

**EDITED BY: Victoria Ann Newsom, Lara Lengel,  
Christian Alexander Vukasovich and Anca Birzescu**  
**PUBLISHED IN: Frontiers in Public Health, Frontiers in Communication and  
Frontiers in Sociology**





# frontiers

## Frontiers eBook Copyright Statement

The copyright in the text of individual articles in this eBook is the property of their respective authors or their respective institutions or funders. The copyright in graphics and images within each article may be subject to copyright of other parties. In both cases this is subject to a license granted to Frontiers.

The compilation of articles constituting this eBook is the property of Frontiers.

Each article within this eBook, and the eBook itself, are published under the most recent version of the Creative Commons CC-BY licence.

The version current at the date of publication of this eBook is CC-BY 4.0. If the CC-BY licence is updated, the licence granted by Frontiers is automatically updated to the new version.

When exercising any right under the CC-BY licence, Frontiers must be attributed as the original publisher of the article or eBook, as applicable.

Authors have the responsibility of ensuring that any graphics or other materials which are the property of others may be included in the CC-BY licence, but this should be checked before relying on the CC-BY licence to reproduce those materials. Any copyright notices relating to those materials must be complied with.

Copyright and source acknowledgement notices may not be removed and must be displayed in any copy, derivative work or partial copy which includes the elements in question.

All copyright, and all rights therein, are protected by national and international copyright laws. The above represents a summary only. For further information please read Frontiers' Conditions for Website Use and Copyright Statement, and the applicable CC-BY licence.

ISSN 1664-8714

ISBN 978-2-83250-157-3

DOI 10.3389/978-2-83250-157-3

## About Frontiers

Frontiers is more than just an open-access publisher of scholarly articles: it is a pioneering approach to the world of academia, radically improving the way scholarly research is managed. The grand vision of Frontiers is a world where all people have an equal opportunity to seek, share and generate knowledge. Frontiers provides immediate and permanent online open access to all its publications, but this alone is not enough to realize our grand goals.

## Frontiers Journal Series

The Frontiers Journal Series is a multi-tier and interdisciplinary set of open-access, online journals, promising a paradigm shift from the current review, selection and dissemination processes in academic publishing. All Frontiers journals are driven by researchers for researchers; therefore, they constitute a service to the scholarly community. At the same time, the Frontiers Journal Series operates on a revolutionary invention, the tiered publishing system, initially addressing specific communities of scholars, and gradually climbing up to broader public understanding, thus serving the interests of the lay society, too.

## Dedication to Quality

Each Frontiers article is a landmark of the highest quality, thanks to genuinely collaborative interactions between authors and review editors, who include some of the world's best academicians. Research must be certified by peers before entering a stream of knowledge that may eventually reach the public - and shape society; therefore, Frontiers only applies the most rigorous and unbiased reviews.

Frontiers revolutionizes research publishing by freely delivering the most outstanding research, evaluated with no bias from both the academic and social point of view. By applying the most advanced information technologies, Frontiers is catapulting scholarly publishing into a new generation.

## What are Frontiers Research Topics?

Frontiers Research Topics are very popular trademarks of the Frontiers Journals Series: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area! Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers Editorial Office: [frontiersin.org/about/contact](https://frontiersin.org/about/contact)

# STRATEGIC NARRATIVES IN POLITICAL AND CRISIS COMMUNICATION: RESPONSES TO COVID-19

Topic Editors:

**Victoria Ann Newsom**, Olympic College, United States

**Lara Lengel**, Bowling Green State University, United States

**Christian Alexander Vukasovich**, University of Southern Maine, United States

**Anca Birzescu**, Xi'an International Studies University, China

**Citation:** Newsom, V. A., Lengel, L., Vukasovich, C. A., Birzescu, A., eds. (2022). Strategic Narratives in Political and Crisis Communication: Responses to COVID-19. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-83250-157-3

# Table of Contents

- 06 Editorial: Strategic Narratives in Political and Crisis Communication: Responses to COVID-19**  
Victoria Ann Newsom, Lara Lengel, Anca Birzescu and Christian Vukasovich
- 12 COVID-19 Management in Iran as One of the Most Affected Countries in the World: Advantages and Weaknesses**  
Maryam Rassouli, Hadis Ashrafizadeh, Azam Shirinabadi Farahani and Mohammad Esmaeil Akbari
- 15 Bridging the Gap Between UK Government Strategic Narratives and Public Opinion/Behavior: Lessons From COVID-19**  
Neil Dagnall, Kenneth Graham Drinkwater, Andrew Denovan and R. Stephen Walsh
- 23 Hazard Prevention, Death and Dignity During COVID-19 Pandemic in Italy**  
Silvia Ussai, Benedetta Armocida, Beatrice Formenti, Francesca Palestra, Marzia Calvi and Eduardo Missoni
- 26 A Preventive and Control Strategy for COVID-19 Infection: An Experience From a Third-Tier Chinese City**  
Shushan Fan, Min Wu, Shengjun Ma and Shouguo Zhao
- 32 Are Lockdown Measures Effective Against COVID-19?**  
Samer Kharroubi and Fatima Saleh
- 36 Public Health and Risk Communication During COVID-19—Enhancing Psychological Needs to Promote Sustainable Behavior Change**  
Talya Porat, Rune Nystrup, Rafael A. Calvo, Priya Paudyal and Elizabeth Ford
- 51 Youth Networks' Advances Toward the Sustainable Development Goals During the COVID-19 Pandemic**  
Kevin Barber and Mohammed A. Mostajo-Radji
- 56 The Necessity of Stool Examination in Asymptomatic Carriers as a Strategic Measure to Control Further Spread of SARS-CoV-2**  
Hamed Mirjalali, Ehsan Nazemalhosseini-Mojarad, Abbas Yadegar, Seyed Reza Mohebbi, Kaveh Baghaei, Shabnam Shahrokh, Hamid Asadzadeh Aghdai and Mohammad Reza Zali
- 60 COVID-19: Scientific Arguments, Denialism, Eugenics, and the Construction of the Antisocial Distancing Discourse in Brazil**  
Claudia Malinverni and Jacqueline Isaac Machado Brigagão
- 74 Coping With Stress and Burnout Associated With Telecommunication and Online Learning**  
Nour Mheidly, Mohamad Y. Fares and Jawad Fares
- 81 Disinformation and Conspiracy Theories in the Age of COVID-19**  
Pedro Silveira Pereira, Antonio da Silva Silveira and Antonio Pereira
- 86 Covid-19 as a Social Crisis and Justice Challenge for Cities**  
Annegret Haase
- 93 Communicating About COVID-19 in Four European Countries: Similarities and Differences in National Discourses in Germany, Italy, Spain, and Sweden**  
Annelie Sjölander-Lindqvist, Simon Larsson, Nadia Fava, Nanna Gillberg, Claudio Marcianò and Serena Cinque



- 107 ***Some at Risk for COVID-19 Are Reluctant to Take Precautions, but Others Are Not: A Case From Rural in Southern Iran***  
Masoud Yazdanpanah, Bijan Abadi, Nadejda Komendantova,  
Tahereh Zobeidi and Stefan Sieber
- 114 ***Steering the Private Sector in COVID-19 Diagnostic Test Kit Development in South Korea***  
Sora Lee
- 119 ***COVID-19 Infection Process in Italy and Spain: Are Data Talking? Evidence From ARMA and Vector Autoregression Models***  
Paloma Monllor, Zhenyu Su, Laura Gabrielli and Paloma Taltavull de La Paz
- 128 ***Improving Public Access to COVID-19 Pandemic Data in Indonesia for Better Public Health Response***  
Pande Putu Januraga and Ngakan Putu Anom Harjana
- 132 ***Longitudinal Evidence of How Media Audiences Differ in Public Health Perceptions and Behaviors During a Global Pandemic***  
Thomas Frissen, David De Coninck, Koenraad Matthys and Leen d'Haenens
- 142 ***Public Health Responses to COVID-19: Whose Lives Do We Flatten Along With "The Curve?"***  
Aravind Ganesh, Joao M. Rato, Venu M. Chennupati, Amanda Rojek and Anand Viswanathan
- 146 ***Spies and the Virus: The COVID-19 Pandemic and Intelligence Communication in the United States***  
Ana Maria Lankford, Derrick Storzieri and Joseph Fitsanakis
- 157 ***The Online Education Mode and Reopening Plans for Chinese Schools During the COVID-19 Pandemic: A Mini Review***  
Xuanzhen Cen, Dong Sun, Ming Rong, Gusztáv Fekete, Julien S. Baker, Yang Song and Yaodong Gu
- 164 ***Actual Politics on Physical Activity Challenged by Crisis. The Italian Case of Reaction to the COVID-19 Pandemic***  
Federico Ranieri
- 168 ***"Wars" on COVID-19 in Slovakia, Russia, and the United States: Securitized Framing and Reframing of Political and Media Communication Around the Pandemic***  
Marta N. Lukacovic
- 182 ***A Resilient Health System in Response to Coronavirus Disease 2019: Experiences of Turkey***  
Bekir Kesinkiliç, Irshad Shaikh, Ahmet Tekin, Pavel Ursu, Adil Mardinoglu and Emine Alp Mese
- 194 ***Study on the Knowledge, Attitude, and Practice (KAP) of Nursing Staff and Influencing Factors on COVID-19***  
Xin Wen, Fan Wang, Xiuyang Li and Hua Gu
- 200 ***War Metaphors in Political Communication on Covid-19***  
Eunice Castro Seixas
- 211 ***Prospects of COVID-19 Vaccination in Romania: Challenges and Potential Solutions***  
Stefan Dascalu, Oana Geambasu, Ovidiu Covaciu,  
Razvan Mircea Chereches, Gabriel Diaconu, Gindrovel Gheorghe Dumitra,  
Valeriu Gheorghita and Emilian Damian Popovici

- 216 *Presenting or Spinning Facts? Deconstructing the U.S. Centers for Disease Control Statement on the Importance of Reopening Schools Under COVID-19***  
Habib Benzian, Marilyn Johnston, Nicole Stauf and Richard Niederman
- 222 *To What Extent Have Conspiracy Theories Undermined COVID-19: Strategic Narratives?***  
Kenneth Graham Drinkwater, Neil Dagnall, Andrew Denovan and R. Stephen Walsh
- 227 *SWOT Analysis and Preliminary Study on Prevention and Control Management of Temporary Integrated Isolation Ward During COVID-19 Outbreak***  
Ye Zhou, Lixiang Bai, Hao Guo, Shaowei Guo, Xiaowen Han, Ning J. Yue and Qingxia Li
- 234 *The Traffic Light Approach: Indicators and Algorithms to Identify Covid-19 Epidemic Risk Across Italian Regions***  
Luca Paroni, Clelia D'Apice, Silvia Ussai, Benedetta Armocida, Beatrice Formenti, Lorenzo De Min and Eduardo Missoni
- 240 *Organizational Level Responses to the COVID-19 Outbreak: Challenges, Strategies and Framework for Academic Institutions***  
Jagannath Biswakarma, Danielle Rushworth, Gitika Srivastava, Gagandeep Singh, Kyounglim Kang, Subhasish Das, Surendra Babu Anantharaman, Meret Aeppli, Andrea L. Popp and Deep Jyoti Bhuyan
- 248 *Theory(ies) of Culture and Compassion: Indian Writers Call out Local and Global Politics Under the Pall of Covid-19***  
Priya Kapoor
- 256 *Reaching at-Risk Student Populations During a Pandemic: The Impacts of Covid-19 on Prison Education***  
Desiree Ann Montenegro
- 263 *The <Three Cs> of Japan's Pandemic Response as an Ideograph***  
Sasha Allgayer and Emi Kanemoto
- 274 *A Multi-Criteria Framework for Pandemic Response Measures***  
Love Ekenberg, Adriana Mihai, Tobias Fasth, Nadejda Komendantova and Mats Danielson
- 291 *Research on International Cooperative Governance of the COVID-19***  
Xueyu Lin, Hualei Yang, Yuanyang Wu, Xiaodong Zheng, Lin Xie, Zheng Shen and Sen Hu
- 301 *"Salus Populi Suprema Lex": Considerations on the Initial Response of the United Kingdom to the SARS-CoV-2 Pandemic***  
Evaldo Favi, Francesca Leonardis, Tommaso Maria Manzia, Roberta Angelico, Yousof Alalawi, Carlo Alfieri and Roberto Cacciola
- 308 *Accuracy and Timeliness of Knowledge Dissemination on COVID-19 Among People in Rural and Remote Regions of China at the Early Stage of Outbreak***  
Wen Zhou, Leshui He, Xuanhua Nie, Taoketaohu Wuri, Jinhai Piao, Dunshan Chen, Hui Gao, Jianmin Liu, Kyedrub Tubden, Ming He and Jun He



## OPEN ACCESS

EDITED AND REVIEWED BY  
Tobias Eberwein,  
Austrian Academy of Sciences  
(OeAW), Austria

\*CORRESPONDENCE  
Victoria Ann Newsom  
vnewsom@olympic.edu

SPECIALTY SECTION  
This article was submitted to  
Media Governance and the Public  
Sphere,  
a section of the journal  
Frontiers in Communication

RECEIVED 22 July 2022  
ACCEPTED 05 August 2022  
PUBLISHED 24 August 2022

CITATION  
Newsom VA, Lengel L, Birzescu A and  
Vukasovich C (2022) Editorial: Strategic  
narratives in political and crisis  
communication: Responses to  
COVID-19.  
*Front. Commun.* 7:1000359.  
doi: 10.3389/fcomm.2022.1000359

COPYRIGHT  
© 2022 Newsom, Lengel, Birzescu and  
Vukasovich. This is an open-access  
article distributed under the terms of  
the [Creative Commons Attribution  
License \(CC BY\)](#). The use, distribution  
or reproduction in other forums is  
permitted, provided the original  
author(s) and the copyright owner(s)  
are credited and that the original  
publication in this journal is cited, in  
accordance with accepted academic  
practice. No use, distribution or  
reproduction is permitted which does  
not comply with these terms.

# Editorial: Strategic narratives in political and crisis communication: Responses to COVID-19

Victoria Ann Newsom<sup>1\*</sup>, Lara Lengel<sup>2</sup>, Anca Birzescu<sup>3</sup> and Christian Vukasovich<sup>4</sup>

<sup>1</sup>Communication Studies and Affiliate Faculty in Social Justice and Diversity, Olympic College, Bremerton, WA, United States, <sup>2</sup>School of Media and Communication, Bowling Green State University, Bowling Green, OH, United States, <sup>3</sup>Communication Studies, Xi'an International Studies University, Xi'an, China, <sup>4</sup>Communication and Media Studies Department, University of Southern Maine, Portland, ME, United States

## KEYWORDS

agenda setting, COVID-19, health inequities, misinformation and disinformation, pandemic response, polarization, political and government communication, public health literacy

## Editorial on the Research Topic

[Strategic narratives in political and crisis communication: Responses to COVID-19](#)

## Introduction

The COVID-19 pandemic has been a global health emergency of unprecedented proportions, generating need for clearly articulated, continuously updated, widely available information. Much communication about the pandemic, however, has proven to be problematic, unevenly disseminated and, due to political and economic concerns, often inaccurate. Many strategic political narratives have been at odds with messaging recommended by the World Health Organization (WHO) and other leading public health authorities, creating a conflict of interest with direct impacts on public message consumption and public health literacy. Thus, effective health communication strategies are critical, particularly at the various times when the virus spread was reaching its peak. Increased implementation of effective health communication strategies by media, and public health, governmental, and other organizations is vital.

The substantial, global, and ongoing loss of life has required a need for political response and action through clear, detailed messaging to global constituencies. Employment, economic stability, supply-chain sustainability, and systemic biases and oppressions have joined public health as core messaging aspects of the pandemic era. The rhetoric surrounding the pandemic and its multiple variables has thus been unevenly produced, disseminated, and consumed.

Political and economic concerns have impacted the messaging goals of global authorities. Political messaging and rhetoric have been influenced by existing strategic narratives promoted by national, state, and provincial government leaders, political agencies, and influential interest groups. In many cases, these narratives are in direct opposition with those of the scientific community, leading to ongoing tensions that not only impact on public messaging, but the acceptance or rejection of scientific and medical expertise.

Prior to the pandemic era there existed a lack of interdisciplinary research and focus on the communication practices influencing the construction and maintenance of these strategic narratives, and a paucity of research on the impact of global crises on existing narratives and strategic constructs. Our special topic provides a core set of analyses to fill this gap. Further, the authors explore the interaction between political and economic narratives and narratives rooted in health communication policies and procedures, and on conflicting measures and rhetorics used from within different political and ideological epistemologies.

*“Strategic narratives in political and crisis communication: Responses to COVID-19”* is a ground-breaking collection that we conceptualized in February 2020, and for which we began soliciting materials on March 15, 2020, during the very first week of the pandemic. At the time there were only a handful of publications from the epidemiological, clinical, and virological fields about the emerging massive health crisis and, of course, none analyzing the economic, political and cultural crises to follow after the first weeks of the pandemic.

Building on [Burke's \(1969\)](#) concept of narrative structure, [Roselle et al. \(2014\)](#) describe strategic narratives as a means of illustrating how actors, setting, conflict, and resolution are used to appeal to international, national, and issues-focused constituencies in each of these levels. Strategic narratives are stories crafted to generate specific audience reaction ([Archetti, 2017](#)). These narratives focus on particular audiences and audience characteristics and are structured based on the notion that stories are more persuasive than arguments ([Fisher, 1984](#)). [Roselle et al. \(2014\)](#) identify three levels of strategic narratives that function as soft power: International System Narratives, National Narratives, and Issue Narratives. International system narratives “describe how the world is structured, who the players are, and how it works” (p. 76) on an international level. National or agency-based narratives are designed to tell the story of a nation or state agency, highlighting values and goals viewed as intrinsic to a nationalistic/centric worldview. Such narratives are generated both by the nation or agency in question, and by other nations and agencies promoting oppositional ideals.

Issue narratives are designed to promote policies and illustrate how those policies should be implemented. [Roselle et al. \(2014\)](#) explain:

An issue narrative of a specific conflict can be connected to a national narrative that characterizes a certain nation involved as traditionally intransigent or cooperative. Alternatively, it could be connected to a system narrative concerning broad power struggles and rivalry between great powers, regions or alliances. In this way, expectations of likely behavior and outcomes can be generated, expectations that may feed into decision-making and the expression of support for certain courses of action. (p. 79–80)

Issues narratives often function at the inter-agency level, particularly in relation to global messaging efforts. They also interact with international system narratives and national narratives. Issue narratives are also used by activists and propagandists to promote ideological objectives both within and counter to national and international narratives ([Jenkins, 2015](#)).

Pandemic narratives function at all three levels: they are international system narratives that are reified at the national and issue levels. They are designed to build audience support for and adherence to the recommended mitigation measures designed by public health authorities. Contributing authors [Dagnall et al.](#) argue that ideal “strong, coherent official strategic health narratives should provide pertinent advice, clear rules, and convey correct vital information” (para. 7). However, for these messages to be effective, they must also be consumed. This is a challenge when competing narratives are present. [Dagnall et al.](#) explain, “it is crucial that those delivering and those receiving the message come together under the umbrella of shared group membership” (para. 8) and that “for our public leaders to be trusted and effective” (para. 8) the message must be perceived as coming from an authority that audiences perceive as belonging to their culture, perspective, and shared narrative history.

Our aim was, and continues to be, to build a community of esteemed researchers, analysts, peer reviewers, and readers to engage in an ongoing dialogue on the most profound phenomenon the contemporary world has seen and continues to experience. In particular, we seek to encourage exploration and critique of the communicative, sociological, and public health concerns at the center of pandemic mitigation efforts and outreach. Our aim is also to continue this dialogue as new developments emerge in the pandemic and to envision new ideas and research directions in the near and distant future.

Contributing authors to *Strategic Narratives in Political and Crisis Communication* come from Australia, Austria, Belgium, Brazil, Canada, China, Germany, Hungary, India, Indonesia, Iran, Italy, Japan, Lebanon, Netherlands, Norway, Portugal, Romania, Saudi Arabia, South Korea, Spain, Sweden, Switzerland, Turkey, the United States, and the United Kingdom. These internationally recognized researchers are affiliated with some of the most prestigious institutions in the world including, but not limited to, the

World Health Organization, the Feinberg School of Medicine at Northwestern University, the Directorate General for Food and Health of the European Commission in Brussels, Massachusetts Institute of Technology (MIT), the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, the Department of Public Health Analysis and Data Management of the Public Health Agency of Sweden, Imperial College London, University of Cambridge, Stanford University, and Harvard Medical School.

In addition, the special topic is a robust and unique collection of research articles, policy briefs, mini review articles, community case studies, opinion articles, and perspective articles. In line with the values espoused by Frontiers.org, our collection thus encourages intersectional and interdisciplinary collaboration and innovation. Additionally, this collection of diverse works illustrates a need for intellectual collaboration at the intersections of multiple academic and practical research programs in relation to public health communication. The interdisciplinary approaches included in this collection offer what contributing researcher (Marta Lukacovic), in her study, “Wars” on COVID-19 in Slovakia, Russia, and the United States: Securitized Framing and Reframing of Political and Media Communication Around the Pandemic, identifies as “comprehensive tools” to aid in understanding the COVID-19 pandemic as “a complex maze of phenomena” (para. 2). Such interdisciplinarity is required to interrogate one of the complex constellations of problems in contemporary history.

Further, *Strategic Narratives in Political and Crisis Communication* highlights an emerging discipline-based and interdisciplinary intersectionality necessary to analyzing and constructing effective messaging responsive to developing and ongoing systemic inequities, political polarizations, religious, ideological, and philosophical barriers, and fiscal disruptors. It is imperative that voices from within and across our multiple disciplinary and region-based spans are collectively shared, addressed, and interconnected in order to establish effective messaging strategies. This interconnectivity is also key to establishing and improving strategically-placed advocacy narratives within larger global messaging frameworks.

Our result is one of the most interdisciplinary collections of studies regarding the COVID-19 pandemic and related crises. The range of interdisciplinary areas of expertise emerge from public health to political science to economics to ethnic studies. Researchers in this collection investigate political influence in relation to pandemic messaging, analyses of messaging techniques, and how different behavioral patterns, as well as access and freedom to engage in such behavioral patterns have influenced pandemic exposure and transmission rates. Other researchers in the collection critique surveillance systems, securitization, policy making, institutional actions, organizational level responses to the public health crisis, health systems reforms, epidemiologic risk assessments, and the efficacy of lockdown measures against the spread of the disease.

The collection also includes studies, opinions, and warnings regarding the pluralities of health concerns exacerbated by the pandemic, conflicts between public health standards and social justice efforts, impacts on the medical community, and the problems of misinformation and polarization in audience response.

The articles in “Strategic narratives in political and crisis communication: Responses to COVID-19” are grouped into three categories; (1) Public Health Policy as Strategic Narrative, (2) War Metaphors: Crisis Risk and Security, and (3) Compassion for Lived Experience in the Face of Polarizations and Structural Inequities.

## Public health policy as strategic narrative

Given the vast attention to and interest in the pandemic and the need for thorough analysis of the risk perceptions and communication about SARS-CoV-2, this collection of work analyses the political and politicized discourses surrounding COVID-19. The misperceptions of risk have, in some cases, led to increased fatalities and pathogenic exposure. The choices made by heads of state and other political leaders, public health agencies, media pundits and others are rooted in existing strategic narratives, i.e., in a type of metanarrative aimed at driving public opinion and garnering support for political institutions, actions, policy, and specialized political interests.

Articles in this collection address key foci surrounding the COVID-19 pandemic and associated crises. For instance, Favi et al., considers the governmental responses to COVID-19, particularly how these responses have been criticized by healthcare professionals, media organizations, and broader publics, as well as how they have been addressed acrimoniously in political debate. The authors argue “messaging variables and constituent response, lack of transparency on scientific advice and political choices associated with misinformation regarding the magnitude of the pandemic and the actual resources of the national healthcare provider, deserve scientific attention” (para. 20). Further, Favi et al. note, “the way the pandemic-related messaging is conceptualized, packaged, and presented to the citizens, and the actual possibility of the people to understand and cope with scientific and technical information” (para. 24).

A number of articles and discussions in this collection focus on the need to fully understand the pandemic in order to, for instance, implement effective public health policies and protocols for the effectivity of lockdown procedures (Kharroubi and Saleh), establish more comprehensive management measures of pandemic infectious disease control and patient care (Zhou Y. et al.), develop innovative disease screening strategies (Mirjalali et al.), and address the mitigation of healthcare system collapse (Monllor et al.). Authors also analyze the culture-bound, ideological



construction of political discourse surrounding pandemic response (Allgayer and Kanemoto). These contributions to our collection all reflect how such diverse aspects of pandemic knowledge impact the construction of international systems, national, and issue-based strategic narratives.

Media discourses and information dissemination are also the focus of several studies in this collection. For instance, Frissen et al. interrogate how media audiences differ in public health perceptions and behaviors, and how media shape “socio-economic and socio-psychological perceptions toward the health crisis” (para. 27). Rassouli et al. analyze information transparency and political-economic and cultural aspects of the pandemic. Zhou W. et al. critique the accuracy and timeliness of knowledge dissemination about disease spread, and the lack of knowledge dissemination to marginalized groups.

Studies also focus on the generation of institutional responses to the pandemic. For instance, Biswakarma et al. analyze organizational level responses to COVID-19. Lee investigates national and international knowledge transmission and public-private sector collaboration to generate effective infectious disease responses.

Finally, Barber and Mostajo-Radji explore “the power of non-traditional forms of public health intervention” (para. 10). Ussai et al. address death and dignity during COVID-19 pandemic and the importance of not only safe, but also dignified and culturally sensitive burial procedures of deceased persons with suspected or confirmed COVID-19. Ussai et al. argue, “the dignity of the dead, their cultural and religious traditions, and their families should be always respected and protected. Among all the threats, COVID-19...revealed the fragility of human beings under enforced isolation and, for the first time, the painful deprivation of families to accompany their loved ones to the last farewell” (para. 21). These personal narratives become absorbed into issue-based strategic narratives and become elements that simultaneously reinforce and contrast with national and international systems narratives.

## War metaphors: Crisis, risk, security

Strategic narratives drive political messaging and propaganda, both by state agencies and by ideological actors. Such narratives are often applied in the context of war and security threats to legitimize military or paramilitary action; in the pandemic era this has expanded into threats about both the virus itself, and virus response measures. Discussions of the impact of COVID-19 have included references to government action that bear the characteristics of war-time discourse and rabble-rousing. In many cases, politicians have also laid claim to wartime labels in order to justify their policy directives. These claims echo historical patterns associated with national and global crises, ranging from pandemics to economic collapse.

Many of the discussions of COVID-19 public health management center around risk assessment strategies, from

institutional responses to the perceived risk of the pandemic, to local, regional, and national risk management strategies. Biosurveillance, or the mechanisms by which state agencies monitor and counter biological threats, is understood within the public health community as a necessary tool to provide early warnings, “monitoring and evaluation of the impact of an intervention” (World Health Organization, n.d., para. 4) and provide agenda-setting guidance. A number of the studies, perspectives, and opinion pieces in our collection center on how biosurveillance has been balanced with other political and public health priorities throughout the crisis.

Notably, the use of “War Metaphors” and military rhetorics is a common practice in dealing with biological and other security threats. Seixas, for instance, investigates how these rhetorical constructs functioned within early pandemic response measures. In another of the articles in our collection, Lukacovic argues, “COVID-19 exemplifies a far reaching and multidimensional type of global emergency, where communication plays an important role. The spectrum of communication-related concerns ranges from a type of deliberate strategic messaging by governmental authorities to an ‘infodemic’ of misinformation that spreads online” (para. 1). In another study, Lankford et al. investigate how the collection of pandemic intelligence exists as a form of “biodefense” strategies implemented by intelligence agencies and can be impacted by political gamesmanship.

Several researchers in our collection highlight how biodefense strategies are then adapted into disease control policies and processes. Fan et al. and Paroni et al., for example, outline how national health agencies sought to collect risk management data and apply that to controlling the spread of the pandemic in China and Italy, respectively. Researchers also investigate how state and public health agencies sought to balance the immediate biosurveillance recommendations about the biological threat of the pandemic with other health and political risks. Ranieri and Porat et al. each investigate how public health agencies sought to balance physical and mental health factors, respectively, with lockdown and other recommended pandemic response measures. Similarly, Cen et al. and Benzion et al. investigate risk management decision-making related to reopening schools in China and the US, respectively. All of these works focus on how risk-management decisions must maintain a balance between political necessity and public health within strategic narrative construction.

## Compassion for lived experience in the face of polarisations and structural inequities

Building on the notion of biosurveillance discussed in the last section, a number of the offerings in our collection contrast this public health mechanism with Foucault’s (1976) critiques of biopower. The COVID-19 pandemic laid bare a variety

of global structural and systemic inequities, many of which further highlighted ongoing global social and anti-hegemonic movements. The relationship between biopower, hegemonic agency, and surveillance in relation to pandemic response narratives grounds the analyses presented by a number of our authors.

There is ample evidence that marginalized and vulnerable communities have been negatively impacted by the pandemic and associated economic and other crises (Lengel and Newsom, 2022). Building on emerging research and reports from policy making bodies and healthcare organizations, this collection gives further evidence that the pandemic has exacerbated existing inequities and vulnerabilities. For example, in her article, “Covid-19 as a Social Crisis and Justice Challenge for Cities,” Haase investigates multiple overlapping debates that impact cities as they seek to prioritize public health measures without disrupting needed social support and economic structures as a “social justice” challenge (para. 18). Similarly, Ganesh et al. ask “whose lives do we threaten along with ‘the curve?’” in their investigation of the impacts of lockdown measures.

The impact of COVID-19 on individuals and their personal experiences is core to several of the pieces in this collection. For example, Wen et al. examine the impact of the pandemic on Nurses, a much needed investigation of affect and first responders. Articles in the collection also address the impact of the stress of COVID-19 on mental health. For instance, Mheidly et al. analyze how telecommunication during the pandemic quarantine and lockdown implementation exacerbated other stressors leading to exhaustion and burnout. Disenfranchised individuals are also investigated, as in Montenegro’s discussion of incarcerated students impacted by the pandemic.

Finally, the works analyze how messages focused on public health issues are impaired by competing global narratives. Pereira et al. investigate Disinformation and Conspiracy Theories in the Age of COVID-19 and how social media became a primary mechanism for the development and spread of counternarratives. Drinkwater et al. examine how conspiracy theories flourished during the pandemic because of a lack of consistent, transparent, messaging across political divides. Malinverni and Brigagao investigate how scientific denialism has influenced the consumption of public health information in Brazil. Similarly, Januraga and Harjana consider how the impacts of misinformation, disinformation, and political and ideological biases could be mitigated by better public access to public health data in India. Significantly, our collective authors argue that such transparency could help improve some of the structural inequities that influenced resistance to public health measures. For example, Dagnall et al. explain how government agencies have “placed a disproportionate weight on the scientific assessments of infection modelers” and have not adequately presented a transparent, digestible argument for public consumption (para. 23).

## The future of strategic narratives in political and crisis communication

The pandemic remains an unprecedented worldwide health emergency; and competing global rhetorics and narratives of the virus complicate and exacerbate response and alleviation. The pandemic is not over, and even as we move toward an eventual endemic state, we must continually maintain and expand mitigation efforts. Vaccination rates have somewhat stagnated, new and more virulent variants continue to expand the health concerns, and so-called long COVID poses ongoing challenges. As we continue to address the unrelenting impacts of the pandemic, we must investigate the intersections of culture and public health, such as preservation of dignity for those who were claimed by the pandemic (Ussai et al.), the mobilizing power of strategic narratives about COVID-19 (Eckenberg et al.) and the further marginalization of ethnic minorities and other disempowered groups through information gaps about COVID-19 (Zhou W. et al.). We must also continue to determine how and what strategic narratives can help to improve the reception of mitigation efforts, and how those can best be designed to address the structural inequities that underpin much of the resistance efforts.

We must also consider the intersectional and multiplicities of the pandemic as the struggle is compounded by the war in Ukraine and violent conflict around the globe, ongoing supply-chain issues, economic instabilities, and political upheaval that all present competing strategic narratives. Pandemic messaging is activism that must be embodied, and thereby reactive to embodied realities (Lengel and Newsom, 2022). Thus, as our authors recommend, and as others engaging in the collective academic research process describe, we must seek to construct clear, direct strategic public health messages that meet two ideals: (1) They must reflect the lived experiences of the full range of audiences being addressed (see Bodenheimer and Leidenberger, 2020; Davis and Lohm, 2020; Ogden, 2020; Chang, 2021; Dagnall et al.; Hagström and Gustafsson, 2021), and (2) they must decolonise and dismantle the hegemonic cores of the language within which messages are constructed and the processes by which those messages are disseminated (see Kuhn et al., 2020; Elers et al., 2021; Kapoor; Carter Olson et al., 2022). In both of these ideals, we must ensure that strategic pandemic messaging centers in compassion.

This collection serves as a form of information activism intended to meet these calls. It is designed to enhance clarity of messaging and make the information open and free to all. While our audience is, by nature, predominantly academic, we are the voices that can serve our multiple publics by disseminating the knowledge produced within this important interdisciplinary collection of studies on this tremendously important subject area of the COVID-19 pandemic and related crises.

## Author contributions

VN, LL, AB, and CV jointly drafted and approved the final manuscript. All authors contributed to the article and approved the submitted version.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships

that could be construed as a potential conflict of interest.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

- Archetti, C. (2017). "Narrative wars: understanding terrorism in the era of global interconnectedness," in *Forging the World: Strategic Narratives and International Relations*, eds A. Miskimmon, B. O'Loughlin, and L. Roselle (Ann Arbor, MI: University of Michigan Press), 218–245.
- Bodenheimer, M., and Leidenberger, J. (2020). COVID-19 as a window of opportunity for sustainability transitions? Narratives and communication strategies beyond the pandemic. *Sustain. Sci. Pract. Policy* 16, 61–66. doi: 10.1080/15487733.2020.1766318
- Burke, K. (1969). *A Grammar of Motives*. Berkeley, CA: University of California Press.
- Carter Olson, C. S., LaPoe, B., LaPoe, V., Azocar, C. L., and Hazarika, B. (2022). "Mothers are medicine": US indigenous media emphasizing indigenous women's roles in COVID-19 coverage. *J. Commun. Inquiry* 46, 289–310. doi: 10.1177/01968599221083239
- Chang, Y.-Y. (2021). The post-pandemic world: between constitutionalized and authoritarian orders—China's narrative-power play in the pandemic era. *J. Chin. Polit. Sci.* 26, 27–65. doi: 10.1007/s11366-020-09695-3
- Davis, M., and Lohm, D. (2020). *Pandemics, Publics, and Narrative*. New York, NY: Oxford University Press.
- Elers, C., Jayan, P., Elers, P., and Dutta, M. J. (2021). Negotiating health amidst COVID-19 lockdown in low-income communities in Aotearoa New Zealand. *Health Commun.* 36, 109–115. doi: 10.1080/10410236.2020.1848082
- Fisher, W. R. (1984). Narration as a human communication paradigm: the case of public moral argument. *Commun. Monogr.* 51, 1–22.
- Foucault, M. (1976). *Histoire de la sexualité (Tome 1)—La volonté de savoir*. Paris: Éditions Gallimard.
- Hagström, L., and Gustafsson, K. (2021). The limitations of strategic narratives: the Sino-American struggle over the meaning of COVID-19. *Contemp. Secur. Policy* 42, 415–449. doi: 10.1080/13523260.2021.1984725
- Jenkins, K. (2015). Unearthing women's anti-mining activism in the Andes: Pachamama and the "mad old women. *Antipode* 47, 442–460. doi: 10.1111/anti.12126
- Kuhn, N., Sarkar, S., White, L. A., Hoy, J., McCray, C., and Lefthand-Begay, C. (2020). Decolonizing risk communication: indigenous responses to COVID-19 using social media. *J. Indig. Soc. Dev.* 9, 193–213. Available online at: <https://journalhosting.ucalgary.ca/index.php/jisd/article/view/70919>
- Lengel, L., and Newsom, V. A. (2022). "Ouverture: embodied activism," in *Embodied Activisms: Performative Expressions of Political and Social Action*, eds V. A. Newsom and L. Lengel (Lanham, MD: Lexington), xi–xxi.
- Ogden, C. (2020). The role of competing narratives in China and the West's response to Covid-19. *Br. J. Chin. Stud.* 10, 1–5. doi: 10.51661/bjocs.v10i0.121
- Roselle, L., Miskimmon, A., and O'Loughlin, B. (2014). Strategic narrative: a new means to understand soft power. *Media War Conflict* 7, 70–84. doi: 10.1177/1750635213516696
- World Health Organization (n.d.). *Surveillance in Emergencies*. Available online at: <https://www.who.int/emergencies/surveillance> (accessed August 14, 2022).





# COVID-19 Management in Iran as One of the Most Affected Countries in the World: Advantages and Weaknesses

Maryam Rassouli<sup>1</sup>, Hadis Ashrafizadeh<sup>2</sup>, Azam Shirinabadi Farahani<sup>3</sup> and Mohammad Esmaeil Akbari<sup>1\*</sup>

<sup>1</sup> Cancer Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>2</sup> Student Research Committee, Nursing & Midwifery School, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran, <sup>3</sup> Department of Pediatric & Neonatal Intensive Care Nursing, School of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Jacques Oosthuizen,  
Edith Cowan University, Australia  
Marisa Theresa Gilles,  
Western Australian Center for Rural  
Health (WACRH), Australia

### \*Correspondence:

Mohammad Esmaeil Akbari  
profmeakbari@gmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 12 April 2020

**Accepted:** 07 August 2020

**Published:** 15 September 2020

### Citation:

Rassouli M, Ashrafizadeh H,  
Shirinabadi Farahani A and Akbari ME  
(2020) COVID-19 Management in Iran  
as One of the Most Affected Countries  
in the World: Advantages and  
Weaknesses.  
Front. Public Health 8:510.  
doi: 10.3389/fpubh.2020.00510

COVID-19 management is a hot topic due to its extensive spread across the world and the declaration of pandemic status. How a crisis is managed in each country is influenced by several factors, and various strategies are applied in accordance with these factors in order to manage the crisis. Due to the rapid spread and increasing trend of the crisis and the fact that almost more than half of the countries are engaged in this pandemic, it is impossible to apply trial-and-error based strategies. One of the best strategies is to use the experiences of other countries in dealing with COVID-19. This report explores the advantages and weaknesses of the Islamic Republic of Iran in the management of this crisis in regard with political economic and cultural issues, health service coverage, and the transparency of information that can be used as a model for other countries around the world.

**Keywords:** coronavirus, COVID-19, health policy, management report, Islamic Republic of Iran

The Islamic Republic of Iran, as the second country to declare two deaths due to coronavirus, within 50 days after China on February 18, 2020 (1), is still one of the countries to deal with most cases of COVID-19 infection and the subsequent deaths (2). Obviously, managing the disease, which is considered a pandemic according to the World Health Organization (3), requires specific strategies that may vary due to different factors in each country, which may either lead to effectively dealing with the disease or cause challenges.

Considering the fact that using global experience, especially in times of crisis, is one of the best crisis management mechanisms, a review of the strengths and weaknesses of the Islamic Republic of Iran in the COVID-19 management covering the political-economic aspects, Health services coverage, cultural aspect, and the transparency of information can be used as a model by other involved countries, while at the same time benefiting from the strategies of countries with similar experiences.

Health is not only a biological, but also a political, social, cultural, and economic issue. "Health is a political issue" has been a point of consensus for a long time (4). Therefore, the ability of countries to manage COVID-19 is strongly influenced by their political-economic conditions which can be considered both an advantage and a threat. Thus, it can be said that sanctions as a political-economic factor, more than any other factor, have challenged Iran's ability to cope with COVID-19. COVID-19 spreads in Iran at the same time as the most severe sanctions are imposed on Iran. Although over the past four decades various sanctions have always been imposed on Iran, since May 2019, the unilateral US sanctions against Iran have been increased significantly (5). The Iranian health system has been directly and indirectly

impacted by these sanctions, although it is one of the most prominent health systems in the Eastern Mediterranean Region (6). Although it is believed that sanctions are imposed on the physical weapons of war and do not include medicines and medical equipment, due to difficulties in commercial and financial exchanges with most countries, some essential medicines and laboratory equipment especially diagnostic, medical, and protection kits are not sufficiently available. In addition, numerous sanctions in the field of publishing research articles impede the international community's awareness of the consequences of such sanctions.

On the other hand, as an advantage, the influential presence of effective and socially acceptable positions such as the Iranian Supreme Leader as the highest religious authority and commander-in-chief can be named which helped in facing many unbearable challenges rooted in the beliefs, the culture and the religion of Iranian people, by taking measures such as ordering the General Staff of the Armed Forces to assist with the implementation of the regulations made by the Supreme National Security Council, thanking the medical community on many occasions, advising on the implementation and acceptance of the by-laws of Coronavirus Committee, and issuing the closures of sacred shrines and the suspension of Friday prayer (7).

In regard to the second dimension, the health system capacity and service coverage of Iran have a suitable condition with 65 schools/universities of medical sciences integrated with health services as the unique country in the world is responsible for covering the whole people's needs. In Iran, where measures have been taken regarding the Primary Health Care (PHC) since 5 years before the Alma-Ata Declaration (1978) the use of the network system is considered as one of the main mechanisms of coping with COVID-19 in a ratified the health system. However, upon the prevalence of Covid-19 in the country, much potential was ignored, one of which was the capacity of the PHC system with ~21,500 centers in rural areas and ~8,000 health centers in the governmental sector. However, after a while, part of the outpatient management protocol was assigned to this extensive network for home-to-home screening and the information on the health status of all Iranians was registered in a system. Therefore, it is possible to follow up on individuals by having access to the patients' contacts and other information (8).

In addition, not assigning epidemiologists at the right time to determine indicators such as fatality and mortality was among the weaknesses that disturbed predictions for estimating care and diagnostic needs. Although many research centers in the country have begun to develop high-sensitivity and specificity diagnostic kits and these experiments are carried out in 50 laboratories, it is still not possible to perform tests on all potential cases. On the other hand, the dissemination of viruses firstly began in the central regions of the country and then intensively spread to other regions (9). The sudden increase in the number of cases led to a shortage of hospital beds in the referral hospitals initially dedicated to these patients, although there are ~130,000 private and public hospital beds in Iran.

This shortage, which has been a concern of the authorities in all provinces, has led to the establishment of care centers after the early discharge of patients from referral hospitals or outpatient admission prior to hospital admission. Although the

establishment of these centers took place in the middle of March, with the launch of Command Headquarters, it was attempted to refer patients to these centers after the acute period of the disease was passed if they could not be discharged to home, or to become a center for mild patients. An interesting point in the management of these centers is the combination of military staff and volunteer or hospital personnel that may be somewhat different from international standards as these centers should apparently be managed by military forces to prevent hospital personnel from being separated from their workplace.

On the contrary to the above weaknesses, the diagnosis, treatment, and follow-up of symptomatic and infected patients have been free from the very beginning. A variety of therapeutic and diagnostic protocols have been developed in the form of clinical trials. In this regard, Coronavirus Molecular Diagnostic Network and Anti-Coronavirus Scientific Committee consisting of faculty members of the Iranian universities of medical sciences, and specialists, and experts in various fields with the aim of collaborating with the Ministry of Health and Medical Education (MOHME).

The launch of MOHME online patient screening system for screening more than 75 million people so far and controlling the outbreak was among the effective measures taken to reduce referrals to health centers and reduce the risk of infection in healthy people, of which 146,000 were discovered and referred to health centers (10).

As the third dimension, culture has always been considered one of the effective factors on health (11), the importance of which is particularly clear in the COVID-19 pandemic. The Iranian New Year's celebration (March 21th) is thousands of years old symbolizing renewal in all aspects for Iranians. Therefore, all people prepare for Nowruz from the middle of February which is apparent from the high traffic and crowds of people walking in the streets and all parts of cities. On the other hand, the nearly 15-day holiday of Nowruz is a time for Iranians to make many trips. Thus, the concurrency of COVID-19 pandemic with these days, which happened similarly in China, led to possibly the highest rate of interpersonal contact in the community, and the city-to-city spread of the disease by Nowruz travelers. Although there is a lack of cooperation and attention to the health guidelines by some people, the cooperation of many other members of the community is exemplary. The adherence to the slogan "We stay at home" and avoiding social interactions, performing volunteer activities such as the disinfection of public areas, the voluntary presence at patients' bedside, good-doers' helping provide and produce protective equipment such as scrubs and masks, changing factory production lines to manufacture and prepare disinfectants, gloves, etc., landlords' not receiving rental fees, and obeying the Supreme Leader's orders not to visit sacred shrines and sanctuaries are examples of the culture of sacrifice among Iranian (12).

The last point is that the information provided by Iranian authorities is always regarded as the most reliable information unless, for some reason, this transparency is compromised. Despite the daily reports of the number of the infected, recovered cases and deaths by the MOHME, the negative propaganda in foreign media and cyberspace has been able to effectively worsen the community's attitude toward the Iranian management. This

negative wave targets a wide range of issues from the number of deaths reported by the authorities to the news of digging mass graves for the victims and even suggests Iran as the center for spreading the disease through its international airports, even in cities with no airports. Everything considered, while disturbing public opinion, this will lead to distrust toward Iran's effectiveness in dealing with the outbreak in this country (13).

Overall, what has helped Iran control the disease so far can be summarized in several factors: the managerial concept all governance, although delayed, was strongly implemented were religious leaders along with military forces and civil volunteers accompanied the MOHME. On the other hand, the powerful PHC infrastructure and therapeutic, care, and specialized workforce which is appropriately distributed, due to the spread of the universities of medical sciences all across the country, have played important roles in disease management. Despite the actions taken to create an atmosphere of distrust, the honesty of the authorities even in regard to the shortage of resources and equipment is considered an advantage in Iran. And finally, given Iran's specific circumstances, the focus should be put on domestic production, rather than importing equipment, to soon change the country into an exporter of health goods.

In regard with the weaknesses of the system in dealing with the disease, due to the shortage of diagnostic kits at the onset of the disease in the country and its impact on the infected cases and subsequent deaths, some contradictory statistics have been presented which have led to the misinterpretation of the statistics and influenced planning for hospital beds, and hospitalization and patient care facilities. The shortage of data, the epidemiologists' lack of engagement in investigating the disease trend, and presenting different scenarios have also contributed to this matter. The lack of personal protective equipment for the frontline staff and people is also a challenge for the health system that has resulted in the death of a number

of physicians and nurses. Furthermore, the lack of advanced equipment for the care of critically ill patients in intensive care units, as a result of sanctions, is what requires to be managed.

In summary regarding the detection of new cases and rapid responses health authorities did the best by supporting people but tracing the cases were not in an appropriate status, they asked them to stay home by family responsibility, but it did not work in some cases and the infected cases were in touch with the public. We did not use the temporary care centers as a part of the PHC facility, social distancing was supported by other stakeholders not managing by health managers, which may not be promising effective in the future.

Ultimately, it is certain that the COVID-19 pandemic will end as did all previous ones, although it obviously will not be the last. Therefore, the lessons learned from managing it in each country and sharing it with other countries can help prepare the world to deal with future pandemics.

## DATA AVAILABILITY STATEMENT

All datasets presented in this study are included in the article/supplementary material.

## AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

## ACKNOWLEDGMENTS

The authors would like to appreciate the managers of the Shahid Beheshti University of Medical Science for their support.

## REFERENCES

- Zhan C, Tse C, Fu Y, Lai Z, Zhang H. Modeling and prediction of the 2019 coronavirus disease spreading in china incorporating human migration data. *medRxiv*. (2020). doi: 10.1101/2020.02.18.20024570
- Coronavirus Cases. Available online at: <https://www.worldometers.info/coronavirus/country/iran/>
- Prevention UCDCA. *Coronavirus Disease 2019 (Covid-19)*. (2020). Available online at: <https://www.cdc.gov/coronavirus/2019-nCoV/summary.html>
- Verheul E, van de Pas R. Health is a political issue. *Glob Med*. (2010) 27–9. Available online at: [https://www.researchgate.net/publication/280729652\\_Health\\_is\\_a\\_political\\_issue](https://www.researchgate.net/publication/280729652_Health_is_a_political_issue)
- Takian A, Raoofi A, Kazempour S. COVID-19 battle during the toughest sanctions against Iran. *Lancet*. (2020) 395:1035–6. doi: 10.1016/S0140-6736(20)30668-1
- Al Shorbaji N. e-health in the Eastern Mediterranean Region: a decade of challenges and achievements. *East Mediterr Health J*. (2008) 14(Suppl.):S157–73. Available online at: [http://applications.emro.who.int/emhj/14\\_s1/14\\_s1\\_s157.pdf](http://applications.emro.who.int/emhj/14_s1/14_s1_s157.pdf)
- Thanks to the Supreme Leader for the Efforts of Physicians and Nurses in the Fight Against the Corona Virus*. (2020). Available online at: <http://farsi.khamenei.ir/news-content?id=45033>
- Yazdi Feyzabadi V, Emami M, Mehrollhassani MH. Health information system in primary health care: the challenges and barriers from local providers' perspective of an area in Iran. *Int J Prev Med*. (2015) 6:57. doi: 10.4103/2008-7802.160056
- Education MoHaM. *Daily Statistics of Covid-19 in Iran*. (2020). Available online at: <http://webda.behdasht.gov.ir/index.jsp?siteid=1&fkeyid=&siteid=1&pageid=54782&newsview=201112>
- Education MoHaM. *People's Screening System*. (2020). Available online at: <https://salamat.gov.ir/>
- Hernandez M, Gibb JK. Culture, behavior and health. *Evolut Med Public Health*. (2019) (2019) 2020:12–3. doi: 10.1093/emph/eoz036
- University-Industry Cooperation, a Mechanism to Deal With the Corona Virus*. Available online at: <https://www.irna.ir/news/83704872/>
- Tuite A, Bogoch I, Sherbo R, Watts A, Fisman D, Khan K. Estimation of COVID-2019 burden and potential for international dissemination of infection from Iran. *medRxiv*. (2020). doi: 10.1101/2020.02.24.20027375

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Rassouli, Ashrafzadeh, Shirinabadi Farahani and Akbari. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Bridging the Gap Between UK Government Strategic Narratives and Public Opinion/Behavior: Lessons From COVID-19

Neil Dagnall\*, Kenneth Graham Drinkwater, Andrew Denovan and R. Stephen Walsh

Department of Psychology, Manchester Metropolitan University, Manchester, United Kingdom

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Vian Bakir,  
Bangor University, United Kingdom  
Kostas Maronitis,  
Leeds Trinity University,  
United Kingdom  
Hugh Ortega Breton,  
University of Central Lancashire,  
United Kingdom  
Ganiyu Oladega Okunnu,  
Crescent University Abeokuta, Nigeria

### \*Correspondence:

Neil Dagnall  
n.dagnall@mmu.ac.uk

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 02 June 2020

**Accepted:** 07 August 2020

**Published:** 17 September 2020

### Citation:

Dagnall N, Drinkwater KG, Denovan A  
and Walsh RS (2020) Bridging the  
Gap Between UK Government  
Strategic Narratives and Public  
Opinion/Behavior: Lessons From  
COVID-19. *Front. Commun.* 5:71.  
doi: 10.3389/fcomm.2020.00071

In the UK, there exists an important “action gap” between Government advice on measures necessary to counter the threat of COVID-19, and the behavior of a significant minority of the population. There are several reasons for this disconnect, including lack of message potency (i.e., credibility and congruence), inflexible/habitual behavior patterns, prevailing beliefs (i.e., vulnerability to, and seriousness of COVID-19), and individuals valuing personal concerns above general public health. For official messages to be effective and advice adhered to, strong, coherent “strategic narratives” are required. This article, using a psychological perspective, critically examined prevailing COVID-19 UK Government announcements during the lockdown (23/03/2020) and initial easing phase (10/05/2020). Specifically, it focused on important communication inconsistencies, and identified factors that may facilitate and create barriers to the adoption of essential public health directives. This included deliberation of factors that enhanced source impact, diminished the influence of message content, and the negative consequences of contrary information. Accordingly, this article proposes a framework for providing a unifying strategic narrative on COVID-19, one that helps to maximize the impact of key messages and promote effective behavior change. This framework places an emphasis on engaging the full range of actors and considers ways of reducing the efficacy of false information. The article provides recommendations that will potentially improve the reception of government policy and suggests how strategic narratives can harness the drivers of behavioral change needed to meet challenges such as COVID-19.

**Keywords:** strategic narratives, COVID-19, action gap, behavior change, public health

## INTRODUCTION

### Background and Purpose

Adopting a psychological perspective, this article focused on the central role that strategic narratives played in persuading UK citizens to follow public health guidelines during the lockdown (23/03/2020) and initial easing phase (10/05/2020). This includes factors that enhanced source impact, diminished the influence of message content, and the negative consequences of contrary information (e.g., fake news). Accordingly, there is consideration of communication inconsistencies, and variables that facilitated and created barriers to the adoption of essential public health directives.



An emphasis was placed on factors that aligned to those identified by the UK's Behavioural Insights Team (BIT). BIT, established in 2010, combines the principles of psychology, cognitive science, and social science to push or nudge people to make better choices. BIT applies behavioral insights to inform policy making and improve public services. This involves using subtle policy changes to influence the decision-making of citizens. Thus, key points of focus were message quality and consistency, individual perceptions and identities, the role of expert opinion, and misinformation (The Behaviour Insights Team, 2020).

It is important to conceptually evaluate the effectiveness of strategic narratives because messages do not always have their intended outcome (Malecki et al., 2020). For instance in the UK, there exists an important "action gap" between Government advice on measures necessary to counter the threat of COVID-19, and the activities of a significant minority of the population, who despite warnings continue to engage in behaviors that potentially place public health at risk (i.e., attend social gatherings) (UCL, 2020). Illustratively, a snapshot of Ipsos MORI's research related to COVID-19 dated May 26, 2020, indicated that less than half of the sample surveyed (46%) had completely followed Government rules (Ipsos MORI, 2020a).

There are several reasons for this disconnect, such as lack of message potency (i.e., credibility and congruence), habitual behavior patterns, prevailing beliefs (i.e., about vulnerability to, and seriousness of COVID-19), and individuals valuing personal concerns above general public health (see Becker and Maiman, 1975; Webster et al., 2020). Another important factor is lack of "shared identity." Identity is the sense of self that people possess because of the social groups that they believe they "belong to" (Tajfel, 1972). Research has shown that social cohesion is a consequence of shared social identity (Haslam et al., 2011). A frequently cited example is the "Blitz spirit" demonstrated by the British people during World War II. Whether true or a socially persisting myth, the notion that state and society join as one to battle national adversity is an important theme that encourages co-operation and collaboration (Reicher and Stott, 2020).

Key to this process is leadership, which during the COVID-19 outbreak was undermined by a series of controversies (e.g., lockdown introduced too late and failure to provide frontline workers with protective equipment) (Reicher and Stott, 2020). Incidents such as these reduce shared social identity via the creation of "us" and "them" (Haslam et al., 2011). Additionally, structural factors (e.g., employer demands that employees attend work and reliance on public transport to achieve this) in some instances prevented individuals from adhering to Government advice. In such situations, people were aware of the message but unable to comply fully (Webster et al., 2020).

These influences produced varying motivations for ignoring or failing to act upon public health guidelines during lockdown and the initial easing phase. Accordingly, non-adherence to COVID-19 protection advice in some instances was unintentional, arising from lack of awareness or ignorance or constraints, whereas on others occasions it represented deliberate disregard. A pertinent example of identity-based disregard is available from the United States, where many regard COVID-19 related personal protective equipment as a badge

of Democratic party sympathy at best and rabid Marxism at worst (Smith D., 2020, July 4). Moreover, there are individuals who selectively adhere to some guidelines, whilst ignoring or trivializing the importance of other measures. For example, some complied with 2 m social distancing with strangers, but regularly met with family and friends outside their immediate household unit.

Regardless of motivation, an "action gap" is damaging to public health because it reflects the fact that people are continuing to engage in unsafe behaviors, which not only undermine the efficacy of protective public health measures, but also are likely to propagate COVID-19. Alongside direct adverse effects, there are also socially detrimental indirect consequences. Notable factors include, diminished faith in government, and disregard for scientific advice. Collectively, these factors weaken the effectiveness of protection advice and potentially normalize non-compliance.

## Role of Strategic Narratives

To encourage maximum engagement, effective public health communication through strategic narratives is vital. Narratives generally are "a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed" (Kreuter et al., 2007, p. 222). Previous research indicates that narratives are an effective format for delivering persuasive health messages (Bilandzic, 2012). Extending this delineation, strategic narratives focus on "scientific development, strategic dissemination, and critical evaluation of relevant, accurate, accessible, and understandable health information communicated to and from intended audiences to advance the health of the public" (Bernhardt, 2004, p. 2051). Inherent within this definition is the notion that strong, coherent official strategic health narratives should provide pertinent advice, clear rules, and convey correct vital information (Gill and Boylan, 2012). Moreover, concentrating on these features enhances the effectiveness of official messages, and concomitantly encourages adherence to public health rules and recommendations.

Furthermore, for strategic narratives to be effective, it is crucial that those delivering and those receiving the message come together under the umbrella of shared group membership. No one takes advice from "one of them" in the same spirit as we take advice from "one of ours." Hence, for our public leaders to be trusted and effective, they need to be perceived as "one of us" (Haslam et al., 2011).

In this context, strategic narratives can shape the health perceptions, beliefs, and behavior of actors (Flaherty and Roselle, 2018). More generally, strategic narratives are a central component of communication that informs the development of a collective worldview and guides/constrains actions (see Miskimmon et al., 2014; Dagnall et al., 2015). With reference to COVID-19, this should also include broadcasting necessary actions and desired outcomes. The public reaction to UK government health communications concerning COVID-19 has highlighted the important role that strategic narratives play in determining personal and collective reality at times of crisis. The

crisis also reveals that no matter how effective strategic narratives are there exist factors that limit their impact and effectiveness (i.e., individual intrinsic motivations) (Kooistra et al., 2020).

## THE EFFECTIVENESS OF STRATEGIC NARRATIVES

There are myriad variables that influence the effectiveness of strategic narratives. Noting this, the present article placed an emphasis on key conceptual factors pertinent to the UK Government handling of the COVID-19 outbreak during the first half of 2020 (i.e., lockdown and initial easing phase).

### Awareness and Behavior Change

One factor that influenced the success of Government strategic narratives was variations in audience reception and reaction to key information. Public health literature reports, that although, increased awareness, persuasion/influence, and behavior change are overlapping processes, the extent to which they are achievable varies (Kelly and Barker, 2016). In the case of COVID-19, increasing public awareness of the dangers of the coronavirus and persuading people that lockdown was necessary was relatively easily realized. This was achieved using carefully orchestrated media messages by key Government officials and scientific advisors.

Mass media was the best vehicle to initiate social mobilization because of its rapidity and reach (Welch et al., 2016). Key to this discursive process was ensuring alignment between broadcast, digital, internet, print, and outdoor information platforms. To maximize effect, the main elements of the strategic narrative were concisely combined to produce the affectively powerful “Stay Home, Protect the NHS, Save Lives” slogan. This causally linked lockdown adherence to preservation of life and the reciprocal protection and empowerment of health care services (Conservatives.com, 2020b).

The initial Government assumption was that this core narrative, supported by expert opinion and empirical data, would also facilitate behavior change (i.e., adherence to lockdown measures). Though, the message successfully increased awareness of the need to act and persuaded people generally that lockdown was essential to counter the threat of COVID-19, the UK government had to rapidly introduce enforcement measures to ensure that guidelines were followed. This outcome was consistent with previous health research that has demonstrated that knowledge alone is not sufficiently persuasive to produce behavior change (Kelly and Barker, 2016). This disparity arises from the complexity of the health communication-behavior change relationship. Particularly, the fact that elements that increase awareness and message impact (e.g., risk and need for prevention) do not necessarily enable or sustain behavior change (Ross, 1991).

In the case of the COVID-19, the ability to adhere to lockdown in the UK was largely dependent upon internal motivations (i.e., capacity to comply with the rules, and the normative obligation to obey the law) (Kooistra et al., 2020). This finding was based

on data from an online survey, which comprised a nationally representative sample of 555 UK participants.

While, the confluence of factors effecting behavior change varies across health contexts, this example illustrates how external and internal drivers can limit behavior change (see Kwasnicka et al., 2016). Prevailing limiting factors are cognitive skills (critical thinking, decision-making, etc.) and socio-cultural context (personal, cultural, geographic, and economic variables) (Lewis et al., 2010). Associated with these is the extent to which individuals feel that they can influence health conditions (Syme, 2004).

Difficulties initiating and maintaining behavior change during the COVID-19 crisis align with previous research indicating that across health settings there is often a mismatch between information provided and behavior (Michie et al., 2011). This observation concurs with previous public health campaigns, which have found that although strong informational/educational components can influence behavior, they achieve only limited success (Economos et al., 2001).

Subtly influencing people to make better choices using nudges, in the form of actions and policies, has previously proved successful in public health, health policy, and health promotion (Ewert, 2020). Specifically, nudges have facilitated positive health-related behavior and encouraged use of healthcare systems (Vallgård, 2012). Although, there are multiple methods employed in nudging strategies, these generally involve presenting options to the intended audience in such a way that they become obvious, default choices (see Thaler and Sunstein, 2008).

Consistent with a behavioral insights approach, the UK Government during the initial phase of the COVID-19 outbreak used a series of nudges (i.e., encouraged people to wash their hands, advised them to stop face touching and hand shaking, recommended that individuals stayed at home if they felt ill, and advocated self-isolate if a continuous cough developed) to curtail the spread of the virus.

The successfulness of this “nudging” approach is difficult to assess because the situation quickly escalated to lockdown. More generally, the degree to which nudges are successful is questionable (Ledderer et al., 2020). Furthermore, in a recent systematic literature review, Ledderer et al. (2020) concluded that while nudging can effectively produce immediate change, there was little evidence that nudging interventions resulted in lasting behavioral alterations.

### Source Credibility

The success of strategic narratives varies also as a function of communication environment. Hence, factors that negatively impact on information transmission, flow and reception diminish the impact of protection advice (Miskimmon et al., 2014). In the case of the UK Government, early fundamental errors of judgment (i.e., expressed doubt that measures were necessary, the delay in reacting to rapidly worsening situation, and the continued sanctioning of mass gatherings) weakened the authority of subsequent COVID-19 messages (Kooistra et al., 2020). Consistent with this notion, a significant proportion of the British population surveyed on 24–27 April, 66%, thought

that the Government introduced lockdown too late; only 26% believed the measures came at the right time (Ipsos MORI, 2020b).

In combination, these factors undermined the perceived, source credibility of UK Government strategic narratives. The source credibility of the body issuing information, is an important component of effective health campaigns. When a source is highly credible, strategic narratives are more likely to effectively change attitudes and influence behavior (Schmidt et al., 2016). The important role source credibility plays in message acceptance is demonstrated by its inclusion in prominent models of persuasion (e.g., the Elaboration Likelihood Model, Petty and Cacioppo, 1984).

Credibility too relates to group membership. Individuals give more credibility to sources of information with which they are familiar and able to identify (e.g., family and friends) (Nauroth et al., 2017), and are frequently skeptical about the validity of government risk messages (Slovic, 2000). This is especially true, when risk messages conflict with people's personal experiences of their health and well-being (Thirlaway and Heggs, 2005). In the case of COVID-19, this factor is important because many individuals do not have direct personal experience of the virus.

Despite negative perceptions of timing, the credibility of the UK Government response message was enhanced by allying measures to scientific and expert opinion. For example, on March 16, at a press conference accompanied by the Chief Medical and Chief Science Advisors, the Prime Minister stated that anyone with a fever or a persistent cough should self-isolate for 7 days (Hunter, 2020). This was consistent with the prevailing theme that the UK Government would be guided by science and do the "right thing at the right time" (Prime Minister's Office, 2020). This illustrates how governments during the COVID-19 pandemic have attempted to use scientific evidence as a device for reducing uncertainties and ambiguities (see Van Dooren and Noordegraaf, 2020). However, as Van Dooren and Noordegraaf (2020) point out, the evidence provided on COVID-19 has often been manufactured and staged for political reasons. Another issue has been significant disagreements between experts and scientists. Consequently, specialist views on COVID-19 are wide-ranging and vary as a function of field of expertise. This has produced criticisms, notably that the UK Government overlooked public health experts and placed a disproportionate weight on the scientific assessments of infection modelers (Devlin and Boseley, 2020).

Narrative momentum, however, proved difficult to sustain because the rapidly evolving COVID-19 situation made it difficult to specify the nature and duration of subsequent measures. Correspondingly, the resignation of key scientific figures for violating lockdown rules (i.e., prominent government adviser; Hodgson, 2020; and Scotland's Chief Medical Officer, Beattie, 2020) potentially weakened the perceived credibility of scientific guidance. This is consistent with Reicher and Stott (2020), who observed that when significant figures fail to follow collective practices authority is weakened and togetherness undermined.

## Inconsistency and False Information

The initial strategic narrative introduced on March 23 was simple and backed by clear guidelines (Conservatives.com, 2020b). However, these strengths were not inherent features of the shift from the containment to management of COVID-19. Easing the lockdown in England was difficult because the strategic narrative altered on May 10 from the explicit "stay home" to the ill-defined "stay alert" slogan (Conservatives.com, 2020a). This change in emphasis was poorly implemented, and the central message was vague and open to misinterpretation (Smith M., 2020, May 11).

Considering these points in turn, the UK Government seeded the new guidelines prior to official release via selected media. This caused public uncertainty because of the lack of confirmation, and was confusing because of extant rumor, conjecture and misinformation. Indeed, public ratings of the clarity of UK Government communications about what to do in response to the coronavirus dropped from 90% (27–30 March) to 56% (15–18 May) (Ipsos MORI, 2020c). Although, the underlying theme of the new discourse was to subtly indicate the beginning of the transition from lockdown to social normality, the lack of detail caused public ambiguity and generated political and social criticism (BBC, 2020). The knock-on effect of this was citizens reengaging in less than optimal behaviors (e.g., mass excursions to leisure sites) (Mailonline, 2020). Additionally, because the UK Government is only responsible for lockdown restrictions in England, Scotland, and Wales remained on full lockdown.

These different approaches influenced public perceptions of government handling of the crisis. Illustratively, in Scotland over three quarters (78%) of respondents thought the Scottish Government had handled the crisis well so far, compared with 34% who stated the same of the UK Government (Ipsos MORI, 2020d). Group membership is perhaps salient here where the population of Scotland might be looking at the contrast between "themselves" and the "others" in England/Wales. These issues obfuscated the importance of the new strategic narrative. Specifically, that although the English government was empowering individuals to enjoy greater autonomy as a step to returning to a new normal, important restrictions remained in place (i.e., social distancing and no public gatherings).

Contradictory information is particularly problematic to Government strategic narratives because it weakens the credibility and coherence of official communications. In the case of COVID-19, a recent survey found that 46% of respondents had encountered false or misleading information since the lockdown (Lally and Christie, 2020). In the present health crisis, the internet generally and social media particularly has amplified the speed, spread and reach of false information (Cuan-Baltazar et al., 2020). So prolific is the volume of inaccurate information about the COVID-19 outbreak that some authors have named it the global infodemic (Zarocostas, 2020). This denotes that information overload makes finding a solution more difficult (World Health Organization, 2018). Moreover, once processed contradictory information can prove difficult to reject. Indeed, strategies to correct misinformation are often ineffective and can inadvertently reinforce ill-founded health-related beliefs (Lewandowsky et al., 2012).

In the context of COVID-19, the flurry of information has also negatively affected understanding of the origins, nature and treatment of the virus, and caused social unrest (cf., the unfounded notion that 5G is linked to COVID-19) (Brainard and Hunter, 2020). This is important because false information distracts public attention away from official strategic narratives and potentially undermines safety advice and practice.

## Reactance

When strategic narratives, as in the case of COVID-19, contain themes and messages that threaten personal freedoms, particularly behavioral actions (e.g., activities) and emotions/attitudes (e.g., sense of autonomy), they can arouse a motivation to resist advocacy (Quick and Stephenson, 2008). This process is explained by Psychological Reactance Theory (Brehm, 1966). Reactance arises from a combination of anger and negative cognitions. It represents the individual motivation to restore threatened or lost freedom (Brehm and Brehm, 1981). Characterized as an individual difference variable, high reactance is typified by desire for autonomy, resistance to rules and regulations, low concern for social norms, and defensiveness (Seibel and Dowd, 2001).

This manifests as expressing negative thoughts, counterarguing, feeling anger, derogating message source, and perceiving the narrative to be weak or not credible (Gollust and Cappella, 2014). Accordingly, reactance prone individuals are more likely to engage in risky health behaviors (Reynolds-Tylus, 2019). This is particularly relevant to the UK Government COVID-19 lockdown guidelines, which instructed people to avoid partaking in normal, routine behaviors. This notion is supported by Sibony (2020), who identified reactance as a potential reason for failure to comply with lockdown.

## DISCUSSION

Identifying factors that influence the effectiveness of earlier COVID-19 strategic narratives, will help to improve subsequent health messages. This is important not only in the context of the present crisis, but also with regards to future public health initiatives. Previous public health campaigns have failed because they have not accounted for the complex relationship between communication and behavior change (Kelly and Barker, 2016). Thus, it is vital that future strategic narratives draw on health behavior theory (Perrier and Martin Ginis, 2018). This generally indicates that knowledge is an essential element of behavior change. Explicitly, the Health Belief Model usefully delineates variables that facilitate engagement with preventative action (Orji et al., 2012). These comprise whether the threat to health is viewed as serious, awareness of vulnerability, if the supposed benefits outweigh the costs, and individual concerns about the consequences of contracting the disease (Fisher and Fisher, 1992).

Collectively, these factors suggest strategic narratives that address explicit individual perceptions about susceptibility, benefits/costs, and self-efficacy will be most effective (Bushell et al., 2017). In the context of COVID-19, perceptions of the threat and evaluation of the effectiveness of counter behaviors

are key factors that increase the likelihood of engagement with health-related action.

Strategic narratives need also to consider the vital role of leadership. Effective leadership is important because it cultivates a sense of “we-ness,” which in turn facilitates buy-in to collective aims and objectives (Haslam et al., 2011). Thus, “we-ness” can act as a health-related resource to motivate and sustain positive behavior change (Haslam et al., 2018). Accordingly, effective leadership during the COVID-19 crisis could encourage the same selfless behavior witnessed previously in times of social adversity (e.g., wars).

In order to achieve and sustain behavior change, strategic health narratives need to ensure that guidelines correspond closely with desired actions. This fact is often overlooked because health campaigns focus on the provision of information, which can often confuse the audience. Although data can enhance health understanding and literacy, narrative content does not directly influence behavior, and on occasion can interfere with desired behavior change.

Thus, while information plays a vital role with regards to increasing awareness and in shaping norms, data alone does not facilitate behavior change. This is only achievable through triangulation of accompanying policy, regulation, and environmental modifications (i.e., 2 m distancing).

To avoid resistance in the form of reactance, ensuing strategic health narratives need to obscure persuasive intent (Moyer-Gusé, 2008) and balance advocacy with the individual need for autonomy (Rains, 2013). Previously, this strategy has increased positive attitudes toward both the message and the advocated health behaviors (Gardner and Leshner, 2016). Other important features that diminish the possibility of negative reactions to COVID-19 messages are minimizing freedom-threatening language, discourse coherency, and demonstrating appreciation of the effect of the message on the audience. Additionally, the behavior of politicians and public figures is likely to affect levels of reactance (Sibony, 2020). As Sibony (2020) points out, media coverage of Prime Minister Boris Johnson publicly shaking hands, attending meetings and conducting visits, during the COVID-19 crisis, may have undermined the official message of social distancing (Bhanot, 2020).

To increase the impact of COVID-19 strategic narratives and decrease the aversive effects of false information, there are several measures the UK Government can implement. These include providing clear, accessible guidelines that are supported by expert opinion. To avoid ambiguity, where possible, strategic narratives should be accompanied by detail that operationalises key terms and outlines precisely how implementation will occur. This could include providing dedicated, trusted sites of information and undertaking measures to reduce the spread of misinformation (see The Behaviour Insights Team, 2020). In the case of COVID-19, this has involved encouraging digital platforms to moderate content (i.e., fact checking, and myth busting false claims) (Kapoor et al., 2020).

Following analysis of narratives around climate change, Bushell et al. (2017) identified key communication factors that enhance strategic narrative influence. Applying this to the present COVID-19 crisis in the UK, indicates ways in which



the Government can improve communication of subsequent related messages. Firstly, the strategic narrative should address the complexity of the central issue in an accessible manner. To achieve this and maximize understanding, the message should permit addressees to engage with COVID-19 in a manner that is comprehensible and that accords with their worldview. Secondly, the strategic narrative needs to legitimize policy by appealing to audiences. This is possible by providing a strong empirical rationale for measures, using inspirational language, and ensuring that the strategic narrative is coherent. Thirdly, appreciate the sociological and psychological issues that motivate behavior change in potential actors. Part of this process is to develop a narrative that bestows ownership of the problem on the audience (i.e., it needs to tap into their sense of identity). Additionally, the narrative should evolve through a strategic dialogue between the Government and the citizens throughout the duration of the measures. This reflexivity encourages an adaptive approach (Haasnoot et al., 2013).

These recommendations are consistent with Webster et al. (2020), who state that public health officials can improve adherence to health measures (i.e., quarantine during infectious disease outbreaks) through provision of clear, timely rationales and information about protocols, and by emphasizing social norms to encourage altruistic behavior. This is important with regards to the COVID-19 crisis in the UK because the situation is constantly evolving and further restrictions may prove necessary (e.g., Leicestershire City Council, 2020).

Although the conclusions in this article derived from careful consideration of existing data, it is important to acknowledge

limitations that potentially reduce the impact and effectiveness of recommendations. Concerns center on restricted available information, difficulties separating opinion and conjecture from fact, and determining audience perceptions of the COVID-19 crisis. Concomitantly, the article focused only on a narrow time period, and temporal immediacy mitigated a longer, critical reflective analysis. Moreover, from the perspective of social constructionism, it is important to note that meanings are fluid and dynamic because they are constructed via the coordination of people in various encounters (Gergen and Gergen, 2016). Accordingly, historical and cultural contexts may also restrict extrapolation of findings (Camargo-Borges and Rasera, 2013).

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

## AUTHOR CONTRIBUTIONS

ND and KD decided on the Perspective topic and undertook the literature review, ND was the main author. KD and RW contributed to the article write-up. AD provided additional informed advice and performed the editing. All authors contributed to the article and approved the submitted version.

## REFERENCES

- BBC (2020). *Coronavirus: Minister defends 'stay alert' advice amid backlash*. Available online at: <https://www.bbc.co.uk/news/uk-52605819> (accessed July 15, 2020).
- Beattie, K. (2020, April 05). *Scotland's chief medical officer resigns after visiting second home twice during lockdown*. Available online at: <https://www.pressandjournal.co.uk/fp/news/politics/scottish-politics/2127163/scotlands-chief-medical-officer-resigns-after-visiting-second-home-twice-during-lockdown/> (accessed July 13, 2020).
- Becker, M. H., and Maiman, L. A. (1975). Sociobehavioral determinants of compliance with health and medical care recommendations. *Med. Care* 13, 10–24. doi: 10.1097/00005650-197501000-00002
- Bernhardt, J. M. (2004). Communication at the core of effective public health. *Am. J. Public Health* 94, 2051–2053. doi: 10.2105/AJPH.94.12.2051
- Bhanot, S. (2020). Why are people ignoring expert warnings? – psychological reactance. *Behavioural Scientist*. Available online at: <https://behavioralscientist.org/why-are-people-ignoring-expert-warnings-psychological-reactancecoronavirus-COVID-19> (accessed March 20, 2020).
- Bilandzic, H. (2012). "Narrative persuasion," in *The SAGE handbook of persuasion: Developments in theory and practice*, eds J. P. Dillard and L. Shen (Thousand Oaks, CA: SAGE Publications, Inc), 200–219. doi: 10.4135/9781452218410.n13
- Brainard, J., and Hunter, P. R. (2020). Misinformation making a disease outbreak worse: outcomes compared for influenza, monkeypox, and norovirus. *Simulation* 96, 365–374. doi: 10.1177/0037549719885021
- Brehm, J. W. (1966). *A theory of psychological reactance*. New York, NY: Academic.
- Brehm, S. S., and Brehm, J. W. (1981). *Psychological reactance: A Theory of freedom and control*. New York, NY: Academic.
- Bushell, S., Buisson, G. S., Workman, M., and Colley, T. (2017). Strategic narratives in climate change: towards a unifying narrative to address the action gap on climate change. *Energy Res. Soc. Sci.* 28, 39–49. doi: 10.1016/j.erss.2017.04.001
- Camargo-Borges, C., and Rasera, E. F. (2013). Social constructionism in the context of organization development: dialogue, imagination, and co-creation as resources of change. *Sage Open* 3:2158244013487540. doi: 10.1177/2158244013487540
- Conservatives.com (2020a). *Stay Alert, Control The Virus, Save Lives: The Prime Minister's Update*. Available online at: <https://www.conservatives.com/news/stay-alert-control-the-virus-save-lives> (accessed June 1, 2020).
- Conservatives.com (2020b). *Stay At Home, Protect The NHS, Save Lives*. Available online at: <https://www.conservatives.com/news/stay-at-home-protect-the-nhs-save-lives> (accessed June 1, 2020).
- Cuan-Baltazar, J. Y., Muñoz-Perez, M. J., Robledo-Vega, C., Pérez-Zepeda, M. F., and Soto-Vega, E. (2020). Misinformation of COVID-19 on the internet: infodemiology study. *JMIR Public Health Surveill.* 6:e18444. doi: 10.2196/18444
- Dagnall, N., Drinkwater, K., Parker, A., Denovan, A., and Parton, M. (2015). Conspiracy theory and cognitive style: a worldview. *Front. Psychol.* 6:206. doi: 10.3389/fpsyg.2015.00206
- Devlin, H., and Boseley, S. (2020). *Scientists criticise UK government's 'following the science' claim*. Available online at: <https://www.theguardian.com/world/2020/apr/23/scientists-criticise-uk-government-over-following-the-science>
- Economos, C. D., Brownson, R. C., DeAngelis, M. A., and Novelli, P. (2001). What lessons have been learned from other attempts to guide social change? *Nutr. Rev.* 59, S40–S56. doi: 10.1111/j.1753-4887.2001.tb06985.x
- Ewert, B. (2020). Moving beyond the obsession with nudging individual behaviour: towards a broader understanding of behavioural public policy. *Public Policy Adm.* 35, 337–360. doi: 10.1177/0952076719889090
- Fisher, J. D., and Fisher, W. A. (1992). Changing AIDS risk behavior. *Psychol. Bull.* 111, 455–474. doi: 10.1037/0033-2909.111.3.455

- Flaherty, E., and Roselle, L. (2018). Contentious narratives and Europe: conspiracy theories and strategic narratives surrounding RT's Brexit news coverage. *J. Int. Aff.* 71, 53–60.
- Gardner, L., and Leshner, G. (2016). The role of narrative and other-referencing in attenuating psychological reactance to diabetes self-care messages. *Health Commun.* 31, 738–751. doi: 10.1080/10410236.2014.993498
- Gergen, M. M., and Gergen, K. J. (2016). *Playing with purpose: Adventures in performative social science*. New York, NY: Routledge. doi: 10.4324/9781315422459
- Gill, T. P., and Boylan, S. (2012). Public health messages: why are they ineffective and what can be done? *Curr. Obes. Rep.* 1, 50–58. doi: 10.1007/s13679-011-0003-6
- Gollust, S. E., and Cappella, J. N. (2014). Understanding public resistance to messages about health disparities. *J. Health Commun.* 19, 493–510. doi: 10.1080/10810730.2013.821561
- Haasnoot, M., Kwakkel, J. H., Walker, W. E., and ter Maat, J. (2013). Dynamic adaptive policy pathways: a method for crafting robust decisions for a deeply uncertain world. *Glob. Environ. Change* 23, 485–498. doi: 10.1016/j.gloenvcha.2012.12.006
- Haslam, C., Jetten, J., Cruwys, T., Dingle, G., and Haslam, A. (2018). *The new psychology of health: Unlocking the social cure*. London: Routledge. doi: 10.4324/9781315648569
- Haslam, S. A., Reicher, S. D., and Platow, M. J. (2011). *The new psychology of leadership: Identity, Influence and Power*. Hove; New York, NY: Psychology Press.
- Hodgson, C. (2020). *Neil Ferguson resigns as government adviser after breaking lockdown rules*. Available online at: <https://www.ft.com/content/c554ad9e-2abd-4ffc-99d7-1cfbba0296b9> (accessed July 13, 2020).
- Hunter, D. J. (2020). Covid-19 and the stiff upper lip—The pandemic response in the United Kingdom. *N. Engl. J. Med.* 382:e31. doi: 10.1056/NEJMp2005755
- Ipsos MORI (2020a). *Coronavirus tracking UK public perception 26th May 2020*. Available online at: <https://www.ipsos.com/sites/default/files/2020-04/coronavirus-COVID-19-infographic-ipsos-mori.pdf> (accessed June 1, 2020).
- Ipsos MORI (2020b). *Coronavirus perceptions tracker 24–27 April 2020*. Available online at: [https://www.ipsos.com/sites/default/files/ct/news/documents/2020-04/coronavirus\\_omnibus\\_week\\_7\\_300420.pdf](https://www.ipsos.com/sites/default/files/ct/news/documents/2020-04/coronavirus_omnibus_week_7_300420.pdf) (accessed June 1, 2020).
- Ipsos MORI (2020c). *Majority think Government communications on coronavirus are clear, but fall from peak after original lockdown*. Available online at: <https://www.ipsos.com/ipsos-mori/en-uk/majority-think-government-communications-coronavirus-are-clear-fall-peak-after-original-lockdown> (accessed June 1, 2020).
- Ipsos MORI (2020d). *Four in five Scots say Nicola Sturgeon has handled the coronavirus outbreak well*. Available online at: <https://www.ipsos.com/ipsos-mori/en-uk/four-five-scots-say-nicola-sturgeon-has-handled-coronavirus-outbreak-well> (accessed June 1, 2020).
- Kapoor, A., Guha, S., Das, M. K., Goswami, K. C., and Yadav, R. (2020). Digital healthcare: the only solution for better healthcare during COVID-19 pandemic? *Indian Heart* 72, 61–64. doi: 10.1016/j.ihj.2020.04.001
- Kelly, M. P., and Barker, M. (2016). Why is changing health-related behaviour so difficult? *Public Health* 136, 109–116. doi: 10.1016/j.puhe.2016.03.030
- Kooistra, E. B., Reinders Folmer, C., Kuiper, M. E., Olthuis, E., Brownlee, M., Fine, A., et al. (2020). *Mitigating COVID-19 in a nationally representative UK sample: Personal abilities and obligation to obey the law shape compliance with mitigation measures*. Available online at: <https://ssrn.com/abstract=3598221>
- Kreuter, M. W., Green, M. C., Cappella, J. N., Slater, M. D., Wise, M. E., Storey, D., et al. (2007). Narrative communication in cancer prevention and control: a framework to guide research and application. *Ann. Behav. Med.* 33, 221–235. doi: 10.1007/BF02879904
- Kwasnicka, D., Dombrowski, S. U., White, M., and Sniehotta, F. (2016). Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health Psychol. Rev.* 10, 277–296. doi: 10.1080/17437199.2016.1151372
- Lally, C., and Christie, L. (2020). *COVID-19 misinformation*. Post.parliament.uk. Available online at: <https://post.parliament.uk/analysis/COVID-19-misinformation/> (accessed June 1, 2020).
- Ledderer, L., Kjær, M., Madsen, E. K., Busch, J., and Fage-Butler, A. (2020). Nudging in public health lifestyle interventions: a systematic literature review and metasynthesis. *Health Educ. Behav.* doi: 10.1177/1090198120931788. [Epub ahead of print].
- Leicestershire City Council (2020). *Increased Restrictions for Leicester and Parts of Leicestershire Announced*. Available online at: <https://www.leicestershire.gov.uk/coronavirus-COVID-19/how-you-can-help/increased-restrictions-for-leicester-and-parts-of-leicestershire-announced> (accessed July 15, 2020).
- Lewandowsky, S., Ecker, U. K., Seifert, C. M., Schwarz, N., and Cook, J. (2012). Misinformation and its correction: continued influence and successful debiasing. *Psychol. Sci. Public Interest* 13, 106–131. doi: 10.1177/1529100612451018
- Lewis, S., Thomas, S. L., Hyde, J., Castle, D., Blood, R. W., and Komisaroff, P. A. (2010). “I don’t eat a hamburger and large chips every day!” A qualitative study of the impact of public health messages about obesity on obese adults. *BMC Public Health* 10:309. doi: 10.1186/1471-2458-10-309
- Mailonline, K. (2020, May 20). *Thousands of locked-down Brits cram onto packed beaches as temperatures soar to 82F*. Available online at: <https://www.dailymail.co.uk/news/article-8339235/Britain-hits-beach-bask-82F-sunshine-today-hottest-day-year-far.html> (accessed July 15, 2020).
- Malecki, K., Keating, J. A., and Safdar, N. (2020). Crisis communication and public perception of COVID-19 risk in the era of social media. *Clin. infect. dis.* doi: 10.1093/cid/ciaa758. [Epub ahead of print].
- Michie, S., Ashford, S., Sniehotta, F. F., Dombrowski, S. U., Bishop, A., and French, D. P. (2011). A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviours: the CALO-RE taxonomy. *Psychol. Health* 26, 1479–1498. doi: 10.1080/08870446.2010.540664
- Miskimmon, A., O’loughlin, B., and Roselle, L. (2014). *Strategic narratives: Communication power and the new world order*. New York, NY: Routledge. doi: 10.4324/9781315871264
- Moyer-Gusé, E. (2008). Toward a theory of entertainment persuasion: explaining the persuasive effects of entertainment-education messages. *Commun. Theor.* 18, 407–425. doi: 10.1111/j.1468-2885.2008.00328.x
- Nauroth, P., Gollwitzer, M., Kozuchowski, H., Bender, J., and Rothmund, T. (2017). The effects of social identity threat and social identity affirmation on laypersons’ perception of scientists. *Public Underst. Sci.* 26, 754–770. doi: 10.1177/0963662516631289
- Orji, R., Vassileva, J., and Mandryk, R. (2012). Towards an effective health interventions design: an extension of the health belief model. *Online J. Public Health Inform.* 4:4321. doi: 10.5210/ojphi.v4i3.4321
- Perrier, M. J., and Martin Ginis, K. A. (2018). Changing health-promoting behaviours through narrative interventions: a systematic review. *J. Health Psychol.* 23, 1499–1517. doi: 10.1177/1359105316656243
- Petty, R. E., and Cacioppo, J. T. (1984). Source factors and the elaboration likelihood model of persuasion. *Adv. Consum. Res.* 11, 668–672.
- Prime Minister’s Office (2020). *Prime Minister’s statement on coronavirus (COVID-19): 12 March 2020*. Available online at: <https://www.gov.uk/government/speeches/pm-statement-on-coronavirus-12-march-2020> (accessed July 13, 2020).
- Quick, B. L., and Stephenson, M. T. (2008). Examining the role of trait reactance and sensation seeking on perceived threat, state reactance, and reactance restoration. *Hum. Commun. Res.* 34, 448–476. doi: 10.1111/j.1468-2958.2008.00328.x
- Rains, S. A. (2013). The nature of psychological reactance revisited: a meta-analytic review. *Human Commun. Res.* 39, 47–73. doi: 10.1111/j.1468-2958.2012.01443.x
- Reicher, S., and Stott, C. (2020). On order and disorder during the COVID-19 pandemic. *Br. J. Soc. Psychol.* 59, 694–702. doi: 10.1111/bjso.12398
- Reynolds-Tylus, T. (2019). Psychological reactance and persuasive health communication: a review of the literature. *Front. Commun.* 4:56. doi: 10.3389/fcomm.2019.00056
- Ross, M. W. (1991). Factors affecting information and education, and behaviour change. *AIDS Care* 3, 419–421. doi: 10.1080/09540129108251602
- Schmidt, A. M., Ranney, L. M., Pepper, J. K., and Goldstein, A. O. (2016). Source credibility in tobacco control messaging. *Tob. Regul. Sci.* 2, 31–37. doi: 10.18001/TRS.2.1.3
- Seibel, C. A., and Dowd, E. T. (2001). Personality characteristics associated with psychological reactance. *J. Clin. Psychol.* 57, 963–969. doi: 10.1002/jclp.1062
- Sibony, A. L. (2020). The UK COVID-19 response: a behavioural irony? *Eur. J. Risk Regul.* 11, 350–357. doi: 10.1017/err.2020.22

- Slovic, P. (ed.). (2000). "Perceived risk trust and democracy," in *The Perception of Risk*, ed P. Slovic (London: Earthscan), 316–326.
- Smith, D. (2020, July 4). 'Consigning his voters to sickness': trump fuels culture war over masks. *The Guardian Newspaper*. Available online at: <https://www.theguardian.com/us-news/2020/jul/03/trump-face-masks-coronavirus-covid-19> (accessed July 14, 2020).
- Smith, M. (2020, May 11). *Brits split on changes to coronavirus lockdown measures*. Available online at: <https://yougov.co.uk/topics/health/articles-reports/2020/05/11/brits-split-changes-coronavirus-lockdown-measures> (accessed July 14, 2020).
- Syme, S. L. (2004). Social determinants of health: the community as an empowered partner. *Prev. Chronic Dis.* 1:A02.
- Tajfel, H. (1972). "Social categorization. English manuscript of 'La catégorisation sociale,'" in *Introduction à la Psychologie Sociale, Vol. 1*, ed S. Moscovici (Paris: Larousse), 272–302.
- Thaler, R. H., and Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. London, UK: Yale University Press.
- The Behaviour Insights Team (2020). *COVID-19: How do we encourage the right behaviours during an epidemic?* Available online at: <https://www.bi.team/blogs/COVID-19-how-do-we-encourage-the-right-behaviours-during-an-epidemic/> (accessed July 15, 2020).
- Thirlaway, K. J., and Heggs, D. A. (2005). Interpreting risk messages: women's responses to a health story. *Health Risk Soc.* 7, 107–121. doi: 10.1080/13698570500108677
- UCL (2020, May 22). *More than half of young adults not 'strictly' sticking to lockdown guidelines*. Available online at: <https://www.ucl.ac.uk/news/2020/may/more-half-young-adults-not-strictly-sticking-lockdown-guidelines> (accessed July 14, 2020).
- Vallgård, S. (2012). Nudge—A new and better way to improve health? *Health Policy* 104, 200–203. doi: 10.1016/j.healthpol.2011.10.013
- Van Dooren, W., and Noordegraaf, M. (2020). Staging science: authoritativeness and fragility of models and measurement in the COVID-19 crisis. *Public Adm. Rev.* 80, 610–615. doi: 10.1111/puar.13219
- Webster, R. K., Brooks, S. K., Smith, L. E., Woodland, L., Wessely, S., and Rubin, G. J. (2020). How to improve adherence with quarantine: rapid review of the evidence. *Public Health* 182, 163–169. doi: 10.1016/j.puhe.2020.03.007
- Welch, V., Petkovic, J., Pardo, J. P., Rader, T., and Tugwell, P. (2016). Interactive social media interventions to promote health equity: an overview of reviews. *Health Promot. Chron. Dis. Prev. Can. Res. Policy Pract.* 36, 63–75. doi: 10.24095/hpcdp.36.4.01
- World Health Organization (2018). *Managing epidemics: Key facts about major deadly diseases*. World Health Organization.
- Zarocostas, J. (2020). How to fight an infodemic. *Lancet* 395:676. doi: 10.1016/S0140-6736(20)30461-X

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Dagnall, Drinkwater, Denovan and Walsh. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Hazard Prevention, Death and Dignity During COVID-19 Pandemic in Italy

**Silvia Ussai<sup>1\*</sup>, Benedetta Armocida<sup>2</sup>, Beatrice Formenti<sup>3</sup>, Francesca Palestra<sup>3</sup>, Marzia Calvi<sup>3</sup> and Eduardo Missoni<sup>3,4</sup>**

<sup>1</sup> Directorate General for Food and Health, European Commission, Brussels, Belgium, <sup>2</sup> Institute for Maternal and Child Health, IRCCS “Burlo Garofolo”, Trieste, Italy, <sup>3</sup> SaluteGloble.it Associazione di Promozione Sociale, Brescia, Italy, <sup>4</sup> Center for Research on Health and Social Care Management (CERGAS), Bocconi University, Milan, Italy

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Luret Albert Lar,  
Jos University Teaching  
Hospital, Nigeria  
Chundung Asabe Miner,  
University of Jos, Nigeria

### \*Correspondence:

Silvia Ussai  
ussai.silvia@gmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 23 April 2020

**Accepted:** 07 August 2020

**Published:** 18 September 2020

### Citation:

Ussai S, Armocida B, Formenti B,  
Palestra F, Calvi M and Missoni E  
(2020) Hazard Prevention, Death and  
Dignity During COVID-19 Pandemic in  
Italy. *Front. Public Health* 8:509.  
doi: 10.3389/fpubh.2020.00509

On 9 March 2020, Italy passed the Prime Minister's Decree n. 648, establishing urgent measures to contain the transmission of COVID-19 and prevent biological hazards, including very restrictive interventions on public Holy Masses and funerals. Italy banned burial procedures based (i) on the recent acknowledgment about the virus environmental stability as well as (ii) its national civil contingency plan. Hence, only the cremation process is admitted for COVID-19 deaths. Viewing of the body is permitted only for mourners, which are allowed to perform the prayer at the closing of the coffin and the prayer at the tomb (cf. Rite of Succession, first part n. 3 and n. 5). The dead cannot be buried in their personal clothes; however, priests have been authorized to put the family clothes on top of the corpse, as if they were dressed. Burying personal items is also illegal. The dignity of the dead, their cultural and religious traditions, and their families should be always respected and protected. Among all the threats, COVID-19 epidemic in Italy revealed the fragility of human beings under enforced isolation and, for the first time, the painful deprivation of families to accompany their loved ones to the last farewell. Ethics poses new challenges in times of epidemics.

**Keywords:** COVID-19, hazard & risk, deaths, public health, policy & institutional actions

On March 24, 2020, the World Health Organization (WHO) released its guideline on “Infection Prevention and Control for the safe management of a dead body in the context of COVID-19” (1).

The document offers the most updated recommendations on the safe and dignified burial procedures of deceased persons with suspected or confirmed COVID-19. These include, among others: (1) the lack of evidence—which does not mean that we may exclude the possibility of future evidence emerging—of human transmission to subjects having become infected from exposure to the bodies of persons who died with/for COVID-19. This, in contrast with Ebola or Marburg diseases, where dead bodies are known to be associated with contagion; (2) the option for decedents with confirmed or suspected COVID-19 to be buried or cremated; (3) respect of customs, with family's chance to view the body after it has been prepared for burials, using standard precautions at all times including hand hygiene; (4) body wrapping in cloth and deceased transfer as soon as possible to the mortuary area.



WHO recommendations are released in the form of interim guidance, subjected to revision as new evidence becomes available. National healthcare authorities are fully empowered in leading local actions according to the context and customs.

Italian Government adopted the highest level of precautions given its exceptional number of deaths (34,561, 20 June 2020) and the limited knowledge on this novel virus.

On 9 March 2020, Italy passed the Prime Minister's Decree n. 648 (2), establishing urgent measures to contain the transmission of COVID-19 and prevent biological hazards, including very restrictive interventions on public Holy Masses and funerals.

In coordination with the measures launched by the Italian authorities, the Italian Conference of Bishops (Conferenza Episcopale Italiana) issued a statement describing actions taken by the Vatican to limit the spread of COVID-19 (3). Severe measures that entail stringent restrictions on freedom of movement and association affecting the right to decent burials can be hugely distressing for families, exacerbating their grief. When balanced against public health interests, a basic rule is that governments should employ the least restrictive means necessary to protect public health.

During the emergency phase, Italy banned burial procedures based (i) on the recent acknowledgment about the virus environmental stability (4) as well as (ii) its national civil contingency plan. Hence, only the cremation process was admitted for COVID-19 deaths.

The visit to the body was equally forbidden by the Health Authority. Therefore, in addition to the funeral ceremonies, any prayer at the closing of the coffin was suspended as well.

Viewing of the body was permitted only for mourners, which were allowed to perform the prayer at the closing of the coffin and the prayer at the tomb (cf. Rite of Succession, first part n. 3 and n. 5).

The dead could not be buried in their personal clothes; however, priests have been authorized to put the family clothes on top of the corpse, as if they were dressed. Burying personal items was also illegal.

Funeral gatherings were not permitted and family members of SARS-CoV-2 victims were either denied to participate at the burial as they themselves were, most of time, under quarantine. In order to minimize delays between time of death and cremation, deceased were taken straight to the cemetery where a brief rite of burial was celebrated. All the Masses in suffrage of the deceased with the family have been postponed after the emergency.

Italy's mortuary industry has been overwhelmed as the number of dead kept rising. In Bergamo, a city in Lombardy region with the highest number of COVID-19 cases in Italy, the capacity to manage dead bodies exceeded. The time frame set by law from the death to the burial was up to 48 h. However, due to the unprecedented amount of deaths, certain areas experienced a 30 min turnover procedure because of the pressure created by the number of corpses, as caskets have been piling up in churches instead of the local cemeteries, which were full. The military stepped in to move about 70 coffins to other provinces and regions for timely burial procedures (5).

The cremation followed the standard procedure foreseen for biological hazard risk. For instance, in order to increase the capacity of each burial facility and in compliance with all hygiene requirements, safety and environmental regulations, alternative technical solutions have been allowed for each cremation to shorten the burial execution time, for example by accelerating the ignition of the coffin. The use of easily inflammable wooden coffins has been encouraged in cremation and only the use of a zinc inner bonnet was permitted.

In case of massive transportation of crematorium coffins, these have been carried out with a closed truck, also military, to be disinfected properly after use, preferably internally covered with waterproof material easily washable. Furthermore, in the cemetery register it was mandatory to indicate that the coffin was packed for the burial of the deceased with a contagious infectious disease by affixing the code "Y" (6).

Currently, the recovery phase is easing restrictions on funeral and burial procedures. Family members (up to 15 people) can participate in the Holy Mass; any physical contact between the participants must be avoided. The funeral should preferably take place outdoors and it is mandatory the use of Personal Protective Equipment (PPE) as well as the strict observance of the interpersonal safety distance of at least 1 m (7).

On March 31, 2020 the Italian government proclaimed a national day of mourning, inviting all public institutions to expose the Italian flag at half-mast "as a sign of mourning for the victims of the Coronavirus, of proximity to their families and of national participation in the condolences to the most affected communities."

Authors acknowledge that in the absence of any pharmaceutical intervention, the only strategy against COVID-19 was to reduce mixing of susceptible and infectious people through early ascertainment of cases or reduction of contact. Although biologic hazard prevention actions (including death management) have been praised by WHO, the possibility of imposing severe restrictions on death during COVID-19 as adopted by the Italian government raises important questions. The population requires and deserves assurance that the decision to enact these measures affecting vital cultural practices as faith-based services has been informed by the best attainable evidence.

It is therefore relevant that policy makers maintain the public's trust through use of rigorous scientific assessment of risk and effectiveness.

Yet, burial restrictions in Italy have been imposed without any individualized risk assessment.

Difficult questions will then arise, though. For example, was complete funeral ban necessary, or might the final goodbye be still said by families while practicing physical distancing?

The dignity of the dead, their cultural and religious traditions, and their families should be always respected and protected. Among all the threats, COVID-19 epidemic in Italy revealed the fragility of human beings under enforced isolation and, for the first time, the painful deprivation of families to accompany their loved ones to the last farewell.

## DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. This data can be found here: <http://www.protezionecivile.gov.it>.

## REFERENCES

1. *Infection Prevention and Control for Dead Body Management in the Context of COVID-19: Interim Guidance*. Available online at: <https://apps.who.int/iris/bitstream/handle/10665/331538/WHO-COVID-19-IPC-DBMgmt-2020.1-eng.pdf>
2. Ulteriori interventi urgenti di protezione civile in relazione all'emergenza relativa al rischio sanitario connesso all'insorgenza di patologie derivanti da agenti virali trasmissibili. (Ordinanza n. 648) - Serie Generale n.64 del 11-03-2020. (2020).
3. "Decreto "coronavirus": la posizione della CEI", Comunicato della Conferenza Episcopale Italiana CS 11/2020. (2020).
4. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *J Hosp Infect.* (2020) 104:246–51. doi: 10.1016/j.jhin.2020.01.022
5. *Coronavirus Lombardia, Altro Giorno di Lutto per Bergamo: 70 Bare Sui Camion dei Militari*. Available online at: [https://www.ilmessaggero.it/italia/coronavirus\\_lombardia\\_bergamo\\_milano\\_esercito\\_bare\\_sala\\_ultime\\_notizie\\_news-5124365.html](https://www.ilmessaggero.it/italia/coronavirus_lombardia_bergamo_milano_esercito_bare_sala_ultime_notizie_news-5124365.html) (accessed March 29, 2020).
6. *Oggetto: Indicazioni Emergenziali Connesse ad Epidemia COVID-19 Riguardanti il Settore Funebre, Cimiteriale e di Cremazione*. Ministry of Health. Available online at: <http://www.feniof.it/wordpress/wp-content/uploads/2020/04/Circolare-MinSal-12302-8-aprile-2020.pdf>
7. Spagnolo VFase 2. *La Cei ai Parroci: Ecco le Indicazioni per Celebrare i Funerali*. *Avvenire*. (2020) Available online at: <https://www.avvenire.it/attualita/pagine/quesito-funerali-viminale-cei>

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Ussai, Armocida, Formenti, Palestra, Calvi and Missoni. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# A Preventive and Control Strategy for COVID-19 Infection: An Experience From a Third-Tier Chinese City

Shushan Fan<sup>1</sup>, Min Wu<sup>1\*</sup>, Shengjun Ma<sup>2\*</sup> and Shouguo Zhao<sup>3</sup>

<sup>1</sup> Department of Healthcare Associated Infection Control, Liaocheng People's Hospital, Liaocheng, China, <sup>2</sup> Department of Cardiac Surgery, Liaocheng People's Hospital, Liaocheng, China, <sup>3</sup> Department of Urology, Liaocheng People's Hospital, Liaocheng, China

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Nilesh Chandrakant Gawde,  
Tata Institute of Social Sciences, India  
Iffat Elbarazi,  
United Arab Emirates University,  
United Arab Emirates

### \*Correspondence:

Min Wu  
wumin2009@126.com  
Shengjun Ma  
msj6336@126.com

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 14 May 2020

**Accepted:** 18 September 2020

**Published:** 15 October 2020

### Citation:

Fan S, Wu M, Ma S and Zhao S  
(2020) A Preventive and Control  
Strategy for COVID-19 Infection: An  
Experience From a Third-Tier Chinese  
City. *Front. Public Health* 8:562024.  
doi: 10.3389/fpubh.2020.562024

COVID-19 is a rapidly spreading infectious disease that has led to a global pandemic. This study describes a novel strategy for preventing and controlling COVID-19 infection in the third-tier city of Liaocheng, China. The prevention and control measurements included city-wide orders to close workspaces, sanitize essential workspaces, quarantine individuals with a travel history to an epidemic area, and issue emergency medical responses to quarantine and treat COVID-19 patients using all necessary technologies, personnel, and resources. As a result, there were only 38 diagnosed COVID-19 cases in Liaocheng since the pandemic began in China in late 2019, including in the metropolitan area and six suburban counties, accounting for more than 6.39 millions residents living in a 8,715 km<sup>2</sup> area. There was no COVID-19-related fatality and no healthcare professional inter-transmission as of June 25, 2020. The strategies of this third-tier Chinese city provide useful insights into approaches to prevent and control COVID-19 spread in other Chinese cities and countries.

**Keywords:** COVID-19, prevention and control, first level response, economy, strategy

## INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a rapidly spreading infectious disease that has led to global pandemic (1–4). On June 25, 2020, there have been more than 9.44 million confirmed COVID-19 cases and 483 thousand COVID-19-related deaths in the world (5). Epidemiologically, COVID-19 is mainly spread by inhalation of droplets or fomites. Small droplets produced by an infected person with or without any symptoms can be aerosolized through coughing, sneezing, talking, or singing and then inhaled by persons in close contact. Furthermore, poorly ventilated environments leads increase potential of transmission (6, 7). In the clinic, the most common symptom of COVID-19 is fever, followed by cough, loss of appetite, fatigue, shortness of breath, sputum, and muscle and joint pains (8, 9), while other symptoms, like nausea, vomiting, or diarrhea can also occur (10, 11); common flu symptoms, such as sneezing, runny nose, sore throat, and skin lesions, are less common in COVID-19 patients [World Health Organization (WHO)]. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) on February 16–24, 2020 (<https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>). As there are no curable treatment options currently available, COVID-19 patients often suffer from complications including pneumonia, acute respiratory distress syndrome (ARDS), multi-organ failure, septic shock, heart failure, blood coagulation, liver injury, seizure, stroke, encephalitis, and even death (12–17). Thus, novel and

effective preventive and control strategies for COVID-19 infection are crucial to ending this ongoing global pandemic. Here, we describe our experiences and implementation of strategies to control and prevent COVID-19 in a third-tier Chinese city with a population of 6.39 million residents. Our findings will hopefully provide insight for preventing and controlling the spread of COVID-19 in other Chinese cities and countries.

## METHODS AND STRATEGIES

### Liaocheng Statistics and Study Population

Liaocheng is a third-tier Chinese city that spans 8,715 km<sup>2</sup> in Western Shandong province. As of April 7, 2020, there have been 83,157 confirmed cases, 1,042 imported cases, and 1,095 asymptomatic cases of COVID-19 in China. In Liaocheng, which has a population of 6.39 million, there have been only 38 confirmed cases without any related fatality. The population in Liaocheng includes ~2.39 million residents in the metropolitan area and 4 million residents in its suburban six counties. In 2007, Liaocheng was named one of the top 10 most livable cities in China by the Chinese Cities Brand Value Report ([https://archive.is/20130410050946/http://eng.hnloudi.gov.cn/engld%5Caboutloudi/Loudicity/Loudihonor/2011/1\\_327/default.shtml](https://archive.is/20130410050946/http://eng.hnloudi.gov.cn/engld%5Caboutloudi/Loudicity/Loudihonor/2011/1_327/default.shtml)). Economically, the total 2019 gross domestic product (GDP) of Liaocheng accounted for 225.98 billion RMB, a 3% increase from 2018, among which the industrial GDP contributed 49.8% to the total GDP (2019 Liaocheng city GDP data. <https://baike.baidu.com/item/%E8%81%8A%E5%9F%8E/127583>). Among Liaocheng's 9.39 million residents, there are ~3.3 million males and ~3.1 million females, and ~1.6 million (25.2%) are 0 and 17 years old, ~3.7 million (57.1%) are 18 and 59 years old, and ~1 (17.6%), are over 60 years old (Liaocheng population data from Liaocheng city municipal government). Liaocheng has 552 hospitals and clinics with 26,280 beds and 28,900 medical staff employees (data from Liaocheng city municipal government).

### Strategies to Handle the COVID-19 Crisis in Liaocheng

#### Implementation of Prevention and Control Mechanisms and Strengthening Organizational Leadership During the COVID-19 Pandemic

To effectively control and prevent the COVID-19 pandemic, the municipal government of Liaocheng first formed a COVID-19 pandemic workgroup on January 22, 2020, that provided guidance on the prevention and control of COVID-19 infection. Thereafter, the workgroup established 36 fever clinics and designated 10 medical institutions to manage and treat patients with COVID-19. This workgroup was formed as an urgent response to complement the research efforts and achieve the objectives of controlling and preventing COVID-19 infection. Moreover, this workgroup followed the central government's directives and adapted them to local situations by developing health policies and measurements related to infection control. This workgroup also strengthened communications

between departments and updated the relevant departments on COVID-19 infection rates.

### First Responses

At the onset of the crisis, the Shandong provincial government immediately activated a Level 1 crisis response on January 24, 2020, and Liaocheng followed the same protocol on the day when the city reported its first case of COVID-19. However, this occurred during the Chinese New Year and there was an increase in travel and movement between regions, leading to an increase in consecutive COVID-19 transmissions and risk of urban to suburban area transmission. Thus, Liaocheng implemented the strictest infection control measurements to prevent further COVID-19 spread and infection. The detailed strategies were as follows: (1) The city ordered a stoppage of activities and workplace closure, including museums, stadiums, libraries, tourist attraction sites, parks, cinemas, cafes, public facilities, all other entertainment facilities, fitness centers, and public and private schools. Only supermarkets, hospitals, fresh food markets, petrol stations, infant accessory shops, and pharmacies were allowed to remain open. (2) All shopping malls were ventilated at an automated setting, sterilized every 4 h, and shortened operating hours (open from 10 a.m.–6 p.m.). (3) Fresh markets were ordered to stop all wildlife trade and close all live animal trade and handling (meat butchering and preparation) to prevent potential animal to human transmission. (4) All immigration and imported goods were scrutinized and quarantined as necessary (for immigrants, there was a mandatory 14 days stay at home or hotel quarantine). Since January 27, 2020, all Liaocheng automobiles were ordered to stop operation except those for transportation of basic necessities. Public transportation, such as buses, operated at reduced frequencies and all riders were ordered to wear facemasks and ensure their body temperatures were <37.3°C before boarding the vehicle. Social distancing was also implemented on all public transportation, and mobile payments were encouraged instead of cash payments. (5) Residents with a significant travel history were ordered to wear facemasks and regularly monitor their body temperatures. Such individuals were asked to stay home, isolate themselves in a room, and be subject to screening by medical professionals and monitoring by the local authorities. (6) Residents were ordered to stop visitation and eating out and instructed to avoid any crowded places, including hospitals, shopping malls, and fresh markets. All food and beverage services in the public areas were ordered to stop and all funerals and weddings were scaled down to reduce large congregations of people. (7) Residents were highly encouraged to use personal protection equipment, such as facemasks, and adhere to good hygiene practices, especially using alcohol-based hand rubs or hand washing solutions. However, individuals with a fever or respiratory symptoms who were seeking medical attention were required to wear a facemask and avoid self-medicating during this period of the pandemic. (8) School reopening was postponed and online learning was implemented. Graduating students were given priority to return to school and the timing of their classes was staggered when feasible.



## Prevention and Control of COVID-19 Infection in Urban and Suburban Areas

According to the Shandong provincial COVID-19 infection control plan, various measurements were implemented to further control the possible spread of COVID-19 between the urban and suburban regions. All districts within Liaocheng were ordered to close their borders (boundaries) and instructed to report individuals with a travel history. Entry and exit permits were issued for the individual district, facemasks were supplied to the local residents, and social gatherings were reduced or limited. In the suburban areas, all roads within the villages were closed and temperature measurements were instituted to prevent importation of COVID-19 cases. All villages were also instructed to reduce commuting and encouraged to stay home to reduce the risk of COVID-19 infection.

## Control of COVID-19 Infection in Hospital and Healthcare Institutions

Before COVID-19 was officially regulated as an infectious disease, protection and prevention measurements among the medical staff employees were low, resulting in potential increases in cross-contamination and infection among the medical staff and patients. After COVID-19 was categorized as a deadly infectious disease with a greater risk than Severe Acute Respiratory Syndrome (SARS), the risk of an outbreak in the healthcare setting was eminent (18). In China, there were 1,716 medical staffs reported to be infected with COVID-19 (data as of June 25, 2020), resulting in the local government of Liaocheng to implement various strategies to reduce the risk of COVID-19 infection. (1) Risk assessment was carried out at urban and suburban levels and the appropriate resources, such as staff and equipment, were allocated to manage COVID-19 infection risk. The guidelines of regular monitoring and updates of COVID-19 infection were implemented to reduce the over or under control of COVID-19 infection. (2) Strict standards on infection control were implemented. For example, medical staff employees and relevant staff working in the fever clinics, isolation rooms, and laboratories were trained and tested on the use of personal protective equipment and all medical staff employees were required to wear facemasks and practice good hygiene when entering the facilities. The healthcare institutions were required to ventilate, sterilize, and differentiate the various routes for patients and medical staff to reduce cross-contamination in their facilities. Medical staff employees with direct contact of patient blood, body fluid, secretions, or aerosolizing procedures were required to wear the personal protective equipment, including facemasks, protective goggles or shields, and gowns. (3) All operations at the healthcare institutions were modified. For instance, patients were urged to schedule their appointments in advance to reduce their waiting time, and all patients had their temperatures measured before entering the hospitals. If a patient had a fever while in the healthcare facility, they would be sent to an isolation room and subjected to diagnosis and treatment procedures. (4) Acute respiratory wards were instituted to house and isolate patients at risk of COVID-19 infection. Further imaging scans, respiratory swabs, and blood tests were instituted to exclude COVID-19

infection before transferring any patient to the general ward. The healthcare staff movements were controlled via different access cards, and a non-visitation policy was instituted for the relatives or patients' next of kin. (5) Active surveillance of all medical staff was instituted. For example, all medical staff employees were required to periodically report their health status and temperature. The emergency department, laboratories, radiation oncology, operating theaters, and endoscopic center were monitored to reduce the spread of COVID-19 among staff. (6) Specific precautions were also taken for certain patients. For example, special arrangements were made for patients who needed emergency surgery, suffered acute myocardial infarction or cerebrovascular complication, or received periodic chemoradiotherapy treatments. All other patients who were usually in the outpatient setting were encouraged to delay their appointments while extending their prescriptions or having their consultations using telemedicine services.

## Traditional Chinese Medicine (TCM) to Control COVID-19 Infection

Seven Chinese Medicine experts formulated a novel regimen using TCM to aid the management of patients with COVID-19 infection. Herbal soup was prepared for all first-line medical staff, policemen, widowed elderlies, and other vulnerable individuals in an effort to improve their immunity and decrease the risk of COVID-19 infection.

## Novel Technologies to Control COVID-19 Infection

Multiple technology platforms were utilized to help fight the COVID-19 pandemic. (1) Telemedicine and telephone conversations were used to manage and maintain patient appointments, which helped to reduce patients coming into the medical facilities and to prevent cross-contamination and risk of COVID-19 infection. The popular Chinese smartphone application WeChat, which functions similarly to Skype and Facebook; was used among 36 medical organizations in Liaocheng to provide free real time online consultation services for patients with a fever, chronic diseases, or common ailments. Physicians were able to either diagnose symptoms online or refer patients to a medical facility as needed, which significantly reduced the waiting time and potential cross-infection. (2) Liaocheng created a common hotline operated by healthcare specialists to discuss and promote health knowledge. Liaocheng residents could use the hotline to receive psychological consultation to improve mental health during the COVID-19 pandemic. (3) Working at home was widely encouraged when feasible. Meeting in person was discouraged and telecommuting was advised.

## Media-Related Health Wellness to Control COVID-19 Infection

Television, radio, and the Internet were efficiently utilized to spread news and health wellness advice to control COVID-19 infection. Through these platforms, medical and epidemiologist experts explained current information and created more supportive messages for the general population and local

residents. This resulted in more residents taking charge of their health using the latest COVID-19 information.

## RESULTS

### Control of COVID-19 Infection in Liaocheng

As of March 1, 2020, there were only 38 confirmed COVID-19 cases with no reported deaths in Liaocheng. On March 7, 2020, Shandong provincial government had re-classified Liaocheng from a Level 1 risk response area to a Level 2 risk response area. In Level 2, all normal life activities can be phased back in, including the use of public bus transportation for short and long distance commuters. On March 10, 2020, Liaocheng was further categorized as a low risk area of COVID-19 infection. As of the time of this study's publication, there has been no report of cross infection or contamination cases in the healthcare institutions and no infection among patients and the medical staff in Liaocheng.

### Characteristics of Patients With COVID-19 Infection

Detailed information of the 38 patients with COVID-19 infection is presented in **Table 1**. Specifically, the mean age of the patients was  $43.17 \pm 17.9$  years (ranged between 6 months and 77 years) and included 18 males and 20 females. The underlying medical conditions were fever and cough and treatments included thymosin, oxygen therapy, and TCM. One patient stayed in the intensive care unit for 7 days with plasma exchange (PE) and high-flow nasal cannula (HFNC) supportive care (**Table 1**).

### Effectiveness of the Preventive and Control Strategies in Liaocheng

Because of the successful implementation and measurements to control COVID-19 infection in Liaocheng, the city has currently started to revive its economy, despite remaining in a critical period of the COVID-19 pandemic. As the number of COVID-19 cases continues to rise in other parts of China and the world, there has been no single COVID-19 infection case reported in Liaocheng as of June 25, 2020. We acknowledge that Liaocheng is still at risk of COVID-19 transmission and infection, and that newly developed asymptomatic cases and transmission could challenge our ability to prevent and control the COVID-19 pandemic.

### Lessons Learned From Liaocheng's Prevention and Control Strategies

During the past 6 months of the COVID-19 pandemic in Liaocheng, we successfully implemented various strategies and measurements to prevent and control COVID-19 infection. Our strategies and measurements to timely and effectively reduce COVID-19 in our community were successful. These prioritized initiative included: (1) issuing city-wide orders to close workspaces or reduce operation hours for essential facilities, like the public water, gas, or telecommunication facilities, medical staff, and supermarkets; (2) enforcing social distancing; (3) enforcing body temperature checks and DNA tests, when available; (4) enforcing the use of facemasks; and (5) quarantining

**TABLE 1 |** Clinical characteristics of the COVID-19 patients in Liaocheng ( $n = 38$ ).

Characteristics and treatment	All patients $n$ (%)
<b>Age (yrs.)</b>	43.17 $\pm$ 17.9
<b>Gender</b>	
Male	18 (47.37)
Female	20 (52.63)
<b>The underlying diseases</b>	
Any	9 (23.68)
Hypertension	3 (7.89)
Coronary heart disease	3 (7.89)
Diabetes	2 (5.26)
Pulmonary interstitial fibrosis	1 (2.63)
Cirrhosis, liver cancer	1 (2.63)
<b>Epidemiological history</b>	
Contact with wild	0 (0)
Wuhan sojourn	6 (15.79)
Contact with a diagnosed patient or workplace	30 (78.95)
Not available	2 (5.26)
<b>Symptoms</b>	
Asymptomatic	8 (21.05)
Fever	23 (60.53)
$\leq 38.0^{\circ}\text{C}$	20 (86.96)
$> 38.0^{\circ}\text{C}$	3 (13.04)
Chills	1 (2.63)
Fatigue	9 (23.68)
Headache	3 (7.89)
Nasal congestion	3 (7.89)
Sore throat	8 (21.05)
Cough	25 (65.79)
Hemoptysis	1 (2.63)
Shortness of breath	12 (31.58)
Vomiting or diarrhea	8 (21.05)
Pain in a muscle or joint	2 (5.26)
<b>Disease severity</b>	
Mild	6 (15.79)
Moderate	30 (78.95)
Severe	1 (2.63)
Critical	1 (2.63)
<b>Treatment</b>	
Antibiotics	27 (71.05)
Antifungal drugs	1 (2.63)
Antiviral drugs	37 (97.37)
Glucocorticoids	8 (21.05)
Albumin	12 (31.58)
Immunoglobulin	7 (18.42)
Thymosin	24 (63.16)
Oxygen therapy	15 (39.47)
Common	13 (34.21)
HFNC	2 (5.26)
PE	1 (2.63)
TCM	37 (97.37)

HFNC, high-flow nasal cannula; PE, plasma exchange; TCM, traditional Chinese medicine.

and isolating individuals with a travel history to epidemic areas and who present with COVID-19-like symptoms.

## DISCUSSION

In the current study, we summarized our implementation of various strategies and measurements to prevent and control COVID-19 infection in Liaocheng, a third-tier Chinese city. Our data showed that there were only 38 confirmed COVID-19 cases with no deaths in Liaocheng since the COVID-19 pandemic began in late 2019 through June 25, 2020. Our successful strategies and measurements led the Shandong provincial government to down-classify of our city on March 7, 2020 to a Level 2 risk response area and on March 10, 2020 to a low risk response area. At the time of this publication, our city has had no new cases or cross infection or contamination cases among patients and the medical staff. In conclusion, we implemented a successful model that could be emulated by similar-size cities worldwide to prevent and control the spread of COVID-19.

Among the 38 patients in our current study, eight had no symptoms or signs of infection, 20 presented with a low fever ( $\leq 38^{\circ}\text{C}$ ), and only three presented with a high fever. These clinical characteristics differed from regular signs of respiratory system infections, such as the common cold or flu. Among the 38 patients, 37 received TCM treatments and showed good responses. The TMCs included jin hua qing gan granules, lian hua qing wen capsules, and other prescriptions issued by TMC doctors. Because of the orders issued by the city government, Liaocheng successfully controlled the COVID-19 pandemic; however, globally the pandemic is far from contained, and we will continue to reinforce and follow the government orders and regulations to prevent and control another possible COVID-19 epidemic in our city.

## REFERENCES

- Kannan S, Shaik Syed Ali P, Sheeza A, Hemalatha K. COVID-19 (novel coronavirus 2019) - recent trends. *Eur Rev Med Pharmacol Sci.* (2020) 24:2006–11. doi: 10.26355/eurrev\_202002\_20378
- Zhai P, Ding Y, Wu X, Long J, Zhong Y, Li Y. The epidemiology, diagnosis and treatment of COVID-19. *Int J Antimicrob Agents.* (2020) 55:105955. doi: 10.1016/j.ijantimicag.2020.105955
- Ge H, Wang X, Yuan X, Xiao G, Wang C, Deng T, et al. The epidemiology and clinical information about COVID-19. *Eur J Clin Microbiol Infect Dis.* (2020) 39:1011–9. doi: 10.1007/s10096-020-03874-z
- Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). *Int J Surg.* (2020) 76:71–6. doi: 10.1016/j.ijsu.2020.02.034
- Ramphul K, Mejias SG. Coronavirus disease: a review of a new threat to public health. *Cureus.* (2020) 12:e7276. doi: 10.7759/cureus.7276
- Ding J, Fu H, Liu Y, Gao J, Li Z, Zhao X, et al. Prevention and control measures in radiology department for COVID-19. *Eur Radiol.* (2020) 30:3603–8. doi: 10.1007/s00330-020-06850-5
- Hamner L, Dubbel P, Capron I, Ross A, Jordan A, Lee J, et al. High SARS-CoV-2 attack rate following exposure at a choir practice - Skagit County, Washington, March 2020. *MMWR Morb Mortal Wkly Rep.* (2020) 69:606–10. doi: 10.15585/mmwr.mm6919e6
- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* (2020) 395:507–13. doi: 10.1016/S0140-6736(20)30211-7
- Grant MC, Geoghegan L, Arbyn M, Mohammed Z, McGuinness L, Clarke EL, et al. The prevalence of symptoms in 24,410 adults infected by the novel coronavirus (SARS-CoV-2; COVID-19): a systematic review and meta-analysis of 148 studies from 9 countries. *PLoS ONE.* (2020) 15:e0234765. doi: 10.1371/journal.pone.0234765
- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet.* (2020) 395:497–506. doi: 10.1016/S0140-6736(20)30183-5
- Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents.* (2020) 55:105924. doi: 10.1016/j.ijantimicag.2020.105924
- Murthy S, Gomersall CD, Fowler RA. Care for critically ill patients with COVID-19. *JAMA.* (2020) 323:1499. doi: 10.1001/jama.2020.3633
- Heymann DL, Shindo N. COVID-19: what is next for public health? *Lancet.* (2020) 395:542–5. doi: 10.1016/S0140-6736(20)30374-3
- Long B, Brady WJ, Koefman A, Gottlieb M. Cardiovascular complications in COVID-19. *Am J Emerg Med.* (2020) 38:1504–7. doi: 10.1016/j.ajem.2020.04.048

During the past 6 months of the COVID-19 epidemic in China and in Liaocheng specifically, our residents followed the orders issued by all levels of government, which essentially prevented and controlled the COVID-19 epidemic in our city of 6.3 million people. The lessons learned from our response include the following: (1) Issue city-wide orders to close workspaces or reduce operation hours for essential facilities, like public water, gas, or telecommunication facilities, medical staff, and supermarkets. (2) Enforce social distancing. (3) Enforce body temperature checks and DNA testing, when feasible. (4) Everyone wears a facemask. (5) Quarantine and isolate individuals with a travel history to an epidemic area and who have COVID-19-like symptoms. In our approach, any individual who did not follow these orders could be arrested or prosecuted. In addition, if there was a diagnosed COVID-19 case in a building or community, that building or community was isolated (no one could enter or leave). These measurements were necessary in helping us to prevent and control COVID-19 infection. It is important to note that this report only provides insight into the prevention and control, but not into treatment strategies. Since our study only included 38 patients who did not have severe symptoms, our cohort size was too small to determine efficacy of TMC for treating COVID-19.

## DATA AVAILABILITY STATEMENT

All datasets generated for this study are included in the article.

## AUTHOR CONTRIBUTIONS

SF and MW are the principal investigators of this study. SF wrote the first draft of the manuscript. All authors conceived the study, contributed to the manuscript revision, read, and approved the submitted version.

15. Xu L, Liu J, Lu M, Yang D, Zheng X. Liver injury during highly pathogenic human coronavirus infections. *Liver Int.* (2020) 40:998–1004. doi: 10.1111/liv.14435
16. Sanders JM, Monogue ML, Jodlowski TZ, Cutrell JB. Pharmacologic treatments for coronavirus disease 2019 (COVID-19): a review. *JAMA.* (2020) 323:1824–36. doi: 10.1001/jama.2020.6019
17. Carod-Artal FJ. Neurological complications of coronavirus and COVID-19. *Rev Neurol.* (2020) 70:311–22. doi: 10.33588/rn.7009.2020179
18. Hui DS, E IA, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health - the latest 2019 novel coronavirus outbreak in Wuhan, China. *Int J Infect Dis.* (2020) 91:264–6. doi: 10.1016/j.ijid.2020.01.009

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

*Copyright © 2020 Fan, Wu, Ma and Zhao. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.*



# Are Lockdown Measures Effective Against COVID-19?

**Samer Kharroubi<sup>1\*</sup> and Fatima Saleh<sup>2</sup>**

<sup>1</sup> Department of Nutrition and Food Sciences, Faculty of Agricultural and Food Sciences, American University of Beirut, Beirut, Lebanon, <sup>2</sup> Department of Medical Laboratory Sciences, Faculty of Health Sciences, Beirut Arab University, Beirut, Lebanon

As the Coronavirus Disease 2019 (COVID-19) pandemic progresses, countries around the world are increasingly implementing a range of responses that are intended to help prevent the transmission of this disease. In the absence of a COVID-19 vaccine, we assess the potential role of containment measures to suppress the virus transmission, thereby slowing down the growth rate of cases and rapidly reducing case incidence. The aim of this study is to show that country lockdown has a critical and significant impact on the pandemic. This is explored using real time incidence data in Lebanon. We analyze COVID-19 cases in Lebanon before and after lockdown measures have been implemented. The findings show that the nationwide lockdown was effective in reducing cases and has been successful in, so far, containing the virus. This study could be an evidence-based call to continue with the lockdown measures, based on real time incidence data. Further research is encouraged.

**Keywords:** COVID-19, lockdown measures, Poisson regression model, modeling, Lebanon

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Peter James Franklin,  
University of Western  
Australia, Australia  
Jacques Oosthuizen,  
Edith Cowan University, Australia

### \*Correspondence:

Samer Kharroubi  
sk157@aub.edu.lb

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 09 April 2020

**Accepted:** 09 September 2020

**Published:** 22 October 2020

### Citation:

Kharroubi S and Saleh F (2020) Are  
Lockdown Measures Effective  
Against COVID-19?  
Front. Public Health 8:549692.  
doi: 10.3389/fpubh.2020.549692

## INTRODUCTION

Many authors have tried to predict the incidence of COVID-19 in China (1). The outbreak, nonetheless, has rapidly accelerated outside China and was declared by the World Health Organization (WHO) as a global pandemic on March 11, 2020 (2). Thus, serious debates were raised on ways to react to the transmission of this disease. China was the first to implement a complete lockdown of Wuhan and at least 16 other cities by the end of January to try to contain the causal virus (SARS-CoV-2), then the world followed, which can now be described as the largest quarantine in human history. However, an alternative approach was adopted by many countries including the UK and the US that is to achieve herd immunity. Herd immunity refers to having as many lower risk people infected as possible and thus become immune while minimizing the exposure of people who are vulnerable (3, 4).

The Lebanese Ministry of Public Health, along with its Mediterranean peers, has been explicitly attempting to limit the spread of the virus and, hopefully, eradicate it. Hence, the Lebanese government has adopted one of the strictest lockdowns in the Middle East and North Africa (MENA) region even before a single death was reported, and has isolated infections to keep the disease at bay. As a matter of fact, the Lebanese government was trying to combat COVID-19 amid its worst financial and economic crisis since the Lebanese civil war and at a time of wide spread protests raging across the country demanding political and economic reforms.

In this study we aim to show, with real time incidence data, that the country lockdown imposed by the Lebanese government will have a critical and significant impact on reducing the spread of the virus and eventually containing it. More specifically, we present results of an analysis



of COVID-19 cases in Lebanon pre- and post-lockdown measures. The data show that post-lockdown daily cases decreased, thereby, demonstrating that the lockdown measures have been successful in, so far, containing the disease. To the best of our knowledge, this study would be the first in the Middle East to analyze and predict the spread of COVID-19 before and after containment measures such as lockdowns have been implemented, and would therefore be of benefit to neighboring countries until similar studies are conducted in the region.

## METHODS AND RESULTS

On February 21, Lebanon, a small country in the Middle East, reported the first case of COVID-19 for a 45-year-old woman traveling from Iran. With a deepening economic crisis and lack of robust health system, the arrival of the coronavirus was unwelcome and particularly alarming. However, the government imposed strict measures in response to COVID-19 with a strategy to flatten the curve while increasing the capacity of the health care system to adequately respond to this pandemic. A week after the first case was confirmed, the Lebanese government announced the closure of all educational institutions. On March 6, the Ministry of Public Health declared that Lebanon is no longer in COVID-19 containment stage and thus urged the public to avoid gatherings followed by closure of all theaters, gyms, restaurants and pubs. On the 15th of March, the Lebanese government declared a state of health emergency and adopted sweeping measures, including full lockdown, shutting down airport, imposing travel restrictions and completely sealing the borders, as part of the country's efforts to combat the spread of COVID-19. All of these measures have the potential to suppress the virus transmission from one person to another, thereby, slowing down the growth rate of cases and rapidly reducing case incidence. It is perhaps worth commenting that containment measures implemented in Lebanon to date are in line with WHO's recommendations, and are similar to those implemented by other countries. New Zealand, for example, adopted strict lockdown measures before a single death was reported (March 23) with the aim to eradicate the virus.

In terms of numbers, as of March 24, a total of 304 cases of COVID-19 has been declared in Lebanon (5). At the country level, the incidence rate was equivalent to 39 cases per 1 million of the Lebanese population. In comparison to other countries, this was in line with New Zealand (38 cases/1 million of New Zealanders), which is widely regarded as having done a good job of managing the spread of COVID-19 and has a slightly smaller population—5.3 million compared with Lebanon's 6 million. However, the incidence rate seemed to be well below countries where the outbreak has started around the same time but has been substantial (e.g., Italy: 1,057 cases/1 million; Spain: 708 cases/1 million), yet higher than other countries in the Middle East (Jordan: 11 cases/1 million; Saudi Arabia: 16 cases/1 million) (6). Over the last 2 weeks (March 21–April 3), the growth of new cases appeared to be slowing down (5). This could give rise to critical and highly significant questions: Are containment measures working? Does this recent data

suggest that the measures are effective and starting to show an impact?

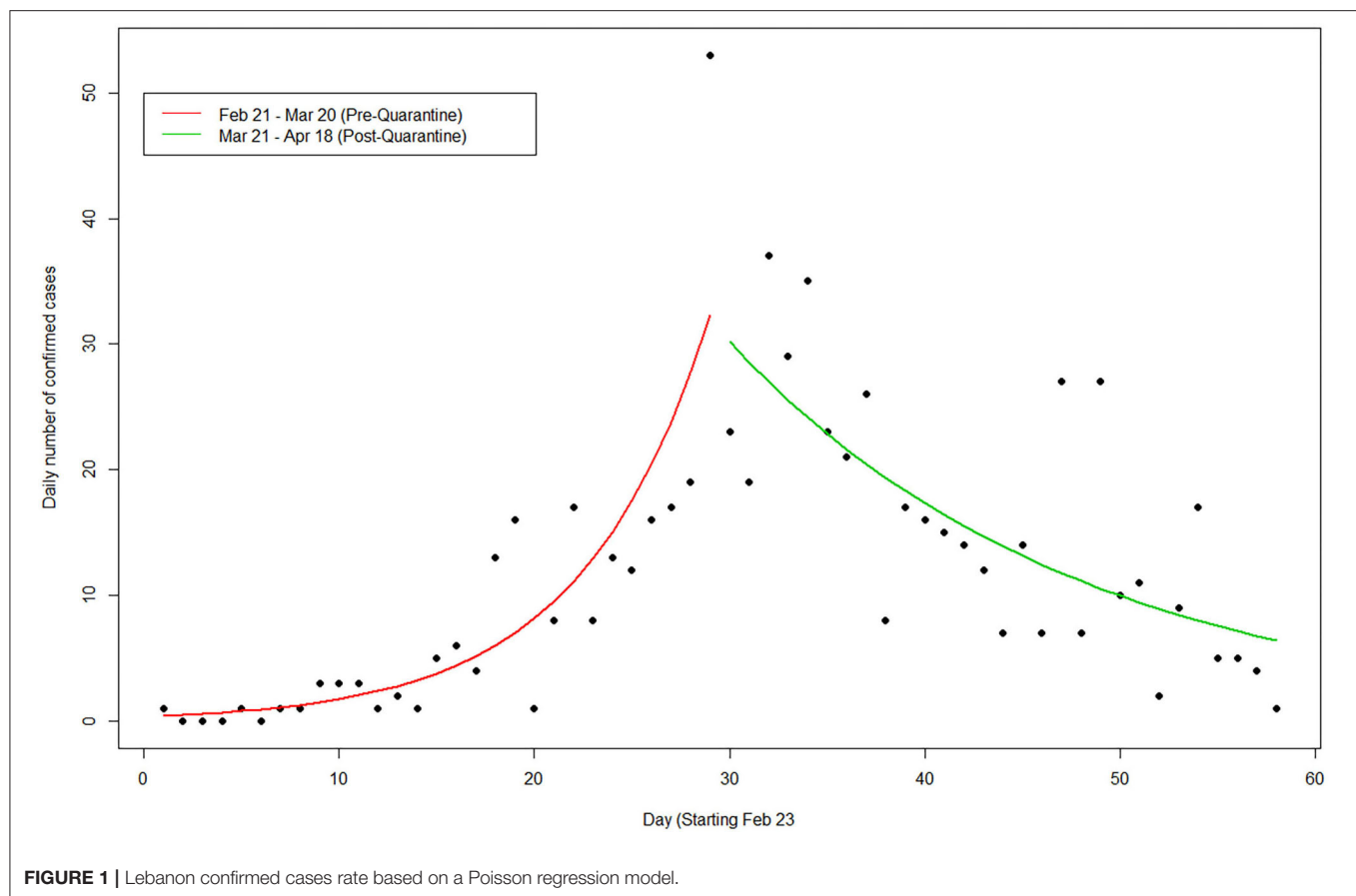
To answer these questions, the incidence of COVID-19 in Lebanon was predicted by applying a Poisson regression model using data on the daily number of new COVID-19 occurrences since 21st of March. In statistics, Poisson regression is a generalized linear model form of regression analysis used to model count data as a function of a set of predictor variables. A model of this kind has been extensively used both in human and in veterinary epidemiology to investigate the incidence and mortality of many different infectious diseases, for instance malaria (7), SARS (8), MRSA (9), Ebola (10), and mastitis (11). Herein, we propose to adapt this model to the COVID-19 contagion in Lebanon. All analyses were carried out using the statistical software R (12).

The Poisson regression model was applied pre- and post the nationwide lockdown enforced by the Lebanese government. The pre-quarantine period started from February 21 (when the first case of COVID-19 was reported) until March 20 (a week after wide-reaching lockdown measures were announced). The post-quarantine included the period from March 21–April 18, which showed the recent reduction in the number of new cases being recorded each day. The resulting predicted mean occurrences using the Poisson model pre- and post-quarantine along with the actual occurrences are depicted in **Figure 1**. As can be seen from the plot, the Poisson model (red line) showed a significant growth trajectory in the number of cases during the pre-quarantine period. **Figure 1** also revealed an inflection point where the growth of cases has slowed down and the number of cases has declined significantly during the post-quarantine period (green line). This supports the claim that the containment measures implemented were effective at this stage in containing the outbreak.

## DISCUSSION

As the COVID-19 pandemic progresses, countries worldwide are increasingly implementing a broad range of responses that are intended to help preventing the spread of this disease. Our results demonstrate that it will be extremely important to continue to enforce and/or adhere to containment measures implemented in Lebanon. These measures have shown to have a critical and significant impact and appeared to be crucially effective, given the growth of new cases has slowed down significantly as well as the overall number of new cases has potentially decreased over the past month.

This has been shown in other countries that introduced early, and even delayed, locked down. New Zealand, for example, was unique among western countries in adopting strict lockdown measures to eradicate the virus and the early results were promising. The rate of new infections has decreased to the lowest in a matter of weeks, and the death toll was one of the lowest among developed nations. Other countries resorted to such measures only after fatalities soared. Nations including the UK and the US opted for such mitigation and suppression efforts after they found themselves overwhelmed by cases. More specifically,



when the UK announced its lockdown on March 23, it had 6,650 Covid-19 cases and 335 people had already died (2).

However, when assessing how countries approached the coronavirus pandemic, Lebanon, being a small country in the Middle East, is sure to stand out given the crumbling economy, political chaos and the overstretched and fragmented healthcare system. The crisis in Syria has forced millions of Syrians to flee their country and find refuge outside Syria. Lebanon, in particular, hosts an estimate of 1.5 million Syrian refugees which is the largest number of refugees per capita. Now several years into the Syrian crisis, the Lebanese healthcare system is already vastly strained and overstretched. Another challenge facing the healthcare sector is the shortage of medical supplies (for example, mechanical ventilators and protective gear) necessary to deal with the COVID-19 pandemic given that all supplies are imported in US dollars and there is currently extreme dollar shortage in the country along with the liquidity crunch and the de facto devaluation of local currency.

Further significant challenge worth mentioning is that enforcement of a lockdown without socio-economic support is not sustainable. In Lebanon, a high proportion of the society already lives under the poverty line and the country's recent economic turmoil adds insult to injury. Economic conditions continue to worsen creating a level of hardship that many families

found themselves unable to cope with. Governmental and non-governmental organizations as well as international agencies have been discussing different types of social and economic supports. However, these have not been materialized sufficiently yet. Thus, as a matter of urgency, extensive coordination, support, and more engagement of local communities and municipalities must be employed to ensure people continue to adhere to containment measures.

Despite all the above challenges, the early response of the Ministry of Public Health in handling the pandemic, Lebanon's relatively young population and the crucial role the media played in launching "stay at home" campaigns and spreading fear and panic amongst Lebanese, have all helped in the fight against COVID-19. At the region-level, the governmental decision, in an unprecedented move, to shut down its land borders, airport, and seaports at an early stage of the pandemic has played a significant role in controlling the spread of the virus as well as maintaining the lowest rate of infection among the surrounding countries and in the region.

We believe this study could be an evidence-based call to continue with the lockdown measures, based on real time incidence data. We predict that the country lockdown will have an impact on the pandemic, under the assumption that people continue to adhere to containment measures. These measures need to remain in place for as much of the epidemic period

as possible. We stress that strict enforcement of these measures should be coupled with increased testing (and ensure that testing is available for free), contact tracing and various socio-economic support to citizens to ensure and enhance compliance. We also emphasize it is not certain that these containment measures will remain effective in the long term. Future decisions on time and length of containment to relax measures will need to be informed by ongoing surveillance. Perhaps, close monitoring of the situation in Lebanon in the coming weeks will possibly help shape strategies in other countries.

To this end, this small middle-eastern country, swinging on the edge of economic ruin and political chaos, has somehow

performed something right and timely when it comes to COVID-19.

## AUTHOR CONTRIBUTIONS

SK participated in the data acquisition, data analysis, data interpretation, manuscript drafting, and the final review of the manuscript. FS participated in the conceptualization of the idea, the design of the methodology, data interpretation, the writing of the original manuscript draft, and the final review of the manuscript. All authors have read and given final approval of the version to be published.

## REFERENCES

1. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in china: summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*. (2020) 323:1239–42. doi: 10.1001/jama.2020.2648
2. World Health Organization. *Coronavirus Disease 2019*. (2020). Available online at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (accessed April 1, 2020).
3. Horton R. Offline: COVID-19—a reckoning. *Lancet*. (2020) 395:935. doi: 10.1016/S0140-6736(20)30669-3
4. Kwok KO, Lai F, Wei WI, Yeung S, Wong S, Tang J. Herd immunity—estimating the level required to halt the COVID-19 epidemics in affected countries. *J Infect*. (2020) 80:e32–3. doi: 10.1016/j.jinf.2020.03.027
5. Ministry of Public Health. *Novel Coronavirus 2019*. (2020). Available online at: <https://www.moph.gov.lb/en/Pages/2/24870/novel-coronavirus-2019> (accessed April, 1, 2020).
6. Worldometer. *Coronavirus Cases*. (2020). Available online at: <https://doi.org/10.1101/2020.01.23.20018549V2> (accessed April 1, 2020).
7. Segun OE, Shohaimi S, Nallapan M, Lamidi-Sarumoh AA, Salari N. Statistical modelling of the effects of weather factors on malaria occurrence in Abuja, Nigeria. *Int J Environ Res Public Health*. (2020) 17:3474. doi: 10.3390/ijerph17103474
8. Hwang SW, Cheung AM, Moineddin R, Bell CM. Population mortality during the outbreak of Severe Acute Respiratory Syndrome in Toronto. *BMC Public Health*. (2007) 7:93. doi: 10.1186/1471-2458-7-93
9. Garvey MI, Wilkinson MAC, Bradley CW, Holden KL, Holden E. Wiping out MRSA: effect of introducing a universal disinfection wipe in a large UK teaching hospital. *Antimicrob Resist Infect Control*. (2018) 7:155. doi: 10.1186/s13756-018-0445-7
10. Levy B, Odoi A. Exploratory investigation of region level risk factors of ebola virus disease in West Africa. *PeerJ*. (2018) 2018:e5888. doi: 10.7717/peerj.5888
11. Zadoks RN, Allore HG, Hagenaars TJ, Barkema HW, Schukken YH. A mathematical model of *Staphylococcus aureus* control in dairy herds. *Epidemiol Infect*. (2002) 129:397–416. doi: 10.1017/S0950268802007483
12. R Core Team. *R: A Language and Environment for Statistical Computing*. Vienna (2016). Available online at: <https://www.R-project.org/> (accessed April 1, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Kharroubi and Saleh. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# Public Health and Risk Communication During COVID-19—Enhancing Psychological Needs to Promote Sustainable Behavior Change

Talya Porat<sup>1\*</sup>, Rune Nystrup<sup>2</sup>, Rafael A. Calvo<sup>1</sup>, Priya Paudyal<sup>3</sup> and Elizabeth Ford<sup>3</sup>

<sup>1</sup> Dyson School of Design Engineering, Imperial College London, London, United Kingdom, <sup>2</sup> Leverhulme Centre for the Future of Intelligence, University of Cambridge, Cambridge, United Kingdom, <sup>3</sup> Brighton and Sussex Medical School, University of Sussex, Brighton, United Kingdom

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Gregory Dore,  
University of New South  
Wales, Australia  
Ranjeet Kumar Sinha,  
Patna Medical College, India

### \*Correspondence:

Talya Porat  
t.porat@imperial.ac.uk

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 16 June 2020

**Accepted:** 17 September 2020

**Published:** 27 October 2020

### Citation:

Porat T, Nystrup R, Calvo RA, Paudyal P  
and Ford E (2020) Public Health and  
Risk Communication During  
COVID-19—Enhancing Psychological  
Needs to Promote Sustainable  
Behavior Change.  
Front. Public Health 8:573397.  
doi: 10.3389/fpubh.2020.573397

**Background:** The current COVID-19 pandemic requires sustainable behavior change to mitigate the impact of the virus. A phenomenon which has arisen in parallel with this pandemic is an infodemic—an over-abundance of information, of which some is accurate and some is not, making it hard for people to find trustworthy and reliable guidance to make informed decisions. This infodemic has also been found to create distress and increase risks for mental health disorders, such as depression and anxiety.

**Aim:** To propose practical guidelines for public health and risk communication that will enhance current recommendations and will cut through the infodemic, supporting accessible, reliable, actionable, and inclusive communication. The guidelines aim to support basic human psychological needs of autonomy, competence, and relatedness to support well-being and sustainable behavior change.

**Method:** We applied the Self-Determination Theory (SDT) and concepts from psychology, philosophy and human computer interaction to better understand human behaviors and motivations and propose practical guidelines for public health communication focusing on well-being and sustainable behavior change. We then systematically searched the literature for research on health communication strategies during COVID-19 to discuss our proposed guidelines in light of the emerging literature. We illustrate the guidelines in a communication case study: wearing face-coverings.

**Findings:** We propose five practical guidelines for public health and risk communication that will cut through the infodemic and support well-being and sustainable behavior change: (1) create an autonomy-supportive health care climate; (2) provide choice; (3) apply a bottom-up approach to communication; (4) create solidarity; (5) be transparent and acknowledge uncertainty.

**Conclusion:** Health communication that starts by fostering well-being and basic human psychological needs has the potential to cut through the infodemic and promote effective and sustainable behavior change during such pandemics. Our guidelines provide a starting point for developing a concrete public health communication strategy.

**Keywords:** public health, health communication (MESH), risk communication, COVID-19, coronavirus, infodemic, behavior change, well-being

## BACKGROUND

The World Health Organization (WHO) is leading and coordinating the global effort to respond to the coronavirus disease (COVID-19) outbreak, however, it is also fighting a second “disease”—an infodemic (1). An infodemic is an overabundance of information, of which some is accurate and some is not, making it hard for people to find trustworthy and reliable guidance to make informed decisions (2). This adds to the natural difficulties in making decisions and adhering to recommendations, and may increase distress and the risks for common mental health disorders (3). Studies during the COVID-19 outbreak already show that the high prevalence of mental health problems, especially anxiety, and depression among the general population, is positively associated with frequent social media exposure (4).

In the age of social media, the infodemic phenomenon is amplified, information spreads faster and further than the science (1), leading even faster to information overload, including misinformation and myths. The COVID-19 pandemic is characterized by inconsistent, ambiguous, contradicting messages and absence of clear, actionable, credible, and inclusive information from authorities that people trust, leaving space for other actors to fill the void irresponsibly. Politicians, officials, media, celebrities, and even heads of state, have been elevating disinformation, posing a risk to global health and safety (5). It is therefore important to understand what sources of information and modes of communication are trusted and popular among the population and how communicators can tap into them to make sure their communication strategy is most effective.

Health communication is an essential tool for achieving public health objectives, including facilitating and supporting behavior change and eliminating health discrepancies (6). Effective risk communication is crucial for enhancing understanding of health threats and to support the public in making informed decisions for mitigating the risks (7). Poor communication is often a factor in enabling public concerns to escalate and groups to become polarized (8). “The public” may be accused of ignoring scientifically sounded and sensible advice and “those in charge” may be perceived as untrustworthy and secretive (8).

Due to excess demand for trustworthy and timely information about COVID-19, WHO has established the Information Network for Epidemics (EPI-WIN), which defined “simplifying knowledge” as one of the strategic areas of work to respond to the infodemic—the challenge being to translate the knowledge into actionable and behavioral change messages (2). In this pandemic, massive and fast behavioral change is critical (9)

with the need to provide the public with actionable information for health protection (10), while taking into consideration the needs of vulnerable populations (11). Experience from previous pandemics may be helpful in understanding human behavior in public health crises, but many things have changed including the virus and its spread, the ways people collect and search for information and the ways authorities such as WHO communicate with the public via social media (9). In addition, pandemics like COVID-19 are unique in the sense that face to face interactions are limited and people have to rely on remote platforms like social media and news outlets to gain information.

Thus, there is a need for enhanced communication guidelines and strategies that cut through the infodemic by better understanding human behaviors and motivations (12) and that are: (1) accessible; (2) reliable; (3) useful; (4) actionable; (5) acceptable; (6) inclusive; (7) consistent; (8) understandable, and (9) promote sustainable behavior change to mitigate the impact of the virus.

Decades of research show that individuals and societies can only prosper in environments that foster basic psychological needs, such as autonomy and competence (13). Evidence from the Self Determination Theory [SDT: (14, 15)] shows that by maximizing one’s experience of autonomy (meaning, volition, choice), competence (feeling effective and mastery), and relatedness (feeling cared for by others, trusted and understood), the control of health-related behaviors is likely to be internalized, and behavior change is likely to be maintained (13).

Developing a sense of autonomy, competence and relatedness are critical for self-regulating and sustaining behaviors that improve health and well-being. This means that environments and contexts that foster autonomy, confidence, and trust are likely to enhance adherence and improve health outcomes (13).

Previous research has shown a positive effect of meeting these psychological needs (autonomy, competence and relatedness) on mental health (fewer depressive symptoms), physical health and quality of life, including increased physical activity, reduced smoking, and improved adherence to prescribed medications (16, 17). We are not aware of previous literature in health communication that has applied the SDT framework and integrated concepts from psychology, philosophy and human computer interaction.

The COVID-19 pandemic requires long-term strategies and sustainable behavior changes. Engaging the public and enhancing intrinsic motivation is imperative for these changes to be sustainable and foster well-being.

## METHOD

We applied the self-determination theory [SDT: (14, 15)] and concepts from philosophy [e.g., (18–21)] and human computer interaction [e.g., (22, 23)] to propose practical guidelines that will enhance current public health communication recommendations and address the above needs by fostering the basic human psychology needs of autonomy, competence, and relatedness. We then systematically searched the literature for research on health communication strategies during COVID-19 to discuss our proposed guidelines in light of the emerging literature.

We searched the literature in MEDLINE/PubMed and EMBASE. The search was up to August 2020 using the terms “COVID-19” (OR “corona,” “2019-nCoV,” “SARS-COV-2”) AND “communication” AND “strategy” (OR “strategies”), restricted to studies in English. Papers were included if they related to government communication strategy for the general public dealing with COVID-19. Papers relating to specific diseases, mental health, emergency departments, and search trends were excluded.

SDT was selected as a conceptual framework, since it is an empirically-validated approach to identify factors that promote sustained motivation, behavior change and well-being (24). In addition, compared to other motivational and behavior change theories and techniques, it is specifically focused on the processes which one acquires the motivation to change his/her behavior and sustain it over time (16).

The domain of health communication integrates theoretical and methodological approaches from diverse disciplines—including public health, communication, public relations, and anthropology. Since insights from numerous fields may enhance our understanding of how people behave in crisis, what motivates them, how they perceive the risk we face and how it relates to psychological needs (9), we integrated concepts relating to autonomy, competence and relatedness also from psychology, human computer interaction (HCI) and philosophy. Psychology contributes in understanding people’s behavior and motivations, philosophy acts as a guiding principle for behavior and brings considerations of ethics, such as explainability and transparency, and HCI puts people in its center, focusing on usable, accessible and inclusive interfaces and interactions, which is very relevant when most of the communication is digitalised.

### Case Study: Wearing Face-Coverings

One of the most inconsistent and ambiguous messages to the public during COVID-19 is whether the public should wear face masks/face-covering and if so, which type and under what circumstances.

Only recently (June 5th), WHO revised their recommendations advising the general public to wear fabric masks in settings where physical distancing of at least 1 m is not possible [WHO, June 7]. This comes after recommending masks only for those with COVID-19 symptoms earlier this year (25). There was consistency in the recommendation that symptomatic individuals and those in healthcare setting should wear a mask, however discrepancies were observed in recommendations to the general public and community settings (26). The main reasons

for these discrepancies were the limited evidence on their efficacy in preventing respiratory infections during epidemics; the need to preserve limited supplies of face masks for professional use in healthcare settings; the argument that face masks may create a false sense of security and lead to neglecting other important measures such as hand hygiene and social distancing, and that people may not wear them properly or repeatedly touch their mask, causing more harm than good (26, 27). Recent research has shown that face masks could reduce the transmission of the virus (28, 29), resulting in many governments advising or mandating the use of masks for healthy individuals in the community. However, there are still debates on the potential risks of wearing masks, such as unintended negative consequences and the effectiveness of different face coverings (30, 31).

Given the poor communication at the level of public health or government, particularly in some western nations on the population benefit of face coverings, at the end of the Findings section we illustrate how the guidelines could be applied for encouraging people to wear face-coverings in public during this pandemic (see Table 1).

## FINDINGS

In this section, we use SDT as a framework, and identify concepts from psychology, philosophy and HCI to foster each of the three basic psychological needs: autonomy, competence, and relatedness, to propose practical guidelines for public health communication during pandemics such as COVID-19. For each guideline, we then discuss the emerging research from our systematic literature search.

The systematic literature search resulted in 253 articles (after removing duplicates and non-English articles). Two hundred six papers were excluded based on title and abstract screening, and 27 were excluded after reading the full paper. A total of 20 papers matched the inclusion criteria (36, 38–56).

Out of the 20 papers included in this overview, 12 papers focused on issues relating to autonomy [i.e., cultural values, voluntary adoption of preventative measures, societal tightness vs. looseness; (36, 38–48)]; five papers related to issues of competence [i.e., adjusting messages to context, public involvement; (46, 49–52)] and nine addressed relatedness (sense of community, trust) (36, 38, 42, 46, 51, 53–56). Some of the papers addressed more than one issue. These findings are discussed in more detail under each of the proposed guidelines.

### Public Health and Risk Communication Guidelines

#### Fostering Autonomy

Behavior change is more effective and sustainable when people are autonomously motivated (17). According to the Self-Determination Model of Health Behavior Change (16), an autonomy-supportive health care climate (e.g., providing choice, taking the patients’ perspectives) facilitates satisfaction of the basic psychological needs and respects patient choice. However, a controlling health care climate uses external pressure to move people toward desired outcomes (15). Common forms of

**TABLE 1** | A summary of the proposed guidelines for public health communication and their application to the “face-covering” case study.

Guideline	Description	Example	Case study: wearing face-covering	Psychological need
Create an autonomy-supportive health care climate	Utilize identified regulation by providing relevant information and meaningful rationales for change, and not applying pressures and external controls that detract from a sense of autonomy and choice. One's motivation will reflect personal value of the behavior's outcomes (e.g., “Stay home, protect the NHS, save lives” —UK coronavirus campaign). Rapid, clear, consistent, and repetitive messages with meaningful rationale for change and reflecting personal value has the potential to cut through the infodemic and increase adherence to preventative measures.	“I will adhere to the requirements because I value their benefits”	Encourage wearing masks or face covering by emphasizing the rationale and value. E.g., “ <i>Your mask protects me, my mask protects you</i> ” (Czech Republic Masks4All campaign) (32). While encouraging the public to wear face covering, acknowledge and inform the public that some people may not be able to wear a mask due to disability (e.g., anxiety, prior trauma, lung disease, deafness) to avoid mask-shaming situations, where mask-wearing is promoted so strongly that people who do not wear masks get abused for not doing so (31).	Autonomy
Provide choice within the limitations	In addition to what the public cannot do (e.g., social interactions), provide information on what they can do in this situation. Advise people to be proactive and take actions that are constructive and directly relate to the crisis they are facing.	“I feel helpful rather than helpless”	Provide different choices: preparing a mask at home (with simple instructions), a home-made mask delivered to your home for free, buying a fabric-mask online, option to personalize your mask. Volunteering to make home-made masks for others and distributing them. Prioritize the situations where masks are most important (e.g., on crowded public transport or in shops), and where they are less important (in the open air, and not in a crowd), so that individuals feel empowered to choose to wear the mask at the most appropriate time and feel able to competently decide how to prioritize its use in case of scarcity. Provide choice for people who cannot wear a mask due to disability, for example, maintain social distancing, wear a visor.	Autonomy
Apply a bottom-up communication	Enhance accessibility, usability and inclusiveness by creating messages that are actionable and can be integrated into people's circumstances. Engage stakeholders in a co-production process to elicit and identify informational needs of a given audience: what decisions or inferences are important for that audience to make? And what information do they need to make those decisions/inferences successfully? Look to the science/evidence available. If sufficient information is available to satisfy the informational needs of the audience, consider how it can be tailored to serve those information needs. Recognize cultural and age-related differences and sensitivities. Recommendations should be realistic for the vulnerable, disabled and poorest in society. If there is no sufficient information, consider how the uncertainty/incompleteness can best be communicated. Actionable messages that can be integrated into people's circumstances can cut through the infodemic since they are easier to follow and adhere to, compare to ambiguous and generic guidance.	“This is advice which relates to my circumstances and is easy for me to follow”	Engage different audiences in co-production to understand their needs and facilitators/barriers to acquire and wear a mask. Inclusiveness: To be inclusive, there will be a need in addition to preparing and distributing home-made masks, to hand out disposable masks in the entrance of populated places (e.g., tube stations, malls, schools). This is already done in several countries (e.g., China, Israel). Note that some groups will struggle with mask-wearing (hard of hearing, neurodiverse individuals) and reassure people that if a majority of the community comply with mask-wearing, it does not matter if some individuals cannot comply. Accessibility: The way the information is communicated must be accessible (e.g., different languages, visual only, audio only), including clear and simple instructions on how to make, use and wash the masks, and the channels used (social media, traditional media, brochures, hotlines, information boards, local communities and representatives). See recent guidelines from OCHA, 2020 (33).	Competence

(Continued)

TABLE 1 | Continued

Guideline	Description	Example	Case study: wearing face-covering	Psychological need
Create solidarity	Communicate the social norm, for example that the clear majority of people are restricting themselves to protect others. Avoid “us vs. them mentality.” Emphasize desired behaviors rather than punishment for perceived breaches.	“I feel part of the community”; “we are all in this together”	<p>Actionable: Consider also choices or decision trees: if you can't buy disposable masks then make your own mask at home, or ask for a fabric-mask to be delivered to your home (via website, phone number, text message), etc. This would allow people to tailor advice to their own situation.</p> <p>Clarity: clear communication on the intended plan and its duration (e.g., for how long people are expected to wear masks).</p> <p>People of power and celebrities all wearing a mask (e.g., Zuzana Caputova president of Slovakia, matching her fabric mask with her outfit) (34).</p> <p>Emphasize acts of solidarity, e.g., industries repurposing their manufacturing capacity to address mask shortages (35), volunteers producing home-made masks and distributing them (32).</p> <p>Consider using nudges to inform the social norm (36), for example, that others within the community are wearing masks in shops.</p>	Relatedness
Be transparent and acknowledge uncertainty	Communicate epistemic transparency: What is known? What is still uncertain? What scientific evidence is used to inform a given policy or piece of advice? And value transparency: What political value judgements are the decisions based on? What overall aim/strategy is being pursued? What trade-offs are being made? To enhance dissemination of the information, collaborate with trusted and popular sources on social media and news outlets.	“I feel the authorities want my best interests.”	<p>Epistemic transparency: Be honest about the evidence of the efficiency of face masks and face covering for COVID-19, and provide the rationale for encouraging to wear them (e.g., that the wearing of masks by the general public as a form of source control is important in severe pandemics, since even partial protection could have a meaningful impact on transmission) (37). Emphasize the need to continue to adhere to the hygiene and social distancing requirements.</p> <p>Value transparency: The need to preserve limited supplies of face masks for professional use in healthcare settings, is an argument that does not address the question whether a mask is recommended for use by the public. It is an argument for the need to manufacture more masks or for advocating homemade face coverings, not for denying them from the public (27).</p> <p>Manufacturing of face masks, both fabric masks and disposable masks is required.</p> <p>Research is urgently needed to determine the efficiency of disposable masks and cloth masks, including recommended fabric, thickness, closeness of fit, during this pandemic (27), and communication should be regularly updated to present the new evidence.</p>	Relatedness



controlled motivation are *external regulation*, in which one acts only to avoid punishment, accord with social pressure or get a reward and *introjection regulation*, in which one acts to receive approval or avoid guilt feelings. According to SDT, both of these forms of controlled regulation may improve positive outcomes only for a short period of time [e.g., (57)]. In a meta-analysis study analyzing the relationships between mental and physical health and autonomy supportive and controlling healthcare climates, a clear relationship was found between introjected regulation and negative psychological outcomes such as anxiety and depression (17).

In contrast, autonomous motivation can result in a sustainable change. Common forms of autonomous motivation are *identified regulation* and *integrated regulation*. *Identified regulation* is when one supports or identifies with the virtue or importance of a behavior. Identification is facilitated when healthcare professionals, local governments or health authorities provide applicable information and meaningful rationales for change, and do not apply pressure and external controls (16). Providing meaningful rationales for change may also enable the public to reason about the advice. For example, by understanding what it is trying to achieve and how, we might be better able to think about what else can be done, when it is not feasible to strictly follow the advice or how to balance it against other considerations. *Integrated regulation* is when a person not only values a behavior but has adapted this behavior as part of his/her values and lifestyle. For example, healthcare professionals promote integration by supporting patients when they face barriers to change by identifying compatible pathways to health. According to SDT, both of these regulations enhance sustainable behavior change and well-being (15, 16). This means that even if something is not enjoyable (intrinsically motivating), we can be motivated to engage with it if our motivation is autonomous (24).

A recent study examining adolescents' motivations and engagement in social distancing and their mental health during COVID-19, found that the common reported motivations for social distancing were social responsibility and not wanting someone to get sick. Social responsibility motivations were associated with more social distancing. In contrast, adolescents who noted that they were adhering to social distancing due to lack of alternatives reported less social distancing. Thus, adolescents who are motivated by a lack of alternatives may stop social distancing if it will be less convenient or there will be more appealing alternatives (58).

This pandemic requires adherence to several measures, where some are needed for personal protection against the infection (e.g., hand hygiene, avoiding direct contact with an infected person) and some are required for the protection of the society as a whole (e.g., staying at home, social distancing) and depend on a strong sense of community solidarity and shared responsibility. The use of masks includes both motivations (personal and courtesy to others) (59). Fostering autonomy and an autonomy-supportive climate might be beneficial not only to motivate people to adhere to personal protection measures but also for motivating and enhancing collective responsibility to defeat the virus as a joint effort and return to normalcy.

As part of an autonomy-supportive climate, providing choice is a central requirement for autonomy perception. In HCI, interfaces that offer options and choices of use, and do not in turn demand actions from users without their consent, enhance feelings of autonomy (24). Therefore, to foster autonomy, health authorities, and local governments should be encouraged to create an autonomy-supportive health care climate by enhancing autonomous motivation (Guideline 1) and providing choice within the limitations (Guideline 2).

### ***Guideline 1: create an autonomy-supportive health care climate***

In dealing with the new COVID-19 pandemic, different countries and governments have adopted different strategies to communicate guidelines and requirements to the general public. Some countries motivate the public to change behavior and adhere to the new requirements by using controlled motivation such as external regulation, thus, through mere authority and coercion. Other countries use autonomous motivation, such as identified regulation—making one understand, endorse, and identify with the value or importance of a behavior.

The 12 papers (36, 38–48) relating to autonomy that were identified in the systematic search, show an agreement that rapid, clear and decisive response, effective management, and public adherence to social norms were critical to slow the trajectory of the virus in the early stages.

Countries with high levels of cultural tightness (strict norms and little tolerance for deviance) and government efficiency were found to have lower mortality rates compared with countries that have only one of these factors or neither (38). People in tight nations may be more willing to adhere to cooperative norms (e.g., effective handwashing, physical distancing). In loose-nations (weak social norms and high tolerance of deviant behavior), such as the United States, citizens expect the government to provide sufficient information and rationale to justify taking away their individual and social freedom (36). There is also evidence that a more democratic and participative style (vs. autocratic or directive style) was more effective in managing the pandemic (39).

Taiwan is an example for effective pandemic management because of its low COVID-19 infection and mortality rates, which have been partly attributed to the clear communication of appropriate behavior, efficiency of its government's resource coordination, and the voluntary adherence to social norms by its citizens (38, 43).

Findings also show that to enhance effective management and adherence to social norms during this pandemic, interventions will need to be tailored to fit differences in countries' unique circumstances, while respecting their values, cultures, and belief systems (45–48). However, there is agreement that authoritarian responses to COVID-19 may cause long-term damage to the autonomy and health of citizens, as they often reflect self-serving motives, lack of transparency, and limited information sharing (38).

Adjusting the communication strategy to the culture and values is important, but this does not contrast with our first recommendation, that governments, particularly in loose

nations, should strive to foster an autonomy-supportive health care climate, which motivates individuals to engage in health-related behaviors for their own reasons, promotes success in dealing with barriers and resistance to change, and enhances emotions of acceptance, trust, and respect. This can be done by utilizing identified regulation. In addition, clear, consistent, and repetitive messages with meaningful rationale for change and reflecting personal value have the potential to cut through the infodemic and increase adherence to preventative measures. This approach is particularly important as it becomes clear that such messaging may play a role in public health for months or years, and not for a few weeks as was initially projected.

### ***Guideline 2: provide choice within the limitations***

The COVID-19 pandemic has resulted in many constraints and limitations on the public, including social distancing, requirement to stay at home, screening, testing, contact tracing, and travel restrictions (60). Many of these constraints are counter-intuitive and difficult to comply with, such as keeping away from grandparents, who are most vulnerable in this pandemic.

In these situations, understanding what people can do in addition to what they cannot do is important. It is useful to advise people to be proactive and do things that are constructive and directly relate to the crisis they are facing (61). Taking action and being proactive during a crisis can help to redevelop a sense of control and overcome emotions of helplessness and hopelessness (62). Helping the public feel in control and empowered on some parts of their lives may also decrease fear (61). One paper from the systematic search related to this aspect (46) emphasized the importance of understanding one's limitations (making changes that are possible and accepting what cannot be changed), reversing negative thoughts and knowing one's strengths during this pandemic. This can be supported by resilience training, which could enhance health ownership and self-efficacy (46).

### **Fostering Competence**

Internalization requires experiencing the competence and confidence to change. In healthcare, competence is fostered when professionals provide relevant information and feedback (16). The patient is given the skills and tools for change, and is supported when barriers arise (16). Acquiring a feeling of competence is promoted by autonomy. Once people are autonomously engaged and have high willingness to act, they are then most inclined to learn and apply new methods and competencies (63).

Competence, or feeling capable and effective, is a familiar need to HCI and usability experts, as usability heuristics are based on the needs for competence and autonomy (24). For example, the amount, type and clarity of the feedback provided and the intuitive design of the interface and controls, all impact the users' empowerment and engagement via increased competence (24). Accessibility, which is an important requirement for feeling competent, is a major concern in health technologies, which may include poor interface design or complex information that excludes parts of the population, such as elderly or

disabled patients, from accessing a particular service or from understanding or acting on the recommendations (64).

To design an accessible and usable interaction, HCI researchers and practitioners follow a user-centered design approach (22). This is done by designing a system based on the user's needs and requirements and by involving users and stakeholders in the design process (23). This collaboration with users is commonly termed "co-production" which in current policy agendas is defined as a way of incorporating people's expertise into health services and research ethics in more meaningful and substantial ways (65, 66). This process of community engagement encourages a more equal partnership and reinforces the importance of listening to and celebrating the voices of communities to gain deeper understanding of the issues, thus helping to create knowledge and implement the findings for transformational social change (67–69). Using a co-production approach in health research was found to identify stakeholders' pain points and research ideas (70, 71), ensures that the proposed interventions are in line with stakeholders' needs (72, 73) and was found to improve health and social care outcomes for people with long-term conditions and resultant disabilities (74, 75). Co-production is still quite limited in its use to produce communication tools for public health messages.

In a pandemic, where the confusion is high, actionable messages supporting decision making are required, and people need the competence or the capability to act on these messages. High level requirements or guidelines will be dismissed if one cannot adhere to the requirement or does not know how to comply. Recommendations should be concrete, localized, accessible (e.g., in accessible formats), actionable and inclusive—tailored to different audiences and linguistically and culturally appropriate (60, 76), and adaptable to their context and tensions with real life. For example, if an individual has COVID-19 symptoms, the UK advice is to isolate from members of their household—sleep in a spare room and use a second bathroom. This type of advice is not actionable for those who live as a family of five in a one bedroom flat. Other advice has been to work from home, again this is not actionable for individuals who work as cleaners or construction workers. This type of advice from public health authorities appears to be applicable only to a wealthier section of society, and falls wide of the mark for much of the population (76). If it had been end-user tested before being released, it could have avoided the disdain with which it was received.

When planning a public health communication strategy, special attention should be given to vulnerable groups, including homeless people, people without adequate employment, immigrants, communities of color, people with disabilities, certain frontline workers (60). It is important to engage these groups and organizations that represent vulnerable and disabled people in decision making to understand their needs and how best to communicate and disseminate information. Failure to respect their needs will seriously undermine response efforts (60). A concern over the disproportionate impact of COVID-19 on the Black, Asian and minority ethnic (BAME) communities in the UK and US has already been raised (76, 77).

Community engagement is important not just for formulating and communicating the messages but also on implementing these messages, as risk communication messages not only have personal implications but also have significant implications at community level (for example, closure of religious places, parks, and shops).

Thus, engaging users and taking their perspective (bottom-up approach) to design an intervention that is actionable and tailored to their values and needs (while removing obstacles), results in an intervention that is usable, accessible and inclusive (Guideline 3). This enhances their autonomy and competence, making users feel understood and enables them to perform their tasks effectively and efficiently, with increased satisfaction (22).

### **Guideline 3: apply a bottom-up (vs. top-down) communication using principles of co-production**

WHO EPI-WIN defined “simplifying knowledge” as one of the strategic areas of work to respond to the infodemic, defining it as “ways of interpreting and explaining the science to different audiences” (2). This implies a top-down model of science communication—we have “the science” or “the evidence” and the aim is to “simplify,” “explain,” or “interpret” it so that a given audience understands it. This seems related to the “information deficit model” (78), which is associated with a defined separation between experts who have the information and non-experts who do not, and suggests that communication should focus on enhancing the transfer of information from experts to non-experts (79). This model has been criticized on theoretical and pragmatic grounds (80).

Within this top-down framing, normative analysis starts from “the science/evidence.” It suggests that the ideal is for the audience to understand all of it perfectly but that we have to simplify the information because of the audience limitations. It also assumes that as long as the audience have understood it correctly, they will definitely act on its meaning, and there will be no other barriers to them acting on it. There are two main problems with this approach: (1) it suggests that understanding the science is valuable for its own sake, that the default aim is for the audience to understand as much as possible. Constraints to this aim stem from the limited ability of the audience to understand. The specific purposes or values of a given audience are not foregrounded by default; (2) it suggests that the science/evidence is unproblematic or complete and uncontested. It does not foreground (by default) the possibility that the science/evidence might be uncertain or incomplete, might change in future, or might implicitly encode value assumptions that are not shared by a given audience (20, 81).

An alternative framing would start bottom-up, from the informational needs of a given audience: What decisions or inferences are important for that audience to make in order to stay safe and healthy (given their specific values and context)? And what information do they need to make those decisions/inferences successfully? Philosophers have defended bottom-up approaches to explanation [e.g., (18, 19)]. Here we propose that this approach should be adopted for public health communication as well. This is particularly important since

the main rationale for seeking out information is to reduce uncertainty about a decision (82) and information seeking in the health context is an important element in coping with a disease and health-related uncertainty.

Once the informational needs of a given audience have been identified, then we can look to the science or evidence available. Is sufficient information available to satisfy the informational needs of the audience? If it is, consider how information can be tailored to serve those information needs. If not, consider how the uncertainty/incompleteness can best be communicated. Again, the aim is to tailor the communication based on how it will impact the ability of the audience to take competent action. Rather than thinking (primarily) about how information can be tailored to the cognitive limitations of the audience (simplifying knowledge), focus on how the information can be tailored to serve their needs. Rather than (or in addition to) thinking about the cognitive limitations of the audience, think (also) about the limitations of the available science/evidence and translating the science into meaningful messages that resonate with the realities of people’s circumstances.

Five papers relating to a bottom-up approach were identified in the systematic literature search (46, 49–52). All papers emphasized the importance of contextualizing communication strategies to different populations and engaging communities and the public in decision making.

Taiwan was given as an example for its human-centric approach by understanding that successful management of the virus requires cooperation and trust from the public (50). The government has engaged with various sectors of the society, enhancing public support, and instead of forcing laws to ban religious mass gatherings, the government reached an understanding with local religious leaders which resulted in postponing mass events voluntarily.

Therefore, our third recommendation is to use a bottom-up communication approach by engaging stakeholders, to enhance accessibility, usability, and inclusiveness by creating messages that are actionable and can be integrated into people’s circumstances. These messages can cut through the infodemic since they are easier to follow and adhere to compare to ambiguous and generic guidance.

### **Fostering Relatedness**

According to SDT, relatedness is the feeling of being understood, trusted, and cared for by others. It also relates to belonging, trusting others and contributing to others (13). In healthcare, the relationship between the practitioner and the patient is critical for enhancing change. Patients look for the guidance and feedback of professionals and therefore a sense of being understood, respected and cared for is necessary to form an experience of trust and connection that will allow internalization to happen (16). Health communication is similar in this respect, the relationship between local governments and health authorities to the public is crucial for behavior change. People need to feel respected, cared for and understood for trust to occur. In addition, they would like to feel part of a community.

Trust in health authorities is linked to attitudes and behaviors in many aspects, having implications on vaccination adherence,

clinician-patient relationships, treatment adherence, and seeking care (83). Underserved communities, such as people with disabilities and communities of color, are particularly distrustful of public health authorities and institutions, since they have been historically abused and undertreated in the healthcare system (60). When the government credibility is low, people question the reliability of the official information and the ability of the authorities to handle the outbreak situation.

A recent survey (84) suggests that UK citizens are more likely to trust COVID-19 information from their workplace than from the government and official sources. The survey also implies that people in the US and UK are less trusting of official information on the pandemic than in other countries such as Germany. WHO and local scientific advisors are shown to be a trusted source of information by almost all countries. The recent decision of the US to withdrawal from WHO (85), might influence the trust people have toward WHO, perhaps in a negative way.

A study on popular tweets following a case of diphtheria in Spain (86) found that individual journalists and authors of popular science were the most popular sources for disseminating health information on Twitter, tweeting mainly personal opinionated messages and engaging with followers, leading journalists and the public to be more interconnected in real time. Furthermore, the authors found that health organizations did not publish any of the popular tweets. This could suggest that it could be useful for healthcare organizations to collaborate with popular journalists and authors of popular science to disseminate health information on social media, while addressing misinformation and public concerns in accessible ways (86).

Previous research has shown that trust leads to trust-related behaviors such as making a purchase, sharing personal information, or performing an action on a website (87). In HCI, particularly in designing decision support systems (DSS), trust in the knowledge base is an enabler of DSS use. When healthcare professionals trust the system, they will use it, but when they do not trust the system, it would not be used (88).

Trust begins with communication, and communicating information during outbreaks is challenging, particularly as our knowledge of a virus or a disease evolves (89). This emphasizes the importance of building trust and respect well in advance, rather than at the time of the outbreak. Trust is identified as a multidimensional concept including three types of trust beliefs: benevolence, competence and integrity (90).

*Benevolence trust* is the degree to which trustees act in trustors' interests based on altruism (87, 91). This means that benevolent trustees select to help trustors even without a requirement or reward to do so. In the context of public health communication, benevolence trust indicates how much the public perceives health and official authorities to act in their interests, such as caring about their health, trying their best to solve their health issues and keeping personal information safe. When benevolence trust beliefs are high, people are more likely to feel cared for and seek health information. Both autonomy and relatedness are important to support benevolence trust beliefs (90).

*Competence trust* is the degree to which trustees are capable of meeting trustors' needs (87). In relation to public health communication, individuals' competence trust depends on

whether individuals believe that official authorities are capable of providing relevant health information and whether the health information can solve the health-related issues. If the public feels that the authorities are competent, the trust in such information may be high. This might not be the case in developing countries where governments are corrupt and their motives are often questionable.

*Integrity trust* is defined as the degree of trustees' reliability and honesty (87) and indicate whether individuals believe that official authorities are honest in what they know and what they don't know and in their motivations. When people feel that they interact with others that honestly care about their health and well-being and do not have other agendas such as promoting certain health services or gaining money then their perceived relatedness increases (90).

The authorities' response to an outbreak can enhance morale and spirit of public solidarity that contributes to outbreak control (59). However, if scientific uncertainty is not communicated properly to the public, it can aggravate the situation making it difficult for solidarity. In addition, during outbreaks, such as COVID-19, the advice needs to be based on emerging facts rather than established facts (for example, a loss or change to your sense of smell or taste was added to the symptom list later on during the outbreak in the UK).

Thus, for people to feel relatedness and trust in local governments and health authorities, they need to feel part of the society and community (Guideline 4) and perceive the communication as transparent and honest (Guideline 5).

#### **Guideline 4: create solidarity (we are all in this together)**

A key strategy in health communication is communicating the social norm. A recent study (9) found that people are willing to restrict their everyday life to "flatten the curve" and decrease the burden for the healthcare system. However, their motivation to restrict their everyday life was even higher when the need was to protect vulnerable others. Communicating the social norm, that the vast majority of people are restricting themselves to protect others, encourages others to do the same. It creates solidarity at a time when everybody needs it and people may suffer from the non-health-related issues of the pandemic (9).

Six papers from the systematic search related to solidarity and sense of community (36, 38, 46, 51, 53, 54). Findings showed that communicating the social norm during COVID-19 could improve adherence (36, 38, 53). For example, nudges that inform what others within the community are doing had a positive influence on citizens' behavior (36) and are particularly important in loose cultures, which are more likely to resist increased constraint. However, such nudges need to maintain people's sense of autonomy or they may backfire and elicit psychological reaction (38).

In contrast, political communication, as was seen in the US (i.e., propagating conspiracy beliefs, using war language) contributes to "us vs. them" mentality, which may undermine people's sense of collective support and care and lead to individualistic behaviors such as hoarding, which was seen in this pandemic (46, 54). Furthermore, messages that emphasize



desired behaviors are likely to lead to higher adherence than those that emphasizes punishment for perceived breaches (46).

#### **Guideline 5: be transparent and acknowledge uncertainty**

Public trust is injured when governments or health authorities downplay the true risk posed by a crisis or have caused panic by overstating a potential threat. Honesty about what is known and what is unknown is a critical component of transparency (92), and the ability of authorities to apologize frankly if a mistake was made.

Lack of transparency breeds rumors, confusion, speculations, and engenders mistrust leading people to seek information from unreliable sources (60). Social media offers a fruitful platform for misinformation to be disseminated. Accurate information provided by trusted clinicians and scientists that emphasize the facts and not the myth (93) can help mitigate the spread of misinformation. Health communication experts can directly counter false information and narratives while promoting reliable sources of health information (92).

Philosophers of science have emphasized the importance of transparency for creating (ethically well-placed) trust in science-informed policy (20, 21, 81, 94). They highlight the importance of both epistemic and value transparency (95) in communications by local governments and health authorities. Epistemic transparency: What is known? What is still uncertain? What scientific evidence is used to inform a given policy or piece of advice? Value transparency: What political value judgements are the decisions based on? What overall aim/strategy is being pursued? What trade-offs are being made?

In addition to public trust, transparency could enforce careful and accountable decision making as the shortcomings are likely to be revealed. This is particularly important in the context of a global crisis, where many governments are simultaneously seeking to address the same problem. Individual governments may feel incentivised to present policy as purely evidence-based, to avoid taking responsibility for potentially controversial political judgements. However, if governments pursue different policies, the public will notice the discrepancy and start asking questions. If good answers are not forthcoming, this can breed distrust and lead people to start speculating about what the “real” motives behind the policies are and to seek out alternative sources of information. For example, there has been widespread confusion as to whether the UK government is pursuing (or has pursued) a “herd immunity” strategy, fuelling speculation that this was a deliberate “cold-blooded experiment in social engineering” (96). Apparently, the term was used in early messaging to help justify their proposed social distancing measures. Though the government has since disavowed the use of this term, there is speculation that the government continues to pursue the herd immunity strategy. This is arguably reinforced by the fact that other governments have adopted different strategies for managing the pandemic, highlighting that the UK’s approach was not the only one possible. A clearer and more transparent account of the overall strategy would have helped avoid the resulting distrust.

Five papers relating to transparency and trust were identified in our systematic search (42, 46, 54–56). Findings show that trust is a critical factor influencing the public’s adherence to

preventative measures during COVID-19. For example, the Romanian public lost trust in its healthcare system after years of corruption, which resulted in citizens not reporting truthfully about their travels and disregarding the government’s restrictions (55). In the US, individuals interpreted the COVID-19 threat in partisan-patterned ways, with Republicans following party leaders in dismissing the threat and taking less actions than did Democrats (54). In a recent survey in the US, only 23% of respondents expressed high levels of trust in COVID-19 information given by the President, where in Australia, the government’s response was rated highly (42). This could explain the higher adherence of preventative measures in Australia vs. the US, and the more effective management of the pandemic.

Thus, our last recommendation is to communicate with both epistemic and value transparency, while acknowledging uncertainty. Trust is probably the most important criterion in fighting the infodemic. Trusted sources have the power to influence people, however there is no trust without trustworthiness, and governments and other authorities should strive to gain the public’s trust by being honest, transparent, informing early in the outbreak and acknowledging uncertainty and mistakes.

## **DISCUSSION**

This paper proposes practical guidelines for public health and risk communication, starting from addressing humans’ basic psychological needs of autonomy, competence, and relatedness. Fostering these needs during this pandemic has the potential to cut through the infodemic and maintain our well-being, while enhancing our intrinsic motivation to adhere to the required behavior change (e.g., staying at home, social distancing, hand hygiene) for longer periods of time.

The COVID-19 pandemic requires long-term strategies and sustainable behavior changes. The requirements and expectations from the public during this long period are extreme (i.e., staying at home, social distancing), and have serious implications for the privacy, freedom and wellbeing of citizens (97). Restrictive or mandatory measures need to be proportionate and well-explained and justified, if they are to be effective and to receive the support and trust of the public (97).

Health communication has an important role in influencing, supporting and engaging individuals, communities, healthcare professionals, policymakers, and the public to adopt and sustain a behavioral practice that will ultimately improve health outcomes (98). When the restrictions on the public are so extreme and limiting, health communication strategies that focus on enhancing basic psychological needs such as autonomy, competence and relatedness (within the limitations) are critical for maintaining well-being and motivation to adhere to these requirements for a long period of time.

To cut through the infodemic and support wellness and sustainable behavior change, we applied the SDT as a framework and used concepts from philosophy, psychology and HCI to discuss how these concepts can be applied to health communication during the COVID-19 pandemic to enhance human’s basic psychological needs of autonomy, competence and relatedness. These three needs are linked together and are all



essential for ongoing psychological growth and well-being (14). This resulted in proposing five practical guidelines, which gained initial support from the emerging literature on the effectiveness of different communication strategies during COVID-19.

To foster *autonomy*, we propose to (1) create an autonomy-supportive health care climate and (2) provide choice within the limitations.

A common concern across disciplines such as public health and philosophy, is the tension and balance between ensuring the safety of people and respecting their right to autonomy (64, 99). As the findings show, communication strategy should be tailored to the culture, values and context, and therefore one may argue that an autonomy-supportive healthcare culture may not “work” in some cultures or countries and that without external regulation (e.g., enforceable legislation), the adherence might be low. For example, the message might not get through the infodemic, might not be trusted, people might not find it actionable if it is in conflict with other things that are important to them, or they might find it hard to prioritize it (e.g., stay at home vs. going to work and earning money to feed their family). In the short-term controlled motivation by external regulation may be effective (people may obey), if the rationale is explained transparently. In the longer term, people may get tired from the strict measures, resulting, as is already evidenced in this pandemic, in breaches of lockdowns, domestic violence (100), street violence and demonstrations (101), police brutality (102), and “quarantine fatigue” (48).

Furthermore, a strict and closed list of “essential” reasons that people may go out of their house for (e.g., buying food, doctor appointment), cannot cover all the needs of individual cases, particularly when it relates to mental health. Whilst we may be able to identify what is “essential” to us on an individual basis, it is impossible to define what is essential to someone else (103). Measures to respond to COVID-19 are essential. However, they should also be ethical, proportionate, and subject to robust democratic accountability (97). There should be strong countervailing arguments to denying people, properly informed about the risks, to make choices about how to live their lives (97).

To foster *competence*, we propose to (3) apply a bottom-up communication. Conventionally, scientists and decision-makers apply top-down approaches to communicate and engage with the public (104). At the current time, organizations such as WHO look for ways to address the infodemic by “simplifying knowledge,” thus, applying a top-down approach where the aim is to take the existing science and simplifying it so the public (different audiences) will understand. We propose to apply a bottom-up approach that will start from understanding the informational needs of a given audience based on the decisions they have to make in their specific context and circumstances, and tailor the information to satisfy these informational needs. This means that some communication strategies would have to be formulated locally to take into account local demographics and needs, devolved to e.g., city councils. This is in line with “explainability,” a concept in philosophy and HCI, that has been recently discussed extensively in the context of Artificial Intelligence (Explainable AI). Explanations are provided to support transparency, where users can see aspects of the inner state of the AI system and support them in making

decisions (105). Explainable recommendations help to improve the transparency, effectiveness, trustworthiness and satisfaction of recommendation systems (106). According to Miller (107) the main reason that people want explanations is to facilitate learning, enabling them to create a conceptual model where they can predict and control future phenomena (105). Thus, this bottom-up approach will enable providing messages that are inclusive, actionable, and integrated into people’s circumstances and hence have better chances to cut through the infodemic. Furthermore, a bottom-up approach which engages the public enhances trust which builds confidence in the authorities’ ability to manage and control the situation (7).

Engaging different audiences and understanding their specific circumstances and needs is critical in designing interventions that will be inclusive and address those needs. Historically, risk communication during crisis has been inaccessible to vulnerable people, including people with disabilities, cognitive limitations or low literacy levels (108) resulting in them not receiving information and being able to act in a timely manner (11). Initiatives such as Community Citizen Science (CCS) which embraces participatory democracy to influence policymaking and address local concerns, should be encouraged and applied (104).

To foster *relatedness*, we propose to (4) create solidarity and (5) be transparent and acknowledge uncertainty. Community activism evidenced in the current COVID-19 emphasizes the critical and impactful role of the public and the importance of the bottom-up approach in engaging the public in decision making which enhances the understanding of the experiences and concerns of those affected. Engaging the public and being transparent and honest about the decision making process is critical for changing behavior and community initiatives such as the above. Governments cannot just ask for people to trust them, they have to earn trust and do so in the right ways. They should not just be trusted but also be trustworthy. Trust and transparency go together: we can only trust if we are well-informed and understand what is being asked from us (109).

The proposed guidelines are a starting point for developing a multidisciplinary comprehensive public health communication strategy that fosters well-being and sustainable behavior change at its core. While some of the guidelines we propose have been discussed previously in the context of health communication, such as transparency and trust [e.g., (59)], these guidelines enhance and strengthen their importance by providing supporting evidence from a different perspective and practical and actionable ways to act on them. Other proposed guidelines such as fostering an autonomy-supportive climate and applying a bottom-up approach are unique and novel in this context.

While these guidelines are based on evidence from other domains, and gained initial supporting evidence from this pandemic, they will need to be validated in the context of public health communication during such pandemics. The factors affecting the pandemic outcomes in different countries is complex, and their medium and long-term social, psychological, and economic costs are far from being understood. Thus, part of the preparedness for future health crises should include a robust analysis of the best strategies for public cooperation and communication (12).

## CONCLUSION

Health communication that starts by fostering well-being and basic human psychological needs, has the potential to cut through the infodemic and promote effective and sustainable behavior change during such pandemics. Our guidelines provide a starting point for developing a concrete public health communication strategy.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

## REFERENCES

- Zarocostas J. How to fight an infodemic. *Lancet*. (2020) 395:676. doi: 10.1016/S0140-6736(20)30461-X
- World Health Organisation. *Infodemic Management – Infodemiology. Ad-Hoc Technical Consultation on Managing the COVID-19 Infodemic*. Available online at: <https://www.who.int/teams/risk-communication/infodemic-management> (accessed April 7–8, 2020).
- Shultz JM, Baingana F, Neria Y. The 2014 ebola outbreak and mental health: current status and recommended response. *JAMA*. (2015) 313:567–8. doi: 10.1001/jama.2014.17934
- Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S, et al. Mental health problems and social media exposure during COVID-19 outbreak. *PLoS ONE*. (2020) 15:e0231924. doi: 10.1371/journal.pone.0231924
- Kassam N. “Disinformation and Coronavirus”. The Interpreter. Lowy Institute. (2020). Available online at: <https://www.loyinstitute.org/the-interpreter/disinformation-and-coronavirus> (accessed March 25, 2020).
- Freimuth VS, Quinn SC. The contributions of health communication to eliminating health disparities. *Am J Public Health*. 94:2053–5. doi: 10.2105/AJPH.94.12.2053
- Lowbridge CP, Leask J. Risk communication in public health. *N S W Public Health Bull*. (2011) 22:34. doi: 10.1071/NB10055
- Bennett P, Calman K, Curtis S, Fischbacher-Smith D. *Risk Communication and Public Health*. Oxford: Oxford University Press (2010). doi: 10.1093/acprof:oso/9780199562848.001.0001
- Betsch C. How behavioural science data helps mitigate the COVID-19 crisis. *Nat Hum Behav*. (2020) 4:438. doi: 10.1038/s41562-020-0866-1
- Heymann DL, Shindo N. COVID-19: what is next for public health? *Lancet*. (2020) 395:542–5. doi: 10.1016/S0140-6736(20)30374-3
- Bista SB. *Sapana Basnet Bista: Covid-19 and the Neglect of People with Disabilities in Communication Campaigns*. *The BMJ Opinion*. (2020) Available online at: <https://blogs.bmj.com/bmj/2020/05/06/sapana-basnet-bista-covid-19-and-the-neglect-of-people-with-disabilities-in-communication-campaigns/> (accessed May 6, 2020).
- Challenger M. Viral information overload: persuading people to act during a pandemic requires a better understanding of human motivations. *Nuffield Council on Bioethics*. (2020). Available online at: <https://www.nuffieldbioethics.org/blog/viral-information-overload-persuading-people-to-act-during-a-pandemic-requires-a-better-understanding-of-human-motivations> (accessed April 2, 2020).
- Ryan RM, Deci EL. *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. New York, NY: Guilford Press (2017). doi: 10.1521/978.14625/28806
- Deci EL, Ryan RM. The “what” and “why” of goal pursuits: human needs and the self-determination of behavior. *Psychol Inq*. (2000) 11:227–68. doi: 10.1207/S15327965PLI1104\_01

## AUTHOR CONTRIBUTIONS

TP and RN: conception of the study. TP, RN, RC, PP, and EF: review of the literature, analysis, interpretation of themes and guidelines, revising the paper critically for important intellectual content, and sign-off final version of manuscript. TP: initial draft of manuscript. All authors contributed to the article and approved the submitted version.

## FUNDING

RN was funded by Wellcome Trust [213660/Z/18/Z] and by the Leverhulme Trust through the Leverhulme Center for the Future of Intelligence.

- Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*. (2000) 55:68–78. doi: 10.1037/0003-066X.55.1.68
- Ryan R, Patrick H, Deci EL, Williams GC. Facilitating health behaviour change and its maintenance: interventions based on self-determination theory. *Eur Health Psychol*. (2008) 10:2–5. doi: 10.1.1.460.1417&rep=rep1&type=pdf
- Ng JY, Ntoumanis N, Thøgersen-Ntoumani C, Deci EL, Ryan RM, Duda JL, et al. Self-determination theory applied to health contexts: a meta-analysis. *Pers Psychol Sci*. (2012) 7:325–40. doi: 10.1177/1745691612447309
- Wilkenfeld D. Function Explaining: a new approach to the philosophy of explanation. *Synthese*. (2013) 191: 3367–91. doi: 10.1007/s11229-014-0452-z
- Potochnik A. Scientific explanation: putting communication first. *Philos Sci*. (2016) 83:721–32. doi: 10.1086/687858
- Elliott KC, Resnik DB. Science, policy, and the transparency of values. *Environ Health Persp*. (2014) 122:647–50. doi: 10.1289/ehp.1408107
- Elliott KC. *A Tapestry of Values: An Introduction to Values in Science*. Oxford: Oxford University Press (2017) doi: 10.1093/acprof:oso/9780190260804.001.0001
- Norman DA, Draper SW. *User Centered System Design: New Perspectives on Human-Computer Interaction*. Boca Raton, FL: CRC Press (1986) doi: 10.1201/b15703
- Wickens CD, Lee JD, Liu Y, Becker SG. *An Introduction to Human Factors Engineering*. 2nd ed. Upper Saddle River, NJ: Pearson (2004).
- Peters D, Calvo RA, Ryan RM. Designing for motivation, engagement and wellbeing in digital experience. *Front Psychol*. (2018) 9:797. doi: 10.3389/fpsyg.2018.00797
- World Health Organisation. *Advice on the Use of Masks in the Context of Covid-19: Interim Guidance*. Available online at: [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak) (accessed June 5, 2020).
- Feng S, Shen C, Xia N, Song W, Fan M, Cowling BJ. Rational use of face masks in the COVID-19 pandemic. *Lancet Respir Med*. (2020) 8:434–6. doi: 10.1016/S2213-2600(20)30134-X
- Greenhalgh T, Schmid MB, Czypionka T, Bassler D, Gruer L. Face masks for the public during the covid-19 crisis. *BMJ*. (2020) 9:369. doi: 10.1136/bmj.m1435
- Viola IM, Peterson B, Pisetta G, Pavar G, Akhtar H, Menoloascina F, et al. Face coverings, aerosol dispersion and mitigation of virus transmission risk. *arXiv Preprint arXiv*. (2020).
- Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *Lancet*. (2020) 395:1973–87. doi: 10.1016/j.lancet.2020.07.040
- Matuschek C, Moll F, Fangerau H, Fischer JC, Zanker K, van Griensven M, et al. Face masks: benefits and risks during the COVID-19 crisis. *Eur J Med Res*. (2020) 25:32. doi: 10.1186/s40001-020-00430-5

31. Hanna ES. Rapid response to: face coverings for covid-19: from medical intervention to social practice. *BMJ*. (2020) 370:m3021. doi: 10.1136/bmj.m3021
32. Czech Republic Masks4All campaign. #Masks4All. *Movement for Population-Wide use of Homemade Masks as Critical Protective Equipment Against Covid-19*. Available online at: <https://masks4all.org/> (accessed September 4, 2020).
33. UN Office for the coordination of humanitarian affairs (OCHA). *COVID-19: How to Include Marginalized and Vulnerable People in Risk Communication and Community Engagement Update #1*. Available online at: <https://reliefweb.int/report/world/covid-19-how-include-marginalized-and-vulnerable-people-risk-communication-and-0> (accessed April 20, 2020).
34. Williams S. Coronavirus: How face masks are becoming fashionable. *BBC*. (2020) Available online at: <https://www.bbc.co.uk/news/world-52691164> (accessed May 16, 2020).
35. Reagan C. Retailers shift production to make masks, gowns for health-care workers in coronavirus pandemic. *CNBC Online*. (2020) Available online at: <https://www.cnn.com/2020/03/26/coronavirus-retailers-make-masksgowns-for-healthcare-workers.html> (accessed Mar 26, 2020).
36. Al-Hasan A, Yim D, Khuntia J. Citizens' adherence to COVID-19 mitigation recommendations by the government: A 3-country comparative evaluation using web-based cross-sectional survey data. *J Med Intern Res*. (2020) 22:e20634. doi: 10.2196/20634
37. World Health Organisation. *Non-Pharmaceutical Public Health Measures for Mitigating the Risk and Impact of Epidemic and Pandemic Influenza*. (2019). Available online at: [https://www.who.int/influenza/publications/public\\_health\\_measures/publication/en/](https://www.who.int/influenza/publications/public_health_measures/publication/en/) (accessed September 4, 2020).
38. Gelfand MJ, Jackson JC, Pan X, Nau D, Dagher M, Van Lange P, et al. The importance of cultural tightness and government efficiency for understanding COVID-19 growth and death rates *arXiv [Preprint]*. (2020). doi: 10.31234/osf.io/m7f8a
39. Garikipati S, Kambhampati U. *Leading the Fight against the Pandemic: Does Gender Really Matter?* *arXiv [Preprint]*. (2020) doi: 10.2139/ssrn.3617953
40. Duan T, Jiang H, Deng X, Zhang Q, Wang F. Government intervention, risk perception, and the adoption of protective action recommendations: Evidence from the COVID-19 prevention and control experience of China. *Int J Environ Res Public Health*. (2020) 17:3387. doi: 10.3390/ijerph17103387
41. Guest JL, del Rio C, Sanchez T. The three steps needed to end the COVID-19 pandemic: bold public health leadership, rapid innovations, and courageous political will. *JMIR Public Health Surveill*. (2020) 6:e19043. doi: 10.2196/19043
42. Henderson J, Ward PR, Tonkin E, Meyer SB, Pillen H, McCullum D, et al. Developing and maintaining public trust during and post-COVID-19: can we apply a model developed for responding to food scares? *Front Public Health*. (2020) 8:369. doi: 10.3389/fpubh.2020.00369
43. Ratzan SC, Sommarivac S, Rauh L. Enhancing global health communication during a crisis: lessons from the COVID-19 pandemic. *Public Health Res Pract*. (2020) 30:3022010. doi: 10.17061/phrp3022010
44. Zhang L, Li H, Chen K. Effective risk communication for public health emergency: reflection on the COVID-19 (2019-nCoV) outbreak in Wuhan, China. *InHealthcare*. (2020) 8:64. doi: 10.3390/healthcare8010064
45. Ataguba OA, Ataguba JE. Social determinants of health: the role of effective communication in the COVID-19 pandemic in developing countries. *Global Health Act*. (2020) 13:1788263. doi: 10.1080/16549716.2020.1788263
46. Habersaat KB, Betsch C, Danchin M, Sunstein CR, Böhm R, Falk A, et al. Ten considerations for effectively managing the COVID-19 transition. *Nat Hum Behav*. (2020) 4:677–87. doi: 10.1038/s41562-020-0906-x
47. Irwin RE. Misinformation and de-contextualization: international media reporting on Sweden and COVID-19. *Global Health*. (2020) 16:62. doi: 10.1186/s12992-020-00588-x
48. Malecki K, Keating JA, Safdar N. Crisis communication and public perception of COVID-19 risk in the era of social media. *Clin Infect Dis*. (2020) 16:c1aa758. doi: 10.1093/cid/c1aa758
49. Lau LL, Hung N, Go DJ, Ferma J, Choi M, Dodd W, et al. Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: a cross-sectional study. *J Global Health*. (2020) 10:011007. doi: 10.7189/jogh.10.011007
50. Lee TL. Legal preparedness as part of COVID-19 response: the first 100 days in Taiwan. *BMJ Global Health*. (2020) 5:e002608. doi: 10.1136/bmjgh-2020-002608
51. Prusaczyk B. Strategies for disseminating and implementing COVID-19 public health prevention practices in rural areas. *J Rural Health*. (2020) doi: 10.1111/jrh.12432
52. Richards T, Scowcroft H. Patient and public involvement in covid-19 policy making. *BMJ*. (2020) 370:m2575. doi: 10.1136/bmj.m2575
53. Chen X, Chen H. Differences in preventive behaviors of COVID-19 between Urban and rural residents: lessons learned from a cross-sectional study in China. *Int J Environ Res Public Health*. (2020) 17:4437. doi: 10.3390/ijerph17124437
54. Gollust SE, Nagler RH, Fowler EF. The emergence of COVID-19 in the US: a public health and political communication crisis. *J Health Polit Policy Law*. (2020) doi: 10.1215/03616878-8641506
55. Dascalu S. The successes and failures of the initial COVID-19 pandemic response in Romania. *Front Public Health*. (2020) 8:344. doi: 10.3389/fpubh.2020.00344
56. Muto K, Yamamoto I, Nagasu M, Tanaka M, Wada K. Japanese citizens' behavioral changes and preparedness against COVID-19: An online survey during the early phase of the pandemic. *PLoS ONE*. (2020) 15:e0234292. doi: 10.1371/journal.pone.0234292
57. Pelletier LG, Fortier MS, Vallerand RJ, Brière NM. Associations among perceived autonomy support, forms of self-regulation, and persistence: a prospective study. *Motiv Emot*. (2001) 25:279–306. doi: 10.1023/A:1014805132406
58. Oosterhoff B, Palmer CA, Wilson J, Shook N. Adolescents' motivations to engage in social distancing during the COVID-19 pandemic: associations with mental and social health. *J Adolesc Health*. (2020) 67:179–85. doi: 10.31234/osf.io/jd2kq
59. World Health Organization (WHO). *Outbreak Communication: Best Practices for Communicating with the Public during an Outbreak. Report of the WHO expert Consultation on Outbreak Communications*. Available online from: [https://apps.who.int/iris/bitstream/handle/10665/69138/WHO\\_CDS\\_2005.32.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/69138/WHO_CDS_2005.32.pdf?sequence=1&isAllowed=y) (accessed September 21–23, 2004).
60. Berger ZD, Evans NG, Phelan AL, Silverman RD. Covid-19: control measures must be equitable and inclusive. *BMJ*. (2020) 368:m1141. doi: 10.1136/bmj.m1141
61. Crisis and Emergency Risk Communication (CERC): *Psychology of a Crisis*. US Department of Health and Human Services. Centers for Disease Control and Prevention (2019).
62. Benight CC, Bandura A. Social cognitive theory of posttraumatic recovery: the role of perceived self-efficacy. *Behav Res Ther*. (2004) 42:1129–48. doi: 10.1016/j.brat.2003.08.008
63. Markland D, Ryan RM, Tobin VJ, Rollnick S. Motivational interviewing and self-determination theory. *J Soc Clin Psychol*. (2005) 24:811–31. doi: 10.1521/jscp.2005.24.6.811
64. Burr C, Taddeo M, Floridi L. The ethics of digital well-being: a thematic review. *Sci Eng Ethics*. (2019) 26:2313–43. doi: 10.2139/ssrn.3338441
65. Filipe A, Renedo A, Marston C. The co-production of what? Knowledge, values, and social relations in health care. *PLoS Biol*. (2017) 15:e2001403. doi: 10.1371/journal.pbio.2001403
66. NIHR, National Institute for Health Research. *Going the Extra Mile: Improving the Nation's Health and Wellbeing through Public Involvement in Research*. NIHR (2015). Available online at: <http://www.nihr.ac.uk/about-us/documents/Extra%20Mile2.pdf> (accessed September 4, 2020).
67. National Collaborating Centre for Mental Health. *Working Well Together: Evidence and Tools to Enable Co-Production in Mental Health Commissioning*. London: National Collaborating Centre for Mental Health. (2019). Available online at: <https://www.rcpsych.ac.uk/docs/default-source/improving-care/nccmh/working-well-together/working-well-together-evidence-and-tools-to-enable-coproduction-in-mental-health-commissioning.pdf> (accessed September 4, 2020).
68. NIHR Involve. *Guidance on Co-Producing a Research Project*. (2018). Available online at: [https://www.invo.org.uk/wp-content/uploads/2019/04/Copro\\_Guidance\\_Feb19.pdf](https://www.invo.org.uk/wp-content/uploads/2019/04/Copro_Guidance_Feb19.pdf) (accessed September 4, 2020).



69. London School of Hygiene & Tropical Medicine. *Risk Communications and Engagement*. (2020). Available online at: <https://www.futurelearn.com/courses/covid19-novel-coronavirus/0/steps/74692> (accessed September 4, 2020).
70. Synnot A, Bragge P, Lowe D, Nunn JS, O'Sullivan M, Horvat L, et al. Research priorities in health communication and participation: international survey of consumers and other stakeholders. *BMJ Open*. (2018) 8:e019481. doi: 10.1136/bmjopen-2017-019481
71. Sadler E, Porat T, Marshall I, Hoang U, Curcin V, Wolfe CD, et al. Shaping innovations in long-term care for stroke survivors with multimorbidity through stakeholder engagement. *PLoS ONE*. (2017) 12:e0177102. doi: 10.1371/journal.pone.0177102
72. Porat T, Marshall IJ, Sadler E, Vadillo MA, McKevitt C, Wolfe CD, et al. Collaborative design of a decision aid for stroke survivors with multimorbidity: a qualitative study in the UK engaging key stakeholders. *BMJ Open*. (2019) 9:e030385. doi: 10.1136/bmjopen-2019-030385
73. Porat T, Liao Z, Curcin V. Engaging Stakeholders in the Design and Usability Evaluation of a Decision Aid to Improve Secondary Stroke Prevention. *Stud Health Technol Inform*. (2018) 247:765–9.
74. Ottmann G, Laragy C, Allen J, Feldman P. Coproduction in practice: participatory action research to develop a model of community aged care. *Syst Pract Act Res*. (2011) 24:413–27. doi: 10.1007/s11213-011-9192-x
75. Wherton J, Sugarhood P, Procter R, Hinder S, Greenhalgh T. Co-production in practice: how people with assisted living needs can help design and evolve technologies and services. *Implement Sci*. (2015) 10:75. doi: 10.1186/s13012-015-0271-8
76. Wright M. *Public Health England's Coronavirus Advice Accused of Not Being 'Culturally Sensitive'*. (2020). Available online at: <https://www.telegraph.co.uk/news/2020/04/13/public-health-englands-coronavirus-advice-accused-not-culturally/> (accessed April 13, 2020).
77. Khunti K, Singh AK, Pareek M, Hanif W. Is ethnicity linked to incidence of covid-19? *BMJ*. (2020) 369:m1548 doi: 10.1136/bmj.m1548
78. Burgess J, Harrison C, Filius P. Environmental communication and the cultural politics of environmental citizenship. *Environ Plan*. (1998) 30:1445–46.
79. Dickson D. The Case for a 'deficit model' of science communication. *Sci Dev Netw*. (2005) 6:27. Available online at: <https://www.scidev.net/global/communication/editorials/the-case-for-a-deficit-model-of-science-communic.html>. (accessed October 11, 2020).
80. Owens S, Drifill L. How to change attitudes and behaviours in the context of energy. *Energy Policy*. (2008) 36:4412–8. doi: 10.1016/j.enpol.2008.09.031
81. Douglas H. The role of value judgements in expert reasoning. *Public Aff Q*. (2008) 22:1–18.
82. Hansen F. *Consumer Choice Behavior*. New York, NY: The Free Press. (1972).
83. Hall MA. The importance of trust for ethics, law, and public policy. *Cambridge Q Healthcare Ethics*. (2005) 14:156–67. doi: 10.1017/S096318010505019X
84. Blastland M. Coronavirus and public trust. *Winton Centre for Risk and Evidence Communication*. University of Cambridge. Available online at: <https://medium.com/wintoncentre/coronavirus-and-public-trust-e156c89be5d4> (accessed March 20, 2020).
85. Fox M, Erdman SL, Watts A. *Trump Decision to Leave WHO Endangers Global Health, Medical Groups Say*. CNN. Available online at: <https://edition.cnn.com/2020/05/29/health/who-trump-termination-reaction/index.html> (accessed May 30, 2020).
86. Porat T, Garaizar P, Ferrero M, Jones H, Ashworth M, Vadillo MA. Content and source analysis of popular tweets following a recent case of diphtheria in Spain. *Eur J Public Health*. (2019) 29:117–22. doi: 10.1093/eurpub/cky144
87. McKnight DH, Choudhury V, Kacmar C. The impact of initial consumer trust on intentions to transact with a web site: a trust building model. *J Strat Inform Syst*. (2002) 11:297–323. doi: 10.1016/S0963-8687(02)00020-3
88. Shibl R, Lawley M, Debuse J. Factors influencing decision support system acceptance. *Decis Support Syst*. (2013) 54:953–61. doi: 10.1016/j.dss.2012.09.018
89. Childress JE, Faden RR, Gaare RD, Gostin LO, Kahn J, Bonnie RJ, et al. Public health ethics: mapping the terrain. *J Law Med Ethics*. (2002) 30:170–8. doi: 10.1111/j.1748-720X.2002.tb00384.x
90. Li Y, Wang X. Seeking health information on social media: a perspective of trust, self-determination, and social support. *J Organ End User Comput*. (2018) 30:1–22. doi: 10.4018/JOEUC.2018010101
91. Mayer RC, Davis JH, Schoorman FD. An integrative model of organizational trust. *Acad Manag Rev*. (1995) 20:709–34. doi: 10.5465/amr.1995.9508080335
92. Jacobsen KH, Vraga EK. Improving communication about COVID-19 and emerging infectious diseases. *Eur J Clin Invest*. (2020) 50:e13225. doi: 10.1111/eci.13225
93. Lewandowsky S, Oberauer K. Motivated rejection of science. *Curr Dir Psychol Sci*. (2016) 25:217–22. doi: 10.1177/0963721416654436
94. Douglas, H. *Science, Policy and the Value-Free Ideal*. Pittsburgh, PA: Pittsburgh University Press. (2009) doi: 10.2307/j.ctt6wrc78
95. Nystrup R, Whittlestone J, Cave S. *Why Value Judgements Should Not Be Automated, Written Evidence Submitted to the Committee on Standards in Public Life's AI and Public Standards review*. Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/864452/Artificial\\_Intelligence\\_and\\_Public\\_Standards\\_-\\_written\\_evidence.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/864452/Artificial_Intelligence_and_Public_Standards_-_written_evidence.pdf) (accessed September 4, 2020).
96. Freedman, L. *The Real Reason the UK Government Pursued "Herd Immunity" – and Why It Was Abandoned*. New Statesman. (2020) Available online at: <https://www.newstatesman.com/2020/04/real-reason-uk-government-pursued-herd-immunity-and-why-it-was-abandoned> (accessed April 1, 2020).
97. Whittall H, Griffiths S. *COVID-19: Public Health, Public Trust and Public support*. Nuffield Council on Bioethics. (2020) Available online at: <https://www.nuffieldbioethics.org/blog/covid-19-public-health-public-trust-and-public-support> (accessed Feb 27, 2020).
98. Schiavo R. *Health Communication: From Theory to Practice*. San Francisco, CA: John Wiley & Sons (2013).
99. Van Hooren RH, Van Den Borne BW, Curfs LMG, Widdershoven GAM. Ethics of prevention: an interactive computer-tailored program. *Scand J Public Health*. (2007) 35:503–9. doi: 10.1080/14034940701271890
100. Graham-Harrison E, Giuffrida A, Smith H, Ford L. *Lockdowns around the World Bring Rise in Domestic Violence*. The Guardian. (2020) Available online at: <https://www.theguardian.com/society/2020/mar/28/lockdowns-world-rise-domestic-violence> (accessed March 28, 2020).
101. Daragahi B. *Coronavirus: Chaotic Start to Draconian Weekend Curfew Imposed on Much of Turkey*. Independent (2020). Available online at: <https://www.independent.co.uk/news/world/europe/coronavirus-turkey-draconian-weekend-curfew-news-latest-a9460721.html> (accessed April 11, 2020).
102. Sargent A. *Curfew Crackdowns in Several African Countries Kill More People than Covid-19*. France24. (2020) Available online at: <https://www.france24.com/en/20200417-papers-curfew-crackdowns-in-several-african-countries-kill-more-people-than-covid-19> (accessed April 17, 2020).
103. Crossland-Otter A. Physical health pandemic vs mental health 'epidemic': has our mental health been forgotten? *Mental Health Today*. (2020) Available online at: [https://www.mentalhealthtoday.co.uk/blog/government-policy/physical-health-pandemic-vs-mental-health-epidemic-is-our-mental-health-being-forgotten?utm\\_source=https%3a%2f%2fnews.pavpub.com%2fpavilionpublishingandmedial%2f&utm\\_medium=GatorMail&utm\\_campaign=MHT+Ebul+300420&utm\\_term=Mental+Health+Today&utm\\_content=44774&gator\\_td=7zU6uwaFo5V8%2fYRFdmLRMBczn%2bpt%2bMEQIZrqqbWPtmfmrPHrRnijsAvQjEiZroH0NRIGiUMQYuoHkx5d4YwwEa70rq%2bVBvblUyCMJdQBTccCHYOKn839jSaZerXSkD4zURohB6D2tQ7r8VzV%2fdV%2bleloyaYPwWk0mnODGYSls%3d](https://www.mentalhealthtoday.co.uk/blog/government-policy/physical-health-pandemic-vs-mental-health-epidemic-is-our-mental-health-being-forgotten?utm_source=https%3a%2f%2fnews.pavpub.com%2fpavilionpublishingandmedial%2f&utm_medium=GatorMail&utm_campaign=MHT+Ebul+300420&utm_term=Mental+Health+Today&utm_content=44774&gator_td=7zU6uwaFo5V8%2fYRFdmLRMBczn%2bpt%2bMEQIZrqqbWPtmfmrPHrRnijsAvQjEiZroH0NRIGiUMQYuoHkx5d4YwwEa70rq%2bVBvblUyCMJdQBTccCHYOKn839jSaZerXSkD4zURohB6D2tQ7r8VzV%2fdV%2bleloyaYPwWk0mnODGYSls%3d) (accessed April 27, 2020).
104. Hsu YC, Nourbakhsh I. When human-computer interaction meets community citizen science. *Commun ACM*. (2020) 63:31–4. doi: 10.1145/3376892
105. Wang D, Yang Q, Abdul A, Lim BY. Designing theory-driven user-centric explainable AI. In: *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. Glasgow; New York, NY: Association for Computing Machinery (2019). p. 1–15. doi: 10.1145/3290605.3300831

106. Zhang Y, Chen X. Explainable recommendation: A survey and new perspectives. *arXiv preprint arXiv*. (2018).
107. Miller T. Explanation in artificial intelligence: insights from the social sciences. *arXiv*. (2017).
108. Campbell VA, Gilyard JA, Sinclair L, Sternberg T, Kailes JI. Preparing for and responding to pandemic influenza: implications for people with disabilities. *Am J Public Health*. (2009) 99:S294–300. doi: 10.2105/AJPH.2009.162677
109. Whittall H. COVID, Transparency and trust. *Nuffield Council on Bioethics*. (2020) Available online at: <https://www.nuffieldbioethics.org/blog/covid-transparency-and-trust> (accessed April 16, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Porat, Nyrup, Calvo, Paudyal and Ford. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# Youth Networks' Advances Toward the Sustainable Development Goals During the COVID-19 Pandemic

Kevin Barber<sup>1</sup> and Mohammed A. Mostajo-Radji<sup>2,3,4\*</sup>

<sup>1</sup> The Rockefeller University, New York, NY, United States, <sup>2</sup> Embassy of Science, Technology and Innovation, Ministry of Foreign Affairs of Bolivia, La Paz, Bolivia, <sup>3</sup> Permanent Mission of Bolivia to the United Nations, New York, NY, United States, <sup>4</sup> Clubes de Ciencia Bolivia Foundation, Santa Cruz de la Sierra, Bolivia

**Keywords:** science diplomacy, United Nations, non-state actors (NSAs), sustainable development goals—SDGs, youth networks, COVID-19

## INTRODUCTION

The emergence of the COVID-19 pandemic, a disease caused by novel coronavirus SARS-CoV-2 (Zhu et al., 2020), has presented major challenges to international public health systems. As new data surrounding the epidemiology of the disease continues to emerge, policy recommendations made by institutions such as the World Health Organization have been continually modified and inconsistently applied by national and local governments. For instance, in an effort to contain the initial spread of the disease internationally and reduce the rate of transmission domestically, early affected countries implemented policies to restrict travel and limit the social contact of their citizens (Acosta and Nestore, 2020; Anderson et al., 2020). While these strategies have been found to be effective at reducing the rates of new cases and minimizing the resulting strain to national healthcare systems (Chinazzi et al., 2020), global spread of the disease proved to be unavoidable. Yet specific responses enacted by national governments to mitigate the impact the pandemic would have on their society have varied (Anderson et al., 2020), and in cases, seemingly come in contradiction to one another. Inherent to these discrepancies appears to be a concern between limiting the health and mortality repercussions of the pandemic, opposed with reducing the economic impact associated with commercial and social restraint (Sheridan et al., 2020). The fractured international approach has highlighted the limitations established forms of governance have in agreeing upon and implementing legitimate measures of resolution during a rapidly evolving global pandemic, and how these limitations culminate in serious strains to international public relations.

Recently, the concept of transnational youth networks (TYNs) has emerged as a flexible solution to many of the obstacles faced by international and domestic governance (Acosta et al., 2020). Defined broadly as a cross-disciplinary professional group with members under the age of 40 and selected based on a competitive process that analyzes professional achievements, the hallmarks of TYNs maintain a versatile set of descriptions. These include the selection of members based on the merit of professional achievements, empowerment of decision-making capabilities toward achieving a defined goal, and the application of unique experiential knowledge of individual members (Acosta et al., 2020). Prior to the emergence of the COVID-19 pandemic, organization of TYNs was proposed as a means of driving forward public diplomacy, particularly in relation to the United Nations Sustainable Development Goals (SDG) agenda (Acosta et al., 2020). At the present moment, the preeminent objectives of the SDG agenda have been put in jeopardy by the unfolding pandemic (Naidoo and Fisher, 2020). Most relevantly, the objective of ensuring the health and well-being of global citizens through efficient funding and access to healthcare systems, along with increased sanitation and hygiene (Filho et al., 2020; Sustainable Development Goals, 2020).

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Ganiu Oladega Okunnu,  
Crescent University, Nigeria

### \*Correspondence:

Mohammed A. Mostajo-Radji  
mmostajo@rree.gob.bo

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Sociology

**Received:** 30 July 2020

**Accepted:** 07 October 2020

**Published:** 29 October 2020

### Citation:

Barber K and Mostajo-Radji MA  
(2020) Youth Networks' Advances  
Toward the Sustainable Development  
Goals During the COVID-19  
Pandemic. *Front. Sociol.* 5:589539.  
doi: 10.3389/fsoc.2020.589539

While the WHO and its affiliated partners have been paramount in providing recommendations to national governments' response to the pandemic, groups tantamount to TYNs have ascended to resolve many of the deficiencies left by broader governing bodies. Here we will provide an overview of exemplary solutions designed by these groups and present support for the continued backing of these types of networks as a mechanism to engage international crises. Though these groups do not fall definitively within our working definition of TYNs, we will argue that they contribute useful models of youth empowerment, nonetheless.

## YOUTH NETWORKS AND THE COVID-19 PANDEMIC

Underlying the initial decision made by many national governments to enact extensive quarantining measures on citizens was a concern of overwhelming health care systems with growing rates of COVID-19 patient numbers. Accompanying predictions of shortages of health care system resources was an anticipation of a lack of available personal protective equipment (PPE) for health care workers. In the United States, while health care systems struggle to correspond with the national government for these supplies, a decentralized source of supply chain management was constructed by a coalition of young volunteers. To date, the C19 Coalition reports to have successfully supplied over 100 million PPE units to health care systems across the US and has formed a working collaboration with the National Governors Association, connecting governmental bodies with public and private organizations (Levy, 2020a). Additionally, creative solutions to develop new forms of PPE have been organized under the banner of #HackThePandemic and unified by hackthepandemic.org (Mensley, 2020). This organization allows volunteers and researchers across the globe access to 3D printable mask designs, as well as the ability to contribute large scale manufacturing capabilities of supplies and computing power aimed at the pursuit of understanding the disease through simulations of protein folding. The capability to 3D print effective mask designs has been embraced by high school and university students across the United States, including those in initially hard-hit cities such as New York and Seattle (Reid, 2020; Schlosser, 2020; Siegal, 2020). These techniques have been transferred and reproduced in other countries, particularly in the developing world (Tendencias El Tiempo, 2020). These initiatives provide outstanding examples of how the youth can adapt new technologies to contribute to solving dilemmas currently facing healthcare systems.

Along with shortages of PPE, a looming concern for international healthcare systems remains a lack of available ventilators, an essential piece of equipment for the treatment of critically ill patients (Truog et al., 2020). These inventory shortages have placed major strains on international diplomacy, as countries have exercised restrictions of the transport of ventilators across borders, and in some cases gone as far as resorting to the confiscation of other countries' ventilators during international transit (Kamdar, 2020). The developing world remains most vulnerable to these shortages (Breevoort et al.,

2020), inspiring innovative design solutions for low cost and readily transportable ventilators from youth teams. These include ventures by US university students (Levy, 2020b; Rusch, 2020), as well as a team of young engineers from India, a country with an especially sparse ventilator inventory compared to the domestic population (Biswas, 2020). Additionally, a large review of these types of open source designs has been compiled for future adaption (Pearce, 2020). One of the most comprehensive networks involved in broad scale coordination between globally distributed volunteer groups working to design and produce PPE and medical supplies has been the Open Source Medical Supplies. This organization reports a current record of statistics related to the above venture, including the number of countries actively involved in local response efforts and the total amount of supplies that have been successfully delivered by the global community (Open Source Medical Supplies). Continuing to increase the supply and universal accessibility of ventilators will not only aid the treatment capabilities of underserved health care systems but may also begin to alleviate international diplomacy tensions that result from global medical equipment shortages. Of particular interest, is the focus youth networks have made on advocating for the attention to how regional aspects of the developing world pose specific challenges to coping with a spreading pandemic. For instance, populations living in high altitude regions such as Ethiopia, Ecuador, Bolivia, and Tibet, are sensitive to environmental conditions and physiological adaptations that influence the effectiveness of common ventilator design (Breevoort et al., 2020). Given the limited influence these regions have in the development of traditional health care equipment, special considerations will be necessary to design and supply ventilators capable of functioning effectively for high altitude populations.

Perhaps most at risk of suffering from a lack of specialized intervention in regards to the COVID-19 pandemic are refugee populations and people living in war zones (Jahanshahi et al., 2020). Given the poverty of health care related infrastructure, coupled with increased rates of underlying medical conditions and high population densities often found in refugee camps, the risk of infection within these zones has been a notably difficult problem for traditional governmental systems to address. To help facilitate screening capabilities of health care practitioners serving refugee populations, students at Harvard University have developed a software solution for the efficient collection and sharing of patient data (Parks, 2020). This technology has now become widely available and adapted to the needs of health practitioners within refugee camps across the globe. This development can be viewed as a pivotal first step to mitigating the severity of the pandemic on displaced populations, but more measures will clearly be needed to resolve the special vulnerability of these groups.

## ADVANCING THE SUSTAINABLE DEVELOPMENT GOALS AGENDA THROUGH YOUTH NETWORKS

In 2015, the United Nations put forward the SDG agenda as a blueprint to achieve a better and more sustainable future for all

by 2030 (Joshi et al., 2015). While received with enthusiasm by most member States, the COVID-19 pandemic can potentially delay and even jeopardize the implementation of many of those goals (Naidoo and Fisher, 2020). Indeed, several analyses have revealed that the pandemic has worsened inequalities throughout the world and active interventions from governments are needed to address these issues (Ashford et al., 2020). To assist these needs, UNICEF has been at the forefront of organizing remote networks of youth volunteers inspired to rise to challenges specific to their communities (Hawke, 2020). The formation of this network, headed entirely by youth volunteers, was able to quickly progress through the stages of volunteer recruitment, identification of specific challenges, and response of clear-cut actions. This included initiatives that are aimed at safeguarding the mental health of the youth through access to online psychologists and creation of seed banks to be distributed for home gardening projects.

In the context of the COVID-19 pandemic, youth networks have primarily focused on SDGs 3, 4, 9, 10, and 17. Namely: Good health and well-being; quality education; industry, innovation and infrastructure; reduced inequalities; and partnerships for the goals. Yet, it is important to notice that SDGs are indeed interlinked and the development of one goal strengthens the development of others (Dawes, 2020). Dynamic mathematical models have indeed shown that efforts to address goals 4–16 have a direct impact on goal 1, elimination of poverty (Dawes, 2020). As such providing access to healthcare technology has an impact on economic projections (Mahler et al., 2020). Using the examples pinpointed in this manuscript, one can see that 3D printing of PPE and ventilators, have not only addressed SDG 3, but inspired other regions in the world to adopt these technologies (addressing SDGs 4 and 9), consequently reducing inequality (SDG 10) and poverty (SDG 1).

## OBSTACLES FACED BY YOUTH NETWORKS IN GAINING GOVERNMENTAL SUPPORT

Due to the characteristic of being non-state actors, youth networks are often left behind in policy and decision making (Carosso et al., 2019a). Indeed, one of the most common negative perceptions of young entrepreneurs and technology activists is the lack of governmental interest and support for their initiatives (Saucedo-Bendek et al., 2020).

The COVID-19 pandemic has further highlighted some of these issues. For instance, there is an overall lack for governmental-sponsored grants directed toward young, independent entrepreneurs and volunteer groups (Young and Grinsfelder, 2011; Legg, 2020; Naude, 2020). Even when financing is obtained, the youth usually has to face additional struggles, including difficulties in obtaining quality certifications for their products. As an example, the United States Food and Drug Administration (FDA) has been overly cautious in approving the use of 3D printed PPE and medical equipment (US Food & Drug Administration, 2020), granting emergency

approval to only a handful of organizations (Rodrigo, 2020). Indeed, the majority of FDA COVID-19 actions have focused on relaxing their enforcement guidelines, rather than actively overseeing the development and approving the use of materials and equipment created by youth networks (Flanagan and Ballard, 2020). A similar situation, though to varying degrees, has been observed in other parts of the world, including the European Union (Gierthmuehlen et al., 2020) and the United Kingdom (Emanuel et al., 2020). While aiming to protect the public, these procedures have produced unintended consequences. Specifically, COVID-19 emergency donations and loans provided by multinational organizations such as the United Nations Development Programme, the World Bank and the Interamerican Development Bank often require governments to spend these resources on materials and equipment that are certified by the FDA or the European Union (Ferreira and Mostajo-Radji, 2020). Notable cases are beginning to show the potential of overcoming these sorts of obstacles. For instance, the Bolivian government has worked together with young entrepreneurs to provide local certifications that allows them commercialize 3D printed ventilators in the local market (Los Tiempos Digital, 2020). Similarly, in Colombia, private and university-based ventilators printing projects have gained support from the national medical device regulatory body to begin human trials (Zimmer, 2020). Surmounting governmental regulations currently presents a major impediment to the employment of supplies designed by non-governmental groups and these requirements, in return, hamper governments from supporting initiatives developed by youth networks (Condori, 2020).

## CONCLUSIONS

The development of youth networks capable of identifying and undertaking challenges specific to their communities will not only drive forward solutions related directly to their objectives, but consequently advance a common global agenda, independently of direct governmental support (Carosso et al., 2019b). Altogether, the contributions youth networks have made toward addressing aspects of the current pandemic provide a glimpse into the power of non-traditional forms of public health intervention. The examples listed here should serve as models of the benefit of forming such networks, and continued development of youth networks motivated to solve global issues and advance the United Nations SDGs should be kept in focus.

## AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

## ACKNOWLEDGMENTS

We would like to thank Sebastian Torres Montoya for insightful comments on this manuscript.

## REFERENCES

- Acosta, M., and Nestore, M. (2020). Comparing public policy implementation in Taiwan and Vietnam in the early stages of the COVID-19 outbreak: a review. *SocArXiv*. doi: 10.31235/osf.io/69hqx
- Acosta, M., Szlamka, Z., and Mostajo-Radji, M. A. (2020). Transnational youth networks: an evolving form of public diplomacy to accelerate the sustainable development goals. *SocArXiv*. doi: 10.31235/osf.io/8247s
- Anderson, R. M., Heesterbeek, H., Klinkenberg, D., and Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet* 395, 931–934. doi: 10.1016/S0140-6736(20)30567-5
- Ashford, N. A., Hall, R. P., Arango-Quiroga, J., Metaxas, K. A., and Showalter, A. (2020). Addressing inequality: the first step beyond COVID-19 and towards sustainability. *Sustainability* 12:5404. doi: 10.3390/su12135404
- Biswas, S. (2020). Coronavirus: India's race to build a low-cost ventilator to save COVID-19 patients. *BBC News*. Available online at: <https://www.bbc.com/news/world-asia-india-52106565> (accessed July 30, 2020).
- Breevoort, A., Carosso, G. A., and Mostajo-Radji, M. A. (2020). High-altitude populations need special considerations for COVID-19. *Nat. Commun.* 11:3280. doi: 10.1038/s41467-020-17131-6
- Carosso, G. A., Ferreira, L. M. R., and Mostajo-Radji, M. A. (2019a). Developing brains, developing nations: can scientists be effective non-state diplomats? *Front. Educ.* 4:95. doi: 10.3389/educ.2019.00095
- Carosso, G. A., Ferreira, L. M. R., and Mostajo-Radji, M. A. (2019b). Scientists as non-state actors of public diplomacy. *Nat. Hum. Behav.* 3, 1129–1130. doi: 10.1038/s41562-019-0716-1
- Chinazzi, M., Davis, J. T., Ajelli, M., Gioannini, C., Litvinova, M., Merler, S., et al. (2020). The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science* 368, 395–400. doi: 10.1126/science.aba9757
- Condori, B. (2020). A 5 meses de presentar respiradores, Mambu espera autorización del Gobierno. *Opinion Bolivia*. Available online at: <https://www.opinion.com.bo/articulo/pais/5-meses-presentar-respiradores-ambu-espera-autorizacion-gobierno/20200817131252782731.html> (accessed September 25, 2020).
- Dawes, J. H. P. (2020). Are the sustainable development goals self-consistent and mutually achievable? *Sus. Dev.* 28, 101–117. doi: 10.1002/sd.1975
- Emanuel, E. J., Persad, G., Upshur, R., Thome, B., Parker, M., Glickman, A., et al. (2020). Fair allocation of scarce medical resources in the time of COVID 19. *N. Engl. J. Med.* 382, 2049–2055. doi: 10.1056/NEJMs2005114
- Ferreira, L. M. R., and Mostajo-Radji, M. A. (2020). Plasma-based COVID-19 treatments in low- and middle-income nations pose a high risk of an HIV epidemic. *npj Vaccines* 5:58. doi: 10.1038/s41541-020-0209-2
- Filho, W. L., Brandli, L. L., Salvia, A. L., Rayman-Bacchus, L., and Platje, J. (2020). COVID-19 and the UN Sustainable development goals: threat to solidarity or an opportunity? *Sustainability* 12:5343. doi: 10.3390/su12135343
- Flanagan, S. T., and Ballard, D. H. (2020). 3D printed face shields: a community response to the COVID-19 global pandemic. *Acad. Radiol.* 27, 905–906. doi: 10.1016/j.acra.2020.04.020
- Gierthmuehlen, M., Kuhlencoetter, B., Parpaley, Y., Gierthmuehlen, S., Köhler, D., Dellweg, D. (2020). Evaluation and discussion of handmade face-masks and commercial diving-equipment as personal protection in pandemic scenarios. *Plos ONE* 15:e0237899. doi: 10.1371/journal.pone.0237899
- Hawke, A. (2020). Youth volunteers rise to the challenge of COVID-19. *UNICEF*. Available online at: <https://www.unicef.org/northmacedonia/stories/youth-volunteers-rise-challenge-covid-19> (accessed July 30, 2020).
- Jahanshahi, A. A., Gholami, H., and Mendoza, M. I. R. (2020). Sustainable development challenges in a war-torn country: perceived danger and psychological well-being. *J. Public Aff.* 20:e2077. doi: 10.1002/pa.2077
- Joshi, D. K., Hughes, B. B., and Sisk, T. D. (2015). Improving governance for the post-2015 sustainable development goals: scenario forecasting the next 50 years. *World Dev.* 70, 286–302. doi: 10.1016/j.worlddev.2015.01.013
- Kamdar, D. (2020). Modern day piracy and global contest for medical equipment amidst covid-19 pandemic. *News18*. Available online at: <https://www.news18.com/news/opinion/modern-day-piracy-and-global-contest-for-medical-equipment-amidst-covid-19-pandemic-2630129.html> (accessed July 30, 2020).
- Legg, H. (2020). Rural development project uses 3D printing in fight against COVID-19 spread. *U.S. Department of Agriculture*. Available online at: <https://www.usda.gov/media/blog/2020/04/01/rural-development-project-uses-3d-printing-fight-against-covid-19-spread> (accessed September 25, 2020).
- Levy, N. (2020b). Solving the ventilator shortage with windshield wiper parts. *UT News*. Available online at: <https://news.utexas.edu/2020/04/01/solving-the-ventilator-shortage-with-windshield-wiper-parts/> (accessed July 30, 2020).
- Levy, R. (2020a). Tech entrepreneurs form coalition to take on sourcing coronavirus supplies. *The Wall Street Journal*. Available online at: <https://www.wsj.com/articles/tech-entrepreneurs-form-coalition-to-take-on-sourcing-coronavirus-supplies-11588247752> (accessed July 30, 2020).
- Los Tiempos Digital (2020). Mambu recibe certificado técnico de aprobación de Agedem. Available online at: <https://www.lostiempos.com/actualidad/cochabamba/20200914/mambu-recibe-certificado-tecnico-aprobacion-agedem> (accessed September 27, 2020).
- Mahler, D. G., Lakner, C., Aguilar, R. A. C., and Wu, H. (2020). Updated estimates of the impact of COVID-19 on global poverty. *World Bank Blogs*. Available online at: <https://blogs.worldbank.org/opendata/updated-estimates-impact-covid-19-global-poverty> (accessed July 30, 2020).
- Mensley, M. (2020). Coronavirus crisis: 3D printing community responds. *All3DP*. Available online at: <https://all3dp.com/1/coronavirus-covid-19-sars-cov-2-3d-printing/> (accessed July 30, 2020).
- Naidoo, R., and Fisher, B. (2020). Reset sustainable development goals for a pandemic world. *Nature* 583, 198–201. doi: 10.1038/d41586-020-01999-x
- Naude, W. (2020). Entrepreneurial recovery from COVID-19: decentralization, democratization, demand, distribution, and demography. *IZA Discussion Paper* 13436. Available online at: <https://ssrn.com/abstract=3643200> (accessed September 25, 2020).
- Open Source Medical Supplies (2020). Available online at: <https://opensourcemedicalsupplies.org/impact/> (accessed September 27, 2020).
- Parks, A. (2020). Brothers create screening tool for refugee populations. *The Harvard Gazette*. Available online at: <https://news.harvard.edu/gazette/story/2020/05/brothers-deploy-covid-19-screening-tool-for-refugee-populations/?fbclid=IwAR0yqCF7Lr0x0VEzKN27ls7LEYloPF0-mIBNwh1Wd-2uXotY2SHBCBU4WfW> (accessed July 30, 2020).
- Pearce, J. M. (2020). A review of open source ventilators for COVID-19 and future pandemics [version 2; peer review: 3 approved]. *F1000Research* 9:218. doi: 10.12688/f1000research.22942.2
- Reid, D. (2020). Students make 3D printed masks to help battle coronavirus. *Sacramento State News*. Available online at: <https://www.csus.edu/news/articles/2020/4/6/Students-create-3D-printed-masks-for-local-hospital.shtml> (accessed July 30, 2020).
- Rodrigo, C. M. (2020). 3D printing faces hurdles in coronavirus response. *The Hills*. Available online at: <https://thehill.com/policy/technology/491681-3d-printing-faces-hurdles-in-coronavirus-response> (accessed September 25, 2020).
- Rusch, E. (2020). As COVID-19 spreads around the world, mines student designs low-cost ventilator. *Mines Newsroom*. Available online at: <https://www.minesnewsroom.com/news/covid-19-spreads-around-world-mines-student-designs-low-cost-ventilator> (accessed July 30, 2020).
- Saucedo-Bendek, O., Ewel, S., and Roman-Roig, F. J. (2020). Entrepreneurs' perception toward international cooperation and government programs concerning entrepreneurship. *Front. Educ.* 5:57. doi: 10.3389/educ.2020.00057
- Schlosser, K. (2020). With high school's 3D printers in his house, student runs mask production line for seattle-area hospitals. *GeekWire*. Available online at: <https://www.geekwire.com/2020/high-schools-3d-printers-house-student-runs-mask-production-line-seattle-area-hospitals> (accessed July 30, 2020).
- Sheridan, A., Andersen, A. L., Hansen, T., and Johannesen, N. (2020). Social distancing laws cause only small losses of economic activity during the COVID-19 pandemic in Scandinavia. *Proc. Natl. Acad. Sci. U.S.A.* 117, 20468–20473. doi: 10.1073/pnas.2010068117
- Siegal, I. (2020). NY high school student spearheads 3D-printing initiative to get PPE to hospitals. *NBC New York*. Available online at: <https://www.nbcnewyork.com/news/coronavirus/ny-high-school-student-spearheads-3d-printing-initiative-to-get-ppe-to-hospitals/2357930/> (accessed July 30, 2020).
- Sustainable Development Goals (2020). Available online at: <https://sustainabledevelopment.un.org/?menu=1300> (accessed July 30, 2020).



- Tendencias El Tiempo (2020). Emprendedores buscan apoyo para producir máscara contra coronavirus. *El Tiempo*. Available online at: <https://www.eltiempo.com/tecnosfera/novedades-tecnologia/novedades-tecnologia-477730> (accessed July 30, 2020).
- Truog, R. D., Mitchell, C., and Daley, G. Q. (2020). The toughest triage—allocating ventilators in a pandemic. *N. Engl. J. Med.* 382, 1973–1975. doi: 10.1056/NEJMp2005689
- US Food & Drug Administration (2020). 3D printing of medical devices, accessories, components, and parts during the COVID-19 pandemic. Available online at: <https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/3d-printing-medical-devices-accessories-components-and-parts-during-covid-19-pandemic> (accessed September 25, 2020).
- Young, D. R., and Grinsfelder, M. C. (2011). Social entrepreneurship and the financing of third sector organizations. *J. Public Aff. Educ.* 17, 543–567. doi: 10.1080/15236803.2011.12001661
- Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., et al. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *N. Engl. J. Med.* 382, 727–733. doi: 10.1056/NEJMoa2001017
- Zimmer, K. (2020). Colombian engineers' ventilators to be tested in COVID patients. *The Scientist*. Available online at: <https://www.the-scientist.com/news-opinion/colombian-engineers-ventilators-to-be-tested-in-covid-patients-67696> (accessed September 27, 2020).

**Conflict of Interest:** MM-R is the Bolivian Science, Technology and Innovation Ambassador.

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Barber and Mostajo-Radji. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# The Necessity of Stool Examination in Asymptomatic Carriers as a Strategic Measure to Control Further Spread of SARS-CoV-2

Hamed Mirjalali<sup>1\*</sup>, Ehsan Nazemalhosseini-Mojarad<sup>2\*</sup>, Abbas Yadegar<sup>1</sup>, Seyed Reza Mohebbi<sup>2</sup>, Kaveh Baghaei<sup>3</sup>, Shabnam Shahrokh<sup>2</sup>, Hamid Asadzadeh Aghdaei<sup>3</sup> and Mohammad Reza Zali<sup>2</sup>

<sup>1</sup> Foodborne and Waterborne Diseases Research Center, Research Institute for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>2</sup> Gastroenterology and Liver Diseases Research Center, Research Institute for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran, <sup>3</sup> Basic and Molecular Epidemiology of Gastrointestinal Disorders Research Center, Research Institute for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Grégory Dubourg,  
IHU Mediterranée Infection, France

### \*Correspondence:

Hamed Mirjalali  
hamedmirjalali@sbm.ac.ir;  
hamed\_mirjalali@hotmail.com  
Ehsan Nazemalhosseini-Mojarad  
ehsanmojarad@gmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 19 April 2020

**Accepted:** 09 September 2020

**Published:** 30 October 2020

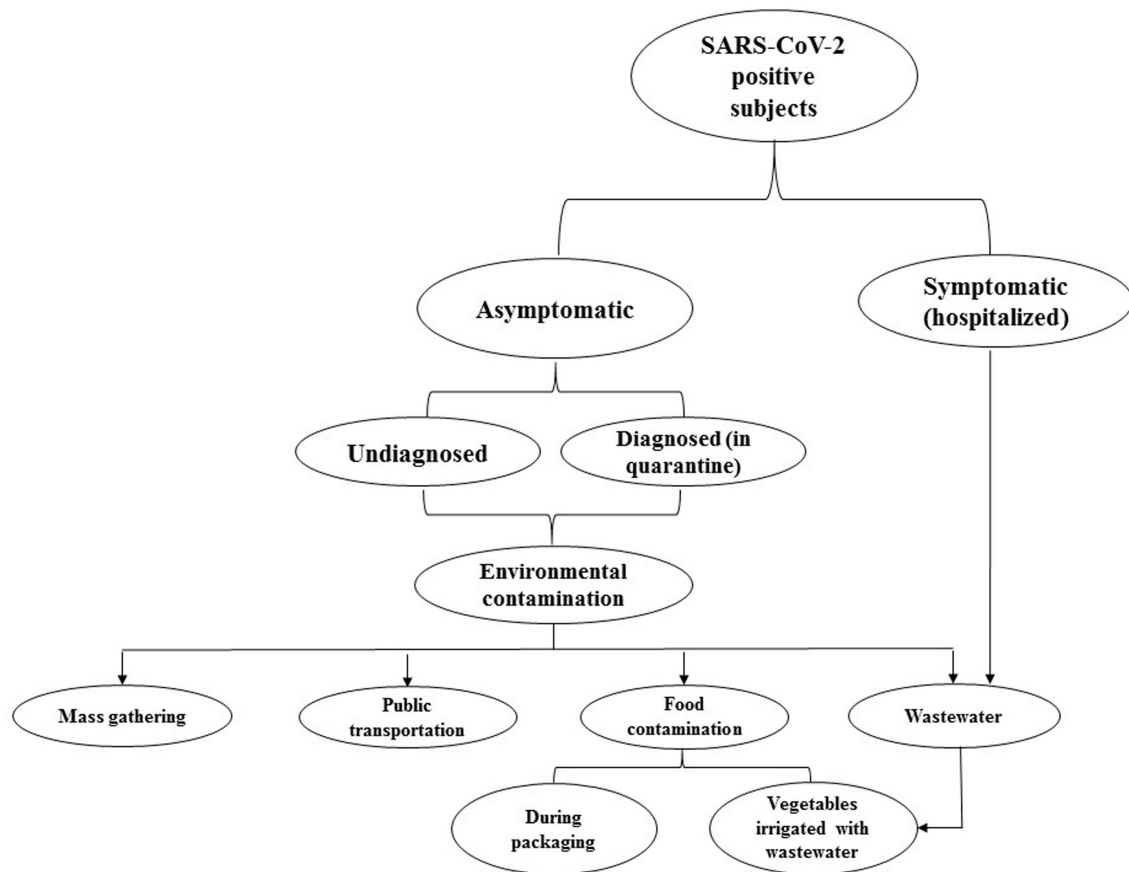
### Citation:

Mirjalali H,  
Nazemalhosseini-Mojarad E,  
Yadegar A, Mohebbi SR, Baghaei K,  
Shahrokh S, Asadzadeh Aghdaei H  
and Zali MR (2020) The Necessity of  
Stool Examination in Asymptomatic  
Carriers as a Strategic Measure to  
Control Further Spread of  
SARS-CoV-2.  
Front. Public Health 8:553589.  
doi: 10.3389/fpubh.2020.553589

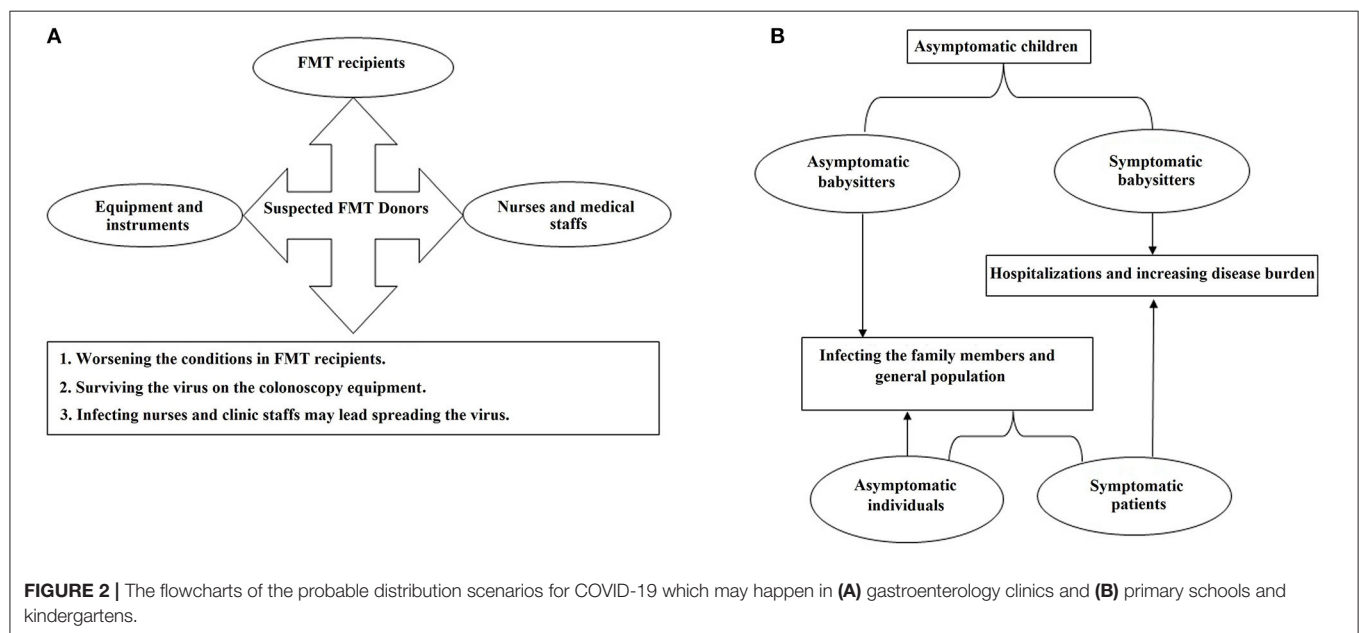
**Keywords:** COVID-19, stool examination, children, asymptomatic carriers, public health

In early December 2019, a novel enveloped RNA beta coronavirus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was identified in Wuhan, and has rapidly spread on a global scale. Soon after, the novel coronavirus was designated the name COVID-19. Finally, the World Health Organization (WHO) announced the outbreak as a pandemic on March 11. Although the prevalence rate of asymptomatic subjects appears to be up to 45% (1), the prevalence of symptomatic infection in children younger than 10 years is reported to be zero (2, 3). The most common symptoms of COVID-19 are fever, dry cough, and dyspnea (4). However, gastrointestinal symptoms like diarrhea, nausea, vomiting, and abdominal discomfort are also being reported in <30% of patients (5, 6). A body of evidence shows that binding of the virus to the host cell receptors may play a key role in the pathogenesis of infection. Actually, SARS-CoV-2 is required to bind to the angiotensin-converting enzyme 2 (ACE2) to enter the cells (7).

ACE2 is a type 1 integral membrane glycoprotein that is expressed in almost all tissues. The highest expression of ACE2 is observed in the lungs, arteries, heart, kidneys (8), and also in enterocytes throughout the ileum and colon (9) which may increase the probability of replication of the virus in the intestine, shedding in stool, and the further distribution of SARS-CoV-2 in the environment (Figure 1). During the COVID-19 pandemic, a couple of studies reported on the presence of viral RNA in stool samples. Accordingly, the prevalence of SARS-CoV-2-positive stool in COVID-19 patients varies from 36 to 53% (10). Xiao et al. (11) analyzed stool samples of 73 SARS-CoV-2-infected patients and showed that more than half of them were positive for SARS-CoV-2 RNA. Unexpectedly, 23.29% of patients were positive for SARS-CoV-2 RNA while their respiratory samples were negative (11). Holshue et al. (12) reported the first case of COVID-19 in the US in a 35-year-old man who suffered from abdominal discomfort on his second day of hospitalization and his stool sample was positive for the virus using a real-time reverse-transcriptase polymerase chain reaction (rRT-PCR) test, and remained positive until day 7 (the stool samples on day 11 and 12 were not tested). The presence of SARS-CoV-2 RNA in stool samples was also confirmed in a couple of studies in symptomatic and even asymptomatic carriers (13–16). However, the virus may shed from stool samples for days, even after clinical symptoms have disappeared and patients have been discharged from hospital or quarantine (16, 17). Surprisingly, Lamers et al. (18) demonstrated the growth and replication of SARS-CoV-2 in human small intestine organoids (hSIOs) which provides evidence for the role of stool in the distribution of SARS-CoV-2. Therefore, although the



**FIGURE 1 |** This flowchart represents the probable environmental distribution of COVID-19. Accordingly, asymptomatic subjects, particularly those who are undiagnosed, can disperse infective virus particles. Discharging the virus from stool may increase the load of SARS-CoV-2 in wastewater. Therefore, concerning the insufficiency of current wastewater treatment systems in eliminating the virus, wastewater can lead to the further distribution of SARS-CoV-2 in the environment.



fecal-oral transmission of SARS-CoV-2 has not been proven, a couple of studies have highlighted concerns about shedding and the distribution of active virus particles through the stool of patients, particularly asymptomatic subjects (9, 10, 18). Nevertheless, it seems that there is no correlation between gastrointestinal symptoms and the positive rate of stool tests (10).

From the public health point of view, a large percentage of the infected subjects do not represent any clinical symptoms but may still shed the infecting virus particles from their stool samples (16, 17). In this regard, cross-contamination may happen in general laboratories that routinely investigate stool samples for microbial agents other than SARS-CoV-2. Therefore, the laboratory technicians who work on stool samples could be an at risk group for the disease. Additionally, another emerging source of the infection might be kindergartens where children under 6 years old regularly visit. Notably, it seems that most of the children do not have symptoms similar to those that are frequently reported in adults (19) which highlights the importance of children as asymptomatic carriers. It was reported that this group of infected subjects may discharge the virus particles in stool for an extended amount time even though their throat swabs test negative (16, 17). Therefore, these asymptomatic carriers may be an important part of the transmission chain. In another words, teachers and other workers in

kindergartens, who are in close contact with the infected children, might be infected with COVID-19 while at work and transmit the infection to their families or communities (Figure 2).

Moreover, during fecal microbiota transplantation (FMT), the presence of COVID-19 may increase the risk of fecal transmission to FMT recipients (20, 21) or operators. Furthermore, colonoscopy instruments could be contaminated with the virus and remain infective during the next procedure (Figure 2). Employees of stool banks who work on the processing and storage of the stool samples taken from COVID-19-asymptomatic donors might be another at-risk group.

Therefore, we believe that stool examination for COVID-19 should be considered as a screening strategy during the pandemic and also in the post-COVID-19 era, particularly in kindergartens, primary schools, gastroenterology clinics, stool banks, and general laboratories to prevent the further spread of the virus.

## AUTHOR CONTRIBUTIONS

HM, EN-M, AY, SRM, KB, SS, HAA, and MRZ: conceptualization and writing. All authors contributed to the article and approved the submitted version.

## REFERENCES

- Oran DP, Topol EJ. Prevalence of asymptomatic sars-cov-2 infection: a narrative review. *Ann Intern Med.* (2020) 173:362–67. doi: 10.7326/M20-3012
- Gudbjartsson DF, Helgason A, Jonsson H, Magnusson OT, Melsted P, Norddahl GL, et al. Spread of SARS-CoV-2 in the Icelandic population. *N Eng J Med.* (2020) 382:2302–15. doi: 10.1101/2020.03.26.20044446
- Lavezzo E, Franchin E, Ciavarella C, Cuomo-Dannenburg G, Barzon L, Del Vecchio C, et al. Suppression of a SARS-CoV-2 outbreak in the Italian municipality of Vo'. *Nature.* (2020) 584:425–9. doi: 10.1101/2020.04.17.20053157
- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. *N Eng J Med.* (2020) 382:1708–20. doi: 10.1056/NEJMoa2002032
- Wong SH, Lui RN, Sung JJ. Covid-19 and the digestive system. *J Gastroenterol Hepatol.* (2020) 35:744–8. doi: 10.1111/jgh.15047
- Zhou Z, Zhao N, Shu Y, Han S, Chen B, Shu X. Effect of gastrointestinal symptoms in patients with COVID-19. *Gastroenterology.* (2020) 158:2294–7. doi: 10.1053/j.gastro.2020.03.020
- Li X, Geng M, Peng Y, Meng L, Lu S. Molecular immune pathogenesis and diagnosis of COVID-19. *J Pharm Anal.* (2020) 10:102–8. doi: 10.1016/j.jpha.2020.03.001
- Chen Y, Guo Y, Pan Y, Zhao ZJ. Structure analysis of the receptor binding of 2019-nCoV. *Biochem Biophys Res Commun.* (2020) 525:135–40. doi: 10.1016/j.bbrc.2020.02.071
- Gu J, Han B, Wang J. COVID-19: Gastrointestinal manifestations and potential fecal-oral transmission. *Gastroenterology.* (2020) 158:1518–9. doi: 10.1053/j.gastro.2020.02.054
- Tian Y, Rong L, Nian W, He Y. Review article: gastrointestinal features in COVID-19 and the possibility of faecal transmission. *Alim Pharmacol Therap.* (2020) 51:843–51. doi: 10.1111/apt.15731
- Xiao F, Tang M, Zheng X, Liu Y, Li X, Shan H. Evidence for gastrointestinal infection of SARS-CoV-2. *Gastroenterology.* (2020) 158:1831–3. doi: 10.1053/j.gastro.2020.02.055
- Holshue ML, DeBolt C, Lindquist S, Lofy KH, Wiesman J, Bruce H, et al. First case of 2019 novel coronavirus in the United States. *N Eng J Med.* (2020) 382:929–36. doi: 10.1056/NEJMoa2001191
- Chen Y, Chen L, Deng Q, Zhang G, Wu K, Ni L, et al. The presence of SARS-CoV-2 RNA in feces of COVID-19 patients. *J Med Virol.* (2020a) 92:833–40. doi: 10.1002/jmv.25825
- Lee IC, Huo TI, Huang YH. Gastrointestinal and liver manifestations in patients with COVID-19. *J Chin Med Assoc : JCMA.* (2020) 83:521–3. doi: 10.1097/JCMA.0000000000000319
- Lo IL, Lio CF, Cheong HH, Lei CI, Cheong TH, Zhong X, et al. Evaluation of SARS-CoV-2 RNA shedding in clinical specimens and clinical characteristics of 10 patients with COVID-19 in Macau. *Int J Biol Sci.* (2020) 16:1698–707. doi: 10.7150/ijbs.45357
- Zhang T, Cui X, Zhao X, Wang J, Zheng J, Zheng G, et al. Detectable SARS-CoV-2 viral rna in feces of three children during recovery period of COVID-19 pneumonia. *J Med Virol.* (2020) 92:909–14. doi: 10.1002/jmv.25795
- Tang A, Tong ZD, Wang HL, Dai YX, Li KF, Liu JN, et al. Detection of novel coronavirus by RT-PCR in stool specimen from asymptomatic child, China. *Emerg Infect Dis.* (2020) 26:1337–9. doi: 10.3201/eid2606.200301
- Lamers MM, Beumer J, van der Vaart J, Knoop K, Puschhof J, Breugem TI, et al. SARS-CoV-2 productively infects human gut enterocytes. *Science.* (2020) 369:50–4. doi: 10.1126/science.abc1669
- Xu Y, Li X, Zhu B, Liang H, Fang C, Gong Y, et al. Characteristics of pediatric SARS-CoV-2 infection and potential evidence for persistent fecal viral shedding. *Nat Med.* (2020) 26:502–5. doi: 10.1038/s41591-020-0817-4
- Green CA, Quraishi MN, Shabir S, Sharma N, Hansen R, Gaya DR, et al. Screening faecal microbiota transplant donors for SARS-CoV-2 by molecular testing of stool is the safest way forward. *Lancet Gastroenterol Hepatol.* (2020) 5:531. doi: 10.1016/S2468-1253(20)30089-3
- Ianiro G, Mullish BH, Kelly CR, Sokol H, Kassam Z, Ng S, et al. Screening of faecal microbiota transplant donors during the COVID-19

outbreak: suggestions for urgent updates from an international expert panel. *Lancet Gastroenterol Hepatol.* (2020) 5:430–2. doi: 10.1016/S2468-1253(20)30082-0

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Mirjalali, Nazemalhosseini-Mojarad, Yadegar, Mohebbi, Baghaei, Shahrokh, Asadzadeh Aghdai and Zali. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# COVID-19: Scientific Arguments, Denialism, Eugenics, and the Construction of the Antisocial Distancing Discourse in Brazil

Claudia Malinverni<sup>1\*</sup> and Jacqueline Isaac Machado Brigagão<sup>2\*</sup>

<sup>1</sup> Faculty of Public Health's Audioteca Collection, University of São Paulo, São Paulo, Brazil, <sup>2</sup> School of Arts Science and Humanities, University of São Paulo, São Paulo, Brazil

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Gareth Huw Stanton,  
Goldsmiths University of London,  
United Kingdom  
Graham Murdock,  
Loughborough University,  
United Kingdom

### \*Correspondence:

Claudia Malinverni  
claudia.malinverni@usp.br  
Jacqueline Isaac Machado Brigagão  
jac@usp.br

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 13 July 2020

**Accepted:** 30 September 2020

**Published:** 04 November 2020

### Citation:

Malinverni C and Brigagão JIM (2020)  
COVID-19: Scientific Arguments,  
Denialism, Eugenics, and the  
Construction of the Antisocial  
Distancing Discourse in Brazil.  
*Front. Commun.* 5:582963.  
doi: 10.3389/fcomm.2020.582963

Since March 11, the world has been experiencing a pandemic of Sars-Cov-2, the new coronavirus, which emerged in China in late December 2019 and causes the COVID-19 disease. Pandemics are characterized by pathogen's ability of emerging or re-emerging across geographical boundaries, simultaneously affecting a large number of people around the world, due to the sustained transmission in humans. In the case of the COVID-19 pandemic, we have witnessed in real time the dissemination of different types of information about it and strategies used to contain the rate of virus contamination. Our main goal in this study is to analyze the discursive production of the Brazilian journalistic media about vertical isolation as a supposed scientific strategy, and to demonstrate how that has been used in the denialist approach adopted by the Brazilian President Jair Bolsonaro. The research was carried out on the Google platform, using the following descriptors: coronavirus and herd immunity; coronavirus and the Imperial College herd immunity strategy; vertical isolation; Bolsonaro and vertical isolation. Thirty-six articles were selected for a qualitative analysis besides the original article by David L. Katz (published in The New York Times), where he claims the creation of the vertical confinement strategy. All documents of the analytical *corpus* are open and free of charge. The articles were submitted to discursive analysis and the main results shows that Brazilian media highlighted Bolsonaro's proposal of vertical isolation and amplified his pandemic denial and eugenics policies. The mass media vehicles play a central role in the dissemination of information and should commit to the publication of reliable and trustworthy information, as well as to objectively situate the areas of knowledge of the specialists whose opinions are being published.

**Keywords:** novel SARS-coronavirus-2/SARS-CoV-2/COVID-19, digital media, eugenics, denialism, public health communication, journalism

## INTRODUCTION

The COVID-19 pandemic presents itself as concerning for the majority of people across the planet. This concern is guided by a number of characteristics of Sars-Cov-2 and by the contemporary lifestyle. The virus has a high potential for dissemination in the globalized world—by mid-August 2020, more than 20.7 million people had been contaminated; part of this contingent became



seriously ill, requiring hospitalization, and nearly 780 thousand people had died<sup>1</sup>. There is still no treatment available for this disease, nor vaccines that might prevent infection. These factors, together with the lack of knowledge and the uncertainties on the evolution of the infection/disease, as well as the post-infection immunological responses, have led to great investments in scientific research in the several fields of science, while at the same time the population searches incessantly for information in order to make sense of their own experiences.

Within this context of a pandemic, mass media holds a key social role; as a source of information that is historically recognized and trustworthy, the media has been disseminating and modeling the ways in which ordinary people think about and deal with everyday events. It is important to remember that the conditions of truth and of social justification are the pillars that support the belief in journalistic discourse, which becomes trustworthy and credible as long as it manages to prove the veracity of its testimony, by means of the detailing of facts and the citation of specialized sources (Lisboa and Benetti, 2015).

It is important to note, however, that this “proof of veracity” does not make news stories “mirrors” of reality, but instead, simply one of the possible narratives about social occurrences. Transformed into information, these occurrences are shared between members of society and journalists, who in turn claim a monopoly on this knowledge (defining what is news), meaning that, more than passive observers, they are active participants in the construction of reality (Traquina, 2007). Although creative, journalistic activity is submitted to a number of “tyrannies”: of the deadlines and formats of journalistic production; of superior hierarchies (editors-in-chief, news editors, and, frequently, the owners of the platforms); the imperatives of journalism as a business; the extreme competition; and the action/pressure of different social actors searching to highlight their own matters (Traquina, 2007). Thus, newsmaking results in journalism’s capacity for producing social facts, in other words, for instituting realities, according to the repertoires and contexts that the journalist chooses to use.

We have, in addition, used journalistic discursive practices within the perspective offered by Van Der Haak et al. (2012), who state that journalism, as a public asset, should produce information and analyses that are useful for democratic societies, based on transparency, independence, the use of reliable sources, and the detailed analysis of events.

In this text we took the journalistic coverage of COVID-19 as a producer of meanings and social facts (Spink, 2004). We also used the perspective of Thompson (2014), for whom the process of news production, whichever it may be, always occurs within a socio-historical context that allows media outlets to capture and transform a certain number of everyday events into messages (symbolic forms) in detriment of an infinity of others.

We considered the context of exceptionality of the pandemic, where researchers and scientists are being obliged to accelerate

their production to a rhythm never seen before, in order to provide clinical responses to the disease and guide public policies and State actions for managing public health around the world. This implies that most of the knowledge produced about Sars-CoV-2 and the disease it causes is being permanently revised, refuted, and discarded.

The problem is that, with this frenetic production, the refuted suppositions have often already reached a level of dissemination and absorption by common sense and even by public authorities which, due to a variety of interests, makes it impossible to revert their use, remaining as valid points of view. In other words, even when these suppositions have been invalidated by science, they continue as a social fact, affecting the lives of people and the manners in which they make their decisions when faced with the epidemic. Thus, it is important for journalists and mass media companies to be vigilant regarding the possible consequences of the content they relay.

We are referring, therefore, to the decisive role played by mass media in structuring the public space. This is a sensitive debate around the world, as it involves controlling the access to the production and circulation of the information that is transformed into messages (symbolic content) by a restricted number of actors, according to private interests or that of the groups that the media represents (Thompson, 2014). This aspect is especially problematic in Brazil. The country has a historical asymmetry in the relationship between mass media and society, establishing what Kucinski (2006) call the “principle of exclusion,” violating the human right to information.

In Brazil, different from that which occurred for the most part in the liberal democracies of the global North, the mediatic market is marked by an ideological, economic, and political homogeneity that is usually pro-establishment. From the start, the media—and particularly the press—has historically reproduced with great fidelity the oligarchic model of land ownership, with a predominance in newspaper management of the “favoritism typical of the command culture of large rural properties” (Kucinski, 2006, p. 20).

The business model for national media is amplified by Brazil’s complexity. Companies are configured as oligopolies, with properties that are horizontal, vertical, and crisscrossed by different mediums (newspapers, magazines, AM and FM radio, open access and pay TV, internet provider) within the same market, whether local, regional, or national. This process was accentuated by the privatization of telecommunications during the 1990s (de Lima, 2001, 2011; Malinverni, 2016). Currently, according to the Brazilian section of the MOM (Media Ownership Monitor)/Reporters Sans Frontières, eight economic family groups control 26 of the 50 largest media vehicles in the country, according to audience and to scheduling capacity; in other words, in terms of potential to influence public opinion.

Divided into four large sectors (print, radio, TV, and online), the study, which resulted in the report “Who controls the media in Brazil,” released in late 2017, indicates a red alert for the Brazilian mediatic system due to the high concentration of audience and properties, the high geographic concentration, and the lack of transparency, besides economic, political, and

<sup>1</sup>Daily map of Johns Hopkins University and Medicine. Available at <https://coronavirus.jhu.edu/map.html>.

religious interference in the production of information<sup>2</sup>. Seven of the twelve vehicles that published the news stories analyzed in this work integrate the control group describe above. The most paradigmatic of these is the Globo group, the largest oligopoly in this sector in Brazil and Latin America, and one of the largest in the world, with more than half of the audience among the first four (36.9%). The concentration of media outlets by a small number of private groups restricts competition and, consequently, the diversity to represent the distinct interests of society. Without the possibility of contradiction, there is a predominance in the mediatic market of what many studies and analysts call “*pensée unique*” (de Lima, 2011).

Faced with such a complex dynamic—taken here in the sense proposed by Law and Mol (2002), according to whom innumerable actors, materialities, and sociabilities perform the several facets of a phenomenon—and with the up-to-the-minute scope of the pandemic, which takes place in real time, journalistic coverage is up against enormous difficulties. These range from the immediacy of translating the technical-scientific knowledge of several fields to critical evaluations on what to publish and the possible effects.

Historically, at moments of public health emergency, the population and journalists wait to receive trustworthy information from governmental organizations and political leaderships, whose actions are based on the guidance of health authorities. In Brazil, however, besides this complexity that is inherent to the pandemic, mass media must deal with other challenges. The first, as we will see in the analyses, lies in reporting two distinct official discourses on controlling COVID-19: that of the president of the Republic and his supporters; and that of the scientists in the field of health, technicians from the Ministry of Health (in the first months), and governors and mayors who are favorable to social distancing. This resulted in a politicization of the actions for disease control.

Brazil has a Unified Health System (Sistema Único de Saúde—SUS) that guarantees universal health access to all within the national territory; the System is well-structured and organized in a decentralized manner. Since the promulgation of the 1988 Constitution, it is up to the federal government to establish guidelines and coordinate healthcare actions, allocating a budget for the states and municipalities, who manage resources and actions according to local/regional needs. This system counts on a structure of sanitary surveillance and consolidated data registration that allows the monitoring of healthcare actions throughout the country. The pandemic, however, hit Brazil at a point when SUS has been weakened, since, as stated by Menezes et al. (2019), from 2016 a policy of defunding healthcare has been implemented, by means of the approval of a constitutional amendment that froze the federal budget in this sector for the next 20 years, with readjustment calculations based only on inflation. This policy of deconstructing SUS

has intensified during the Bolsonaro government, with already-perceptible effects upon the population's health: “For example, the loss of 8.5 thousand Cuban doctors from the More Doctors Program, who were treating around 30 million Brazilians, in 2.9 thousand municipalities and indigenous villages” (Menezes et al., 2019, p. 67).

Despite this process of scrapping, from January to May the technical team of the Ministry of Health, responsible for managing SUS, carried out assertive actions relating to the pandemic, creating decrees, establishing benchmarks for action, and guiding the population. The president of the Republic, however, who refuses to acknowledge the severity of the pandemic, has been producing and divulging, from the start, counterinformation that contradicts the ministerial discourse. Within this context, on April 16, Bolsonaro dismissed the minister of Health, doctor and politician, and nominated a new leader for the department, an oncologist and business entrepreneur who works in the private sector. With a more technical profile, he remained only 28 days in office, and resigned due to disagreeing with the president's position regarding use of chloroquine to combat COVID-19. Therefore, since May 15, the position of minister of Health has been occupied in an interim manner by a general without any health background, who nominated other members of the military, equally without specialized training, to key roles in the Ministry of Health, furthering the dismantling of SUS<sup>3</sup>.

Brazilian journalism gave plenty of space for this polarization between the president and his supporters and the Ministry of Health, during the first months of the pandemic, as well as to the national and international scientific community on the subject of measures of social distancing. The analysis of articles indicated that the journalistic coverage often considered both discourses as equivalent, even knowing that the president and his supporters had no scientific backing—on the contrary, they often based themselves on false news and unfounded calculations.

For Gelbspan (1998, p. 57–58), in discussing journalistic coverage of global warning:

The professional canon of journalistic fairness requires reporters who write about a controversy to present competing points of view. When the issue is of a political or social nature, fairness – presenting the most compelling arguments of both sides with equal weight – is a fundamental check on biased reporting. But this canon causes problems when it is applied to issues of science. It seems to demand that journalists present competing points of views on a scientific question as though they had equal scientific weight, when actually they do not.

In this sense, it is crucial that journalists covering themes that involve science know how to translate the concepts and recognize strong evidence so as not to fall into the mistake that Pitts (2018) designates “*both-sideism*.” Rosen (2010), discussing this journalistic strategy, states that it is often adopted in order to seek an “objectivity,” by means of

<sup>2</sup>Carried out in partnership between the RSF and the Entrevozes collective, MOM-Brasil was the 11th study throughout the world and also the largest—up until 2017, the number of vehicles investigated had reached at the most 40. Available at: <http://brazil.mom-rsf.org/br/>.

<sup>3</sup>Available at: <https://brasil.elpais.com/brasil/2020-06-25/nem-o-pior-ministro-da-saude-fez-o-que-exercito-esta-fazendo-desmontando-a-engrenagem-do-sus.html>.

which the journalist would speak from a supposed position of neutrality (a view from nowhere), and could not therefore be accused of favoring one position. For Sousa (2002), this position is a tributary of two ideological forces that modulate news: that of objectivity and that of professionalism. The first explains the descriptive and factual orientation of news, with its mimetic ambition regarding reality that becomes explicit, and the systematic identification of sources of information in news statements; the second is based on the belief that the production routine and professional experience are sufficient tools for journalistic exemption. Supported by deontological codes constructed throughout history, the journalist acts as a “professional authority,” imbued with the right and the obligation to mediate and simplify information on daily happenings (Traquina, 2007). In other words, under the jargon “interests of society,” the press acts within a discursive safe conduct that “authorizes” the prescription of standards and practices, while at the same time serving as an “argumentative shield” that protects and exempts journalists and owners of communication vehicles from the consequences of their discursive practices (Malinverni et al., 2012). This strategy, however, impedes a deeper analysis and the production of precise information based on the truth.

Another challenge that journalists face is the increasingly precarious nature of work in newsrooms, and a lack of specialization in the area of health (Malinverni and Cuenca, 2017), both of which have become more of an issue over the past decade with the financial crisis that has impacted media companies, especially print journalism, due to the rise of virtual media (Castilho, 2015), affecting directly the quality of the news. Vukasovich and Vukasovich (2016) indicate, additionally, that globalization and the incessant pressures of newsmaking are two more elements that greatly impact the quality of journalistic coverage.

## METHODOLOGY

In this work we carried out the discursive analysis of journalistic coverage following two key thematic lines: herd immunity and vertical isolation. Using Google search, we researched news articles on the Sars-CoV-2 epidemic in Brazil using four descriptors: 1—Herd immunity and coronavirus; 2—Herd immunity and Imperial College; 3—Vertical isolation; and 4—Bolsonaro and vertical isolation. Criteria for inclusion: the first three pages of results presented by Google; articles published by print media and mass news sites with high visitation numbers and open access links. Criteria for exclusion: blogs with no connection to mass media or governmental and non-governmental organizations; low repercussion media, videos and links that can be exclusively accessed by subscribers; texts reproduced *ipsis litteris* on other sites.

The time period set for article selection was March 16 to April 30, 2020, starting 5 days before the date on which the Ministry of Health confirmed community transmission of the disease in the country (March 20) and a public health emergency was declared by most state and municipal governments.

In the first phase of systemization, 101 texts were located; of these, after application of the above criteria, 36 were selected for analysis: 8 articles under descriptor 1; 8 under descriptor 2; 11 under descriptor 3; and 9 under descriptor 4. All texts were copied into Word to be later read in full and analyzed. The texts were published on 12 websites, linked to nine media groups: UOL, Folha de S.Paulo and Bol/UOL (Grupo Folha); O Globo (Organizações Globo); Saúde Estadão (Grupo Estado); Saúde Abril and Veja (Grupo Abril); Gazeta do Acre (independent); IstoÉ Dinheiro (Editora Três); BBC News Brasil (a subsidiary of BBC, controlled by the British government); El País Brasil (from the Spanish group PRISA); and CNN Brasil (a subsidiary of the American CNN). The four first, as already mentioned, are among the organizations that control almost 60% of the national audience. Historically, they operate under the *establishment* logic, with episodic demonstrations of divergences that lend an appearance of plurality. Rarely do they explicitly support a candidate or political party, although the journalistic coverage is always more favorable to agendas that adopt a center or right-wing positioning within the political spectrum. This perspective, shared by IstoÉ Dinheiro and CNN Brasil, has been in effect in the country since mid-March of 2020. The Gazeta do Acre is the only independent vehicle; in other words, that is not connected to a multimedia conglomerate. It was founded by two reporters who worked at an alternative newspaper which, in the 1970s, challenged the censorship imposed by the military regime and reported the daily violence committed by the large landowners against the small-scale rubber tree tappers—among them Acre environmentalist Chico Mendes, murdered by local ranchers in 1988. El País Brasil and BBC News Brasil follow the more liberal line of journalistic coverage set by their parent companies. These characteristics may explain why these three vehicles were the only ones to adopt a more critical approach to Bolsonaro’s discourse, as will be discussed.

We adopted the theoretical perspective of discursive practices (Spink, 2004), focusing on the language in use, a social practice analyzed in the intersection between performative aspects of language (when, in which conditions, with what intention, in which manner) and the conditions of production (understood in this case both as social and interactional context, and in the Foucauldian sense of historical constructions).

In this approach, the notion of interpretative repertoires of Wetherell and Potter (1988, p. 172) is central:

Repertoires could be seen as building blocks speakers use for constructing versions of actions, cognitive processes, and other phenomena. Any particular repertoire is constructed out of a restricted range of terms used in a specific stylistic and grammatical fashion. Commonly these terms are derived from one or more key metaphors and the presence of a repertoire will often be signaled by certain tropes or figures of speech.

The circulation dynamic of the interpretative repertoires, within the flow of production of meanings, updates contents and processes present in the history of a society.

In this analysis we looked for these standards in the journalistic coverage of the two studied themes, making clear

the content of the discussions and marking out the meanings they produce, as well as situating the contexts for production of the articles. Therefore, throughout the text, we introduce episodes and events that contextualize the analysis and help us to understand the scenario for news production, since, as stated by Rosen et al. (1997, p.3), “[...] *the journalism itself, the art of telling our collective story, is never independent of the country and culture in which the story is told.*”

## STRATEGIES OF SOCIAL DISTANCING AND HERD IMMUNITY IN BRAZIL

The strategies of social distancing and of herd immunity were already circulating in Brazilian media before the official declaration of sustained transmission of Sars-CoV-2 in the country. We carried out this study associating the descriptor “Herd immunity” to coronavirus and to Imperial College. Next, we introduce the main results of the discursive analysis, discussing the meanings produced by the articles found with these descriptors.

The first article with the descriptor herd immunity (“What is ‘group immunity,’ the polemical strategy of the United Kingdom to combat coronavirus?”<sup>4</sup>) dates from March 16, and was published by two large Brazilian news sites; its central theme is the debate surrounding the measures adopted by the United Kingdom. The article discusses the criticism suffered by the British government that, contrary to countries such as Italy, Spain, and France, had decided not to adopt a strategy of social suppression, betting on the free circulation of the virus in order to consequently lead the population toward herd immunity (a mitigation strategy). According to this text, the mitigation measure would help preserve the economy, since all activities would remain operational. The key criticism stemmed from the scientific community, for whom mitigation would lead to an uncontrolled growth in the number of people contaminated by Sars-CoV-2, with an inevitable rise in infections and the overburdening of the National Health Service (NHS) due to hospitalization demands for severe cases. This debate permeated the 16 articles analyzed under the descriptor “Herd immunity,” progressively incorporating references to reports from the Imperial College.

All the articles analyzed, when discussing herd immunity, made reference at some point to the United Kingdom and/or its prime minister and team. The United States and its president were also cited in six articles. Thus, we can say that the debate on social distancing, in Brazil, was closely connected to the measures and pronouncements of British and North American political authorities. Despite herd immunity having been considered and discussed in other cities/countries in Europe, the perspective that dominated the Brazilian news was that of the UK and the USA.

In addition to the positioning of political authorities, the scientific reports of the Imperial College were also widely

commented on by the Brazilian media, and for this reason it was included as a descriptor. This institution appears often as being responsible for publishing studies that made the UK and the USA give up on the mitigation strategy. The majority of articles published between March 17 and April 24 refer directly to a specific report by the Imperial College, made public on March 16, which presents calculations regarding the lethality of the disease and the number of sick people according to each behavioral strategy adopted by the two countries. Only one article, from March 26, cites the report that makes estimates regarding the possible effects of the different non-pharmacological strategies in Brazil.

It is interesting to observe that, among the group of articles discussing herd immunity there are explanations on what this strategy entails. But most of these (5 articles) promote a simplification of this strategy, which can be explained by observing the authorship of the analyzed texts: only in three were the authors specialists. The first of these, mentioned above and produced by BBC News Brasil, is signed by a foreign journalist, a specialist in scientific communication. The second—“Coronavirus: must almost everyone catch it to end the pandemic?”<sup>5</sup>, from March 25, published in the health section of the website of *Veja* magazine—was written by two Brazilian researchers from the field of microbiology who acted as scientific disseminators. In this article there is a clear effort to translate expert knowledge for ordinary non-specialized readers, in a clear and simple manner, focusing on the reasons that herd immunity could not be legitimized by science to guide public policies against Sars-CoV-2. The third article—“Who is immune to coronavirus?”<sup>6</sup>, published on April 14 by the newspaper *Folha de S.Paulo* and available on the UOL website—was written by Marc Lipsitch, a professor of Epidemiology at Harvard University’s School of Public Health. Published originally in the *New York Times*, it is a direct translation. In these three articles, there is a greater care in explaining herd immunity, based on scientific knowledge.

Another factor that could explain the simplifications and superficial approaches adopted by the Brazilian media for the theme of herd immunity relates to the sources consulted and used in the articles. Historically, the production of news articles in the field of health includes consultation with known specialists who can expound on the theme with authority, productivity, and credibility, conferring legitimacy and reliability to the information presented (Tuchman, 1983; Traquina, 2007). However, with regard to the debate on herd immunity, the analyzed articles make little use of consulting epidemiologists, the most appropriate specialists when it comes to this theme. Among the medical sources, the articles prioritized the opinions of virologists, infectious disease specialists, and immunologists; only four epidemiologists were consulted—two Brazilians, one from North America, and one from India. This may have

<sup>4</sup>“What is ‘group immunity,’ the polemical strategy of the United Kingdom to combat coronavirus.” Available at: <https://noticias.uol.com.br/saude/ultimas-noticias/bbc/2020/03/16/o-que-e-a-imunidade-de-grupo-a-polemica-estrategia-do-reino-unido-para-combater-coronavirus.htm>.

<sup>5</sup>“Coronavirus: must almost everyone catch it to end the pandemic?” Available at: <https://saude.abril.com.br/blog/cientistas-explicam/coronavirus-quase-todo-mundo-tem-que-pegar-para-a-pandemia-passar/>.

<sup>6</sup>“Who is immune to coronavirus?” Available at: <https://www1.folha.uol.com.br/equilibriosaude/2020/04/quem-e-imune-ao-coronavirus.shtml>.



contributed toward the polarization of measures of social distancing, as the guidelines suggested by epidemiology would explain with more clarity the catastrophic effects of the epidemic on the healthcare system and, consequently, on people's lives, if natural herd immunity were to be adopted in the country.

The articles that cite the reports of the Imperial College approach the theme in a manner that presents, together with projections of mathematical models that favor suppression, the arguments contrary to this measure, as well as the "harmful" effects of broad and unrestricted social distancing on the economy.

The concept of herd immunity has a longstanding and legitimate scientific basis, which postulates that the infection of a percentage of the population is enough to block transmission of a virus, and therefore can contain or even eradicate it within a certain territory. Since this debate began, the World Health Organization (WHO) and scientists all over the world have explained that this concept applies to immunization by means of vaccinations, and that investing in natural herd immunity against COVID-19 would overburden the healthcare systems, causing hundreds of thousands of avoidable deaths.

The positioning of some government leaders in favor of this strategy appears to be oriented by Malthusian theories, according to which some populations, such as the elderly, can be considered as weak and surplus (Mezzadra, 2020). In this manner, they could become "naturally" extinct by pandemics, such as the case of COVID-19. Hannah et al. (2020) observe that, by defending herd immunity, governors assume that the biopolitical interests of capital take precedence over the biopolitical interests of life. One of the articles of the *corpus* emphasizes that matters of economy were decisive in the debate on herd immunity. The text "Specialists recommend herd immunity for poor countries<sup>7</sup>"—produced by Bloomberg, a news agency of the financial sector, and published in the finance section of UOL on April 22—, presents herd immunity as the only alternative for poor, young countries such as India. The journalist presents arguments from an Indian epidemiologist as well as researchers from the Center for Disease Dynamics, Economics & Policy and Princeton University in defense of this strategy:

*[...] allow the virus to circulate in a controlled manner throughout the next seven months would provide immunity to 60% of the country's population by November, and thus, contain the disease. Mortality could be limited while the virus propagates, in comparison to European countries, such as Italy, since 93.5% of the Indian population is under 65 years, it is said, although they have not divulged projections on the number of dead.*

The article is overly brief, but points out that this is a risky strategy, concluding that at the moment not much was known regarding immunity to coronavirus.

The possibility of using the strategy of herd immunity to minimize the effects of the pandemic on the economy was discussed hypothetically in many of the articles analyzed, but not

indicated as a viable solution. For instance, the texts that mention this discussion in the United Kingdom clarify that the British government refuted that they were seeking herd immunity. This proposal would be morally unacceptable, since the known lethality data indicates that this strategy would imply acceptance and recognition that at least 1% of the population could die, in addition to a high number of hospitalizations, leading to a collapse of the healthcare services.

In the 16 articles analyzed with descriptors 1 and 2, only one has a critical approach and presents the Imperial College projections for Brazil. The article is "Coronavirus pandemic: the best scenario is disastrous<sup>8</sup>," published on March 30 on the website of the *Gazeta do Acre*, a local newspaper of the state of Acre, at the extreme north of the country. The text presents the calculations for the newspaper's hometown, the state capital Rio Branco, informing the amount of people who would get sick and die if suppression were not adopted. The other articles touched generically upon the theme, without taking the trouble to inform about the effects of different measures within the local contexts of Brazilian cities with their inequalities.

Among the articles of this *corpus*, the only argument in favor of herd immunity that had no economic framing was that of a supposed prevention of a second wave of the disease, since in the countries that adopted restrictive measures only a small portion of the population would have had contact with the virus, and thus the virus would once again strike these populations.

Before we continue the discussion, it is important to present the facts for the Brazilian context. From March 11, some state governors and mayors began to declare non-pharmacological measures to deal with the pandemic, following recommendations from the Ministry of Health and creating scientific committees. Throughout that entire month, several states and municipalities suspended classes at all educational levels, prohibiting events and religious services, and closing commerce and non-essential services, maintaining only healthcare, pharmacies, and grocery stores, in addition to bars, restaurants, and bakeries, although these last could only serve customers by delivery. These measures met with strong resistance from entrepreneurs and politicians, especially the president of the Republic and his social and political support base.

In this manner, from mid-March and throughout the month of April, the media began to include in discussions of the pandemic the financial damage that social distancing measures could provoke, and the effects on people's daily lives. In this context, the news began to construct a narrative around the concept of "two sides"; one favorable to the strategy of seeking herd immunity, and the other, to social distancing. As previously discussed, his false equivalency between scientifically based arguments and fragile arguments supported by hypotheses is damaging to the coverage of scientific themes (Gelbspan, 1998).

With regard to herd immunity, this approach was present in many of the articles analyzed, with only two of the news stories breaking this logic. The first, titled "Epidemiologist opposes

<sup>7</sup>"Specialists recommend herd immunity for poor countries." Available at: <https://economia.uol.com.br/noticias/bloomberg/2020/04/22/especialistas-recomendam-imunidade-de-rebanho-para-paises-pobres.htm>.

<sup>8</sup>"Coronavirus pandemic: the best scenario is disastrous." Available at: <https://agazetadoacre.com/2020/03/pandemia-de-coronavirus-o-melhor-cenario-e-desastroso/>.



Osmar Terra and sees Brazil as far from the end of the epidemic<sup>9</sup>; from April 14, published on the UOL website, the journalist presents the arguments of an epidemiologist to deconstruct the reasoning presented by congressman Osmar Terra<sup>10</sup>, an advisor to Bolsonaro and part of his support base. As the central character in the text, and in opposition to Osmar Terra, the epidemiologist, who is also the rector of a federal university, demonstrates with data and scientific evidence that the country was far from reaching herd immunity, and points out the political polarization of the debate on social distancing:

*The discussion about social distancing in all the media is based on ideology and not science. There is a group of people who think we must relax and who voted on the same candidate [Bolsonaro], and the other people, who voted against, are in favor of distancing.*

The epidemiologist's perception on the role of the media in this polarization is precise. Osmar Terra is a member of Congress who, despite a degree in medicine and an appointment as Health Secretary, is not a specialist in this theme. It is worth noting that, according to the evaluation carried out by the website Radar aos Fatos, which checks and verifies *fake news*, he was the parliamentary member who most divulged false news on COVID-19<sup>11</sup>. More than that, the fact that there was a link to the video in which the congressman reproduces false news signals that the news site UOL itself contributed toward disseminating an opinion that, based on antiscientific visions, not only encourages the political polarization of the epidemic scenario, but also confuses the population. This polarization indicates a narrative framing typical of political coverage, in which reality is taken as "[...] a field in conflict, a bipolar world of successive hostilities" (Motta, 2007, p. 10), feeding the confrontation with successive affirmations that belie the sources, in a dramatic game based on the notion of contradiction. In the case of this coverage, the narrative option for the "two opposite sides" of the phenomenon makes no sense, as by giving equal weight and space to the scientific evidence and positioning of the majority of national and international scientists, and the opinions of a small group of denialist politicians with an anti-science agenda, the media breaks their social commitment of informing the population correctly about phenomena and events that impact daily life, such as the case of the COVID-19 epidemic.

The second article for the descriptor "herd immunity"—the previously mentioned "Coronavirus pandemic: the best scenario is disastrous" of the *Gazeta do Acre*—was the only one among the 16 news stories analyzed to critically situate the attacks of

Bolsonaro and his supporters upon suppression measures. The text, with authorship stated simply as "Newsroom," classifies Bolsonaro's statements as unfounded and absurd:

*At this moment, the majority of countries, the Ministry of Health of Brazil, governors and mayors from all around the country, based on directives given by the WHO, are trying to adopt the measure of suppression to control the epidemic in Brazil.*

*However, president Bolsonaro and a small group of his counselors and advisors (which includes his children) are the only dissonant voices and are actively advocating the adoption of the mitigation strategy to control dissemination of the virus in Brazil.*

*This is a noisy minority, incidentally. Thanks to the control that the president and his children have over their thousands of fanatic followers, the social networks are inundated with the most absurd campaigns in favor of this option of control.*

## FROM "VERTICAL INTERDICTION" TO "VERTICAL ISOLATION," THE USE OF SCIENTISTS' OPINIONS FOR DENIALISM

The analysis demonstrated that the use of the terminology "vertical isolation" was imposed by President Bolsonaro himself and naturalized by the media. On March 24, in a pronouncement on the radio and TV network<sup>12</sup>, he urged the population to abandon the social distancing measures that had been recommended by the Ministry of Health and which, as previously mentioned, had been adopted by several governors and mayors. His proposal: keep in confinement only the so-called risk groups. In Brazil, this would be the elderly population over 60 years of age and those with chronic diseases, besides symptomatic cases. In his speech, which shocked the national and international scientific community and those Brazilians who had adhered to social distancing—at least 50% of the population, in several regions, at the start of community transmission—, Bolsonaro stated that COVID-19 was just "a little flu," a "little cold" that was inoffensive to the majority of the young and the healthy who, like him, had an "athletic history"<sup>13</sup>. The following morning (25), when asked by a reporter how the country would protect these vulnerable groups, he answered: "[...] there is horizontal isolation, that they're doing here, and there's the vertical. It's the vertical [for groups at risk]"<sup>14</sup>.

The term vertical isolation resonated intensely in newspapers and news sites, and, after March 25, it was in the title of the 20 articles analyzed for descriptors 3 and 4 ("Vertical" isolation" and "Bolsonaro and vertical isolation"). When explaining the concept proposed by Bolsonaro, three texts cited the hypotheses of David L. Katz, a doctor who specialized in diet and nutrition<sup>15</sup>, which were published in an article in *The New York Times*, on March 20, 2020, with one text also bringing up an article by epidemiologist John Ioannidis, statistician, and co-director of the Stanford Prevention Research Center, published on March

<sup>9</sup>"Epidemiologist opposes Osmar Terra and sees Brazil as far from the end of the epidemic." Available at: <https://www.bol.uol.com.br/noticias/2020/04/14/brasil-esta-longo-do-final-da-epidemia-e-de-imunizacao-diz-epidemiologista.htm>.

<sup>10</sup>Doctor, former Health Secretary of Rio Grande do Sul and former minister for presidents Michel Temer (who took over the presidency of the Republic in 2016, after the parliamentary coup against president Dilma Rousseff) and for Bolsonaro himself, Terra had participated, the day before, in a debate on the epidemic promoted by UOL, one of the largest news sites in the country. Available at: <https://noticias.uol.com.br/politica/ultimas-noticias/2020/04/13/governistas-criticam-isolamento-e-minimizam-briga-bolsonaro-x-mandetta.htm>.

<sup>11</sup>Available at: <https://www1.folha.uol.com.br/poder/2020/05/deputados-divulgam-fake-news-sobre-coronavirus-para-ecoa-discurso-de-bolsonaro.shtml>.

<sup>12</sup>Available at: <https://www.youtube.com/watch?v=Fy9dqEjKvK>.

<sup>13</sup>Link to the pronouncement.

<sup>14</sup>After 7m14s. Available at: [https://www.youtube.com/watch?reload=9&v=vp3A\\_8vywC0](https://www.youtube.com/watch?reload=9&v=vp3A_8vywC0).

<sup>15</sup>The president of the True Health Initiative and director-founder of the Yale-Griffin Prevention Research Center.

17, on the StatNews website. Both were critics of the social suppression measures proposed and adopted in some Asian and European countries.

The analysis also suggested that the terminology “vertical isolation” which circulated in the national media was a translation of the arguments proposed by Katz, which were in turn anchored on the debate about herd immunity and the initial mitigation strategies adopted by the UK and USA to deal with the pandemic. Although quickly rejected by the scientific community, “isolation” as a synonym to distancing continued to resonate in Brazilian newspapers and news sites and is still used today in this sense.

Katz’s article (“Is our fight against coronavirus worse than the disease?”) was published 5 days before Bolsonaro’s interview. In it, Katz employs classic concepts of epidemiology to make a misleading analysis, based on a still-fragile foundation of data about the pandemic, as we will see in the following analysis. Centered on repertoires from epidemiology, he frames social distancing as a potentially harmful “war” strategy, with socioeconomic consequences and effects upon the healthcare systems that could be worse than the disease. From the very start, with the title, Katz makes use of militaristic metaphors—a longstanding and recurring discursive strategy in all dimensions of the dissemination of science and medicine (Wenner, 2007)—in order to build his thesis for reducing the costs of the “war” against the new coronavirus.

He supports his arguments by interpreting data from South Korea, which indicated that 99% of COVID-19 cases were light, while the lethality of the disease basically affected those who were more vulnerable. Still employing war metaphors, Katz concludes that the most advisable approach would be a “surgical strike,” naming this a “vertical interdiction,” which would consist in forbidding circulation only for those who are most vulnerable and exposing the majority of the population to the virus, thus attaining herd immunity. In the text, even though the social impact of distancing is mentioned, it is clear that the specialist is preoccupied with the financial aspect:

I am deeply concerned that the social, economic and public health consequences of this near total meltdown of normal life — schools and businesses closed, gatherings banned — will be long lasting and calamitous, possibly more severe than the direct toll of the virus itself. The stock market will bounce back in time, but many businesses never will. The unemployment, impoverishment and despair likely to result will be public health scourges of the first order (Katz, 2020).

Likewise, the arguments made by Ioannidis—in the article “We know enough now to act decisively against COVID-19. Social distancing is a good place to start”—focused on the economic effects of distancing measures:

If that is the true rate, locking down the world with potentially tremendous social and financial consequences may be totally irrational. It’s like an elephant being attacked by a house cat. Frustrated and trying to avoid the cat, the elephant accidentally jumps off a cliff and dies (Ioannidis, 2020).

The hypotheses of Ioannidis and, mainly, Katz gather elements that are of great use to the interests of the denialists, in the sense used by Hoofnagle and Hoofnagle (2007) and referenced by Diethelm and McKee (2009), for whom the denialist discourse is constructed around rhetorical arguments,

[...] to give the appearance of argument or legitimate debate, when in actuality there is none. These false arguments are used when one has few or no facts to support one’s viewpoint against a scientific consensus or against overwhelming evidence to the contrary. They are effective in distracting from actual useful debate using emotionally appealing, but ultimately empty and illogical assertions (Hoofnagle and Hoofnagle, 2007).

The denial is constructed with basis on five discursive tactics which, together or separately, produce pseudoscientific discourse (Hoofnagle and Hoofnagle, 2007; Diethelm and McKee, 2009). Three of these bring to light the manner in which the arguments of the two American specialists help sustain the denialism of President Bolsonaro and his supporters: (1) selectivity in choosing out-of-context scientific data in order to suggest error; (2) the use of specialists whose opinions are inconsistent with the knowledge established by scientific canon; and (3) resorting to isolated articles that challenge the dominant consensus as a means of discrediting the entire field.

In Brazil, the hypotheses of Ioannidis and, above all, Katz were presented by the media as an explanation for the vertical isolation proposed by Bolsonaro. The news stories also included criticism of this strategy by Brazilian and international specialists. This is what can be surmised from the article “What is the vertical isolation that Bolsonaro wants and why do specialists fear it will cause more deaths<sup>16</sup>” published on the BBC News Brasil website, on March 25. In this news piece, the arguments of the two American specialists are rejected by the scientific community, due to their hypothetical nature, based on fragile data and a partial analysis that does not include the response capacity of the healthcare system; in this case, American healthcare. One of the opposing sources presented in the article is Harry Crane, a statistics professor from Rutgers University, who considered that their mistake was:

[...] to allow themselves to be affected by the desire to negate a situation that can cause despair. “Under severe uncertainty, it’s natural instinct and common sense to hope for the best, but prepare for the worst”, wrote Crane, in response to the article by Ioannidis. This is because the mortality rate does not depend only on the clinical picture that the virus itself can produce, but also the capacity for response of societies for treating the sick.

The text makes it clear that, while the hypotheses of the two specialists were refuted by their peers, they were rapidly embraced by neoliberal politicians and economists, becoming “[...] music for the ears of the governmental economy teams who were trying to finish public accounting in midst of the

<sup>16</sup>“What is the vertical isolation that Bolsonaro wants and why do specialists fear it will cause more deaths?” Available at: <https://www.bbc.com/portuguese/internacional-52043112>.

perspective of recession” (BBC News Brasil, 2020). The journalist who authored the text supports this statement by citing part of an editorial from *The Wall Street Journal*, published in the wake of the Ioannidis article:

*“America urgently needs a pandemic strategy that is more economically and socially sustainable than the current national lockdown”, summarized the editorial from The Wall Street Journal, known for expressing the thoughts of the American economic elite, a week ago.*

In the same article, the journalist affirms that the conclusions of Katz and Ioannidis acquired a following in the team of the Brazilian minister of Economy, “[...] in search of a gentler solution for the public health crisis.”

But it was, above all, the political support base of denialist leaders that took on the hypotheses of the two specialists and began using them to contest social distancing measures. In the news piece “Why is vertical isolation seen with skepticism<sup>17</sup>?” produced by the agency Conteúdo Estadão and published on five news sites, on March 30, there is a clear use of these specialist arguments in the discourse against distancing:

*Defended by President Jair Bolsonaro, the so-called “vertical isolation” of the population is a minority theory among scientists and is viewed with skepticism by the medical community. It consists on separating those who are in the risk group from being exposed to the virus, such as those older than 60 and those with chronic diseases (UOL, March 30).*

Although the title of the article points to skepticism, the body of text brings a plurality of opinions, under the dichotomy of pros-cons and advantages-disadvantages of this strategy, including the discussion on herd immunity as a strategy and the reasons it was discarded in the United Kingdom. The most interesting point brought up in the article is a comparison of the supporters of Bolsonaro and Donald Trump. After informing that the American president had recommended extreme distancing, following the publication of the Imperial College study on March 16, the article adds that Trump went back to defending a quick return to activities in the United States, projecting a flexibilization in 10 days, which did not end up taking place but still had repercussions among Bolsonaro supporters:

*Excerpts of the video with this speech from the American [Trump] were disseminated by supporters of Bolsonaro in Brazil, as a supposed sign that the Americans would relax their measures. After being criticized, Trump pulled back and said that the date to reopen the country was just a suggestion, but that the end of social isolation would not take place without backing from scientists. The day before yesterday, Trump affirmed that he is thinking of establishing an official quarantine for states such as New York (which has the majority of cases), New Jersey and Connecticut.*

<sup>17</sup>“Why is vertical isolation seen with skepticism?” Available at: <https://saude.estadao.com.br/noticias/geral,por-que-isolamento-vertical-e-visto-com-ceticismo,70003252797>.

This text makes it clear how the denialist discourse of Trump and Bolsonaro align and, at the same time, how the largely connected environments of the social networks serve as feedback for both of their support bases. However, by indicating a new retreat by Trump, the text also demonstrates that his denialism was more vulnerable to scientific and medical arguments in favor of social distancing. The impression that we get is that Trump oscillates, either denying the scientific reading of the severity of the pandemic in his discourse and actions, or accepting information from scientists, different in this way from Bolsonaro, who has been unwavering in his denialist positioning from the start of the epidemic in Brazil.

## MEDIA ADHESION AND NATURALIZATION OF “VERTICAL ISOLATION”

In the 20 articles analyzed for descriptor 3 (Vertical isolation), vertical isolation appears as a specific type of social distancing, allowing us to infer the media’s unrestricted adhesion to the terminology, central to the sum of information circulated in both *corpora*. Instrumental, 10 of the 11 titles for descriptor 3 were constructed around the notions of functioning/operation of this model, seeking to explain vertical isolation with its advantages, disadvantages, and risks<sup>18</sup>.

We raised several hypotheses on what may have contributed to this: the generalist nature and increasingly precarious state of Brazilian mass journalism and the absence of epidemiologists as sources for news stories, already discussed in this work; the didacticism employed in the framing of texts, announced even in the titles.

This pedagogic concern brings to light the efforts made by journalists to translate to readers, who are always assumed to be laypeople, the technical-scientific jargon employed in the news. This didacticism—which legitimizes journalists as “[...] the place of ‘being able to show’, of ‘being able to say’ and ‘being able to analyze’ (...) as a place of mediation and of revelation of truth” (Vizeu, 2009, p. 77)—may have contributed in particular toward the production of the meaning of “vertical isolation” as a scientifically validated consensus strategy that “mirrors” a supposed epidemiological reality, aseptic and neutral.

It is necessary, therefore, to problematize the media’s naturalization of “vertical isolation” to express measures of social distancing (quarantine, *cordon sanitaire*, lockdown). In first place, the terminology confuses two distinct models of

<sup>18</sup>The titles of the articles (descriptor 3): What is vertical isolation against coronavirus; What is the vertical isolation that Bolsonaro wants and why do specialists fear it will cause more deaths?; Does vertical isolation work? Reality has already answered that question, says doctor; What is vertical isolation and why it may not work; What is vertical isolation [and why this may not be a good idea]?; What is vertical isolation (and why this is not a good idea)? Horizontal vs. vertical isolation: know the pros and cons of the strategies to contain coronavirus; Health alerts to rash transition, but sees vertical isolation as possible in little-affected locations; and, What are the risks of adopting only vertical isolation, proposed by Bolsonaro; What is the vertical isolation that Bolsonaro wants and why do specialists fear it will cause more deaths?; Specialists: Brazil’s characteristics do not permit vertical isolation; Health alerts to rash transition, but sees vertical isolation as possible in little-affected locations; Turkey endures drastic consequences of vertical isolation.



attention to epidemics. In the field of health, including Brazil, the established scientific consensus uses the term isolation to designate the care given to an infected and symptomatic patient, and is therefore a model for individual attention, belonging to the field of clinical medicine; distancing, on the other hand, implies collective/populational care, affiliated to epidemiology.

The use of “social isolation” in the place of social distancing is also a sematic error as it is based on a false synonymy. In the Portuguese language, “isolate” means to separate, segregate, and confine a person from all others in their social circle—in Brazilian dictionaries, among examples of isolate, we find medical activity aimed at treating patients with contagious diseases. On the other hand, distancing is the act or effect of separating people/groups, centered on a notion of physical space and not segregation.

By using one term in place of another, naturalizing a theoretical hypothesis that is still under discussion and therefore not validated by the scientific community, the media legitimized the term social isolation as common sense. And this may have contributed to the construction of a derogatory meaning for the strategy of social distancing, amplifying the resistance of the Brazilian population toward this measure.

## VERTICAL ISOLATION, DENIALISM, AND EUGENICS

The denialist discourse throughout the world is not just aligned to anti-science, but also resonates as a more or less homogeneous mark of eugenics. In Brazil, this is no different. The social and scientific movement for improving the human race that emerged at the end of the nineteenth century and was widely experimented with by the German Nazi regime during World War II (1939–1945), arrived in the country in 1918, with the creation of the Eugenics Society of São Paulo. Intellectuals from several areas notably from medicine and the public health services, gathered around this movement, and the triad of sanitation, hygiene, and eugenics supported a broad and generalized project for civilizational progress (Maciel, 1999), with medical knowledge playing a central role.

Racial regeneration would occur by means of three types of eugenics: positive, negative, and preventive. This last, also called prophylactic hygiene by Brazilian eugenicists, was mixed with principles of rural and urban sanitation, the suppression of social vices such as alcoholism, control of immigration and of matrimony, and the compulsory sterilization of “degenerates.” In the 1930s, the main activist in Brazilian eugenics, Renato Kehl, openly assumed his favorable position to some of the measures adopted by the German eugenics movement (Kobayashi et al., 2009).

Thus, the world eugenics ideology met the Brazilian positivist-hygienist movement, forming a new and active field, of hygienist-physicians, the protagonists and disseminators of the eugenics elements that would mark the actions of Brazilian public health for the next decades, and which still linger today in many practices, especially in the field of social care. This scientific rationality led to the implementation of “[...] projects of eugenic nature that intended to eliminate disease, separate madness

and poverty” (Schwarcz, 1993, p. 34), focusing mainly on immigrants, Black people, and the poor (Diwan, 2007). Acting in an intensive manner, the hygienist doctors undertook “[...] what they imagined to be a national regenerative mission, exerting functions, carrying out tasks, occupying positions that were strange to medicine,” and disseminating the certainty “[...] of being able to end the blemishes of the nation, collaborating with Brazil’s administrative and social entirety” (Mota, 2003, p. 21).

From the start of the community transmission of Sars-CoV-2 in Brazil it is possible to observe this memory of eugenics in Bolsonaro’s denialism, especially in his defense of vertical isolation. As governors and mayors began to officially order social distancing, the president’s position became more and more radical. This is what can be surmised from the article “Bolsonaro once again minimizes COVID-19 and says that Health is studying vertical isolation<sup>19</sup>,” published on the financial news site IstoÉ Dinheiro on March 26. In this piece, the president once again says that “some governors and mayors erred in the dose” of containment measures, demanding the reopening of all sectors of the economy:

*“And do a stay-at-home campaign. Don’t let grandpa leave the house, leave him in a corner. When you get home have a shower, wash your hands, wipe your ears with sanitizer gel. That’s it”, he declared.*

In the excerpt, Bolsonaro dehumanizes the elderly, the main target for his strategy of vertical isolation, turning their existence into objects in face of the epidemic. In his ambition to maintain the capitalist order, the president treats this subject (the elderly) as objects without free will who must be segregated in a “corner,” removing “their individual, malleable, unique characteristics” and transforming them “into empty husks, representations of themselves who, apparently, are no longer covered by the State of right” (Souza, 2017, p. 70).

In the same article, when commenting on the critical situations in other countries and on the perspectives of how the disease would manifest in Brazil, Bolsonaro yet again invests in a rhetoric of dehumanization:

*“I don’t think it’s going to reach that point, even because Brazilians should be studied, they don’t catch anything. You see the guy leaping into sewage, coming out, diving in and nothing happens”.*

This speech speaks directly of the more vulnerable social classes in Brazil that, due to conditions of extreme poverty, are subject to extremely precarious production relations. In this manner, it is possible to identify in the president’s discourse a correlation between men and rats, who are immune to sewers. This perspective, in turn, bears a resemblance to the metaphor of the crab man, created by doctor and geographer Josué de Castro to designate a new species of Brazilians: those excluded from the production processes and who took their subsistence from the mangrove swamps of Recife, mixing them up with the crabs they

<sup>19</sup>Bolsonaro once again minimizes COVID-19 and says that Health is studying vertical isolation. Available at: <https://www.istoedinheiro.com.br/bolsonaro-volta-a-minimizar-COVID-19-e-diz-que-saude-estuda-isolamento-vertical/>.

fed upon<sup>20</sup>. Later, in the 1990s, following on the heels of the crab men, the *gabiru* men emerged. This hyperbole was used to designate country folk who lost their lands to large-scale farming and ended up in urban shantytowns, carrying with them an old acquaintance, hunger (Portella et al., 1992; de Melo Filho, 2003). From the Tupi *wa'wiru*, *gabiru* means that which devours supplies, lives off trash, begs for hand-outs, causes repugnance, attacks and steals (Portella et al., 1992).

Besides touching upon this social imaginary of the excluded Brazilian, the speech is evidence of a reading in which the population can be left to their own luck, without needing the actions of a protective State since they are, by their animalistic nature, survivors.

In addition to the theoretical fragility of Bolsonaro's proposal, the news stories analyzed also demonstrate that the strategy was unfeasible due to Brazil's socioeconomic inequalities. In the article "Vertical isolation proposed by Bolsonaro may accelerate contagion by coronavirus and compromise health systems<sup>21</sup>," published on March 25 on the El País Brasil website, health specialists and medical authorities alert to the risks of accelerated contagion in Brazil and a rapidly compromised healthcare system:

*"The theoretical idea of vertical isolation is that you can allow young people to circulate. They would become infected and could become immune. But we don't know how this works with COVID-19 and we can't guarantee the exclusive isolation of a specific group", alerts the doctor Valdes Bollela, professor at the School of Medicine of USP Ribeirão Preto [São Paulo University of Ribeirão Preto]. (...) You think you can separate all the people [in the risk groups] who are young from those who are over 60? (...) People with HIV, diabetes and the elderly who count on their families? I can't imagine that in real life. In a theoretical idea, it's possible. In practice, it's a trap (...) In Brazil, a lot of people depend exactly on the care of their children".*

On the isolation of the elderly, in an article published on March 25 on the CNN Brasil website, along with the previously mentioned press conference video, titled "Bolsonaro vai propor isolamento vertical para conter coronavírus<sup>22</sup>," other related opinions are mentioned:

*[...] each family must be responsible for their relatives. "The people need to stop pushing things onto the public powers", he stated. (...) He stressed that the president of the United States, Donald Trump, follows a "similar line" as to measures to contain the disease, referencing yesterday's speech by the North-American in which he intends to end quarantine in the USA "by Easter".*

In these excerpts, it is possible to observe Bolsonaro's contempt for the excluding social characteristics in Brazil, where extreme social inequality would make it impossible to completely isolate the elderly and those with comorbidities from their relatives. Additionally, this also indicates his positioning on two aspects: the first, in prioritizing the economy—what really matters is to keep people working and generating income and taxes; the second, in making the State exempt from the consequences of its omission regarding the risks that the elderly face, in other words, that their life or death is not a problem of the public powers but of their families. Bolsonaro also uses the reference to the president of the United States in order to legitimize and strengthen his arguments and transmit the idea that there is a consensus between them regarding the pandemic, reinforcing the thesis that vertical isolation would be a viable strategy, since it was adopted by a developed country.

The article is short and uses a neutral tone, but it refers to a number of links, informing us, among other things, that Bolsonaro was the target of protests by Brazilians who were maintaining social distancing and of criticism by politicians:

*The speech [referring to the press conference video posted at the start of the article and already mentioned in this analysis] — during which there were records of pot-banging protests in several of the country's capitals — gave rise to criticism by health secretaries, authorities and politicians (CNN Brasil, March 25).*

The website brings visibility to the president's speeches without the concern of reflecting upon them or of pointing out their damaging effects upon the population's health.

In the article "Bolsonaro defende isolamento vertical e sugere que país pode 'sair da normalidade democrática'<sup>23</sup>," produced by international news agency Ansa and published on the website of the *O Globo* newspaper (March 25), the president also makes what can be considered his first threat of democratic rupture, using the argument that measures of social distancing would provoke an economic crisis of enormous proportions, which could lead to social convulsions.

*"[...] what happened in Chile [street movement that left its mark upon the Chilean scenario for months] will be small change next to what could happen in Brazil. We will all pay a price that will take years to pay, that is, if Brazil might not yet leave the democratic normality that you all defend so much, no one knows what can happen in Brazil" (...) "The chaos makes it so the left can seize the moment to come to power."*

By treating a scientifically legitimized event—the existence of an epidemic with planetary proportions—as an "excuse" of the Brazilian left to take his power, Bolsonaro brings up a fourth element that is characteristic of denialism: the identification of conspiracies among the consensuses of science. For conspiracy theorists, the validation of science is not a result of an evidence-based consensus among scientists, but of the involvement of these

<sup>20</sup>The notion of the crab men emerged from the main works of Josué de Castro: *Geografia da fome* (1948), *Geopolítica da fome* (1951), *Documentário do Nordeste* (1957), *Fatores de localização da cidade do Recife* (1957), and *Homens e caranguejos* (1967), the last an autobiographical romance.

<sup>21</sup>"Vertical isolation proposed by Bolsonaro may accelerate contagion by coronavirus and compromise health systems." Available at: <https://brasil.elpais.com/brasil/2020-03-25/isolamento-vertical-proposto-por-bolsonaro-pode-acelerar-contagios-por-coronavirus-e-comprometer-sistema-de-saude.html>.

<sup>22</sup>"Bolsonaro will propose vertical isolation to contain coronavirus." Available at: <https://www.cnnbrasil.com.br/politica/2020/03/25/bolsonaro-nao-estou-preocupado-com-a-minha-popularidade>.

<sup>23</sup>"Bolsonaro defends vertical isolation and suggests the country may 'depart from democratic normality.'" Available at: <https://oglobo.globo.com/brasil/bolsonaro-defende-isolamento-vertical-sugere-que-pais-pode-sair-da-normalidade-democratica-24327038>.



scientists in a complex and secret conspiracy (Hoofnagle and Hoofnagle, 2007). In this sense, the process of peer revision “[...] is seen as a tool by which the conspirators suppress dissent, rather than as a means of weeding out papers and grant applications unsupported by evidence or lacking logical thought” (Diethelm and McKee, 2009).

## “SO WHAT?”: CONSIDERATIONS ON A EUGENICS DISCOURSE

Denialism has different motivations—economic, political, personal, ideological, or religious—, but has as a common point the rejection of any thesis incompatible with the fundamental beliefs of those who hold them. As the analyses demonstrate, a first dimension of the denialism of Jair Bolsonaro on the Sars-Cov-2 epidemic is based on the idea that the effects of an economic crisis would be worse than the severe consequences of the disease itself on people’s lives. As seen in this work, this discourse aligns with that of other denialist world leaders, such as President Donald Trump and Prime Minister Boris Johnson—although, different from the Brazilian president, these leaders have oscillated throughout the pandemic between accepting scientific arguments in favor of the population’s health and prioritizing the economy.

In terms of the economic argument, however, a second dimension emerges in Bolsonaro’s discourse: that of eugenics. Under the terminology of vertical isolation, naturalized and legitimized by the media, the Brazilian president turns the most vulnerable segment of the population into objects, establishing a moral compass according to which, faced with the needs of maintaining the relations of capitalist production, some lives are worth less than others, and that this would be enough to justify the sacrifice.

It is important to point out that this discursive posture is not casual or chaotic. There is a method here that, moreover, helped to elect Bolsonaro<sup>24</sup>, known for his racist, misogynistic, sexist, and xenophobic statements. In 2017, during the electoral campaign for presidency, the then parliamentary member promised to end all demarcation of land for Indigenous Peoples<sup>25</sup>: “You can be certain that, if I get there (...) There will not be a centimeter marked off for indigenous reservations or for *quilombola*<sup>26</sup> lands.”

At the same event, he made disparaging and fat-shaming comments: “I went to a quilombo. The lightest Afro-descendent there weighed seven arrobas (aroba is a measurement used to weigh cattle; one aroba is equivalent to 15 kg). They do nothing. I think he was of no use even to serve for breeding.” Ironically,

this speech, which drew laughter from the audience, was given at Hebraica in Rio de Janeiro, one of the most traditional Jewish associations in the country.

In the wake of the rise of right-wing populism that, in the last years, has benefitted other leaders around the world, Bolsonaro was elected for his antisystem rhetoric, exploiting the fears and prejudices of ordinary voters, undermining the credibility of traditional political parties and democratic institutions, and normalizing discriminatory discourse, thanks to the reach of his social media, which he and his group manage with mastery, and with advisory help from Steve Bannon, former vice-president of Cambridge Analytica (Ricard and Medeiros, 2020). When he took over the presidency of the Republic, in January 2019, he not only radicalized this rhetoric but also, in many cases, transformed it into State policy—in the first days of his government, he ended social and environmental protection structures and programs; under Bolsonaro, for example, the recognition of quilombos fell to the lowest levels in history<sup>27</sup>.

On March 18, in an interview to Fox News<sup>28</sup> during an official visit to the United States, Bolsonaro attacked immigrants by defending Trump’s plans to build a wall on the border between the USA and Mexico: “The majority of immigrants do not have good intentions and do not want to do good for Americans.” It is worth remembering that there are over a million Brazilians living in the USA. In this manner, the alignment of Bolsonaro’s migratory policies with those of the American president—who in December 2019 called Haiti, El Salvador, and African countries “shitholes”—indicates “a racist slant, since not by chance most immigrants are Black or Indigenous people, from countries with a non-white populational majority. There is a logic that is eugenic, racist, and ethnic in nature,” states Dennis Oliveira in the same article—a journalism professor from the University of São Paulo (USP) and an activist in the Rede Quilombação network.

As the Brazilian health crisis grew in severity, Bolsonaro’s eugenics slant became more explicit, until it reached an emblematic declaration: “So what? I’m sorry. What do you want me to do? I’m a Messiah, but I don’t do miracles<sup>29</sup>.” Spoken to a group of reporters and supporters in front of the Alvorada Palace, the presidential residence in Brasília, on the night of April 28, when Brazil hit 5,017 official deaths, the phrase was followed by a disturbing statement on the severity of COVID-19 among the elderly: “I regret the situation we are going through with the virus. We sympathize with the families who have lost their loved ones, who were mostly elderly. But such is life. Tomorrow it will be me [to die].”

## CONCLUSION

The numbers for the epidemic in Brazil indicate that the eugenics project is succeeding, since on June 5, CNN informed that 40%

<sup>24</sup>After retiring as a captain of the Brazilian Army at the age of 33, Bolsonaro has been a professional politician for over 30 years. Before becoming president, he was on the Rio de Janeiro city council and, later, was a federal congressman for 27 years. During that period, he presented only two draft bills.

<sup>25</sup>Available at: <https://veja.abril.com.br/brasil/bolsonaro-e-acusado-de-racismo-por-frase-em-palestra-na-hebraica/>.

<sup>26</sup>Quilombo are settlements first established by escaped slaves in Brazil. Quilombolas are the descendants of Afro-Brazilian slaves who escaped from slave plantations that existed in Brazil until abolition in 1888. Since 2003 the Decreto 4.887/2003 recognized Quilombo communities and their claims to the land they inhabited, but only 219 of the 2,926 Quilombos have land titles.

<sup>27</sup>Available at: <https://www.bol.uol.com.br/noticias/2020/06/23/sob-bolsonaro-reconhecimento-de-quilombolas-cai-ao-menor-patamar-da-historia.htm>.

<sup>28</sup>Available at: <https://ponte.org/eugenia-2-0-a-politica-migratoria-de-bolsonaro/>.

<sup>29</sup>Available at: <https://veja.abril.com.br/politica/e-dai-nao-faco-milagres-diz-bolsonaro-sobre-mortes-por-COVID-19/>.

more Black than white people die from COVID-19 in Brazil<sup>30</sup>. Although the country did not officially adopt the vertical isolation policy proposed by Bolsonaro, because the Supreme Court decreed that states and municipalities had the autonomy to adopt social distancing measures, Bolsonaro's government continued to boycott the actions of governors and mayors to contain dissemination of the virus. This boycott could be observed in the presidential decrees that increased the list of activities considered essential, in the delays and inefficiency in implementing financial aid to those who were left without income, in the absence of effective programs to subsidize small businesses, and, of course, in Bolsonaro's speeches, which resonated throughout the country both by means of mass media and social networks<sup>31</sup>.

Up until the conclusion of this article, the Ministry of Health was still under the interim command of a general who, like Bolsonaro, also adopted a denialist stance. On May 20, under this administration, the ministry published a protocol<sup>32</sup> with guidelines for prescribing chloroquine and hydroxychloroquine for light, moderate, and severe cases of COVID-19. Although there is no strong scientific evidence on the effectiveness of this medication, the Bolsonaro administration maintains its use as a standard for care in SUS. Since the start of June<sup>33</sup>, the government has been changing the manner and time for divulging the epidemiological reports that update infection cases and deaths by the disease, while also announcing the adoption of a new methodology for sharing the data which will invalidate comparisons with the previous numbers and, consequently, affect monitoring of the evolution of COVID-19 in the country. One of the aims of this strategy is to reduce the visibility of the number of deaths and misinform the population. Following the same direction, the Department of Social Communication created a "life scoreboard," a report disseminated exclusively on the presidency's social networks that highlights the number of recovery cases while omitting the deaths.

In addition to these actions, the president's denialist speeches that are spread both by mass media and social networks have a direct effect upon the behavior of the population regarding social distancing, as demonstrated by Ajzenman et al. (2020).

In this scenario, our study demonstrates that the Brazilian mass media is still fixed upon the notion that it is necessary to present both sides of an event, giving each equal weight, even

when one has assumed a denialist position toward the science. This positioning, justified normally by the pursuit of neutrality in news coverage, allows for the spreading of false premises posing as science and strengthens the denialist and eugenic project of Bolsonaro. This occurs because, as stated by Happer and Philo (2013), the media holds a central role in spreading information and in the process of focusing attention on a specific subject, as well as in defining a public agenda.

Another aspect identified in the study relates to the characteristics of the method adopted by Bolsonaro since the elections, which have endured during this past year-and-a-half of his mandate: the discursive verbiage, often grotesque and always of populist appeal, which the Brazilian media appears to have become a hostage of. And, by amplifying the president's speeches, the media symbolically places him at the center of the coordination of control measures for the epidemic in Brazil, a role he has never undertaken. In this sense, we agree with Rosen (2020) and Smith (2020), who identified the same phenomenon in the media coverage of coronavirus in the United States, pointing to the need of removing President Trump as a protagonist in news about the theme.

Under the guise of conclusion, it is important to highlight an action which indicates that the Brazilian press has gradually taken on a more critical posture. In June, faced with the proposal from the Ministry of Health for presenting incomplete data on COVID-19, the six largest newspapers and news sites in the country united in order to compile and systematize daily the data from the State Departments of Health<sup>34</sup>, ensuring a higher reliability and transparency of the numbers, thus acting as overseers for the public powers and guaranteeing the dissemination of correct information. However, in a health crisis with the magnitude of the present one, much more is necessary than merely making numbers visible. Newspapers and news sites have a key role, since the information they produce and circulate guide collective and individual behaviors (Stevens and Hornik, 2014). Therefore, it is crucial that journalists take on a critical posture, knowing how to identify the multiple faces of denialism and making clear the damaging effects of eugenics policies upon the health of the population.

## DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. All the articles/data used in the research are listed in the footnotes and are open access.

## AUTHOR CONTRIBUTIONS

CM and JB contributed to the design and implementation of the research, to the analysis of the results, and to the writing of the manuscript. All authors contributed to the article and approved the submitted version.

## REFERENCES

Ajzenman, N., Cavalcanti, T., and Da Mata, D. (2020). *More Than Words: Leaders' Speech and Risky Behavior During a Pandemic*. Available online at: <https://ssrn.com/abstract=3582908> (accessed June 30, 2020).

Castilho, C. (2015). *Morrem os jornais, surgem as marcas jornalística*. *Observatório da Imprensa*, 29 set. Disponível. Available online at: <http://observatoriodaimprensa.com.br/imprensa-em-questao/morrem-os-jornais-surgem-as-marcas-jornalisticas/> (accessed June 28, 2020).

de Lima, V. A. (2001). *Mídia: teoria e política*. São Paulo: Fundação Perseu Abramo.

- de Lima, V. A. (2011). *Regulação das comunicações: história, poder e direitos*. São Paulo: Paulus.
- de Melo Filho, D. A. (2003). Swamps, men and crabs in Josué de Castro: meanings and their unfolding. *Hist. Cienc. Saude-Manguinhos* 10, 505–524. doi: 10.1590/S0104-59702003000200002
- Diethelm, P., and McKee, M. (2009). Denialism: what is it and how should scientists respond? *Eur. J. Public Health*. 19, 2–4. doi: 10.1093/eurpub/ckn139
- Diwan, P. (2007). *Raça pura. Uma história da eugenia no Brasil e no mundo*. São Paulo: Contexto.
- Gelbspan, R. (1998). *The Heat Is on: The Climate Crisis, the Cover-Up, the Prescription*. Cambridge, MA: Perseus Press.
- Hannah, M. G., Hutta, J. S., and Schemann, C. (2020). *Thinking Through COVID-19 Responses with Foucault – An Initial Overview*. Antipode. Available online at: <https://antipodeonline.org/2020/05/05/thinking-through-COVID-19-responses-with-foucault/> (accessed May 30, 2020).
- Happer, C., and Philo, G. (2013). The role of the media in the construction of public belief and social change. *J. Soc. Political Psychol.* 321:336. doi: 10.5964/jsp.p.v1i1.96
- Hoofnagle, M., and Hoofnagle, C. (2007). *Hello And Welcome To Denialism Blog*. Available online at: <https://scienceblogs.com/denialism/about> (accessed June 12, 2020).
- Ioannidis, J. P. A. (2020, March 17). A fiasco in the making? As the coronavirus pandemic takes hold, we are making decisions without reliable data. *StatNews*. Available online at: <https://www.statnews.com/2020/03/17/a-fiasco-in-the-making-as-the-coronavirus-pandemic-takes-hold-we-are-making-decisions-without-reliable-data/> (accessed May 12, 2020).
- Katz, D. L. (2020, March 20). Is our fight against coronavirus worse than the disease? *The New York Times*. Available online at: <https://www.nytimes.com/2020/03/20/opinion/coronavirus-pandemic-social-distancing.html> (accessed May 12, 2020).
- Kobayashi, E., Faria, L., and Costa, M. C. (2009). Eugenics and the rockefeller foundation in Brazil: health as an instrument of national regeneration. *Sociologias* 11, 314–51. doi: 10.1590/S1517-45222009000200012
- Kucinski, B. (2006). *Síndrome da antena parabólica: ética no jornalismo brasileiro*. São Paulo: Fundação Perseu Abramo.
- Law, J., and Mol, A. (2002). *Complexities: Social Studies of Knowledge Practices*. Durham: Duke University Press. doi: 10.1215/9780822383550
- Lisboa, S., and Benetti, M. (2015). Journalism as justified true belief. *Br. J. Res.* 11, 10–29. doi: 10.25200/BJR.v11n2.2015.843
- Maciel, M. E. de S. (1999). *Eugenics in Brazil*. Available online at: <https://lume.ufrgs.br/bitstream/handle/10183/31532/000297021.pdf?sequence=1>; <https://www.vix.com/pt/ciencia/547185/o-que-foi-o-movimento-de-eugenia-no-brasil-tao-absurdo-que-e-dificil-acreditar> (accessed May 13, 2020).
- Malinverni, C. (2016). *Epidemia midiática de febre amarela: desdobramentos e aprendizados de uma crise de comunicação na saúde pública brasileira Tese (Doutorado em Ciências)*. Faculdade de Saúde Pública, Universidade de São Paulo, São Paulo, Brazil.
- Malinverni, C., and Cuenca, A. M. B. (2017). “Epidemias midiáticas, a doença como um produto jornalístico,” in *Comunicação, mídia e saúde: novos agentes, novas agendas*, ed C. d’Ávila and U. Trigueiros (Rio de Janeiro: Luminatti Editora), 7.
- Malinverni, C., Cuenca, A. M. B., and Brigagão, J. I. M. (2012). Media epidemics: sense production and social configuration of yellow fever in the journalistic coverage, 2007–2008. *Phys. Revista de Saúde Coletiva* 22, 853–872. doi: 10.1590/S0103-73312012000300002
- Menezes, A. P. R., Moretti, B., and Reis, A. A. C. (2019). O futuro do SUS: impactos das reformas neoliberais na saúde pública – austeridade versus universalidade. *Saúde Debate* 43, 58–70. doi: 10.1590/0103-11042019s505
- Mezzadra, S. (2020). *Politics of struggles in the time of pandemic*. Verso. Available online at: <https://www.versobooks.com/blogs/4598-politics-of-struggles-in-the-time-of-pandemic> (accessed June 26th, 2020).
- Mota, A. (2003). *Quem é bom já nasce feito: sanitarismo e eugenia no Brasil*. Rio de Janeiro: DP&A.
- Motta, L. G. (2007). *Enquadramentos lúdico-dramáticos no jornalismo: mapas culturais para organizar conflitos políticos*. Available online at: <https://pt.scribd.com/document/78063603/4134> (accessed March 14, 2020).
- Pitts, L. (2018, September 15). “Both sides-ism” a big problem in journalism. *The Post and Courier*. Available online at: [https://www.postandcourier.com/opinion/commentary/both-sides-ism-a-big-problem-in-journalism/article\\_9bab8232-b6bd-11e8-84ca-5784be02719c.html](https://www.postandcourier.com/opinion/commentary/both-sides-ism-a-big-problem-in-journalism/article_9bab8232-b6bd-11e8-84ca-5784be02719c.html) (accessed May 26, 2020).
- Portella, T., Aamot, D., and Passavante, Z. (1992). *Homem-gabiru: catalogação de uma espécie*. São Paulo: Hucitec.
- Ricard, J., and Medeiros, J. (2020). *Using Misinformation as a Political Weapon: COVID-19 and Bolsonaro in Brazil*. Boston, MA: The Harvard Kennedy School Misinformation Review, I:2. doi: 10.37016/mr-2020-013
- Rosen, J. (2010, November 10). The view from nowhere: questions and answers. Press Think. Available online at: <https://pressthink.org/2010/11/the-view-from-nowhere-questions-and-answers/> (accessed March 26, 2020).
- Rosen, J. (2020, April 19). Five improvements in the design of coronavirus coverage. Press Think. available online at: <https://pressthink.org/2020/04/five-improvements-in-the-design-of-coronavirus-coverage/> (accessed June 30, 2020).
- Rosen, J., Merrit, D. B., and Austin, L. (1997). *Theory and Practice: Lessons from Experience*. Dayton, OH: Kettering Foundation. Available online at: <https://www.kettering.org/sites/default/files/product-downloads/Public%20Journalism.pdf> (accessed March 14, 2020).
- Schwarcz, L. M. (1993). *O espetáculo das raças: cientistas, instituições e questão racial no Brasil (1870-1930)*. São Paulo: Companhia das Letras.
- Smith, B. (2020, April 19). Trump has begun his corona campaign. We don’t have to play along. *The New York Times*. Available online at: <https://www.nytimes.com/2020/04/19/business/media/donald-trump-coronavirus-campaign-media.html> (accessed March 31, 2020).
- Sousa, J. P. (2002). *Por que as notícias são como são? Construindo uma teoria da notícia. Biblioteca On-line de Ciências da Comunicação*. Available online at: <http://www.bocc.ubi.pt/pag/sousa-jorge-pedro-construindo-teoria-da-noticia.pdf> (accessed April 29, 2020).
- Souza, H. B. (2017). The Medusa’s sight: reification and politics reconfiguration through art teaching and scenic practice. *Moringa* 8, 69–80. doi: 10.22478/ufpb.2177-8841.2017v8n2.37769
- Spink, M. J. (ed.). (2004). *Práticas Discursivas e Produção de Sentidos No Cotidiano*. São Paulo: Cortez, 278.
- Stevens, R., and Hornik, R. C. (2014). AIDS in black and white: the influence of newspaper coverage of HIV/AIDS on HIV/AIDS testing among african americans and white americans, 1993–2007. *J. Health Commun.* 19, 893–906. doi: 10.1080/10810730.2013.864730
- Thompson, J. B. (2014). *A mídia e a modernidade: uma teoria social da mídia*. Rio de Janeiro: Editora Vozes.
- Traquina, N. (2007). *O que é jornalismo*. Lisboa: Quimera.
- Tuchman, G. (1983). *La producción de la noticia: estudio sobre la construcción de la realidad*. Barcelona: Gili.
- Van Der Haak, B., Parks, M., and Castells, M. (2012). The future of journalism: networked journalism. *Int. J. Commun.* 6, 2923–2938.
- Vizeu, A. (2009). O telejornalismo como lugar de referência e a função pedagógica. *Revista Famecos* 16:40. doi: 10.15448/1980-3729.2009.40.6321
- Vukasovich, C., and Vukasovich, T. D. (2016). Humanitarian intervention, a predictable narrative? A comparative analysis of media narratives from Serbia to Syria. *Glob. Med. Commun.* 12, 311–331. doi: 10.1177/1742766516653163
- Wenner, M. (2007, February 15). The war against war metaphors. *The Scientist*. Available online at: <https://www.the-scientist.com/daily-news/the-war-against-war-metaphors-46786> (accessed July 13, 2020).
- Wetherell, M., and Potter, J. (1988). “Discourse analysis and the identification of interpretive repertoires,” in *Analysing Everyday Explanation: A Casebook of Methods*, ed C. Antaki (Newbury Park, CA: Sage), 168–83.

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Malinverni and Brigagão. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Coping With Stress and Burnout Associated With Telecommunication and Online Learning

Nour Mheidly<sup>1</sup>, Mohamad Y. Fares<sup>2,3,4</sup> and Jawad Fares<sup>5\*</sup>

<sup>1</sup> Faculty of Information, Lebanese University, Beirut, Lebanon, <sup>2</sup> Neuroscience Research Center, Faculty of Medical Sciences, Lebanese University, Beirut, Lebanon, <sup>3</sup> Faculty of Medicine, American University of Beirut, Beirut, Lebanon, <sup>4</sup> College of Medical Veterinary & Life Sciences, University of Glasgow, Glasgow, United Kingdom, <sup>5</sup> Department of Neurological Surgery, Feinberg School of Medicine, Northwestern University, Chicago, IL, United States

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Ravi Philip Rajkumar,  
Jawaharlal Institute of Postgraduate  
Medical Education and Research  
(JIPMER), India  
Hassan Youssef Hotait,  
Dubai Health Authority,  
United Arab Emirates

### \*Correspondence:

Jawad Fares  
jawad.fares@northwestern.edu

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 22 June 2020

**Accepted:** 28 September 2020

**Published:** 11 November 2020

### Citation:

Mheidly N, Fares MY and Fares J  
(2020) Coping With Stress and  
Burnout Associated With  
Telecommunication and Online  
Learning.  
Front. Public Health 8:574969.  
doi: 10.3389/fpubh.2020.574969

The COVID-19 pandemic substantially impacted the field of telecommunication. It increased the use of media applications that enable teleconferencing, telecommuting, online learning, and social relations. Prolonged time facing screens, tablets, and smart devices increases stress and anxiety. Mental health stressors associated with telecommunication can add to other stressors related to quarantine time and lockdown to eventually lead to exhaustion and burnout. In this review, the effects of the COVID-19 pandemic on communication and education are explored. In addition, the relationship between prolonged exposure to digital devices and mental health is studied. Finally, coping strategies are offered to help relieve the tele-burdens of pandemics.

**Keywords:** COVID-19, SARS-CoV-2, mental health-state of emotional and social well-being, psychology, students, education-active learning, e-learning, COVID-19 mental health response

## INTRODUCTION

The COVID-19 pandemic has led to a major shift in communication. Advancement in technology played a central role in facilitating this shift. People were pushed toward media applications that enable live connection and interaction between individuals, institutions, firms, and even countries. This mode of communication, done through remote applications, is called telecommunication.

Burnout is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed. Over the past decade, studies exploring stress and burnout in the occupational and educational settings were published extensively. During the COVID-19 pandemic, the workplace setting changed upon lockdown implementation. Appropriate jobs shifted to remote working and telecommunication. In addition, education shifted to online mode and distance learning. Nevertheless, studies exploring stress and burnout associated with the new norm of increased telecommunication are lacking.

Here, we explore the status of communication and learning before and during the COVID-19 pandemic. The intense shift to telecommunication during the outbreak can lead to increased levels of stress and burnout as a result of increased on-screen time. Improving public awareness on the negative consequences of telecommunication and offering practical solutions to cope with its associated mental health challenges is vital to relieve the tele-burdens of pandemics.



## ONLINE COMMUNICATION IN THE ERA OF COVID-19

Before the COVID-19 pandemic, online communication and learning has been growing steadily worldwide, as new digital technologies emerge, and the global adoption of the Internet intensifies. The increased demand for skills that match the rapidly developing digital economy projected that online communication and learning was on track to become a global phenomenon and mainstream by 2025 (1).

The pandemic shifted communication substantially from face-to-face to virtual. Business meetings, academic conferences, education, and governmental management were forced to adapt to the challenges and risks that COVID-19 posed. Telecommunication via Skype, Zoom, FaceTime, and Cisco Webex was key in keeping the educational, economic, and health sectors alive and ongoing during the outbreak. Organizations used tele-detailing by means of social media or email to maintain connectivity and communication (2). In addition, telemarketing witnessed a surge in popularity to promote products and connect with customers (2). This shift further necessitated a change in policies and laws that govern communication in some countries. The UK government, for example, temporarily removed the in-person law for local authorities when holding public meetings, facilitating the conduction of meetings remotely (3).

## ONLINE LEARNING AND THE COVID-19 PANDEMIC

The online learning that we have today dates to the 1990s, when the Internet and World Wide Web started reaching individuals in remote locations and different time zones. This was a major shift from the mid-nineteenth century correspondence courses that started in England and involved sending of hard copy documents between students and university instructors. In the past two decades, advances in communication disrupted the education industry and made online education more feasible technologically, economically, and operationally (4).

The COVID-19 pandemic further accelerated the shift of the education sector toward online learning as gathering of students was forbidden. A high demand for massive online open courses, from providers such as Coursera and edX, was noted during the lockdown (3, 5). In April 2020, people searched for “free online courses” more than one million times. Searches for technology courses that upgrade skills and knowledge, such as Microsoft Excel, Python, and coding, increased by 100% (6). To satisfy the demand, Coursera offered certificates for 115 courses for free (3). Course offerings varied between science, philosophy, history, mathematics, and other topics (3). edX also offered a variety of free online courses in partnership with various institutions to teach the history of pandemics, the actions that should be taken during pandemics, the available treatments for the virus, and how to manage during pandemics (5).

Extended protective measures forced most schools and universities to close their campuses until better control of the pandemic is achieved. The University of Cambridge, for example, announced that the 2020/2021 academic year will be fully online

(7). Colleges in the US responded to the pandemic gradually. Touro College and Stanford University were the first to announce their shift to online learning in March 2020. Later, 1,400 private and public educational institutions joined, and announced their transition to online learning (8). Some institutions were reluctant to fully endorse online education straightaway. Harvard University officials, for instance, announced that only some of its schools, such as the schools of design, divinity, and public health, will conduct on-line classes during the Fall 2020 semester (9). In China, the Spring 2020 semester was postponed. To cope with the challenges, the Chinese Ministry of Education issued a notice stating that elementary and middle schools should be held online. Additional web-based and television resources were provided by the government to specific rural areas where there is a lack of network coverage. Special programs were provided for students to increase their health and public safety education and help them cope with epidemics (10). In Georgia, learning shifted online in the Spring 2020 semester. Various facilities were provided to schools, teachers, and students by Georgia's Ministry of Education, Science, Culture and Sports. A total of 2,086 public schools were equipped with the Microsoft Teams platform and accounts for students and teachers were registered to be able to host virtual classes (11). In Germany, the COVID-19 pandemic highlighted hidden challenges in the educational system, which is lagging when it comes to digital learning (12). Officials have lately started to provide schools and teachers with web services and email accounts (13). Nevertheless, teachers lack the training needed for proper online education and are uninformed about technologies and the German digital infrastructure (12). In addition, several universities were shocked to know that their system is limited with respect to online library access, or the number of simultaneous teleconference participants (12).

## TELECOMMUNICATION, WELLBEING, AND MENTAL HEALTH

The surge in telecommunication led people to spend more time facing screens, tablets, and smart phones. Previously, the increase in exposure to smart devices and screens has been reported to increase stress and burnout levels. Stress is an emotional, physical, or mental reaction that causes tension (14). It can result from social, environmental, or psychological situations. Burnout is a mental health state that results from work-related distress, involving a continuous reaction to persistent interpersonal stressors. The major factors contributing to burnout are overwhelming exhaustion, feelings of cynicism, and detachment. In addition, a sense of ineffectiveness and lack of accomplishment may ensue (15). Appropriately, occupational burnout is conceptualized as a breakdown in the relationship between people and their work (16).

The relationship between the use of smart devices and stress and burnout has been a topic of interest for researchers worldwide (17). It is often contended that exposure to computer and smartphone screens is associated with a plethora of stress-related symptoms (18). These may appear in the form of psychological, cognitive, or musculoskeletal impairments, and



may take a toll on the individual's quality of life and daily function (19).

Few studies have addressed how stress due to smart devices correlates with social and demographic variables. Some gender-focused studies exploring psychological effects of prolonged use of smartphones reported more depressive symptoms and sleep disturbances among females than males (17, 18). Studies on personality traits showed that extroverted personalities were associated with telecommunication burnout, whereas introverts were found to face stresses resulting from telecommunication more easily (20). Age and time also seem to have an effect. Electronic media usage at night among adolescents was associated with decreased sleep duration and increased depressive symptoms (18). The duration of exposure further impacts levels of stress and anxiety. Visnjic et al. explored smart device use among university students and indicated that the intensity and modality of smart device use can influence the development of mental health problems in that population (21). Particularly, it was shown that anxiety is more common in younger students, those who send more text messages, and those who browse the internet less frequently (21). Stress was found to be more prevalent in students who spend longer times per day talking on the phone (21). Khouja et al. further confirmed that increased computer usage among teenagers is associated with increased anxiety levels (22). Madhav et al. showed that increased online activity amongst a cohort of 3,201 US students was associated with moderate-to-severe depression (23). Excessive use of e-mails might also be an antecedent for employee burnout. E-mail overuse can cause information overload, while the stress related to continuously answering e-mails may be an antecedent of burnout (24–26).

It is worth noting that the effects of prolonged exposure to telecommunication can also affect physical health. Observing screens and hunching over smartphones for extended periods of time leads to physical harm. Fares et al. found neck pain to be a prominent problem among adolescent and pediatric users, mainly due to the prolonged and distorted positioning when using these devices (27). Specifically, bending the neck when using digital screens and smartphones may progressively lead to stresses on the cervical spine; a condition known as “iHunch.” It may also strain the ligaments, muscles, and tendons of the vertebral column (27, 28).

## OTHER STRESSFUL FACTORS DURING PANDEMICS

Pandemics are often associated with a state of stress and panic. Accordingly, strain resulting from telecommunication can accumulate with other stressors to lead to exhaustion, anxiety, and burnout. During the COVID-19 outbreak, imposed lockdowns and compulsory quarantines increased levels of tension (29). The inability to socialize, attend gatherings and interact with others enhanced separation anxiety, boredom, and suicidal thoughts, and as such, these emotions were reported more often (29). Brooks et al. showed that people who spent more than 10 days in quarantine were more likely to report posttraumatic stress symptoms (29).

The elderly, teens, healthcare providers, and individuals with pre-existing mental health problems became more susceptible to stress and burnout. Symptoms in elderly manifested as changes in eating habits, disturbed sleep cycles, increased intake of tobacco and alcohol, and difficulty in concentrating (30). The closing of schools and educational institutions and the shift in learning to online methods disrupted the lives of students (31, 32). Exams were postponed or canceled, graduation ceremonies were halted, and learning objectives were shifted. This took a heavy toll on the psychological well-being of students worldwide. The shift in utilization of healthcare resources toward disease containment and prevention sidelined many medical conditions in the process (33). In the case of patients with mental health problems, this manifested as an aversion toward seeking help, an adjournment of psychiatric appointments, or a shortage in supplying mental health medications (33).

The lockdown negatively affected many sectors through delaying promotions, cutting wages, and/or job termination. Many institutions were forced to limit their working capacity or stop working completely, and this had a negative socioeconomic impact on employees, employers, and national economies (34). Subsequently, pressure and anxiety levels increased among affected individuals, who had to worry about both the pandemic and the burden of providing for themselves and their families during challenging times.

## RECOMMENDATIONS

Adopting coping strategies that are practical and applicable during online sessions can decrease the risk of psychological distress and preserve health and well-being (Figure 1).

As such, several measures must be taken to increase public mindfulness regarding the psychological repercussions of telecommunication. In addition, health strategies need to be adopted to help the public cope with rising stress and burnout levels during pandemics. Here, we suggest the following:

1. **Promoting awareness on stress and burnout resulting from increased use of telecommunication during pandemics through broadcasting media channels and social media platforms.**

Conventional media must acknowledge stress and burnout related to the pandemic and provide evidence-based data on prevalence and coping mechanisms to the general public. Social media will eventually pick up this information and will facilitate its quick sharing amongst the public (35).

2. **Increasing the frequency of breaks between online lectures or during teleconferences to allow participants to release eye strain and to prevent loss of interest and attention.**

Digital eye strain is an emerging public health issue that results from the continuous use of digital devices. Altered blinking patterns, excessive exposure to intense light, closer working distance, and smaller font size are factors associated with telecommunication through tablets and digital screens that can lead to eye strain and its subsequent effects. Maintaining



Mheidly N, Fares MY, Fares J. Coping with Stress and Burnout associated with Telecommunication and Online Learning. *Frontiers in Public Health*. 2020.

**FIGURE 1 |** An infographic presenting the coping strategies to be adopted during extended online activities and learning sessions.

a normal blinking rate and using artificial tears can help in the management of digital eye strain (36). Increasing breaks between online sessions can also release accumulating tension and maintain interest and attention.

### **3. Directing wellness campaigns at students to increase their awareness on the physical and emotional consequences of increased online time.**

Leading awareness campaigns directed at specific age groups while considering cultural and ethnic differences can help increase compliance to healthy online habits. Campaigns presented by role models can grab attention and induce behavioral change. Television personalities, movie stars, and famous athletes have all been shown to impact certain decisions of adolescents (37). Having these entertainers or athletes endorse awareness campaigns may influence people's attitudes and intentions when it comes to telecommunication.

### **4. Introducing podcast-based communication and learning as a substitute to online visual encounters to decrease eye strain and limit screen exposure.**

Podcasts are episodic digital audio recordings that are downloaded through web syndication or streamed online (38). In medical education, they have gained widespread popularity compared to other media resources (39), as they possess the potential to facilitate communication between researchers, policymakers, and the public. The creation of a learning podcast is an attractive way to provide asynchronous education because the barrier to entry is low and the resources needed are readily available and inexpensive (40). More importantly, podcasts substitute eyes for ears, easing the strain and stress that can result from prolonged visual fixation on screens and tablets.

### **5. Implementing healthy practices in between online sessions and during extended meetings, such as breathing exercises, meditation, and yoga.**

There is growing evidence that yoga is an effective multi-component health intervention that reduces stress, increases physical activity and improves well-being (41–45). Clinical studies provide preliminary support for the effectiveness of yoga as an adjunct treatment for a range of chronic conditions such as depression (46, 47) and anxiety (48). In addition, psychological mechanisms such as enhanced self and body awareness, coping, mindfulness, self-compassion, and social connectedness may underlie healthier lifestyle choices and more adaptive responses to stressors (49). Therefore, adopting such healthy practices can help in coping with stress and burnout resulting from telecommunication.

### **6. Providing online participants with the opportunity to share their feelings and mental struggles so that proper help and support can be administered.**

Professionals partaking in online communities must be proactive in using online platforms to share their feelings and experiences with telecommunication. Through these online communities, users might express emotions and provide tips on how they cope with stress and burnout resulting from prolonged online

activity. For example, preschool teachers, using online learning communities, improved their knowledge on mental health issues by sharing and discussing experiences related to mental health with others in these online spaces (50).

### **7. Cutting down on unhealthy habits that further increase stress levels, such as smoking and caffeine intake.**

An online survey of 957 smokers in the Netherlands reported that 18.9% reported smoking more in May 2020 (51). Severely stressed smokers were even more likely to have increased smoking behavior during the pandemic. Smoking has been linked to depression, anxiety, suicidal thoughts, and weak learning outcomes (52). Caffeine intake may also increase mental health disorders, such as anxiety (53). Cutting down on these bad habits can decrease their additive effect on online-associated stress and burnout.

### **8. Conducting wide cross-sectional surveys to extrapolate the actual levels of stress and burnout among different online populations.**

Studying epidemiological patterns and trends related to telecommunication and its associated stress and burnout can help us decipher the risk factors and protective mechanisms that can be studied and highlighted. Furthermore, efforts should be dedicated to fund health communication research (54–56). This will contribute to the advancement of better ways of communication between the different components of the health sector and, subsequently, improve public health and individual well-being.

## **CONCLUSION**

Recognizing stress and burnout resulting from telecommunication during pandemics is necessary to develop effective mitigation strategies. Research conducted on stress and burnout during the COVID-19 pandemic mainly focused on physicians, nurses, and other healthcare workers (57–61). Screening and surveying studies exploring stress and burnout levels among the general population or other vulnerable groups are lacking. Despite many reports of association between the use of smart devices and mental and psychological consequences, the evidence to this claim remains equivocal. Some studies in the literature report benefits garnered from the use of cellphones and describe it as a tool for coping with stress rather than causing it (62, 63). Consequently, it is not possible to summarize the relationship between smart device use and stress or draw conclusions on their association. Smart devices have grown in popularity to become an integral part of every household, and accordingly, research on its effects is necessary to be able to reap the benefits of this technology in a safe and healthy manner.

## **AUTHOR CONTRIBUTIONS**

NM, MF, and JF conceived the study, collected data, and prepared data presentation. All authors wrote, reviewed, and approved the final version of the manuscript.

## REFERENCES

- Kumar A, Kumar P, Palvia SCJ, Verma S. Online education worldwide: current status and emerging trends. *J Inf Technol Case Appl Res.* (2017) 19:3–9. doi: 10.1080/15228053.2017.1294867
- Whittlesey AA. *Communication During a Pandemic. Regulatory Focus.* (2020) Available online at: <https://www.raps.org/news-and-articles/news-articles/2020/4/communication-during-a-pandemic> (accessed June 20, 2020).
- Mendoza NF. *The Top Free Online Tech Classes to Advance your IT Skills.* (2020) TechRepublic. Available online at: <https://www.techrepublic.com/article/the-top-free-online-tech-classes-to-advance-your-it-skills/> (accessed June 19, 2020).
- Palvia S, Aeron P, Gupta P, Mahapatra D, Parida R, Rosner R, et al. Online education: worldwide status, challenges, trends, and implications. *J Glob Inf Technol Manag.* (2018) 21:233–41. doi: 10.1080/1097198X.2018.1542262
- Shah D. *For a Limited Time, Coursera Offers Free Certificates for 115 Courses. Here is the Full List. Class Central Moocreport.* (2020) Available online at: <https://www.classcentral.com/report/coursera-free-certificate-covid-19/> (accessed June 19, 2020).
- EDX. *Coronavirus Courses.* (2020). Available online at: <https://www.edx.org/learn/coronavirus> (accessed June 19, 2020).
- BBC News. *Cambridge University: All Lectures to be Online-Only Until Summer of 2021 BBC.* (2020). Available online at: <https://www.bbc.com/news/education-52732814> (accessed June 19, 2020).
- Marsicano C, Felten K, Toledo L, Buitendorp M. Tracking campus responses to the COVID-19 pandemic. *APSA Preprints.* (2020). doi: 10.33774/apsa-2020-3wvrl. [Epub ahead of print].
- Esaki-Smith A. *Harvard Law School Will Be Online-Only In The Fall, Harvard's Entering MBA Class Is Down Nearly 25%.* *Forbes.* (2020) Available online at: <https://www.forbes.com/sites/annaesakismith/2020/06/04/harvard-law-school-will-be-online-only-in-the-fall-harvards-entering-mba-class-is-down-nearly-25/#387d44da4dd5> (accessed June 19, 2020).
- Zhou L, Wu S, Zhou M, Li F. 'School's out, but class' on', the largest online education in the world today: taking China's practical exploration during the COVID-19 epidemic prevention and control as an example. *Best Evid Chin Educ.* (2020) 4:501–19. doi: 10.15354/bece.20.ar023
- Basilaia G, Kvavadze D. Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Res.* (2020) 5:7937. doi: 10.29333/pr/7937
- Kerres, M. Against all odds: education in Germany coping with Covid-19. *Postdigit Sci Educ.* (2020). doi: 10.1007/s42438-020-00130-7. [Epub ahead of print].
- News4Teachers. *NRW stellt Schulcloud, Logineo vor – Lehrerverband rät von Nutzung ab.* (2019). Available online at: <https://www.news4teachers.de/2019/11/nach-pleiten-und-pannen-nrw-stellt-endlich-seine-schulcloud-logineo-vor/> (accessed 30 July 2020).
- Shiel WC. *Medical Definition of Stress. MedicineNet.* (2018) Available online at: <https://www.medicinenet.com/script/main/art.asp?articlekey=20104> (accessed June 19, 2020).
- Maslach C, Leiter MP. New insights into burnout and health care: strategies for improving civility and alleviating burnout. *Med Teach.* (2017) 39:160–3. doi: 10.1080/0142159X.2016.1248918
- West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *Lancet.* (2016) 388:2272–81. doi: 10.1016/S0140-6736(16)31279-X
- Sansone RA, Sansone LA. Cell phones: the psychosocial risks. *Innov Clin Neurosci.* (2013) 10:33–7.
- Lemola S, Perkinson-Gloor N, Brand S, Dewald-Kaufmann JF, Grob A. Adolescents' electronic media use at night, sleep disturbance, and depressive symptoms in the smartphone age. *J Youth Adolesc.* (2015) 44:405–18. doi: 10.1007/s10964-014-0176-x
- Hossmann KA, Hermann DM. Effects of electromagnetic radiation of mobile phones on the central nervous system. *Bioelectromagnetics.* (2003) 24:49–62. doi: 10.1002/bem.10068
- Meymandpour R, Bagheri Z. A study of personality traits, viz., extraversion and introversion on telecommuters' burnout. *Telecom Business Rev.* (2017) 10:1–7.
- Višnjić A, Veličković V, Sokolović D, Stanković M, Mijatović K, Stojanović M, et al. Relationship between the manner of mobile phone use and depression, anxiety, and stress in university students. *Int J Environ Res Public Health.* (2018) 15:697. doi: 10.3390/ijerph15040697
- Khouja JN, Munafò MR, Tilling K, Wiles NJ, Joinson C, Etchells PJ, et al. Is screen time associated with anxiety or depression in young people? Results from a UK birth cohort. *BMC Public Health.* (2019) 19:82. doi: 10.1186/s12889-018-6321-9
- Madhav KC, Sherchand SP, Sherchan S. Association between screen time and depression among US adults. *Prev Med Rep.* (2017) 1:67–71. doi: 10.1016/j.pmedr.2017.08.005
- Barley SR, Meyerson DE, Grodal S. E-mail as a source and symbol of stress. *Organ Sci.* (2011) 22:887–906. doi: 10.1287/orsc.1100.0573
- Day A, Paquet S, Scott N, Hambly L. Perceived information and communication technology (ICT) demands on employee outcomes: the moderating effect of organizational ICT support. *J Occup Health Psychol.* (2012) 17:473. doi: 10.1037/a0029837
- Estévez-Mujica CP, Quintane E. E-mail communication patterns and job burnout. *PLoS ONE.* (2018) 13:e0193966. doi: 10.1371/journal.pone.0193966
- Fares J, Fares MY, Fares Y. Musculoskeletal neck pain in children and adolescents: risk factors and complications. *Surg Neurol Int.* (2017) 8:72. doi: 10.4103/sni.sni\_445\_16
- Harvard Medical School. *Stretch to Ease Screen-Time-Related Neck and Shoulder Pain.* (2020). Available online at: <https://www.health.harvard.edu/healthbeat/stretch-to-ease-screen-time-related-neck-and-shoulder-pain> (accessed June 19, 2020).
- Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet.* (2020) 395:912–20. doi: 10.1016/S0140-6736(20)30460-8
- Centers for Diseases Control and Prevention. *Coronavirus Disease 2019: Coping with Stress.* (2020). Available online at: <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html> (accessed June 19, 2020).
- Viner RM, Russell SJ, Croker H, Packer J, Ward J, Stansfield C, et al. School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *Lancet Child Adolesc Health.* (2020) 4:397–404. doi: 10.1016/S2352-4642(20)30095-X
- Ahmed H, Allaf M, Elghazaly H. COVID-19 and medical education. *Lancet Infect Dis.* (2020) 20:777–8. doi: 10.1016/S1473-3099(20)30226-7
- Giallonardo V, Sampogna G, Del Vecchio V, Luciano M, Albert U, Carmassi C, et al. The impact of quarantine and physical distancing following COVID-19 on mental health: study protocol of a multicentric italian population trial. *Front Psychiatr.* (2020) 11:533. doi: 10.3389/fpsy.2020.00533
- Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus and COVID-19 pandemic: a review. *Int J Surg.* (2020) 79:13–4. doi: 10.1016/j.ijsu.2020.04.018
- Mheidly N, Fares J. Leveraging media and health communication strategies to overcome the COVID-19 infodemic. *J Public Health Policy.* (2020). doi: 10.1057/s41271-020-00247-w. [Epub ahead of print].
- Coles-Brennan C, Sulley A, Young G. Management of digital eye strain. *Clin Exp Optom.* (2019) 102:18–29. doi: 10.1111/cxo.12798
- Martin CA, Bush AJ. Do role models influence teenagers' purchase intentions and behavior? *J Consum Mark.* (2000) 17:441–53. doi: 10.1108/07363760010341081
- Lichtenheld A, Nomura M, Chapin N, Burgess T, Kornegay J. Development and implementation of an emergency medicine podcast for medical students: EMIGcast. *West J Emerg Med.* (2015) 16:877. doi: 10.5811/westjem.2015.9.27293
- Cadogan M, Thoma B, Chan TM, Lin M. Free open access meducation (FOAM): the rise of emergency medicine and critical care blogs and podcasts (2002–2013). *Emerg Med J.* (2014) 31:e76–7. doi: 10.1136/emmermed-2013-203502
- Berk J, Watto M, Williams P. Twelve tips for creating a medical education podcast. *Med Teach.* (2020) 16:1–7. doi: 10.1080/0142159X.2020.1779205
- Pascoe MC, Bauer IE. A systematic review of randomised control trials on the effects of yoga on stress measures and mood. *J Psychiatr Res.* (2015) 68:270–82. doi: 10.1016/j.jpsychires.2015.07.013
- Büssing A, Michalsen A, Khalsa SBS, Telles S, Sherman KJ. Effects of yoga on mental and physical health: a short summary of reviews. *Evid Based Complement Alternat Med.* (2012) 2012:165410. doi: 10.1155/2012/165410



43. Fares J, Fares Y. The role of yoga in relieving medical student anxiety and stress. *N Am J Med Sci.* (2016) 8:202–4. doi: 10.4103/1947-2714.179963
44. Fares J, Al Tabosh H, Saadeddin Z, El Mouhayyar C, Aridi H. Stress, burnout and coping strategies in preclinical medical students. *N Am J Med Sci.* (2016) 8:75–81. doi: 10.4103/1947-2714.177299
45. Fares J, Saadeddin Z, Al Tabosh H, Aridi H, El Mouhayyar C, Koleilat MK, et al. Extracurricular activities associated with stress and burnout in preclinical medical students. *J Epidemiol Glob Health.* (2016) 6:177–85. doi: 10.1016/j.jegh.2015.10.003
46. Cramer H, Lauche R, Langhorst J, Dobos G. Yoga for depression: a systematic review and meta-analysis. *Depress Anxiety.* (2013) 30:1068–83. doi: 10.1002/da.22166
47. Pilkington K, Kirkwood G, Rampes H, Richardson J. Yoga for depression: the research evidence. *J Affect Disord.* (2005) 89:13–24. doi: 10.1016/j.jad.2005.08.013
48. Cramer H, Lauche R, Anheyer D, Pilkington K, de Manincor M, Dobos G, et al. Yoga for anxiety: a systematic review and meta-analysis of randomized controlled trials. *Depress Anxiety.* (2018) 35:830–43. doi: 10.1002/da.22762
49. Riley KE, Park CL. How does yoga reduce stress? A systematic review of mechanisms of change and guide to future inquiry. *Health Psychol Rev.* (2015) 9:379–96. doi: 10.1080/17437199.2014.981778
50. Chen D, Zhang R, Liu K, Hou L. Knowledge discovery from posts in online health communities using unified medical language system. *Int J Environ Res Public Health.* (2018) 15:1291. doi: 10.3390/ijerph15061291
51. Bommele J, Hopman P, Walters BH, Geboers C, Croes E, Fong Gt, et al. The double-edged relationship between COVID-19 stress and smoking: implications for smoking cessation. *Tob Induc Dis.* (2020) 18:63. doi: 10.18332/tid/125580
52. Slomp FM, Bara TS, Picharski GL, Cordeiro ML. Association of cigarette smoking with anxiety, depression, and suicidal ideation among Brazilian adolescents. *Neuropsychiatr Dis Treat.* (2019) 15:2799. doi: 10.2147/NDT.S217069
53. O'Neill CE, Newsom RJ, Stafford J, Scott T, Archuleta S, Levis SC, et al. Adolescent caffeine consumption increases adulthood anxiety-related behavior and modifies neuroendocrine signaling. *Psychoneuroendocrinology.* (2016) 67:40–50. doi: 10.1016/j.psyneuen.2016.01.030
54. Mheidly N, Fares J. Health communication research in the Arab world: a bibliometric analysis. *Integrat Healthcare J.* (2020) 2:e000011. doi: 10.1136/ihj-2019-000011
55. Mheidly N, Fares J. Health communication in low-income countries: A 60-year bibliometric and thematic analysis. *J Educ Health Promot.* (2020) 9:163. doi: 10.4103/jehp.jehp\_384\_20
56. Fares J, Salhab HA, Fares MY, Khachfe HH, Fares Y. Academic medicine and the development of future leaders in healthcare. In: Laher I, editor. *Handbook of Healthcare in the Arab World.* Cham: Springer (2020). doi: 10.1007/978-3-319-74365-3\_167-1
57. Restauri N, Sheridan AD. Burnout and PTSD in the COVID-19 pandemic: intersection, impact and interventions. *J Am Coll Radiol.* (2020) 17:921–6. doi: 10.1016/j.jacr.2020.05.021
58. Dimitriu MC, Pantea-Stoian A, Smaranda AC, Nica AA, Carap AC, Constantin VD, et al. Burnout syndrome in Romanian medical residents in time of the COVID-19 pandemic. *Med Hypotheses.* (2020) 7:109972. doi: 10.1016/j.mehy.2020.109972
59. Abdessater M, Rouprêt M, Misrai V, Matillon X, Tellier BG, Freton L, et al. COVID19 pandemic impact on anxiety of French urologists in training: outcomes from a national survey. *Prog Urol.* (2020) 30:448–55. doi: 10.1016/j.purol.2020.04.015
60. Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res.* (2020) 27:113129. doi: 10.1016/j.psychres.2020.113129
61. Morgantini LA, Naha U, Wang H, Francavilla S, Acar Ö, Flores JM, et al. Factors contributing to healthcare professional burnout during the COVID-19 pandemic: a rapid turnaround global survey. *PLoS One.* (2020) 15:e0238217. doi: 10.1371/journal.pone.0238217
62. Kline SL, Liu F. The influence of comparative media use on acculturation, acculturative stress, and family relationships of Chinese international students. *Int J Intercult Relat.* (2005) 29:367–90. doi: 10.1016/j.ijintrel.2005.07.001
63. Toda M, Ezoe S, Takeshita T. Mobile phone use and stress-coping strategies of medical students. *Int J Cyber Behav Psychol Learn.* (2014) 4:41–6. doi: 10.4018/ijcbpl.2014100104

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Mheidly, Fares and Fares. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# Disinformation and Conspiracy Theories in the Age of COVID-19

Pedro Silveira Pereira<sup>1</sup>, Antonio da Silva Silveira<sup>2</sup> and Antonio Pereira<sup>2\*</sup>

<sup>1</sup> Independent Researcher, Belém, Brazil, <sup>2</sup> Department of Electrical and Biomedical Engineering, Institute of Technology, Federal University of Pará (UFPA), Belém, Brazil

**Keywords:** COVID-19, coronavirus, disinformation, misinformation, ideology, conspiracy theory, cognitive bias

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Benjamin Brojakowski,  
Angelo State University, United States

### \*Correspondence:

Antonio Pereira  
apereira@ufpa.br

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Sociology

**Received:** 09 May 2020

**Accepted:** 13 October 2020

**Published:** 12 November 2020

### Citation:

Pereira PS, Silveira AdS and Pereira A  
(2020) Disinformation and Conspiracy  
Theories in the Age of COVID-19.  
Front. Sociol. 5:560681.  
doi: 10.3389/fsoc.2020.560681

Since the 11th of March 2020, the 2019 coronavirus disease (COVID-19) has been declared a global pandemic by the (World Health Organization, 2020). The disease is caused by the SARS-CoV-2 and was first officially reported in Wuhan, China, in December 2019 (Zhu et al., 2020). Since then, COVID-19 has spread globally with millions of laboratory-confirmed cases and hundreds of thousands of deaths (Relief Web, 2020). So far, there is no specific treatment for the disease and many research teams are currently working on a vaccine that, optimistically, will only be available to the public in 2021. Meanwhile, the recommendation from health authorities is to adopt nonpharmaceutical interventions such as travel restrictions, school closures, social distancing, washing hands, and wearing face masks. Though these emergency measures are certainly inconvenient, social distancing has been proven historically effective in reducing and delaying infection rates and mortality on previous influenza pandemics (1918 and 2009) (Ahmed et al., 2018) while face masks minimize the risk of spreading viral particles through respiratory droplets (Leung et al., 2020). In short, the greater part of the success of mitigation strategies depends on individual responsibilities for implementing the recommended personal-level actions.

Unfortunately, however, social distancing guidelines against COVID-19 have become a political hot topic and compliance has roughly been defined along ideological lines: conservatives are less probable to adhere to them than liberals (Rothgerber et al., 2020). To complicate matters, there has been a flood of conspiracy theories and false news about COVID-19. For instance, the conspiracy theory that the coronavirus is a laboratory-engineered bioweapon created by the Chinese started in January 2020 and was spread, bot-like, in Twitter by mostly right-wing and conservative profiles (Graham et al., 2020). While conspiracy theories are not the preserve of the ideological left or right, they are more common at ideological extremes and certainly strongest at the extreme right (Sutton and Douglas, 2020). The appeal of conspiracy theories is that they often serve as a “radicalizing multiplier” (Bartlett and Miller, 2010) for fringe groups while offering an easy explanation for complex issues (Marchlewska et al., 2018), thus satisfying people’s need for cognitive closure (Kruglanski and Fishman, 2009). However, as seen with “the stab in the back” myth in Germany after the end of WWI, for instance, the unchallenged dissemination of conspiracy theories and false news can posit a great risk to democracy (Ardèvol-Abreu et al., 2020).

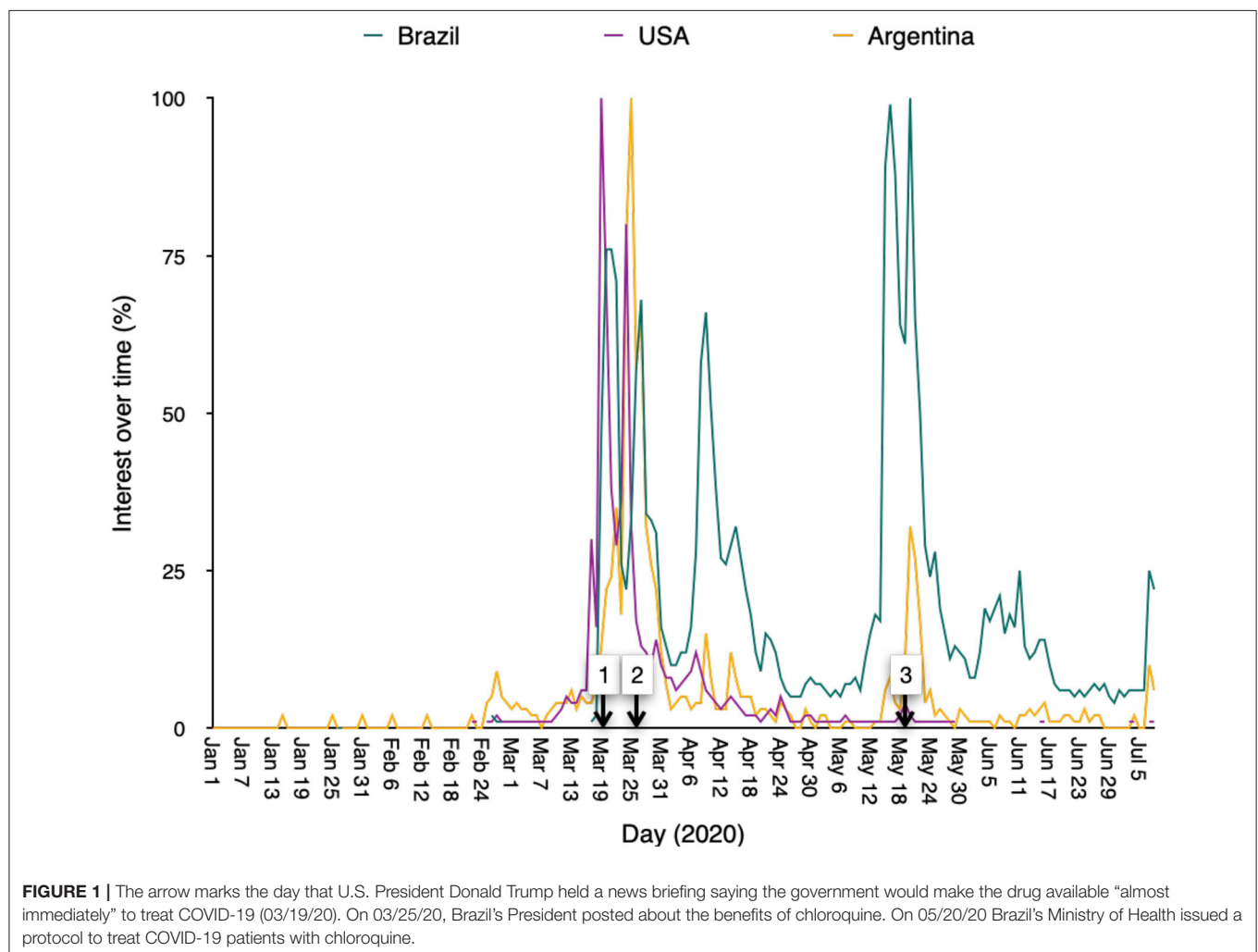
Aided by the existence of modern information networks powered by the internet, coordinated disinformation campaigns disseminating conspiracy theories, false news, and health hoaxes, are more common than ever. Conspiracy theories usually have a system-justifying function of supporting the status quo by redirecting the public attention toward imaginary perils and distracting from genuine threats (Eco, 2014; Jolley et al., 2018). Health hoaxes and false news also sidetrack demands for adequate and science-backed solutions to fight the pandemic and its consequences, such as investment on vaccine development, adequate hospital infrastructure (ventilators, ICU units, etc.), and financial relief programs. Some conservative

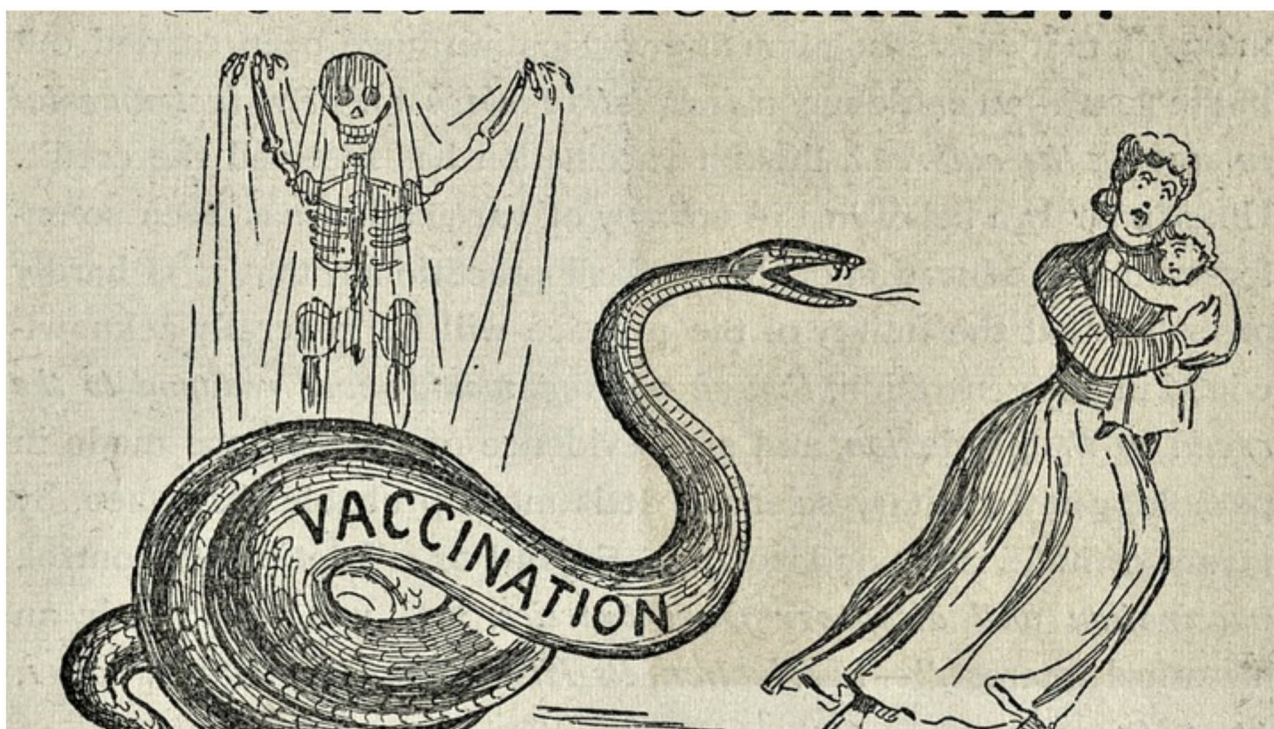
political leaders have regularly stressed the link between the adoption of social distancing guidelines with negative effects on the economy, even though there is evidence from the 1918 influenza pandemic that US cities that moved more aggressively to limit interactions among the public fared much better economically afterward than cities which were laxer (Correia et al., 2020). To justify the end of lockdowns, some have also promoted the use of unproven therapeutic methods, such as Chloroquine (CQ)/hydroxychloroquine (HCQ), to treat COVID-19 (Guzman-Prado, 2020).

CQ was proposed in the 1930s as a drug to treat malaria (Peters, 1971), which is still the deadliest infectious disease in the world. HCQ was later introduced as a less toxic version of the drug and was approved to treat autoimmune diseases (Ben-Zvi et al., 2012). CQ and HCQ garnered worldwide attention as promising candidates to treat COVID-19 in early February 2020 after the publication of reports showing *in vitro* activity of CQ against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Wang et al., 2020). Subsequently, several randomized controlled clinical trials were initiated but none was able to prove its efficacy against COVID-19 (Recovery, 2020) and some were

halted due to the possibility of harmful side effects. Meanwhile, beginning on 19 Mar 2020, President Donald Trump promoted the use of CQ/HCQ as a game-changer against COVID-19. Other conservative leaders around the world followed suit and began promoting the use of the drugs in their own countries as well. In the USA, the hype with chloroquine was short-lived due to counter-recommendations from the Food and Drug Administration (FDA) (US FDA, 2020), but in other countries, such as Brazil, it never went away due to official support for its use (See **Figure 1**). As shown in **Figure 1** comparing the US with two other countries in the Americas (Argentina and Brazil), Google searches for CQ/HCQ spiked in response to President Trump's press meeting on 19 Mar 2020 not only in the US but in both Argentina and Brazil. Afterward, the number of searches subsided, except in Brazil, where government officials have promoted CQ/HCQ as a valid therapy against COVID-19 even though there is no availability of clinical trial data regarding its safety and efficacy (Chowdhury et al., 2020).

Even though most people obtain the news from conventional media outlets such as television and newspapers, not from social network applications or false news (Allen et al., 2020), heads





**FIGURE 2** | A illustration from an 1894 anti-vaccination publication (The Historical Medical Library of the College of Physicians of Philadelphia).

of government have a bully pulpit through which they can reach a wider audience via traditional media coverage. In our polarized political times, their message is also propagated by both supporters and non-supporters in social media. Besides, the filtering technologies currently used by social media platforms facilitate the formation of psychosocial bubbles that limit the diversity of social contacts and feed the so-called digital “echo chambers” (Kaakinen et al., 2020).

The main assumption of the social identity approach (SIA) is that each person not only has a distinct personal identity but also social identities that connect them to other people (Brown, 2000). According to the SIA, group memberships are important parts of a person’s self-concept and shapes a person’s experience of the world (Hornsey, 2008). For instance, it is known that personal ideology influences people’s opinions on climate change policy (McCright and Dunlap, 2011; Fielding et al., 2020) and influence their decision to share false and misleading content, even though they generally wish to avoid spreading misinformation and are often able to tell truth from falsehood (Pennycook et al., 2019). Thus, by stressing the notion of “us” against “them,” the promoters of conspiracy theories and false news can vastly increase the chance of their message being spread.

The backlash against science-based methods to fight infectious diseases is not new. For instance, anti-vaccination movements were common in the 19th century in England, the US, and Brazil (Figure 2) (Jolley and Douglas, 2014). What’s new is the social environment for the propagation of contrarian views. For most online extremists, the content of the message does not matter as

much as its potential to be used as a bait to amplify the visibility of a conspiracy theory to the wider public when mainstream media and prominent social media actors engage with the conspiracy theory, even critically. Even official denials and corrections can be exploited by conspiracy theorists to claim that authorities are covering up “the real truth” (Graham et al., 2020). Conspiracy theories promoted by the anti-vaccination movement have been widely circulated in social media in recent years and could even hamper the efforts to reach a larger share of the population with an eventual COVID-19 vaccine (Megget, 2020).

A recent study showed that misinformation about COVID-19 on Facebook is available in several languages and much of this content remains active in the platform without a warning or label, giving ample time for it to go viral (Avaaz, 2020b). In a joint statement, Facebook, Google, LinkedIn, Microsoft, Reddit, Twitter, and YouTube have vowed to work against misinformation in their platforms (Shu and Shieber, 2020). However, some observers agree that more has to be done by these companies, including correct the record on health misinformation by individually sending warnings to recipients of false news, ban repeated offenders, and change their algorithms to prevent their posts of appearing systematically on feeds (Avaaz, 2020b). Facebook’s algorithm, for instance, rewards and encourages user’s engagement with content that provokes strong emotions, which is usually how false information is packaged: as something novel and sensational (Avaaz, 2020a).

Thus, there is a strong need for a vast campaign led by respected institutions and individuals to advise the public to be



cautious with dubious claims of effective therapies for COVID-19 and other infectious diseases. A recent proposal is to implement a suite of interventions based on accuracy nudges to make people think about the accuracy of the information they want to share in social platforms (Pennycook et al., 2020). Also, factually inaccurate information disseminated in social media should be promptly labeled and/or removed by social media outlets. Unfortunately, only tagging such stories as inaccurate, as done by Twitter, for instance, does not seem to be an effective solution to this problem (Pennycook et al., 2018). However, to preserve fundamental free-speech rights, moderation decisions should be carried with the utmost transparency by non-governmental oversight boards selected to represent society's diversity. Moderating decisions should be explained in the most user-friendly way to the public. Although there is a strong debate on the effectiveness of corrective measures (Jerit and Zhao, 2020), recent research shows that repeated exposure to correct information contributes to repair the damage of viral misinformation spread in the realm of social media (Carnahan et al., 2020). These measures are a small but necessary step in building a confidence society, where mistrust and pessimism do not further corrode the social tissue (Collectif, 2016).

Infectious diseases have always been an existential threat to mankind (Shaw-Taylor, 2020). Before the emergency of antibiotics or vaccines, i.e., for most of human history, the unexpected introduction of infectious agents could mean the decimation of some immunologically naïve groups. Besides the

physiological immune system, we evolved behavioral immune responses that protect us against pathogen threats and infectious hazards in a more proactive way (Schaller, 2011). Those responses, however, operate mainly subconsciously (Mercier, 2020), and similar to other evolved threat management systems, behavioral immune responses are characterized by contextual sensitivity and biases that aid adaptive responding (Haselton et al., 2015; Ackerman et al., 2018). Though people are usually wary of other people's opinions or advice (Trouche et al., 2018), they are susceptible to repetition, i.e., repeated statements tend to be rated as more likely to be true (Trouche et al., 2018), the so-called "illusory truth effect" (Hasher et al., 1977; Pennycook et al., 2018). During times of elevated stress, such as the ongoing pandemic, our faulty decision-making heuristics are more susceptible to be targeted by groups trying to control the public narrative to their benefit (Starcke and Brand, 2012). Though this procedure is not new, the danger to public health demands a prompt response from society. Words have consequences, and they have been used carelessly in the current pandemic by elected officials, contributing to confuse the public and discredit scientific expertise in the fight against SARS-CoV-2.

## AUTHOR CONTRIBUTIONS

PP, AS, and AP wrote the manuscript. All authors contributed to the article and approved the submitted version.

## REFERENCES

- Ackerman, J. M., Hill, S. E., and Murray, D. R. (2018). The behavioral immune system: current concerns and future directions. *Soc. Personal. Psychol. Compass* 12:e12371. doi: 10.1111/spc3.12371
- Ahmed, F., Zviedrite, N., and Uzicanin, A. (2018). Effectiveness of workplace social distancing measures in reducing influenza transmission: a systematic review. *BMC Public Health* 18:518. doi: 10.1186/s12889-018-5446-1
- Allen, J., Howland, B., Mobius, M., Rothschild, D., and Watts, D. J. (2020). Evaluating the fake news problem at the scale of the information ecosystem. *Sci. Adv.* 6:eay3539. doi: 10.1126/sciadv.aay3539
- Ardévol-Abreu, A., de Zúñiga, H. G., and Gámez, E. (2020). The influence of conspiracy beliefs on conventional and unconventional forms of political participation: the mediating role of political efficacy. *Br. J. Soc. Psychol.* 59, 549–569. doi: 10.1111/bjso.12366
- Avaaz (2020a). *Facebook's Algorithm: A Major Threat to Public Health*. Avaaz. Available online at: [https://secure.avaaz.org/campaign/en/facebook\\_threat\\_health/](https://secure.avaaz.org/campaign/en/facebook_threat_health/) (accessed August 30, 2020).
- Avaaz (2020b). *Health Professionals Sound Alarm Over Social Media Infodemic*. Available online at: [https://fb.avaaz.org/campaign/en/health\\_disinfo\\_letter/](https://fb.avaaz.org/campaign/en/health_disinfo_letter/) (accessed July 13, 2020).
- Bartlett, J., and Miller, C. (2010). *The Power of Unreason: Conspiracy Theories, Extremism and Counter-Terrorism*. London: Demos.
- Ben-Zvi, I., Kivity, S., Langevitz, P., and Shoenfeld, Y. (2012). Hydroxychloroquine: from malaria to autoimmunity. *Clin. Rev. Allergy Immunol.* 42, 145–153. doi: 10.1007/s12016-010-8243-x
- Brown, R. (2000). Social identity theory: past achievements, current problems and future challenges. *Eur. J. Soc. Psychol.* 30, 745–778. doi: 10.1002/1099-0992(200011/12)30:6<745::AID-EJSP24>3.0.CO;2-O
- Carnahan, D., Bergan, D. E., and Lee, S. (2020). Do Corrective Effects Last? Results from a Longitudinal Experiment on Beliefs Toward Immigration in the U.S. *Polit. Behav.* 1:20. doi: 10.1007/s11109-020-09591-9
- Chowdhury, M. S., Rathod, J., and Gernsheimer, J. (2020). A rapid systematic review of clinical trials utilizing chloroquine and hydroxychloroquine as a treatment for COVID-19. *Acad. Emerg. Med.* 27, 493–504. doi: 10.1111/acem.14005
- Collectif (2016). *La Société de Défiance: Comment le Modèle Social Français, 2nd Edn*. Paris: ULM.
- Correia, S., Luck, S., and Verner, E. (2020). *Pandemics Depress the Economy, Public Health Interventions Do Not: Evidence from the 1918 Flu*. Rochester, NY: Social Science Research Network.
- Eco, U. (2014). *A Theory of Conspiracies*. Livemint. Available at: <https://www.livemint.com/Opinion/5lhODHqqZHUcQwOZcw2liL/Umberto-Eco--A-theory-of-conspiracies.html> (accessed August 26, 2020).
- Fielding, K. S., Hornsey, M. J., Thai, H. A., and Toh, L. L. (2020). Using ingroup messengers and ingroup values to promote climate change policy. *Clim. Change* 158, 181–199. doi: 10.1007/s10584-019-02561-z
- Graham, T., Bruns, A., Zhu, G., and Campbell, R. (2020). *Like a virus: The Coordinated Spread of Coronavirus Disinformation*. Canberra, ACT: The Australia Institute. Available online at: <https://apo.org.au/node/305864> (accessed August 25, 2020).
- Guzman-Prado, Y. (2020). Recent findings on cardiovascular safety with the use of chloroquine and hydroxychloroquine for COVID-19. *Am. J. Cardiol.* 130:162–3. doi: 10.1016/j.amjcard.2020.06.003
- Haselton, M. G., Nettle, D., and Murray, D. R. (2015). "The Evolution of Cognitive Bias," in *The Handbook of Evolutionary Psychology*, ed D. M. Buss (Hoboken, NJ: John Wiley & Sons), 968–987.
- Hasher, L., Goldstein, D., and Toppino, T. (1977). Frequency and the conference of referential validity. *J. Verbal Learn. Verbal Behav.* 16, 107–112. doi: 10.1016/S0022-5371(77)80012-1
- Hornsey, M. J. (2008). Social identity theory and self-categorization theory: a historical review. *Soc. Personal. Psychol. Compass* 2, 204–222. doi: 10.1111/j.1751-9004.2007.00066.x



- Jerit, J., and Zhao, Y. (2020). *Political Misinformation*. Rochester, NY: Social Science Research Network.
- Jolley, D., and Douglas, K. M. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. *PLOS ONE* 9:e89177. doi: 10.1371/journal.pone.0089177
- Jolley, D., Douglas, K. M., and Sutton, R. M. (2018). Blaming a few bad apples to save a threatened barrel: the system-justifying function of conspiracy theories. *Polit. Psychol.* 39, 465–478. doi: 10.1111/pops.12404
- Kaakinen, M., Sirola, A., Savolainen, I., and Oksanen, A. (2020). Shared identity and shared information in social media: development and validation of the identity bubble reinforcement scale. *Media Psychol.* 23, 25–51. doi: 10.1080/15213269.2018.1544910
- Kruglanski, A. W., and Fishman, S. (2009). “The need for cognitive closure,” in *Handbook of Individual Differences, in Social Behavior*, eds M. R. Leary and R. H. Hoyle (New York, NY: The Guilford Press), 343–353.
- Leung, N. H. L., Chu, D. K. W., Shiu, E. Y. C., Chan, K.-H., McDevitt, J. J., Hau, B. J. P., et al. (2020). Respiratory virus shedding in exhaled breath and efficacy of face masks. *Nat. Med.* 26, 676–680. doi: 10.1038/s41591-020-0843-2
- Marchlewska, M., Cichocka, A., and Kossowska, M. (2018). Addicted to answers: need for cognitive closure and the endorsement of conspiracy beliefs. *Eur. J. Soc. Psychol.* 48, 109–117. doi: 10.1002/ejsp.2308
- McCright, A. M., and Dunlap, R. E. (2011). Cool dudes: The denial of climate change among conservative white males in the United States. *Glob. Environ. Change* 21, 1163–1172. doi: 10.1016/j.gloenvcha.2011.06.003
- Megget, K. (2020). Even covid-19 can't kill the anti-vaccination movement. *BMJ* 369:m2184. doi: 10.1136/bmj.m2184
- Mercier, H. (2020). *Not Born Yesterday*. Princeton, NJ: Princeton University Press. Available online at: <https://press.princeton.edu/books/hardcover/9780691178707/not-born-yesterday> (accessed July 13, 2020).
- Pennycook, G., Cannon, T. D., and Rand, D. G. (2018). Prior exposure increases perceived accuracy of fake news. *J. Exp. Psychol. Gen.* 147, 1865–1880. doi: 10.1037/xge0000465
- Pennycook, G., Epstein, Z., Mosleh, M., Arechar, A. A., Eckles, D., and Rand, D. G. (2019). Understanding and reducing the spread of misinformation online. *PsyArXiv [Preprint]*. doi: 10.31234/osf.io/3n9u8
- Pennycook, G., McPhetres, J., Zhang, Y., Lu, J. G., and Rand, D. G. (2020). Fighting COVID-19 misinformation on social media: experimental evidence for a scalable accuracy-nudge intervention. *Psychol. Sci.* 31, 770–780. doi: 10.31234/osf.io/uhbk9
- Peters, W. (1971). Malaria. Chemoprophylaxis and chemotherapy. *Br. Med. J.* 2, 95–98. doi: 10.1136/bmj.2.5753.95
- Recovery (2020). *No Clinical Benefit From Use of Hydroxychloroquine in Hospitalised Patients With COVID-19 — RECOVERY Trial*. Recovery Trial. Available online at: <https://www.recoverytrial.net/news/statement-from-the-chief-investigators-of-the-randomised-evaluation-of-covid-19-therapy-recovery-trial-on-hydroxychloroquine-5-june-2020-no-clinical-benefit-from-use-of-hydroxychloroquine-in-hospitalised-patients-with-covid-19> (accessed July 16, 2020).
- Relief Web (2020). *Coronavirus Disease (COVID-19): Situation Report - 175 (13 July 2020) - World*. ReliefWeb. Available online at: <https://reliefweb.int/report/world/coronavirus-disease-covid-19-situation-report-175-13-july-2020> (accessed July 14, 2020).
- Rothgerber, H., Wilson, T., Whaley, D., Rosenfeld, D. L., Humphrey, M., Moore, A. L., et al. (2020). Politicizing the COVID-19 pandemic: ideological differences in adherence to social distancing. *PsyArXiv [Preprint]*. doi: 10.31234/osf.io/k23cv
- Schaller, M. (2011). The behavioural immune system and the psychology of human sociality. *Philos. Trans. R. Soc. B Biol. Sci.* 366, 3418–3426. doi: 10.1098/rstb.2011.0029
- Shaw-Taylor, L. (2020). An introduction to the history of infectious diseases, epidemics and the early phases of the long-run decline in mortality<sup>†</sup>. *Econ. Hist. Rev.* 73, E1–19. doi: 10.1111/ehr.13019
- Shu, C., and Shieber, J. (2020). *Facebook, Reddit, Google, LinkedIn, Microsoft, Twitter and YouTube Issue Joint Statement on Misinformation*. TechCrunch. Available at: <https://social.techcrunch.com/2020/03/16/facebook-reddit-google-linkedin-microsoft-twitter-and-youtube-issue-joint-statement-on-misinformation/> (accessed July 13, 2020).
- Starcke, K., and Brand, M. (2012). Decision making under stress: a selective review. *Neurosci. Biobehav. Rev.* 36, 1228–1248. doi: 10.1016/j.neubiorev.2012.02.003
- Sutton, R. M., and Douglas, K. M. (2020). Conspiracy theories and the conspiracy mindset: implications for political ideology. *Curr. Opin. Behav. Sci.* 34, 118–122. doi: 10.1016/j.cobeha.2020.02.015
- Trouche, E., Johansson, P., Hall, L., and Mercier, H. (2018). Vigilant conservatism in evaluating communicated information. *PLOS ONE* 13:e0188825. doi: 10.1371/journal.pone.0188825
- US Food and Drug Administration. (2020). *FDA Cautions Against Use of Hydroxychloroquine or Chloroquine for COVID-19 Outside of the Hospital Setting or a Clinical Trial Due to Risk of Heart Rhythm Problems*. US Food Drug Administration. Available online at: <https://www.fda.gov/drugs/drug-safety-and-availability/fda-cautions-against-use-hydroxychloroquine-or-chloroquine-covid-19-outside-hospital-setting-or> (accessed July 16, 2020).
- Wang, M., Cao, R., Zhang, L., Yang, X., Liu, J., Xu, M., et al. (2020). Remdesivir and chloroquine effectively inhibit the recently emerged novel coronavirus (2019-nCoV) *in vitro*. *Cell Res.* 30, 269–271. doi: 10.1038/s41422-020-0282-0
- World Health Organization (2020). *WHO Announces COVID-19 Outbreak a Pandemic*. Available online at: <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic> (accessed July 14, 2020).
- Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., et al. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *N. Engl. J. Med.* 382, 727–733. doi: 10.1056/NEJMoa2001017

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Pereira, Silveira and Pereira. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Covid-19 as a Social Crisis and Justice Challenge for Cities

Annegret Haase\*

Department of Urban and Environmental Sociology, Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany

The article deals with Covid-19 as a social crisis and justice challenge for cities. It describes how Covid-19 shines a spotlight on the uneven distribution of goods and burdens, opportunities and resources that we find in most of the world's cities today; inequality and justice challenges arise from both the crisis itself and some of the policy reactions to it, such as the stay-at-home orders and economic lockdowns. It shows how exposure and vulnerability to Covid-19 emerges mainly at the intersection between different dimensions of disadvantage and marginalization. The example of housing and green space provision is used to discuss this general argument in more detail. The article concludes that to overcome the social crisis and justice challenge posed by Covid-19, we have to tackle the underlying structures/mechanisms leading to inequitable outcomes in today's cities, and to re-think the social and justice yardsticks of current urban sustainability and resilience debates and strategies.

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Ganiu Oladega Okunnu,  
Crescent University, Nigeria  
Kostas Maronitis,  
Leeds Trinity University,  
United Kingdom

### \*Correspondence:

Annegret Haase  
annegret.haase@ufz.de

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Sociology

**Received:** 15 July 2020

**Accepted:** 07 October 2020

**Published:** 12 November 2020

### Citation:

Haase A (2020) Covid-19 as a Social  
Crisis and Justice Challenge for Cities.  
Front. Sociol. 5:583638.  
doi: 10.3389/fsoc.2020.583638

**Keywords:** Covid-19, cities, social crisis, justice challenge, urban sustainability

## INTRODUCTION: THE COVID-19 CRISIS AS AN URBAN SOCIAL CRISIS AND JUSTICE CHALLENGE

Cities<sup>1</sup> worldwide have become the hotspots of the current Covid-19 crisis. The pandemic represents, in a way, an urban crisis and challenge for thinking about and shaping sustainable urban futures. It has affected cities in a very unequal manner: There are huge differences between different countries and between cities within one country, in regions all across the globe. But there are also some common features that become obvious when we look at the “urban face” of the Covid-19 crisis. The degree to which the pandemic affects a place and exposes people to health risks is clearly related to the social and socio-spatial inequalities and inequities of the world's cities. As Simon (2020) rightly states: “Patterns of illness and death reflect urban social and economic geographies. Attention has focused on shielding the elderly and those with underlying medical conditions, defined as being most at risk, but the reality is more complex.” Clearly, and this is nothing really new, low socio-economic status is another huge risk factor, a fact that holds true for all regions of the world (Fisher and Bubola, 2020). Both the health crisis itself and the measures taken to counteract it (e.g., restricting people from leaving their homes and shutting down large parts of public and economic life including supply and care infrastructures) not only clearly show existing social, socio-economic and socio-spatial inequities in our cities. They also reinforce and strengthen those inequities, leading to higher exposure to the virus among the disadvantaged and leaving them less capable of protecting themselves from infection. It became clear that social risk factors such as poverty, precariousness and exclusion increased a person's likelihood of becoming infected

<sup>1</sup>When referring to cities, I mean the city as an administrative area, but also its functional sphere of influence e.g., for suburban/commuting zones.

with the virus. Friedmann and Bartsch (2020) even speak of SARS-CoV-2 as a “social virus.” They identified poverty and exclusion as global risk factors that influence whether urban dwellers become infected, suffer from a severe case of the disease and even die from it. In countries like the US, Brazil, the UK or India, just to mention a few examples, the share of poor and low-income people among the Covid-19 cases and fatalities is much higher than their general share in the population. Hence the more socially polarized cities are, the more probable is it that this polarization will be reflected in the figures regarding who is exposed to and affected by the virus (Fisher and Bubola, 2020; Friedmann and Bartsch, 2020). Obviously, the social crisis is most severe in those (urban) societies with the most uneven distribution of and access to opportunities, resources and safety for different population groups and, as a consequence, the greatest social polarization—as witnessed in the countries mentioned above.

Set against this background, in this short article I will look at the coronavirus pandemic as a social crisis and justice challenge for our cities and urban societies. I will first explain what I mean by “social crisis” and “justice challenge” and then specifically discuss how disadvantage affects (a) exposure to the virus and (b) vulnerability to suffer directly and indirectly from the crisis. I will take the empirical example of housing and green space provision and distribution in cities to explore this in more detail. Finally, I will discuss how we can proceed from here to transform our cities in a truly sustainable, inclusive and just way to make them more resilient against external shocks and challenges.

Why does Covid-19 represent a social crisis in our cities? It is a social crisis in three senses, since it (a) exposes and highlights existing social inequities and shortcomings; (b) reinforces or enlarges them, because policies designed to counteract the crisis create unequal (polarized) opportunities for people to adapt and protect themselves; (c) has great potential to continue amplifying social differences even after the lockdowns end, i.e., also leads to more inequalities and inequities in the long run. The Covid-19 crisis is also a “stressor for justice issues,” as Kotsila (2020) recently put it. The opportunities and constraints that influence how well people get through the pandemic—economically and with regard to health—are distributed in a very unjust manner. It is not only the case that the poorest and most excluded are hardest hit by the pandemic; in some respects, the response to the crisis also comes at the expense of those with the lowest incomes, the worst housing conditions, and the least access to high-quality open/green space, health insurance, healthy food, etc. The latest data shows that social polarization did not just become obvious in relation to exposure to the virus, vulnerability to infection and the capacities of people to adapt to lockdown conditions; in the longer term, forecasts suggest we can expect a further increase in disadvantages for those who are most vulnerable and hardest hit by the crisis in a social respect. This polarization is concentrated in cities (DGB, 2020; Fisher and Bubola, 2020). In the following, I will discuss how the Covid-19 pandemic and policy responses to it have reinforced the social crises that already existed in cities, and show how crucial it is to apply an intersectional perspective to grasp the complexity of this crisis. The way urban societies

have responded to the health crisis up until now also shows how inequitable our policy responses are for urban dwellers who are marginalized or suffer low incomes or bad housing and living conditions, and how both the pandemic and the political response to it run the risk of considerably aggravating the social crises in our cities.

Conceptually, this health crisis and how it has unfolded until now (autumn 2020) is the focus of multiple, overlapping debates with great potential for cross-fertilization. The social crisis, as I understand it here, touches different strands of the debates at their intersections:

- (a). It represents a real challenge for large-scale debates on the future of urban sustainability and urban transformation toward greater sustainability. Having said that, I see this issue as another contribution to the current critical discussion on the “ambition-reality gap” of urban sustainability and the rising demands to pay more attention to the social and justice dimensions of the general sustainability discourse (Agyeman et al., 2002; Agyeman, 2008; Kremer et al., 2020).
- (b). It points to the urgent need to deal more critically with social and justice challenges in debates about urban transformation and the ways in which greener, more affordable and healthier cities for all can be designed and implemented. In the last few years, there has been an increase in critical analysis dealing with the awareness of inclusivity and justice in environmental urban debates (Haase et al., 2017; Malin and Ryder, 2018; Menton et al., 2020). More and more, we find overlaps between such critical studies and the ongoing right-to-the-city debates that started decades ago with the work of Lefebvre, Harvey and Marcuse, and which did not end with Sassen’s work on the city as a “collective good” 2017 or Fainstein’s “Just City” 2010.
- (c). It tells us a lot about how our societies cope with social and justice challenges in times of crisis, and whether we can interpret the crisis itself as a condition that is aggravating gaps in equality and justice or as a chance to tackle and overcome existing problems. In a situation of risk and uncertainty that puts society under stress—as conceptualized by Beck (1986) and recently recalled by Nassehi, among others (Nassehi and Yüksel, 2020)—the way this “crisis condition” shapes and determines how we handle inequality and justice issues says a lot about the way a society treats social issues (Are social issues a central priority, dwarfed by other issues or ignored altogether?).

In light of this, it is not just important to analyse the social and justice dimensions of how the Covid-19 crisis emerged in and is affecting our cities. It is equally or even more important to discuss what this means for our conceptual claims on the futures of urban sustainability and the formulation of policies and their implementation. So, my argument includes both an empirical foundation and observations as well as a theoretical and policy-related reflection. This paper is not an empirical one, it delivers a perspective based on my empirical expertise in urban research

so far, observations I've made during the last few months, a study of the emerging discourse on the urban dimension of the coronavirus crisis, and exchanges within my scholarly networks. The section on housing and the provision of green space builds on my nearly two decades of expertise and experience in this field. My aim is to open up a perspective on Covid-19 as a social crisis and justice challenge for cities and generate discussion.

## VULNERABILITY AND EXPOSURE AT THE INTERSECTION OF DISADVANTAGES

"Poor people also inhabit the lowest quality housing and areas of a city. They live at the highest densities and in the most cramped accommodation. These areas have higher air pollution levels, and poor quality or inaccessible utilities and services. They often have the smallest areas of open public spaces." (Simon, 2020) This quote is part of a small but increasing number of studies and reflections on the impacts of the Covid-19 pandemic (on cities). It shows the heart of what I call the social crisis and justice challenge caused by Covid-19. The social dimension of risk and exposure was not in the center of attention when the crisis started. It took researchers a while to grasp it. While at first, risk and exposure were mainly discussed with respect to age and pre-existing illnesses, it quickly became apparent that there are also social risk factors such as poverty, bad housing and living conditions, crowded areas and neighborhoods, job precariousness, lack of access to health services, and the necessity of going to work during lockdowns. Many of those studies and reflections (e.g., Friedmann and Bartsch, 2020; Schneidewind et al., 2020; Simon, 2020; Teubner, 2020) share the opinion that the crisis brings to light a range of (existing) inequalities. As Simon (2020) rightly puts it: "... the combination of social, economic and demographic factors together with the urban environment probably accounts for many of the observed infection patterns."

I think an intersectional perspective is needed here to fully grasp the complexity of exposure and disadvantage (Crenshaw, 2000; Lutz, 2014). Multiple disadvantages also mean that especially vulnerable people

- (a). experience above-average exposure to external risks, either caused directly by the Covid-19 crisis or the policy response to it;
- (b). either lack or do not have equal capacities to adapt or protect themselves (the way shutdowns or restrictions are organized or implemented limit their capacities even more, e.g., stay-at-home orders, rules about leaving one's home or district, closure of social support infrastructure);
- (c). are also most likely to suffer from the long-term consequences of the crisis through the loss of jobs, decreased income, sustained and untreated health problems, as well as longer educational and professional career gaps.

So, it is not just the intersection of disadvantages itself that makes people specifically vulnerable, but also the temporal dimension that keeps them disadvantaged in the long run. It is what Fisher and Bubola (2020) call a "mutually reinforcing cycle" of existing inequalities and external threat that make

Covid-19 a social crisis for cities. Even worse, "inequality itself may be acting as a multiplier on the coronavirus's spread and deadliness. Research on influenza has found that in an epidemic, poverty and inequality can exacerbate rates of transmission and mortality for everyone." (Fisher and Bubola, 2020). The widening of inequalities may additionally widen societal gaps that drive polarization, radicalism and right-wing populism in the long run as we see it currently in the US and Brazil.

Multiple disadvantages look different across the globe, we find a lot of differences and factors that are specific to particular places, but we also find some common ground which I described above. Intersectional disadvantage as the "face" of the urban social crisis in times of Covid-19 is a global phenomenon. It affects seasonal workers in Europe and India, precarious workers who lost their jobs in the US, people living in crowded and poor areas without access to clean water, space for distancing or access to open/green space in the midst or at the fringes of our cities, refugees and people without a secure legal status, homeless people, etc. (e.g., Dick, 2020; Global Platform for the Right to the City, 2020). In order to describe a bit more in detail what I have outlined now in a general way, I will now expand on the field of housing and green space provision in cities.

## EXAMINING THE EXAMPLE OF HOUSING AND GREEN SPACE PROVISION

The field of housing and green space provision shows the possible outcomes of crises in cities where there is an uneven distribution of and access to resources, opportunities and safety. Housing and green space provision belong to the fundamental issues that shape and determine people's quality of life and safety in cities. The case of the Covid-19 crisis has so far shown (a) how differently people were hit by the risk of infection depending on their housing conditions and their access to green spaces and (b) that the policies to counteract Covid-19, especially the conditions of lockdown, have by and large aggravated those uneven conditions. Socio-spatial and socio-economic inequalities were mirrored in the crisis and enlarged by the policy response—so the more polarized a city's living conditions, the greater the extent of the inequities.

Examples from many cities show that exposure to the risk of becoming infected is higher for residents living in crowded circumstances, in dense housing, small flats without a balcony and small rooms/little space per person. In our cities, it is mainly income-poor people who live under such conditions. As Simon (2020) underlines for the global scale, crowded housing has become a risk factor. What is more, in many places low-income housing is also situated in urban areas with high levels of pollution, e.g., along main traffic axes. Poor people often have an above-average level of pre-existing illnesses, which makes them additionally vulnerable. The lockdowns did not change this: They simply transferred the risk of getting infected from public spaces to households and indoor areas. Chair (2020) rightly speaks of the "inequalities of stay home policy," because for people living in bad housing conditions staying at home means being "exposed to cold, damp and other hazardous conditions with consequences



for both physical and mental health,” often with too little space per person (also: Clifford, 2020) and poor or no opportunities to access high-quality open and green spaces. Working from home or home schooling were hardly possible under such conditions, which risked further widening the existing gap in terms of opportunities for escaping poverty and marginalization. Precarious mass housing such as refugee accommodation or overbooked flats for seasonal workers became hotspots of mass infections in many cities, as examples from many countries show (e.g., Heisterkamp and Sussebach, Sauerbrey, 2020 for Germany, Butler, 2020, Chair, Clifford, 2020 for UK, Wennberg, 2000 for Sweden, Williams, 2020 for the US). The decisions of local governments in Spain to close down poor neighborhoods that had become infection hubs (e.g., in Palma de Mallorca or Madrid) in early autumn 2020 deepened the disadvantage of people living there (e.g., Jones, 2020). Not to mention homeless people for whom staying at home is not an option at all. All those groups of poor and/or marginalized people have suffered additionally from the closure of social support infrastructure, particularly children, single mothers and refugees/migrants with a fragile legal status. Care and help became hard or even impossible to provide during the lockdowns. With respect to jobs, many income-poor people had to either continue working and were exposed to the risk of infection in times when others could more effectively protect themselves by working from home. For many people, the economic lockdown meant a considerable loss or reduction in income that led to difficulties in paying rent, among other things. The moratoria on rent payments that was established in many countries only postpone the problem of indebtedness; evictions and the threat of eviction will remain a long-term disadvantage for poor people (e.g., Maalsen et al., 2020). In countries without a (functioning) welfare system, the crisis has made food more expensive due to lockdown conditions or disturbed supply chains. This, too, affects low-income people first and foremost. The interdependency or relatedness/interaction between all of these factors has to be understood to really grasp the extent to which the crisis and the associated political response have led to greater marginalization of already marginalized people in cities.

This is also true for the use of or access to urban green spaces. It is not only that urban green spaces are unevenly distributed in most cities and better-off housing areas and households usually benefit more from high-quality green spaces than poorer households and less popular housing areas. The urban green space debate rightly states that “during these extraordinary circumstances, urban nature offers resilience for maintaining well-being in urban populations, while enabling social distancing” (Samuelsson et al., 2020). Yet this remains an “empty” statement when we think about the uneven distribution of green benefits in most of our cities; this thinking would benefit from the insights of research that explicitly deals with green justice challenges (Haase et al., 2017; Kronenberg et al., 2020; Langemeyer and Connolly, 2020) or with the challenge of prioritizing the needs of the most marginalized (Anguelovski et al., 2020). To be very clear: The structures and organization of access to and benefits from urban green spaces that do

not provide equitable outcomes in non-crisis conditions (as described in many studies by critical urban green scholars) will be even less equitable in crisis conditions. In recent weeks and months many surveys have been conducted that ask urban dwellers worldwide about changes in the way they use urban green space. These surveys will most probably not be able to show the inequities and mismatches between the needs and wants from the perspective of the under-privileged, since they will have hardly participated in such surveys. So, again, it is important to stress the crucial function of urban green spaces as resilient infrastructure that provides safe and quality places for people in times of pandemics and pandemic-related lockdowns—however this is not the full picture. It is also vital to consider the varying degrees to which different groups can make use of and enjoy (discrimination-free) access to such green spaces. A combined “green and justice” perspective would tackle the issue of green space access and benefits as a justice challenge in a more appropriate way; critical urban green discourse increasingly points to such engaged positions (Haase et al., 2017; Anguelovski et al., 2020; Kronenberg et al., 2020; Langemeyer and Connolly, 2020; TNOC Blog Roundtable on Covid-19, 2020). Here, there needs to be more focus on the importance of accessible allotment gardens at affordable prices, the improvement of small or unused green spaces in crowded neighborhoods (green courtyards, pocket parks, corner green, etc.) or the potential to create green roofs as spaces to spend time in low-cost housing areas, among others (e.g., Samuelsson et al., 2020). Last but not least, this also applies to spaces for urban farming as places of low-budget food production that also became more important during the crisis.

Large-scale, fundamental efforts will be required to improve housing and green spaces provision in cities in a way that creates more equitable results in general, but also in times of crisis. Those efforts would also include tackling housing market mechanisms, property rights and income issues. Such efforts would have to be based on the basic principles of a right of all urban citizens for safe and good housing and discrimination-free access to urban green spaces at the neighborhood level. The current situation in most cities shows how far away we are from such a reality, even from such thinking. The reaction to the crisis can veer toward many different directions. It may either enlarge existing inequality and justice gaps or improve the situation for the disadvantaged as a “lesson learnt” from the crisis for more resilience in the future. In some places, as mentioned, highly affected poor neighborhoods are simply closed to fight the spread of disease and infections. In other places, planned or existing greening projects received more support and were fast-tracked in cities, and there was critical debate about precarious housing (e.g., debate in Germany about housing for seasonal or contract workers) (Scheiwe, 2000). But these issues are tackling the defective appearances of an inequitable system, fighting against the worst symptoms, rather than tackling the problems at heart of the system: the unequal and unjust distribution of resources, opportunities, safety and quality of life in our cities. Or perhaps this assessment is too pessimistic? Maybe the Covid-19 crisis and the small improvements and changes in practices and discourse are the start of larger-scale and more fundamental

changes toward truly sustainable cities (Kotsila, 2020; Kremer et al., 2020)?

## DISCUSSION: HOW DO WE GO FURTHER FROM HERE TO TACKLE THE SOCIAL CRISIS AND JUSTICE CHALLENGE IN OUR CITIES (RE)PRODUCED BY COVID-19?

It remains unclear what this all means for

- (a). the discourse on sustainable urban future cities in terms of a fair distribution of and access to opportunities, resources, quality of life and safety for all;
- (b). future discourse including different strands of debate with a particular focus on their overlaps and cross-fertilization potential;
- (c). policy formulation, planning and implementation that aims to tackle, counteract and, in the long run, overcome the social crises that we are observing in cities today as a consequence of the Covid-19 crisis.

There are various directions in which cities could develop during and after the pandemic. Under the given circumstances, it is not very likely that the inequalities and inequities that led to the socially uneven distribution of vulnerability and exposure to the virus will be tackled on a larger scale. This is where engaged, sustainability-oriented social science has to jump in and demonstrate how inequalities might emerge as a long-term risk for urban societies in the long run. For instance, there are a lot of green urban scholars who demand a more critically and emancipatory approach to discussions on sustainable and inclusive urban futures (e.g., Anguelovski et al., 2020), or plead for environmental science to take more responsibility for social concerns. So, if we want to see a different future “after” Covid-19 and not just a step-by-step return to the neoliberal and unjust “normality” that existed until early 2020, we have to demand fundamental changes to the shape and organization of our cities, and beyond. To this end, it would be desirable and indeed vital to deal more stringently and rigorously with overlaps between the strands of discussion on sustainable urban transformation and the right to the city, and raise more awareness about inequalities and justice among green urban scholars as I mentioned at the beginning. The policy fields that I briefly expanded on—housing and green space provision—are good examples for the potential of cross-fertilization between critical, socially aware and justice-oriented perspectives of urban discourse and research.

Clearly, the Covid-19 crisis offers a window of opportunities for change toward more sustainability. It might trigger or speed up changes that otherwise wouldn't have come so quickly, or make room for suggestions and decisions that promote a more sustainable way of looking at globalization, global urbanization, biodiversity protection and climate change mitigation, etc. In some places, efforts to strengthen green infrastructure and space for people increased during and after the lockdown periods, and some relief was provided for people who could not pay their rent due to job losses, reduced working hours and loss of income. The general question, however, is

who will benefit and suffer from changes and opportunities resulting from the Covid-19 crisis, and whether the crisis will lead to opportunities for different groups of people in the long run. A crucial lesson that we have learnt from the pandemic is that we need to ensure that policy responses to crises (and the subsequent recovery periods) are also equitable and affordable for people with fewer opportunities, resources and capacities to react/adapt (see here also Teubner, 2020). Otherwise, future cities will neither be truly sustainable nor resilient in a socially responsible way. So, after all, it would be somewhat naïve to deny that to take the Covid-19 crisis as an opportunity depends on a variety of conditions, conditionalities and contingency.

If we go one step further here, we arrive at a point where we have to seriously look at how sustainability policies are being lived and implemented in our cities today. We see a large gap between our ambitions and the reality, a discrepancy that is highlighted when we examine the increased social crises caused by Covid-19. To tackle this gap, we have to fundamentally question how we measure sustainable (and resilient) cities. What role should social fairness and justice play here? Are we willing to learn from the way the social crisis reveals increased virus exposure and vulnerability at the intersection of disadvantages? Can we develop a policy that tackles aggregated marginalization? Which role can and should an engaged and critical global urban discourse play here? Recent debates call on the “planetary” scientific community to take an active role (Mukherjee, 2020) and also demand close communication between scientific research and practice, as has been the case with virology and epidemiology in the last few months.

Counteracting the social crisis and taking up the justice challenge (re)produced by the coronavirus in our cities represents a multi-level and multi-temporal endeavor. The crisis exists at all levels, from single households to whole countries. The city itself is a place where different levels of impact and affectedness come together and interact. The same is true for the short-term and long-term effects and changes. Hence the social crisis has to be considered and tackled with regard to the short-term and the longer-term. As Samuelsson et al. (2020) point out in relation to urban green space planning, short-term action would be needed to build/improve resilience during the crisis, and long-term action to re-arrange structures and organizational approaches in a way that provides more equitable outcomes and less polarized access to resources, opportunities and safety, regardless of whether there is a crisis. To put it another way: While it will not be possible to overcome all inequitable structures and modes of distribution in the short term, over the longer term it should be possible to minimize the risks of exposure and vulnerability for everyone, especially disadvantaged and marginalized groups (this represents a long-standing key argument in philosophical and social justice thinking since the time of John Rawls).

In his plea for urban social inequities to be made the focus of debate, Simon (2020) concludes: “We have a unique opportunity to work toward fairer, more sustainable cities in the wake of coronavirus. Emergency government [...] support packages

must be used proactively.” I fully share this view and would add by way of conclusion that we also need to take Covid-19 as proof of where and how the social reality in our cities is not sustainable, just or resilient. Inequalities and inequities are major obstacles to true sustainability and not just collateral damage or by-products that have to be accepted. Thus, we can also use the coronavirus crisis as an opportunity to re-think and re-discuss the type of sustainability we want to see in our cities in the future as well as the criteria for measuring it. And hopefully this re-think will have a string focus on counteracting and overcoming the social crisis

and justice challenge currently being highlighted and reproduced by Covid-19.

With this short piece I sought to shape some ideas or at least thoughts and questions about these fundamental questions and invite further debate.

## AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

## REFERENCES

- Agyeman, J. (2008). Toward a ‘just’ sustainability? *Continuum* 22, 751–756. doi: 10.1080/10304310802452487
- Agyeman, J., Bullard, R.D., and Evans, B. (2002). Exploring the nexus: bringing together sustainability, environmental justice and equity. *Space Polity* 6, 77–90. doi: 10.1080/13562570220137907
- Angelovski, I., Brand, A. L., Connolly, J. J., Corbera, E., Kotsila, P., Steil, J., et al. (2020). Expanding the boundaries of justice in urban greening scholarship: toward an emancipatory, antisubordination, intersectional, and relational approach. *Ann. Am. Assoc. Geogr.* 29, 1–27. doi: 10.1080/24694452.2020.1740579
- Beck, U. (1986). *Risikogesellschaft*. Frankfurt: Suhrkamp.
- Butler, P. (2020). *Poor Housing Linked to High Covid-19 Death Rate in London Borough*. Available online at: <https://www.theguardian.com/world/2020/aug/17/poor-housing-linked-high-covid-19-death-rate-london-borough-brent>
- Chair, A. (2020). *Homes, Health, and COVID-19: How Poor Housing Adds to the Hardship of the Coronavirus Crisis*. Available online at: [https://www.smf.co.uk/commentary\\_podcasts/homes-health-and-covid-19-how-poor-housing-adds-to-the-hardship-of-the-coronavirus-crisis/](https://www.smf.co.uk/commentary_podcasts/homes-health-and-covid-19-how-poor-housing-adds-to-the-hardship-of-the-coronavirus-crisis/)
- Clifford, B. (2020). Available online at: <https://theconversation.com/coronavirus-pandemic-puts-the-spotlight-on-poor-housing-quality-in-england-136453> (accessed July 14, 2020).
- Crenshaw, K. (2000). Background paper for the expert meeting on the gender-related aspects of race discrimination. *Rev. Estud. Fem.* 10:171. doi: 10.1590/S0104-026X2002000100011
- DGB (2020). *Corona-Krise Verstärkt Soziale Ungleichheit*. Available online at: <https://www.dgb.de/themen/++co++6bf77ed6-9f34-11ea-9db2-525400e5a74a> (accessed July 14, 2020).
- Dick, E. (2020). Available online at: <https://www.die-gdi.de/en/the-current-column/article/how-the-corona-crisis-is-calling-into-question-the-right-to-the-city/> (accessed July 14, 2020).
- Fainstein, S. (2010). *The Just City*. Ithaca, NY: Cornell University Press.
- Fisher, M., and Bubola, E. (2020). Available online at: <https://www.nytimes.com/2020/03/15/world/europe/coronavirus-inequality.html> (accessed July 14, 2020).
- Friedmann, J., and Bartsch, M. (2020). Available online at: <https://www.spiegel.de/panorama/gesellschaft/corona-risikofaktor-armut-das-sozialvirus-a-28a9400c-971e-453d-a775-b5cdad4aeb84> (accessed July 14, 2020).
- Global Platform for the Right to the City (2020). Available online at: <https://www.right2city.org/the-right-to-the-city-facing-covid-19/> (accessed July 14, 2020).
- Haase, D., Kabisch, S., Haase, A., Andersson, E., Banzhaf, E., Baró, F., et al. (2017). Greening cities - To be socially inclusive? About the alleged paradox of society and ecology in cities. *Habit. Int.* 64, 41–48. doi: 10.1016/j.habitatint.2017.04.005
- Jones, S. (2020). Available online at: <https://www.theguardian.com/world/2020/sep/18/madrid-poor-spanish-capital-covid-19> (accessed September 21, 2020).
- Kotsila, P. (2020). “Just and sustainable cities in the context of a changing climate,” in *Paper Held at the Webinar “Covid-19, Justice and Sustainability in Cities on 5 June 2020*. Available online at: <http://www.bcnuej.org/event/urbana-open-webinar-covid-19-pandemic/> (accessed July 15, 2020).
- Kremer, P., Haase, A., and Haase, D. (2020). The future of urban sustainability: Smart, efficient, green or just? Introduction to the special issue. *Sustain. Cities Soc.* 51:101761. doi: 10.1016/j.scs.2019.101761
- Kronenberg, J., Haase, A., Łaszkiwicz, E., Antal, A., Baravikova, A., Biernacka, M., et al. (2020). Environmental justice in the context of urban green space availability, accessibility, and attractiveness in postsocialist cities. *Cities* 106:102862. doi: 10.1016/j.cities.2020.102862
- Langemeyer, J., and Connolly, J. (2020). Weaving notions of justice into urban ecosystem services research and practice. *Environ. Sci. Policy* 109, 1–14. doi: 10.1016/j.envsci.2020.03.021
- Lutz, H. (2014). “Intersectionality’s (brilliant) career – How to understand the attraction of the concept,” in *Working Paper Series ‘Gender, Diversity and Migration’* (Frankfurt: Goethe University).
- Maalsen, S., Martin, C., Rogers, D., Power, E. (2020). Available online at: <https://theconversation.com/why-housing-evictions-must-be-suspended-to-defend-us-against-coronavirus-1341480> (accessed July 14, 2020).
- Malin, S., and Ryder, S.S. (2018). Developing deeply intersectional justice scholarship. *Environ. Sociol.* 4, 1–7. doi: 10.1080/23251042.2018.1446711
- Menton, M., Larrea, C., Latorre, S., Martinez-Alier, J., Peck, M., Temper, L., et al. (2020). Environmental justice and the SDGs: from synergies to gaps and contradictions. *Sustain. Sci.* 1–6. doi: 10.1007/s11625-020-00789-8
- Mukherjee, J. (2020). *Wissenschaft: Lernt planetares Denken. DIE ZEIT* No. 23/2020.
- Nassehi, A., and Yüksel, Y. (2020). Podcast “Geht es den Deutschen zu gut?” (*Are the Germans doing too well?*). Spiegel Online. Available online at: <https://www.spiegel.de/politik/deutschland/corona-regeln-warum-sind-die-proteste-gerade-in-deutschland-so-heftig-a-749e924e-6d77-46ab-bb18-512ff0f7d57b> (accessed September 22, 2020).
- Samuelsson, K., Barthel, S., Colding, J., Macassa, G., and Giusti, M. (2020). Urban nature as a source of resilience during social distancing amidst the coronavirus pandemic. *Landsc. Urban Plan. [Preprint]*. doi: 10.31219/osf.io/3wx5a
- Sassen, S. (2017). The city – a collective good? *Brown J. World Aff.* xxiii, 119–126.
- Sauerbrey, A. (2020). Available online at: <https://www.tagesspiegel.de/politik/das-coronavirus-und-die-gesellschaft-keiner-hortet-sushi/25669244.html> (accessed July 14, 2020).
- Scheiwe, H. (2000). Available online at: <https://www.rnd.de/panorama/wohnbedingungen-der-tonnies-arbeiter-es-kann-nicht-sein-dass-menschen-wie-sklaven-gehalten-werden-werden-455X6ROVAJDXLBHFJJ123MW4VQ.html> (accessed July 14, 2020).
- Schneidewind, U., Baedeker, C., Bierwirth, A., Caplan, A., and Haake, H. (2020). “Näher-öffentlicher-agiler,” in *Eckpfeiler einer resilienten aezPost-Corona-Stadt, Working Paper*. Available online at: <https://wupperinst.org/fa/redaktion/downloads/publications/Post-Corona-Stadt.pdf> (accessed June 9, 2020).
- Simon, D. (2020). Available online at: <https://theconversation.com/cities-are-at-centre-of-coronavirus-pandemic-understanding-this-can-help-build-a-sustainable-equal-future-136440> (accessed July 14, 2020).
- Teubner, W. (2020). *What is the New Normal? Challenges and Opportunities Beyond COVID-19*. ICLEI News. Available online at: <https://iclei-europe.org/news/?c=search&uid=LKxHrBB> (accessed July 14, 2020).

- TNOC Blog Roundtable on Covid-19 (2020). Available online at: <https://www.thenatureofcities.com/2020/05/03/covid-has-upended-all-the-normal-routines-in-our-lives-and-work-how-do-you-imagine-you-might-be-changed-by-it-both-professionally-but-also-personally-as-you-negotiate-a-new-post-virus-norm/> (accessed May 4, 2020).
- Wennberg, J. (2000). Available online at: <https://www.aftonbladet.se/ledare/a/9vAO0M/virusdoden-far-inte-bli-en-klassfraga> (accessed July 14, 2020).
- Williams, J.P. (2020). Available online at: <https://www.usnews.com/news/healthiest-communities/articles/2020-03-19/coronavirus-could-crush-the-poor-and-homeless-advocates-warn> (accessed July 14, 2020).

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

*Copyright © 2020 Haase. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.*





# Communicating About COVID-19 in Four European Countries: Similarities and Differences in National Discourses in Germany, Italy, Spain, and Sweden

Annelie Sjölander-Lindqvist<sup>1\*</sup>, Simon Larsson<sup>1</sup>, Nadia Fava<sup>2</sup>, Nanna Gillberg<sup>1</sup>, Claudio Marcianò<sup>3</sup> and Serena Cinque<sup>4</sup>

<sup>1</sup> Gothenburg Research Institute, University of Gothenburg, Gothenburg, Sweden, <sup>2</sup> Department of Architecture and Construction Engineering, University of Girona, Girona, Spain, <sup>3</sup> Department of Agriculture, Mediterranean University of Reggio Calabria, Reggio Calabria, Italy, <sup>4</sup> Independent Researcher, Stockholm, Sweden

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Vian Bakir,  
Bangor University, United Kingdom  
Michael D. High,  
Xi'an Jiaotong-Liverpool  
University, China

### \*Correspondence:

Annelie Sjölander-Lindqvist  
annelie.sjolandervist@gu.se

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 10 August 2020

**Accepted:** 09 October 2020

**Published:** 13 November 2020

### Citation:

Sjölander-Lindqvist A, Larsson S,  
Fava N, Gillberg N, Marcianò C and  
Cinque S (2020) Communicating  
About COVID-19 in Four European  
Countries: Similarities and Differences  
in National Discourses in Germany,  
Italy, Spain, and Sweden.  
Front. Commun. 5:593325.  
doi: 10.3389/fcomm.2020.593325

The pandemic spread of COVID-19 grew inexorably to be the main topic of global news after it was first identified in 2019 in China. This article analyzes how heads of state and heads of government in Germany, Italy, Spain, and Sweden framed the problems and solutions to the spread of the virus during the pandemic's initial phase. A Foucauldian-inspired method of problematization guides the narrative analysis, complemented by governmentality, risk communication, and taskscape theories. The results of the analysis show how the individual is conceptualized as a central actor and whose practices are framed as crucial to overcoming the crisis. Through invoking a sense of responsibility, sacrifice, and current life during the pandemic as a difficult time, the speeches allude to how people through changed behavior can/should contribute to the greater good. The individual is positioned as a key cause of, and solution to the problem; however, construing the individual as an indispensable actor to overcoming the crisis also means that the individual is laid open for reprehension. To facilitate the spread of the containment message and to support individual understanding of overt risk, the four countries' leadership also augment their conceptualization of the crisis with ideas of national identity to inspire the individual to contribute to the "battle" and "defeat" of the virus. The leadership does also embrace the important role of the national government in controlling the outbreak and the role of science, and trust in science, are also emphasized. The speeches analyzed in this paper can be understood as governance technologies; the spatial disciplining and self-governance demanded by the regimes create subject positions for individuals or groups. A debate on the rights and responsibilities of the citizen is another aspect that comes to the fore, considering how the containment strategies in all four countries proclaim the individual as a core agent in circumscribing the virus, and hence the individual's activities as potentially damaging to the fight against the pandemic. This throws into question the connection between individual autonomy as a democratic right and disciplinary mechanisms, sometimes phrased encouragingly and at other times in an enforcing way.

**Keywords:** COVID-19, governmentality, problems, solutions, taskscapes, Europe, responsabilisation, political communication

## INTRODUCTION

The pandemic spread of the infectious disease COVID-19, caused by the respiratory syndrome coronavirus 2 (SARS-CoV-2), has grown inexorably to be the main topic of global news after it was first identified in late 2019 in Wuhan, China. In an attempt to mitigate the consequences of SARS-CoV-2, governments have enhanced whole-of-society mechanisms by implementing a wide range of restrictions and limitations to prevent further spread of the virus. While many of these restrictions must be understood as having a positive effect on limiting the spread of the virus, these restrictions have also limited and transfigured the movement of people within and between countries. Furthermore, the effects of self-isolation, quarantine, social distancing and associated feelings of frustration, loneliness, worries about the future, and post-traumatic stress disorders have already been pronounced as significant psychosocial consequences of the pandemic (Giallonardo et al., 2020). Consequently, the virus itself and the measures to contain the virus have had enormous cumulative effects on societies globally.

In what follows, we analyze how heads of state and heads of government in four European countries have framed the problems and solutions in their communication on the implementation of strategies for contagion containment to halt or stop further spread of the disease. We approach this analysis from the understanding that the content of such communication is crucial to society, particularly when there is an acute need to create awareness and readiness for action amongst the receivers of the information (Argenti, 2002). In addition to providing information to the public, the communication of the people in office—be they constitutionally elected, merely symbolic, or with restricted governing power—can also be understood as a way to legitimize interventions and stabilize the system for sound decision-making (Renn and Levine, 1991; Shipunova et al., 2014).

In analyzing this body of communication, we find the concept of “governmentality” (Foucault, 2010) useful since the containment measures serve to governmentalize the pandemic through the creation, activation, and execution of procedures for containing the virus, and by creating rules and incentives to influence particular behaviors of peoples. Official communication about the spread of COVID-19 and the implementation strategies for contagion containment provides a pivotal opportunity to examine how the problem(s) and the solution(s) relating to the pandemic are constructed. This study will therefore explore, compare, and analyze definitions of the problems and solutions to the outbreak and spread of SARS-CoV-2 in the speeches made by the heads of state and heads of government in Germany, Italy, Spain, and Sweden during the pandemic’s initial phase.

Our analysis is inspired by Bacchi (2009, 2012) post-structuralist analytical framework for policy analysis. This is a method and theoretical perspective for studying problematizations in political discourse, which will enable us to identify stated problems and corresponding solutions in the speeches and to compare the cases. We first pose the question “What are the “problem(s)” and the “solution(s)” to the spread of the virus represented to be in the communication of the heads of state and heads of government in the four countries

included in the study”? Our second question formulates as “What presuppositions and assumptions underlie the representations of the “problem(s)” and the “solution(s)””? The final question, which builds on the second, reads “Which metaphors are used to describe the spread of the coronavirus and the method for stopping the spread or mitigating its consequences”? The assumption behind this last question is that there is a link between the metaphorical framing of a problem and suggested solutions and interventions—and that this is related to the policy problem/solution complex (cf., Lakoff and Johnson, 2003[1980]). By comparing problem definitions, proposed solutions, and the carrying concepts of the communications and the metaphors used to convey a discursive message, we will finally consider some of the implications that may ensue through the imposition of individual responsibility at the heart of the strategy for controlling the virus.

## COMMUNICATION, GOVERNMENTALITY, AND SUBJECTIVITIES

In this paper we understand the communication undertaken by heads of state and heads of government to address the COVID-19 outbreak and associated containment strategies as a form of science and risk communication: we can therefore expect the communication to include scientific, exploratory, and descriptive messages and objectives that merge with normative goals (cf., Bunge, 1998). While there are differences between these scholarly fields, they also share many common aspects. Risk communication can briefly be explained as the study of public risk perception and expert risk assessment (Sjöberg, 1998; e.g., Pidgeon, 1998) with the explicit aim of changing the public’s attitudes (Fischhoff, 1995), while science communication is the practice of enhancing public scientific awareness and scientific literacy (Burns et al., 2003).

Previous studies of science and risk communication outline how communication can make people change their behavior in correspondence with scientific knowledge (Renn and Levine, 1991). Studies show that trust in the actors providing the information is crucial for successful communication (e.g., Slovic, 1993; Kasperson et al., 1999; Löfstedt, 2005), but the procedures and standards for the communication are also important to increase public understanding and acceptance of the message itself (Trettin and Musham, 2000). Kurz-Milcke et al. (2008) stress that the role of communication is to educate and inform a target group about the actual risk(s) and benefits of certain actions, strategies, and policies.

Typically, “risk managers see more data or “working harder” as the best answer to reducing uncertainty” (Kasperson, 2014, p. 1236). This has been a recurrent theme during the course of the COVID-19 pandemic—recall how the World Health Organization (WHO) recommends rapid detection, isolation, testing, and management of suspected cases to “limit the spread of disease, [and] enable public health authorities to manage the risk of COVID-19” (WHO, 2020). This alludes to the Foucauldian debate around spaces of care and spaces of control, which in modern society refers to the care for the well-being and

health of larger populaces through the implementation of certain procedures and policies (Foucault, 1977). In our case, this finds a parallel in the WHO recommendation to take epidemiological control over the signs and symptoms of SARS-CoV-2.

The notion of “governmentality” enables us to address how public policy can be productive in terms of promoting particular behaviors. In contrast to more coercive forms of control, governmentality works at a distance by encouraging citizens, individually, and collectively, to take greater responsibility (Rose, 2006); hence, it seeks to shape human conduct in a more subtle way than by mere force (Dean, 2010[1999]). More generally, the concept of governmentality is useful in understanding how policy, through the vehicle of communication, promotes particular knowledge, techniques for regulation, and particular subject positions through the device of what is defined as “good behavior,” or “the conduct of conduct” (Foucault, 1991). This form of governance builds on the idea of what may be termed “responsibilization” and the notion that effective government is indispensably linked to actions of individuals and groups whereby “governing often concerns the formation of the subjectivities through which it can work” (Dean, 2010[1999], p. 71; cf., Raco and Imrie, 2000). Drawing on the concept of governmentality—denoting a form of rule building on the “rational” ordering of human action and affairs—individuals and groups are “governable” through the communication between the state and the public as well as through the technologies and rationalities employed by the state (Foucault, 1991; Sjölander-Lindqvist et al., 2020).

In Foucault’s later works (e.g., Foucault, 2007), he developed a distinction between sovereign power (control over territory), disciplinary power (control over bodies), and biopower (power over human existence). More specifically, biopower “represents the confluence of two concurrent interests: concern with the individual body on the one hand, and with the well-being of the population, or species body, on the other” (Maunula, 2017, p. 42). It is important to note that biopower is a form of modern governance related to individualization and the development of a specific relation between the state and the individual (Larsson, 2016). Foucault’s concept of disciplinary power is important since the discipline of the body is crucial to the work of biopower (Foucault, 1991). This relationship between biopower and disciplinary power is relevant in comparing and discussing the four countries’ national approaches to dealing with the SARS-CoV-2 virus.

Furthermore, the article takes an interest in how governance regimes create and reform physical space; here, Ingold and his “taskscape” concept (2000) can be useful in understanding how the interaction of bodies in a given landscape—be it urban, recreational, an office, a school, or a factory—lays an important foundation for the considerations made. The bodies and the tasks and activities that unfold in these “taskscape”—of the family, at the workplace, on the soccer field, or at a café or restaurant—are spaces of both the social and the political (Lefebvre, 1991[1974]; Ingold, 2000). The ways these spaces are used, or in a pandemic and epidemiological repertoire, how the individual and the collective understand and make changes

to their social and everyday interactions will be crucial to the prevention and management of the virus.

These performed spaces, constituted by ongoing interactions and negotiations of movements and activities (Dunkely, 2009), are where action is implicated in and operated through relations of power (Foucault, 1991). During the COVID-19 pandemic, limitations on movement have been introduced to combat contagion and the spread of the virus throughout the community. These limitations have not only been applied to public space but partially also to the private sphere, thus providing an interesting antithesis when social interactions, labor, and recreation are construed as potentially risky, and binding individual and collective action and co-presence with the ruling power. In the course of the pandemic, these spaces and the activities are considered as problematic and potentially harmful; they have been reorganized by the articulation of different tactics seeking to bring to light the “flattening-the-curve” goal.

The strategy of flattening the curve strives to avoid over-exhaustion of the healthcare system by slowing down the spread of the virus and diffusing it over an extended period of time. Here, the actions of the individual, i.e., the ability of the state to govern individual behavior, is of vital importance for the government regime to function properly. Drawing on the question of citizen engagement in the political, this also translates into how the individual is an asset who through a sense of civic duty can and should contribute to society. The expectation that the individual, as a pandemic subject, should both consider their own health and the health of others, is premised on the neoliberal values of individual responsibility and the virtue of volunteerism (Maunula, 2017).

## THE COVID-19 PANDEMIC IN GERMANY, ITALY, SPAIN, AND SWEDEN

After the initial outbreak, suspected to have begun and spread from the Huanan seafood wholesale market in the Wuhan region of China (Keni et al., 2020), the virus quickly reached other countries and continents. The four countries included in the study all reported their first cases in January 2020, and in this article, we refer to the initial phase of the spread of the virus when we discuss the addressed problems and solutions. Italy soon became notably hard-hit, with skyrocketing cases of infection and deaths. Spain followed the trajectory of Italy and became toward the end of March 2020 the second-most affected country in Europe. Three weeks into the lockdown, Italy started reporting declines in new cases and deaths. In Spain, infections started to slow down in early April. When compared to Italy and Spain, Germany, the third country included in our study, had a low fatality rate. Sweden, our fourth country, started off relatively slowly in terms of confirmed cases and deaths but soon became among the hardest hit in terms of deaths per capita ([www.ecdc.europa.eu/en/covid-19-pandemic](http://www.ecdc.europa.eu/en/covid-19-pandemic)). In terms of strategies to control the virus and reduce the transmission rate of SARS-Cov-2, Italy and Spain implemented large-scale national, regional, and domestic lockdowns and placed tight restrictions on movement with exceptions for primary needs or

professional requirements. Germany's first measures focused on minimizing the expansion of clusters, but soon individual states decided to implement tighter restrictions, including closure of kindergartens and schools and even curfews in a number of cases; other states prohibited physical contact with more than one person from outside one's household. Sweden has consistently taken comparatively milder actions to keep larger parts of society open, with the expressed aim to support the maintenance of the containment strategies over a long period of time. Rather than enforcement and strong lockdowns as was the case for Italy and Spain and to some extent also Germany, the Swedish strategy has largely built on recommendations and advice to maintain levels of hand hygiene and avoid social contacts to reduce the risk of infecting others.

## METHODOLOGY

The study has been inspired by Souto-Manning (2014) concept of critical narrative analysis, which combines elements from critical discourse analysis with elements from narrative analysis. Souto-Manning subscribes to a definition where emphasis is put on the relationship between linguistic statements and the broader social context within which these statements are made. Her understanding of discourse as something that constitutes "an inherent and inseparable part of the social world, of the broader social context" and that "shapes and is shaped by society" (159) is in line with Fairclough (2001) definition of critical discourse analysis as the "close analysis of texts and relations" (p. 26). Both definitions place the dialectical relationship between texts and other social practices at the center of the analysis.

The term discourse, in a general sense, can be defined as a meaning system or chains of equivalence on a linguistic level; discourse entails ideological perceptions of what is acceptable and appropriate within a specific area, and that hence works to describe and prescribe what can be said and what makes sense within a particular field (Jørgensen and Phillips, 2002). This definition of discourse is employed in the present article. Narrative analysis focuses on speech as a way of making sense of human experience (Souto-Manning, 2014). Within research on policy narratives, actors are known to engage in calculated strategies aimed at exploiting narrative elements to mobilize and support particular policy beliefs (McBeth and Shanahan, 2004; McBeth et al., 2010, 2012). In the present article, narratives are defined as stories through which discourses are described and prescribed.

Combining elements from the narrative method and discourse analysis is well-suited to the theoretical framework of this article, and also answering the questions that we have developed by taking inspiration from Bacchi's problematization framework and the proposition that metaphors by character are situated and pragmatically shaped (Kimmel, 2004). The basic theoretical assumption in Bacchi's approach to policy analysis is that any political discourse includes assumptions and taken-for-granted truths that can be analyzed through a Foucauldian-inspired method of problematization. This approach enables us not only to identify explicitly stated problems and corresponding

solutions in the material under study, but also elements that are implicit and taken for granted (Feldman and Sköldbörg, 2002).

To this end, we utilize Bacchi's approach to structure and compare the logic of the problem- and solution complex in each country and include transcribed formal speeches by heads of government and heads of state directed at the public in order to inform them about the pandemic and governmental actions (Table 1). The German head of state has only delivered one speech on the topic of coronavirus, but since this was not addressed to the nation it is not included for review here. We have chosen to limit our study to March 2020, which in all four countries was the month when the virus outbreak began to spread on a larger scale.

The speeches were transcribed by native or fluent speakers of German, Italian, Spanish, and Swedish (several of the author team are either fluent or commands a first-speaker knowledge in more than one of the four languages), translated into English and analyzed in a reiterative process where the members of the research group continuously added to, read, reread, and discussed their material. A spreadsheet was compiled and circulated within the group of researchers. Information on the speeches pertaining to the Bacchi-inspired questions was plotted in the spreadsheet, which provided the basis for discussions and a structure for analysis of the empirical material.

## PROBLEMS, SOLUTIONS, AND METAPHORICAL DISCOURSE

### Germany

The problems as defined in Angela Merkel's speech from March 18 2020, include matters related to the immediate effects of the coronavirus: people getting ill and suffering from the direct consequences of the infection. She stressed that even the best healthcare system can be overloaded if too many patients who are suffering from difficult courses of corona infection are hospitalized within a short period of time. This potential overstrain on medical care is exacerbated by the lack of cures and vaccines against the current virus.

The direct consequences of the virus are not the only problems Merkel talked about in her speech; other problems arising from trying to solve the initial problems of the virus spread are more prominent in the speech. Merkel brings up the consequences of lockdown and social distancing, which she says will dramatically change normality, public life, and social interaction: "Millions of you can't go to work, your kids can't go to school or daycare, theater and cinema and businesses are closed and, what is perhaps most difficult: we will all miss meeting other people."

The consequences of coronavirus mitigation are also addressed in relation to the business sector when Merkel talks about how the weeks ahead will be challenging for business owners who are struggling to continue, and how their difficulties ultimately pose a threat to the economy at large. The consequences of the lockdown and isolation are not only conceived as threats to the economy and "normality and everyday life." In Merkel's speech, these precautions are also understood to be a threat to fundamental democratic values.



**TABLE 1** | List of speeches made by heads of government and heads of state in Germany, Italy, Spain, and Sweden.

	Speeches by the head of government	Speeches by the head of state
Germany	Chancellor and chief executive of Germany Angela Merkel 2020-03-18 "Fernsehansprache von Bundeskanzlerin Angela Merkel" <a href="https://www.bundeskanzlerin.de/bkin-de/aktuelles/fernsehansprache-von-bundeskanzlerin-angela-merkel-1732134">https://www.bundeskanzlerin.de/bkin-de/aktuelles/fernsehansprache-von-bundeskanzlerin-angela-merkel-1732134</a>	—
Italy	Prime Minister Giuseppe Conte 2020-03-11 "Dichiarazioni del Presidente Conte!" <a href="http://www.governo.it/it/media/dichiarazioni-del-presidente-conte/14296">http://www.governo.it/it/media/dichiarazioni-del-presidente-conte/14296</a>  Prime Minister Giuseppe Conte 2020-03-21 "Dichiarazioni del Presidente del Consiglio, Giuseppe Conte, sulle nuove misure per il contenimento dell'epidemia" <a href="http://www.governo.it/it/articolo/dichiarazioni-del-presidente-conte/14357">http://www.governo.it/it/articolo/dichiarazioni-del-presidente-conte/14357</a>	President of the Italian Republic Sergio Mattarella 2020-03-05 "Dichiarazione del Presidente Mattarella sull'emergenza coronavirus" <a href="https://www.quirinale.it/elementi/45540">https://www.quirinale.it/elementi/45540</a>  President of the Italian Republic Sergio Mattarella 2020-03-27 "Dichiarazione del Presidente Mattarella sull'emergenza coronavirus" <a href="https://www.quirinale.it/elementi/48600">https://www.quirinale.it/elementi/48600</a>
Spain	Prime Minister Pedro Sánchez 2020-03-13 "Declaración del presidente del Gobierno para anunciar el estado de alarma" <a href="https://www.lamoncloa.gob.es/multimedia/videos/presidente/Paginas/2020/130320-sanchez-declaracio.aspx">https://www.lamoncloa.gob.es/multimedia/videos/presidente/Paginas/2020/130320-sanchez-declaracio.aspx</a>  Prime Minister Pedro Sánchez 2020-03-21 "Press briefing by President of the Government on coronavirus crisis" <a href="https://www.lamoncloa.gob.es/lang/en/presidente/intervenciones/Paginas/2020/20200321press-covid19.aspx">https://www.lamoncloa.gob.es/lang/en/presidente/intervenciones/Paginas/2020/20200321press-covid19.aspx</a>	King Felipe IV 2020-03-18 "Mensaje de Su Majestad el Rey" <a href="https://www.casareal.es/EN/Actividades/Paginas/actividades_discursos_detalle.aspx?data=6232">https://www.casareal.es/EN/Actividades/Paginas/actividades_discursos_detalle.aspx?data=6232</a>
Sweden	Prime Minister Stefan Löfven 2020-03-22 "Statsminister Stefan Löfvens tal till nationen" <a href="https://www.regeringen.se/tal/2020/03/statsministerns-tal-till-nationen-den-22-mars-2020/">https://www.regeringen.se/tal/2020/03/statsministerns-tal-till-nationen-den-22-mars-2020/</a>	King Carl XVI Gustaf 2020-04-05 "H.M. Konungens hälsning till Sverige" <a href="https://www.kungahuset.se/kungafamiljen/hmkonungcarlxvigustaf/tal/hmkaretstal/hmkonungenshalsningtillsverigesondagenden5april2020.5.3ae6f059170f39e26b98482.html">https://www.kungahuset.se/kungafamiljen/hmkonungcarlxvigustaf/tal/hmkaretstal/hmkonungenshalsningtillsverigesondagenden5april2020.5.3ae6f059170f39e26b98482.html</a>

Accessed October 6, 2020.

Merkel is consistent in returning to the concept of democracy, a consistency that becomes obvious when she notes that the lockdown has consequences for the democratic self-image of the nation. Merkel highlights freedom of travel and movement as basic hard-fought democratic rights that are under threat because of the actions taken to deal with the coronavirus pandemic. The suggested solutions to the initial problem target both the individual and the collective community, but Merkel also addressed the role and responsibilities of state agents, who should endeavor to make their communication "understandable." The Chancellor's allusion to the role of the state and government is connected to a fight for democracy and the need to be transparent—in terms of decision-making and communication—to keep the basic democratic values of the state intact.

By referring to the pandemic and the overarching solution with terminology to "defy" and "slow down" the spread of the virus, Merkel made a connection to how effective treatments and a vaccine are yet to be developed but are essential to the containment of SARS-CoV-2. By slowing down the spread we gain time, Merkel said, explaining that time is beneficial for the development of treatments and vaccines, from which follows the goal "that everyone who gets ill can receive the best possible care."

The solutions formulated in response to these problems put the individual at the center, and include keeping a distance, refraining from handshakes, washing hands with hot water and

soap, and following the imposed restrictions on visits to nursing homes for the elderly. The Chancellor also took the opportunity to personalize the crisis by stating, "... it's not only about abstract, statistical numbers, this is about a dad, a grandfather...or a mom, a grandmother..." "I firmly believe that we will overcome this crisis," Merkel said, framing the issue in terms of solidarity combined with individual compliance:

*... that it is up to ourselves, we can support one another—we must be disciplined and follow the rules—we must show that we can act from our heart and with consciousness to save lives.*

The solutions targeting the individual clearly build on responsabilization and the idea of self-discipline. The outcome of the pandemic "depends on how disciplined everyone is in complying with and practicing the rules." Furthermore, "the advice of the virologists is unambiguous" is a definitive statement that closes the door to any further discussion regarding the scientific knowledge presented. This presents a tension in terms of the role and the responsibility of the individual, who on the one hand is responsabilized for her and others' well-being while on the other hand is obliged to do this within the framework provided by the state.

Merkel was careful to address how not only individuals, but also how local communities had to be responsible and aware of the highly precarious situation caused by the virus.

*You now hear about wonderful examples of neighborhood communities helping the elderly, who cannot go shopping themselves. I am sure that even more can be done and we as a society must show that we will not leave each other all alone.*

There are also measures (said to be necessary) to be taken on a governmental or state level, but these are focused on mitigating the consequences of the response to the coronavirus, to keep the economy running, and to keep the functions of the state intact:

*I assure you: The Federal Government is doing everything it can to mitigate and dampen the impact on the economy—and above all to preserve jobs and workplaces. [...] We will put in all the measures needed to help our entrepreneurs and employees through this difficult ordeal.*

The previous quotation is a reflection of the underlying values, or ontology, guiding the recommendations made by the authorities—it also exposes the way in which they are motivated: Germany is a democracy, and the speech underlines the importance of formulating the guidelines according to the democratic values of the German state. The design of this democratic state is historically rooted: it is a state and a community where every life and human being counts. The Chancellor concluded that the situation for the country is severe and that not since World War II has Germany—as a democratic state—had to meet a greater challenge; it must be met as a united country:

*We are a democracy. We do not live under coercion, but by shared knowledge and participation. It is a historical task and only possible to achieve together.*

## Italy

The President of the Italian Republic stressed in his first address to the nation on March 5 2020, the difficult times facing the country, in particular related to healthcare. Despite the healthcare sector being declared (similar to Germany) “excellent” and “operating with efficiency to the generous abnegation of its staff,” the problem required “the adoption of necessary extraordinary measures” to solve the adversity and to “support the efforts of the healthcare personnel.” President Mattarella articulated, similarly to Prime Minister Conte, a discourse on responsabilization to mitigate the problems caused by COVID-19. President Mattarella invited the individual to be considerate of his/her actions, since the behavior of the individual clearly would have an impact on the capability of Italy to overcome the “emergency.” The President described the crisis as “demanding” and invoked notions of its “defeat;” difficult though they were, these new rules had to be respected and followed in order to overcome the crisis. The need for Italy to unite in a “common sense of purpose” through “involvement, sharing, harmony” was addressed as vital, as was showing “trust in Italy.”

On March 11 2020, Prime Minister Conte delivered a televised statement to the nation, and following up on an institutional statement he had made on March 9, Conte stated: “...I am signing a decree that we can summarize with the expression “I

stay at home.”” Conte stated that all public events were banned and that cinemas, theaters, gyms, discos, and pubs would be closed, and funerals, weddings, and sporting events canceled until further notice.

An important focus for Conte in his speech from March 11 was the already fragile Italian economy and the negative impact of the disease on millions of Italian jobs. He invoked a sense of sacrifice by the Italian people and alluded to their capacity to overcome difficult situations through responsibility, pride, nationhood, and a sense of community: “Italy, we can say it loudly, with pride, is proving to be a great nation, a great community, united and responsible.” Italian citizens must be safeguarded, in particular the vulnerable and fragile. He implied the necessity to be patient, and that the Italian people had “to remain firm, clear, and responsible.” Even if people had to remain apart now they would be able to “embrace each other more warmly” in the near future and “Together, we will do it.”

Conte furthermore stressed how Italy is a positive example for the rest of the world, a source of inspiration and a country whose joint actions swiftly combated the virus through strict rules and resistance:

*At this moment, the whole world is certainly looking at us for the numbers of the contagion, they see a country that is in difficulty, but they also appreciate us because we are showing great strictness and great resistance. I have a deep conviction. I would like to share it with you. Tomorrow not only will they look at us again and admire us, but they will take us as a positive example of a country that, thanks to its sense of community, has managed to win its battle against this pandemic.*

On March 21, the Italian Prime Minister announced that the government had decided that any “production activity that is not strictly necessary, crucial, and indispensable to guarantee us essential goods and services” would close to prepare for the most acute phase of the infection and “contain the spread of the epidemic as much as possible.” Conte assured transparency and the presence of the state in this emergency, which now also had, as expected, turned into “a full economic emergency.”

In this time of extraordinary crisis Conte called for self-reflection and stressed the importance of continuing the struggle, to be patient, resistant, responsible, and show confidence in the measures taken by the government, encouraging people to stay put since “even this, we hope soon, will be finished.” Underlining the efforts of the doctors, nurses, the police and armed forces, supermarket clerks, and those infected and struggling for their lives in hospitals, the sacrifice required of the individual was minimal, he said while alluding to how the community had become more tightly linked, as “a chain to protect the most important asset—“life”: “We are giving up the most expensive habits, we do it because we love Italy, but we do not give up courage and hope in the future. United we will do it.”

It was stated that Italy was experiencing the most difficult crisis since the post-war period and that this would be imprinted in the collective memory of the people. This reference to history and the hard times brought on Italy during and after World War II was also featured in Merkel’s speech. Everyone, according

to Conte, had to make their contribution to overcoming this challenge, represented by the “death of many fellow citizens.” The loss of lives was not only about “simple numbers”: it had a symbolical meaning in the sense that the deaths represented the “values which we grew up with” and by notifying the “stories of families who lose their dearest affections,” Conte alluded to the importance of intergenerational building of meaning and identity creation.

In an address to the nation on March 27 2020, the President of the Republic did also build on the notion of hardship when he stated how the situation in Italy was “a grim period in our history” and how the epidemic had caused a “pain of loss.” Mattarella made a subtle bridge over to how the presence of the virus had consequences for the individual’s freedom to exercise his or her religion: “the impossibility of commemorating their parting from the communities to which they belonged, as we ought to.” This reaffirmed the role the individual plays in the collective, and how people get to know who they are by commemorating family and community members. The main theme in the second address was gratitude, demonstrating how the Republic not only recognizes the importance of remembrance but also how the state and the Italian president applaud the work and generous commitment to society of the “medics, nurses, and the health workforce in its entirety,” especially if they had themselves become “victims” in the defeat of the virus. Other parts of the Italian government were also recognized for contributions that had made it possible not only for societal life to continue but also the practical, day-to-day work of the Republic. However, as he said, the future of the Italian economy and the labor market were not easily handled but he stated again the importance of unity and asserted that the Republic would take care of the people.

By cherishing the changed behavior of “the vast majority of our people,” the Italian President also noted how the acts of the individual were a sign of citizenship. Individual and collective sense of responsibility had to continue. This, the President explained, “is the most essential resource that a democratic state can rely on in the moments we are facing.” He continued that the collective response of the Italian people was admired abroad, and took the chance to point to a sense of commitment amongst heads of state in Europe and beyond. Their expression of “their closeness to Italy” was a demonstration of how Italy had served as a role model in this emergency. Through his statement that the European Union, the Central Bank of Europe, and the European Commission with the support of the European Parliament had “taken significant and positive financial and economic decisions,” he noted that “common initiatives are indispensable,” and by saying that the “reality of the dramatic conditions our Continent is withstanding” he vindicated the solidarity at a European level which was required to beat the threat.

## Spain

On March 13 2020, the President of the Spanish government—Prime Minister Pedro Sánchez—notified the country in an institutional statement that he had informed the head of state that the Council of Ministers would the following day decree a state of emergency throughout Spain for the next 15 days. The day after,

the Prime Minister addressed the nation in a televised speech to announce the conditions of the emergency. Sánchez described the virus as a public health problem, which despite “a robust health system with excellent and extraordinary professionals” and an “action plan,” required an approach that would face it as “a problem that affects us all.” He also called for regional unity to overcome the crisis.

The central government of Spain turned to the constitutional system to provide a base of action in order to solve the extraordinary circumstances arising from the COVID-19 pandemic. On March 13, he had explained how this situation “provides the government of Spain with extraordinary legal resources to respond with.” What is required, he stated, is “a raft of exceptional decisions” to “mobilize all the resources of the state as a whole to better protect the health of all citizens.” To solve this “extraordinary crisis,” resulting from a too rapid spread of the virus and the consequential effects on society, Sánchez said that action required an approach that would:

*...protect all our citizens, particularly those that are most vulnerable to the virus due to their age or other already existing conditions, and also to respond to the social and economic emergency as quickly and forcefully as possible.*

There are “some very tough weeks ahead of us,” Sanchez said and asked—similar to the pleas made in Italy and Germany—for joint action, individual responsibility, and social discipline but did also point to the important support of the national and regional health authorities, which should “provide the professionals with the resources to carry out their work and maintain and reinforce the extraordinary coordination they have implemented over these last few weeks.” He emphasized the need for coordination, protection, and unity to “defy” and “combat” the pandemic. In this address the Prime Minister did not announce any particular policies or restrictions other than pointing to the emergency as merely a sanitary emergency, even though the coming announcement of a state of alarm meant that restrictions were to be adopted.

The Prime Minister addressed the role of the individual in coping with the crisis forced upon Spain but also alluded to the healthcare professionals in terms of them being in the “frontline,” as the “shield” between the virus and the people of Spain. Their need for commitment and sacrifice as the means to overcome the crisis should be recognized by everyone. The Prime Minister also stated that in addition to “a personal duty” to maintain distance both physically and socially, the individual also had “maximum” responsibility to follow the advice and recommendations of the experts. To mitigate this hardship and the burden on healthcare, elderly people, and people with chronic diseases should recognize their responsibility to “protect themselves” to the “utmost degree,” which they could do by avoiding “contact and exposure in public spaces at all costs.” Young people were contracted to play a “decisive” role in “halting the contagion,” and they should not feel protected from the worst effects of the virus because of their youthful vitality. They should be aware that “they can transmit it [the virus] to other far more vulnerable people around them” and should therefore “limit their

social contact and keep their distance.” This passage had a clear collective connotation when it was explained that the people of Spain had to work together, as they were in a tough and difficult conflict with SARS-CoV-2—the enemy that must be defeated:

*Victory depends on us all, in our homes, with our families, at work and in our neighborhoods. Heroism also consists of washing our hands, staying at home and protecting ourselves, which means protecting the rest of our compatriots.*

The idea of the containment as a battle returned in the national address on March 14 when Conte explained that the “objective is to stop the spread of the virus and to eliminate it.”

As in the case of Germany and Italy, the solutions targeting the individual build on responsabilization and the idea of discipline, but it is also clear that Spain, as a state, has a clear role and responsibility: “the government of Spain will do whatever it needs to, whenever and wherever it needs to.” Similar to Italy, overcoming the emergency would require many state resources (including army resources). Ultimately however, and similar to Germany and as we will see, also Sweden, unity, respect, and responsible individuals and collectives (families, young people, etc.) would be the decisive factors.

Four days after Sánchez’s address to the nation, the head of state King Felipe VI made a national address in which he presented the problem as a sanitary crisis with repercussions for the general welfare of the Spanish state and society. He discussed the crisis as a challenge to people, “not only in Spain but throughout Europe and the rest of the world.” When he alluded to the seriousness of the crisis and its unprecedented character, the King suggested that the defeat of the virus through committed and responsible citizens would make society stronger and united, despite the negative consequences of the virus for society and the individual.

In addition to the King referring to science and expert advice as crucial dimensions in overcoming the health crisis, he also recounted how the crisis was a reality that would test the Spanish people and their society. Even if the test could be “difficult, painful, and sometimes extreme,” the current situation would show both the virtues of Spanish society and the capacity of the state to deal with this difficult situation. The spread of the coronavirus “won’t beat us,” the King said. It would on the contrary, “make us stronger as a society; a society that is more committed, more supportive, more united.”

On March 21 2020, the head of government spoke of the virus outbreak as “the worst forecast” ever and that “truly catastrophic scenarios” were approaching—the effects of this, the “worst health emergency in the last century.” Sánchez pointed to the unprecedented character of the COVID-19 virus as it had turned out to be more widespread than normal flu, ominously adding that “it is also more lethal,” seeking to build an image of the deadly serious character of the virus. He referred to the course of the crisis caused by the virus and focused on how the last 7 days had transformed the social landscape. He celebrated the whole of Spanish society, saying:

*...the way we view our neighbors, we now have a closer attachment to our neighbors, they share our fears and the yearnings from the balconies at 8 o’clock have made them familiar, they are no longer strangers who are barely greeted.*

*...[those who] serve us in shops, those who produce the goods we consume from distant locations, those who maintain the communications that keep us connected, those who supply the energy that lights our homes.*

As in his institutional declaration on March 13, the Prime Minister picked up on concepts associated with military battle in terms of solutions; he said how “we are fighting an enemy that we will defeat” through getting to know it better—and, “as we get to know this virus better, the way we fight it will change to become more effective.” He also stressed how Spain had aimed at applying measures that were effective from a health perspective and with the least possible consequences for people’s social lives and the economy. Efficacy of government action, he explained, was a fine balance between social distancing, the maintenance of economic activity, and the protection of individual rights. The solution to the impact of the pandemic was to be found in the allocation of resources to the health sector, and in showing strength even if the Spanish people suffered socially in hindering the “unprecedented” consequences following the virus outbreak. The “most socially vulnerable” had to be protected, while essential supplies, such as electricity, water, housing, and a minimum level of income, had to be guaranteed.

## Sweden

The Swedish Prime Minister Stefan Löfven, in his speech on March 22 2020, urged the individual citizen to take action and show responsibility. Based on the rhetorical framing device that lives, health, and jobs are at stake because of the coronavirus, and with a personal and “you”-oriented phrasing style, he explained that many will contract the virus, and that this provided a basic problem for society since it would affect the adaptive capacity of healthcare. The goal of the government is to limit the spread of the virus so that not many people will become ill at the same time and to ensure adequate resources for the healthcare system. An overarching problem of the pandemic is here associated with the Swedish healthcare system’s ability to cope with the demand for care, and, in particular, the protection of vulnerable groups, primarily older people. In Sweden, ran the Prime Minister’s speech, the solution to this problem is the individual and the willingness of the individual to follow the recommendations made by the government and the responsible agency: “The only way we can cope with this is that we approach this crisis as a society where everyone assumes responsibility, for his- or herself, for one another and for our country.”

According to the Prime Minister, the pandemic “will go on for an extended period of time,” and eradicating the virus is simply not an option. In contrast to Germany, Italy and Spain, Löfven stated it as crucial to learn to live with the virus. The Swedish strategy therefore, focused on the implementation of measures that the individual could uphold over an extended period of time. Since a society can only remain under lockdown for a limited amount of time, a lockdown was not perceived as a sustainable



measure for managing the outbreak of the virus. The tools and measures used to achieve this are mainly recommendations and guidelines aimed foremost at individuals from the Public Health Agency of Sweden; in some, albeit fewer, cases, regulations are also used. The general recommendations given are to stay at home when experiencing even mild symptoms, practice social distancing while out in public spaces, and wash hands with soap and water frequently. It is strongly asserted that it is every individual's responsibility and duty to follow the guidelines from the authorities. To do so is to show solidarity, said the Prime Minister in his speech, ultimately stressing individual responsibility, and how Swedish society and its famous welfare system rests on a contract of trust between the government and the citizens:

*I am convinced that everyone in Sweden will take their responsibility. Do their utmost to ensure the health of others. To help each other and thus be able to look back at this crisis and be proud of your very role, your efforts for your fellow human beings, for our society, and for Sweden. [...] None of us can take a chance. None of us can go to work with symptoms. Young or old, rich or poor, does not matter. Everyone needs to do his or her part.*

A secondary problem brought up in the Prime Minister's speech was the knock-on effect on the Swedish economy. Employers and employees, employer organizations and employee organizations were in the speech considered essential to society, and each and every one of them is also a citizen and part of Swedish society. The Prime Minister averred that in these tough times he sought to relieve the consequences for those who are working and for Swedish companies.

The two speeches made by His Majesty King Carl Gustav XVI focused largely on the spread of the virus and the possible consequences of an infection to people's health. However, problems related to travel restrictions and lockdowns are addressed as a threat to people's livelihood, businesses, work opportunities, and the Swedish economy. "The pandemic is also hitting companies, jobs, and the Swedish economy hard; indeed it hits the entire Swedish society," the King said on April 5 2020. While the speech by the Swedish Prime Minister is decidedly secular, the second speech by the King, given just before Easter, has several religious references and addresses restrictions of religious services as a problem associated with the corona outbreak. His Majesty said in the same way as the Prime Minister how the solution to the problem is primarily a matter for the individual, and so individuals were asked to refrain from doing things that they have looked forward to doing. The King appealed to people's moral responsibility: "Did I think of my fellow humans? Or did I put myself first? The choices we make today we will live with, for a long time," and urged the individual to listen to the recommendations of the responsible authorities and to refrain from gathering together. The speeches also state that industry and government are important actors in relation to the COVID-19 pandemic. However, it is not clear from the speeches if this is related to stopping the spread of the virus or to mitigating the consequences of the implemented restrictions. While the nation, the country, and Swedish society are referred

to as being under threat due to the pandemic, the speeches do not specifically address what aspects of these three elements are under threat and in what way.

## DISCUSSION

The actions taken by the four countries to mitigate the coronavirus build on the establishment of an *assemblage* of different elements and metaphorical framings that each contribute to the configuration of problems and solutions. According to Lakoff (2015), an "assemblage" is a domain connoting the values and forms of individual and collective experience and existence that are at stake. In our case, we see how this domain includes statements regarding the uncertainties of the coronavirus and the risk it poses to public health and the ability of the healthcare sector to cope with infected people. The discourse presented also includes statements regarding risks to economy, nationhood, and ultimately democracy. Another vital message is how the individual but also the collective are both a problem and the solution in the course of the COVID-19 pandemic. Following Foucault's governmentality approach, the solutions presented build on an ensemble of different institutions and procedures directed at containment, but we also see how these far-reaching tactics and the success of them, are said to be relying heavily upon and determined by the actions of the individual.

The communication of the strategies undertaken by heads of state and heads of government legitimizes the interventions implemented; those speaking do this by using different frames, particular conceptualizations, and generalizing assumptions to build meaningful syllogisms. Our four cases show how the heads of government and heads of state have addressed their nations to not only inform about the coronavirus outbreak, but also to explain the restrictions and interventions planned and implemented by the state; and these speeches consequently become a part of the strategy implementation. Our analysis and comparison leaves us with both similarities and differences in the ways the heads of state and heads of government conceptualize the containment interventions and strategies. One striking similarity regards how the communication includes the motivation of both individual action and non-action, both in fact argued necessary to contain the COVID-19 virus. This operates through a responsibilization discourse in which the individual body is conceptualized as a central agent, one whose practices—be it hand sanitization or keeping socially distant from the elderly—are framed as crucial to overcoming the crisis brought onto the different countries through the spread of the virus.

The individual is also important as part of and due to her/his effect on the collective. We see how the collective is appreciated in the speeches; healthcare personnel are highlighted as vital to the containment of the virus, and volunteerism is mentioned to exemplify how the individual as part of the collective can make containment possible. Whereas, the concept of *collective action* is usually associated with the governance and management of natural resources (Ostrom, 2000), we see an analogy here in terms of the debate about whether

a self-interested person would actually choose to contribute to the public good (Olson, 1965), and also Ostrom's dispute with Olson's (1965) and Hardin (1971) idea of the prisoner's dilemma and the choice between selfish behavior and social altruism. Ostrom held that "the world contains multiple types of individuals, some more willing than others to initiate reciprocity to achieve the benefits of collective action" (Ostrom, 2000, p. 138). This brings the role of the individual in relation to the collective good into sharp light (as we see in other issues as well, for example is individualization of responsibility a recurrent frame in the mitigation of climate change). Our study shows how responsibility and sacrifice of the individual are said to determine the collective's capacity to react to and overcome a difficult situation. The Italian leadership, for example, brings the virtues of responsibility, pride, nationhood, and sense of community into their communication. The German Chancellor frames the issue in terms of solidarity combined with individual compliance with recommendations and rules for social interaction, and the Swedish Prime Minister embraces individual endurance and personal responsibility as central to society's coping ability. Following the advice and recommendations are "a personal duty," says the Spanish Prime Minister.

Our findings display the shift in the social contract in many European countries over the last few decades depicted by Soysal (2012), according to which a greater emphasis has been put on "active citizenship." Italy makes a connection between individual behavior and citizenship through evoking the notions of "people" and "nationhood," and that the pandemic is a threat to the Italian national territory. In Sanchez' and Löfven's speeches we find how the citizens are acknowledged as part of society. In the German and Italian speeches historical references are made to install a sense of community, and they all embrace the notion of active citizenship through pointing to the role the individual plays for the common good. In the Swedish speeches however, the historical context is largely absent; the pandemic is instead framed in relation to the life of the individual in the present where the choice to do the right thing can be made.

The speeches analyzed can be understood as governance technologies in line with Foucauldian scholarship; the spatial disciplining and self-governance demanded by the regimes create subject positions for individuals or groups by advocating hand sanitation, self-isolation, social distancing, and other containment strategies and protocols, which are purposely implemented to slow the spread of the virus. The subject position could be the employee who works from home, the regular gym visitor who organizes a workout place in the garden, or people who on a voluntary basis buy groceries for elderly neighbors or poor families. Through invoking a sense of responsibility, sacrifice, and current life under the influence of the Corona pandemic as a difficult time for everyone, the speeches allude to how people through changed behavior can, and should, contribute to the greater good. The communication posit actions, strategies and policies, which are embedded in ideological and world view-shaped conceptual frames (cf., Lakoff and Johnson, 2003[1980]; Underhill, 2011). The heads state the need to change life in order to slow down the spread of the virus. Our results show how the countries' containment strategies depend

on the individual's willingness to support the collective gain—the individual is a key cause of, and solution to the problem. However, construing the individual as an indispensable actor to overcoming the crisis also means that the individual is laid open for reprehension—we see evidence of this in the speeches when the ethos of conduct is attached to the individual through inspiring a sense of responsibility (cf., Foucault, 1991).

However, in the context of the countries included in this study, we find resistance toward the strategies when people skirt confinement orders and refuse to comply with social distancing rules—going to "Corona parties" as was reported in the German case (Al-Jazeera, 2020; Washington Times, 2020), or the YouTube-published footage of a man who took a run along an Italian beach despite prohibition (YouTube, 2020). This non-embrace of the guidelines and rules for individual behavior goes hand in hand with a Foucauldian understanding of the resistance at the capillary level of power execution and refers both the idea of disciplinary power and the taskscape concept. Skirting orders is an act of resistance, a refusal to be a subject of discipline, surveillance, and ranking. This political act begs us to ask how well-being is produced, for whom, and what factors makes certain communication less prone to be rendered meaningful for certain groups. A study by Campbell et al. (2001) demonstrates how compliance or non-compliance with advice is a reasoned response in relation to a person's perception and assessment of the effectiveness of the intervention, and the willingness to make changes to her/his daily life if the action asked for is understood to affect the everyday life in a negative way. Acts of resistance can also be related to studies in risk communication where it has been shown how communication intended to increase knowledge and change behavior might instead lead to polarization and the reinforcement of boundaries between the public and experts (Wynne, 1992). This may worsen if there are conflicting views on the matter in question (Earle and Cvetkovich, 1995). The information that underlies the communication might have a high degree of uncertainty due to lack of previous research, conflicting results in previous studies, or—as have been particularly evident in the current pandemic—conflicting views and interpretations of scientists from different fields of research and disciplines (e.g., Dagens, 2020). Debates and conflicting views *per se* are not a problem [from a democratic perspective it is rather the contrary; see, e.g., Laclau and Mouffe (2001)], but a lack of unanimity may possibly increase existing polarization and lead the individual to neglect advice, guidelines, and regulations (Sjölander-Lindqvist, 2020). From risk communication research, we have learned the important and problematic role of trust for scientific advice to be received well by its recipients, which means that it is important to build individual willingness to engage in preventive or emergency behaviors proposed by an authoritative agent (Jasanoff, 2007; Cairns et al., 2013). A lack of knowledge may be inherently distortive as suggested by Al-Hanawi et al. (2020), who note that the low level of knowledge among the public about the pandemic and the virus may lead to non-compliance with guidelines and recommendations. The high level of uncertainty regarding the disease itself and the effectiveness of different strategies to combat its spread may distort the message (Lundgren and McMakin, 2018).

Furthermore, competing discourse, such as conspiracy theories or religious narratives, might also distort a message or help create the conditions for disobedience (Ahmed et al., 2020; Depoux et al., 2020). An example in this specific case is a popular belief that God will protect those who have sufficient faith, as was the case in Brazilian neo-pentecostal churches (Capponi, 2020). These might be reasons as to why the role of science, and trust in science, are emphasized in the speeches (Slovic, 1993; cf., Kasperson et al., 1999; Löfstedt, 2005). The Swedish Prime Minister points to the importance of endurance since it is a novel virus and the German Chancellor talks about the current lack of cures and vaccines. In the meantime, to control spread and make containment decisions, WHO (2020) has pointed out that it is “important to understand longer-term trends in the disease and the evolution of the virus.” This dimension is rarely noted by the leaders in their speeches; the role of science is instead related to the issue of a cure more than how epidemiological surveillance can track the spread of contagion. Focus lies more in controlling movement through either lockdowns (as in the case of Germany, Italy, and Spain) or through inspiring individual willingness to stay at home as much as possible (Sweden). In both cases, action is implicated in and operated through relations of power (Foucault, 1977) but also through relying on an existing trustworthy relation between the governor and the governed.

To facilitate the spread of a message and to support individual understanding of overt risk, communicators should map out the situation using conceptual models (Covello et al., 2001). This is reflected in the ways the heads of state and heads of government conceptualize the pandemic as a war to be fought. In addition to putting the healthcare sector and science in the frontline of the “battle” to “defeat” the virus and pronouncing responsibility and sacrifice (cf., Bates, 2020), the heads augment the importance of responsive actions to the current crisis with ideas of citizenship and inspiring a collective sense of belonging. The Italian leaders talk about how Italy, through the Italians’ love for their country and the nation, has shown the rest of the world their capacity to respond swiftly to a crisis despite the suffering caused by the virus. This shows how the collective, and collective values, serve as a rhetorical model for individual action. Where in Italy and to some extent Spain they talk about nationalism and the love of country as a motivation for individual action, this is not highlighted in the Swedish and German speeches. In the Swedish case, the nation is less explicit. This can be understood to reflect historical differences in views on how a society functions, of what creates cohesion and binds a society together, and the role and acceptance of nationalistic discourses. For example, the leadership in all cases takes the opportunity to embrace the important role of the national government in controlling the outbreak. This is particularly salient in the speeches by the Spanish Prime Minister and the Spanish King, who both propose the need to mobilize the resources of the state to protect the citizens and how governments are ready to make exceptional decisions. At the same time, people must patiently be ready to change their lives. This reflects how solutions to the initial problem target both the individual and the collective national community, and the important supervising role of the state and its agents.

Italy brings up the importance of European cohesion, narrated in terms of the importance of collective action based on the idea of solidarity. This should be seen against the exhaustion of the economy due to the implementation of society lockdowns. However, the shutdown of national borders remains relatively unnoticed in the speeches. This is interesting since the core of the European Union is stipulated as the freedom of movement of people, goods, services, and capital. The differences between national strategies within the EU and the fact that the problem related to closing is not more prominent in the speeches indicate that individual nations understand the virus and the consequences of the virus as a problem to be addressed on a national level—rather than on a joint European level.

As seen, there are distinct differences in the national responses to the pandemic. While differences in national regulation and the institutional division of roles and responsibilities in each country, respectively, influence the national strategies, the different approaches can also be understood as differences in governing techniques. While a discourse on biopower is evident in all the national cases there are differences in how this power is executed and what rhetorical figures and methods are employed to regulate the population. The measures based on cohesive force and prohibition can be understood as forms of disciplinary power—executing direct power over human bodies whereas, say, the Swedish approach of pleading for the responsibility of the individual is rather a method that more radically relies on biopolitical power and control over populations. Following Rose (2006), the individual and social body becomes “a vital national resource” (p. 144). In terms of Foucauldian scholarship, the containment strategies implemented are therefore a style of governmental control envisaged to reorganize social relations, which takes shape through regulated schemes for actions. The individual is assumed to take co-responsibility for her or his actions and to operate and live her or his life within a new regulated space to avoid further spread of virus, since the actions, and social relations, of individuals are considered incontestably risky to public health. Indubitably, COVID-19 shows that people “are all connected, both by the microbial and interpersonal vulnerabilities that always haunt us and by the social and collective care infrastructures that could minister to heal broken bodies” (Kochhar, 2020, p. 73).

The German Chancellor points to how the virus and the measures implemented to prevent its spread might not only negatively influence the economy—as all the heads of government and heads of state agree—but also present a threat to fundamental democratic values. Ingold (2000) taskscape idea can be useful here since it provides the opportunity to devote attention to how the prevention of further spread of the coronavirus affects the opportunities for the individual to pursue social relations and undertake activities, both in the public and the private. Through the individualized regulations and recommendations to contain the spread of the virus, the individual’s very home and private space also becomes a taskscape. The individual’s actions, and the possible effects thereof, are connected to the collective of society at a distance. This, in turn, had impact on both the personal and collective production of meaning when German, Italian, and Spanish

residents were stripped of their right to go to church, take a run, or meet extended family members. This reaffirms the individual-collective relationship but also how the building of meaning is an inherently social practice. On the other hand, changes to life and social relations had new configurations when the containment situation led to other kinds of collective acts; as, for instance, when people volunteered to help their fellow community members by shopping for groceries or picking up medicine from the pharmacy.

Clearly, the solutions to the problems of public health arising due to the COVID-19 pandemic place the body, and the movements and the network of the social relations of the body, at the center. The strategies of containment are both dynamic and embodied as there is a clear focus on mastering individual movement, but also contextual since the four countries label their containment strategies somewhat differently. The leaders pronounce to some extent different concerns developing from how solutions to problems can lead to new problems. Or, to put it another way, some uncertainties can be reduced with the implementation of spatial disciplining and self-governance tactics, but this may lead to *new* uncertainties and *new* gaps in knowledge when value issues (pertaining to, for example, the economy or justice) inform the identification of uncertainty, making decisions on course of actions no less problematic (Dietz, 2013).

## CONCLUSIONS

By comparing the communication of political/constitutional leaders in Italy, Germany, Spain, and Sweden, we have found how the solutions to the problems caused by COVID-19 pandemic are strongly constituted and defined by epidemiological considerations through which health and well-being to a large extent have become the antithesis: social interactions and recreational activities should as much as possible be avoided, or even forbidden. These politics place the body at the center of events and the interaction of bodies in a given landscape—be it urban, recreational, an office, a school, or a factory—as the problem. All of these are landscapes of interaction, based in relations and constituted by the material world, and these are the spaces where movements are renegotiated and restricted, and where limits of movement are introduced to combat contagion and spread in the community. This includes public space but also the private sphere when we are given advice to wash our

hands thoroughly after returning home from the risky outside or to quarantine from our family members in case of infection.

The analyzed speeches showcase the relationship between disciplinary power and biopower as depicted by Foucault, with the controlling of the body serving as a way to control, and having far-reaching implications for, human existence. The communication by the heads of state and heads of government hinges on the tenet of how the individual citizen is assigned a significant role and is deemed a carrier of responsibility for preventing further spread of the virus. While the German case clearly addresses the relationship between democracy and limits of rights, for most of the other countries such an issue was exempt. This throws into question the unsettling connection between individual autonomy as a democratic right and disciplinary mechanisms, sometimes phrased encouragingly and at other times in an enforcing way. It should give us pause for thought that whereas the (laudable) goal of state action has been to produce corona-free spaces, human, and democratic rights have been fenced-in.

Another fundamental dimension is how the ways the leadership in the four countries inform about and explain the containment strategies coincide. Exploring the framing we see how the messages attempt to be meaningful “via symbol-to-word correspondences” (p. 173). In this perspective, the communication—following the logic of posing the problem and describing the solutions through the articulation of a discourse in which the individual body is apprehended as a basis for the spatial specifications of strategy—push us toward an understanding of how risk communication is a part of governance technologies.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## AUTHOR CONTRIBUTIONS

AS-L, SL, NF, and NG: conception and design of study. AS-L, SL, NF, NG, CM, and SC: analysis of data, critical revision of the manuscript for important intellectual content and approval of the version of the manuscript to be published, and main responsibility for acquisition of data. AS-L, SL, and NG: drafting the manuscript. AS-L: coordinating role. All authors contributed to the article and approved the submitted version.

## REFERENCES

- Ahmed, W., Vidal-Alaball, J., Downing, J., and López Seguí, F. (2020). COVID-19 and the 5G conspiracy theory: social network analysis of twitter data. *J. Med. Internet Res.* 22:e19458. doi: 10.2196/19458
- Al-Hanawi, M. K., Angawi, K., Alshareef, N., Qattan Ameerah, M. N., Helmy, H. Z., Abudawood, Y., et al. (2020). Knowledge, attitude and practice toward COVID-19 among the public in the Kingdom of Saudi Arabia: a cross-sectional study. *Front. Public Health* 8:217. doi: 10.3389/fpubh.2020.00217
- Al-Jazeera. (2020). *Germany: Will Authorities Crack Down on 'Corona Parties'?* Available online at: <https://www.aljazeera.com/news/2020/03/germany-authorities-crack-corona-parties-200319205701825.html> (accessed July 20, 2020).
- Argenti, P. (2002). Crisis communication. Lessons from 9/11. *Harvard Bus. Rev.* 80, 103–9.
- Bacchi, C. L. (2009). *Analysing Policy: What's the Problem Represented to be?* London: Pearson Education.
- Bacchi, C. L. (2012). Why study problematizations? Making politics visible. *Open J. Political Sci.* 2:1. doi: 10.4236/ojps.2012.21001
- Bates, B. R. (2020). The (in)appropriateness of the WAR metaphor in response to SARS-CoV-2: a rapid analysis of donald J trump's rhetoric. *Front. Commun.* 5:50. doi: 10.3389/fcomm.2020.00050



- Bunge, M. (1998). *Social Science Under Debate: A Philosophical Perspective*. Toronto, ON: University of Toronto Press.
- Burns, T. W., O'Connor, D. J., and Stocklmayer, S. M. (2003). Science communication: a contemporary definition. *Pub. Underst. Sci.* 12, 183–202. doi: 10.1177/09636625030122004
- Cairns, G., de Andrade, M., and MacDonald, L. (2013). Reputation, relationships, risk communication, and the role of trust in the prevention and control of communicable disease: a review. *J. Health Com.* 18, 1550–1565. doi: 10.1080/10810730.2013.840696
- Campbell, R., Evans, M., Tucker, M., Quilty, B., Dieppe, P., and Donovan, J. L. (2001). Why don't patients do their exercises? Understanding non-compliance with physiotherapy in patients with osteoarthritis of the knee. *J. Epidemiol. Commun. Health* 55, 132–138. doi: 10.1136/jech.55.2.132
- Capponi, G. (2020). Overlapping values: religious and scientific conflicts during the COVID-19 crisis in Brazil. *Soc. Anthropol.* 28, 236–237. doi: 10.1111/1469-8676.12795
- Covello, V., Peters, R., Wojtecki, J., and Hyde, R. (2001). Risk communication, the West Nile virus epidemic, and bioterrorism: responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *J. Urban Health* 78, 382–391. doi: 10.1093/jurban/78.2.382
- Dagens, N. (2020). DN Debatt: Folkhälsomyndigheten har Misslyckats – nu Måste Politikerna Gripa in. Available online at: <https://www.dn.se/debatt/folkhalsomyndigheten-har-misslyckats-nu-maste-politikerna-gripa-in/> (accessed July 30, 2020).
- Dean, M. (2010[1999]). *Governmentality: Power and Rule in Modern Society*, 2nd edn. (Thousand Oaks, CA: Sage Publications).
- Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., and Larson, H. (2020). The pandemic of social media panic travels faster than the COVID-19 outbreak. *J. Travel Med.* 27:taaa031. doi: 10.1093/jtm/taaa031
- Dietz, T. (2013). Bringing values and deliberation to science communication. *Proc. Natl. Acad. Sci. U.S.A.* 110, 14081–14087. doi: 10.1073/pnas.1212740110
- Dunkely, C. M. (2009). A therapeutic taskscape: Theorizing place-making, discipline and care at a camp for troubled youth. *Health Place* 15, 88–96. doi: 10.1016/j.healthplace.2008.02.006
- Earle, T. C., and Cvetkovich, G. (1995). *Social Trust: Toward a Cosmopolitan Society*. Westport: Praeger.
- Fairclough, N. (2001). "Critical discourse analysis," in *How to Analyse Talk in Institutional Settings*, eds. A. McHould and M. Rapley (London: Continuum), 25–38.
- Feldman, M. S., and Sköldberg, K. (2002). Stories and the rhetoric of contrariety: subtexts of organizing (change). *Cult. Org.* 8, 275–92. doi: 10.1080/14759550215614
- Fischhoff, B. (1995). Risk perception and communication unplugged: twenty years of process. *Risk Anal.* 15, 137–145. doi: 10.1111/j.1539-6924.1995.tb00308.x
- Foucault, M. (1977). *Discipline and Punish: The Birth of the Prison*. London: Penguin Books.
- Foucault, M. (1991). "Governmentality," in *The Foucault Effect: Studies in Governmentality: With Two Lectures by and an Interview with Michel Foucault*, eds. G. Burchell, C. Gordon, and P. Miller (Chicago: University of Chicago Press), 53–72.
- Foucault, M. (2007). *Security, Territory, Population: Lectures at the Collège de France, 1977–1978*. Basingstoke: Palgrave Macmillan.
- Foucault, M. (2010). *The Birth of Biopolitics: Lectures at the Collège de France, 1978–1979*. New York, NY: Palgrave Macmillan.
- Giallonardo, V., Sampogna, G., Del Vecchio, V., Luciano, M., Albert, U., Carmassi, C., et al. (2020). The impact of quarantine and physical distancing following COVID-19 on mental health: study protocol of a multicentric Italian population trial. *Front. Psychiatry* 11:533. doi: 10.3389/fpsy.2020.00533
- Hardin, R. (1971). Collective action as an agreeable n-prisoners' dilemma. *Science* 16, 472–81. doi: 10.1002/bs.3830160507
- Ingold, T. (2000). *The Perception of the Environment*. London: Routledge
- Janoff, S. (2007). Technologies of humility: citizen participation in governing science. *Nature* 450:33. doi: 10.1038/450033a
- Jørgensen, M., and Phillips, L. J. (2002). *Discourse Analysis as Theory and Method*. London: Sage.
- Kasperson, R. (2014). Four questions for risk communication. *J. Risk Res.* 17, 1233–1239. doi: 10.1080/13669877.2014.900207
- Kasperson, R., Kasperson, J. X., and Golding, D. (1999). "Risk, trust, and democratic theory," in *Social Trust and the Management of Risk*, eds. G. Cvetkovich and R. Löfstedt (London: Earthscan), 22–41.
- Keni, R., Anila, A., Ganesh, N. P., Jayesh, M., and Krishnada, N. (2020). COVID-19: Emergence, spread, possible treatments, and global burden. *Front. Public Health* 8:216. doi: 10.3389/fpubh.2020.00216
- Kimmel, M. (2004). Metaphor variation in cultural context: perspectives from anthropology. *Eur. J. English Stud.* 8, 275–294. doi: 10.1080/1382557042000277395
- Kochhar, R. (2020) Disability and dismantling: four reflections in a time of COVID-19. *Anthropol. Now* 12, 73–75. doi: 10.1080/19428200.2020.1761213
- Kurz-Milcke, E., Gigerenzer, G., and Martignon, L. (2008). Transparency in risk communication: graphical and analog tools. *Ann. N. Y. Acad. Sci.* 1128, 18–28. doi: 10.1196/annals.1399.004
- Laclau, E., and Mouffe, C. (2001). *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics*. London: Verso.
- Lakoff, A. (2015). Real-time biopolitics: the actuary and the sentinel in global public health. *Econ. Soc.* 44, 40–59. doi: 10.1080/03085147.2014.983833
- Lakoff, G., and Johnson, M. (2003[1980]). *Metaphors We Live By*. Chicago: University Chicago Press.
- Larsson, S. (2016). *Att Bygga ett Samhälle vid Tidens Slut: Svenska Missionsförbundets Mission i Kongo 1881 Till 1920-Talet*. (Ph.D. Thesis), University of Gothenburg, Gothenburg, Sweden.
- Lefebvre, H. (1991[1974]). *The Production of Space*. Oxford: Basil Blackwell.
- Löfstedt, R. (2005). *Risk Management in Post-Trust Societies*. New York, NY: Palgrave Macmillan.
- Lundgren, R. E., and McMakin, A. H. (2018). *Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks*. Hoboken, NJ: Wiley & IEEE Press.
- Maunula, L. (2017). *Citizenship in a Post-Pandemic World: A Foucauldian Discourse Analysis of H1N1 in the Canadian Print News Media*. (Ph.D. Thesis), University of Toronto, Toronto, ON, Australia.
- McBeth, M. K., and Shanahan, E. A. (2004). Public opinion for sale: the role of policy marketers in greater yellowstone policy conflict. *Policy Sci.* 37, 319–38. doi: 10.1007/s11077-005-8876-4
- McBeth, M. K., Shanahan, E. A., Anderson, M. C., and Rose, B. (2012). Policy story or gory story: narrative policy framework analysis of buffalo field campaign's YOUTUBE videos. *Policy Internet* 4, 159–83. doi: 10.1002/poi3.15
- McBeth, M. K., Shanahan, E. A., Hathaway, P. L., Tigert, L. E., and Sampson, L. (2010). Buffalo tales: interest group policy stories in greater yellowstone. *Policy Sci.* 43, 391–409. doi: 10.1007/s11077-010-9114-2
- Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.
- Ostrom, E. (2000). Collective action and the evolution of social norms. *J. Econ. Perspect.* 14, 137–58. doi: 10.1257/jep.14.3.137
- Pidgeon, N. (1998). Risk assessment, risk values and the social science programme: why we do need risk perception research. *Reliab. Eng. Syst. Saf.* 59, 5–15. doi: 10.1016/S0951-8320(97)00114-2
- Raco, M., and Imrie, R. (2000). Governmentality and rights and responsibilities in urban policy. *Environ. Plan. A* 32, 2187–2204. doi: 10.1068/a33365
- Renn, O., and Levine, D. (1991). "Credibility and trust in risk communication," in *Communicating Risks to the Public: Technology, Risk, and Society*, eds. R. E. Kasperson and P. J. M. Stallen (Springer: Dordrecht), 175–218.
- Rose, N. (2006). "Governing advanced liberal democracies," in *The Anthropology of the State*, eds. S. Aradhana and A. Gupta (Oxford: Blackwell Publishing), 144–162.
- Shipunova, O. D., Timmermanis, I. E., and Evseeva, L. I. (2014). Political system legitimation in network society. *Rev. Eur. Stud.* 6, 69–73. doi: 10.5539/res.v6n4p69
- Sjöberg, L. (1998). Risk perception: experts and the public. *Eur. Psychol.* 3, 1–12. doi: 10.1027//1016-9040.3.1.1
- Sjölander-Lindqvist, A. (2020). "Arsenic fields: community understandings of risk, place and landscape," in *Anthropological Perspectives on Environmental Communication*, eds. A. Sjölander-Lindqvist, I. Murin, and M. Dove (New York: Palgrave Macmillan).
- Sjölander-Lindqvist, A., Risvoll, C., Kaarhus, R., Lundberg, A. K., and Sandström, C. (2020). Knowledge claims and struggles in decentralized large carnivore

- governance: insights from Norway and Sweden. *Front. Ecol. Evol.* 8:120. doi: 10.3389/fevo.2020.00120
- Slovic, P. (1993). Perceived risk, trust, and democracy. *Risk Anal.* 13, 675–682. doi: 10.1111/j.1539-6924.1993.tb01329.x
- Souto-Manning, M. (2014). Critical narrative analysis: the interplay of critical discourse and narrative analyses. *Int. J. Qual. Stud. Educ.* 27, 159–180. doi: 10.1080/09518398.2012.737046
- Soysal, Y. N. (2012). Citizenship, immigration, and the European social project: rights and obligations of individuality. *Brit. J. Soc.* 6, 1–21. doi: 10.1111/j.1468-4446.2011.01404.x
- Trettin, L., and Musham, C. (2000). Is trust a realistic goal of environmental risk communication? *Environ. Behav.* 32, 410–426. doi: 10.1177/00139160021972595
- Underhill, J. W. (2011). *Creating Worldviews: Metaphor, Ideology and Language*. Edinburgh: Edin University Press.
- Washington Times. (2020). *Rebels Defy Mandates with Coughs, 'Corona Parties'*. Available online at: <https://www.washingtontimes.com/news/2020/mar/22/coronavirus-rebels-defy-mandates-coughs-corona-par/> (accessed July 10, 2020).
- WHO. (2020). Surveillance strategies for COVID-19 human infection. *Interim Guidance 10 May 2020*. Available online at: [https://apps.who.int/iris/bitstream/handle/10665/332051/WHO-2019-nCoV-National\\_Surveillance-2020.1-eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/332051/WHO-2019-nCoV-National_Surveillance-2020.1-eng.pdf?sequence=1&isAllowed=y) (accessed July 15, 2020).
- Wynne, B. (1992). Misunderstood misunderstanding: social identities and public uptake of science. *Publ. Underst. Sci.* 1, 281–304. doi: 10.1088/0963-6625/1/3/004
- YouTube. (2020). *Man Jogging on Beach During Lockdown Chased by Police*. Available online at: <https://www.youtube.com/watch?v=vQxwTq5gM38> (accessed April 9, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Sjölander-Lindqvist, Larsson, Fava, Gillberg, Marcianò and Cinque. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Some at Risk for COVID-19 Are Reluctant to Take Precautions, but Others Are Not: A Case From Rural in Southern Iran

Masoud Yazdanpanah<sup>1\*</sup>, Bijan Abadi<sup>2</sup>, Nadejda Komendantova<sup>3,4</sup>, Tahereh Zobeidi<sup>5</sup> and Stefan Sieber<sup>6,7</sup>

<sup>1</sup> Department of Agricultural Extension and Education, Agricultural Sciences and Natural Resources University of Khuzestan, Khuzestan, Iran, <sup>2</sup> Department of Biosystem Engineering, University of Maragheh, Maragheh, Iran, <sup>3</sup> Advanced Systems Analysis (ASA) Program, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, <sup>4</sup> Institute for Environmental Decisions, ETH Zurich, Zurich, Switzerland, <sup>5</sup> Department of Agricultural Extension, Communication and Rural Development, University of Zanjan, Zanjan, Iran, <sup>6</sup> Research Area 2 "Land Use and Governance", Working Group: Sustainable Land Use in Developing Countries, Leibniz Centre for Agricultural Landscape Research (ZALF), Munchenberg, Germany, <sup>7</sup> Department of Agricultural Economics, Faculty of Life Sciences, Thae-Institute, Humboldt-Universität zu Berlin, Berlin, Germany

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Nilesh Chandrakant Gawde,  
Tata Institute of Social Sciences, India  
Jeff Bolles,

University of North Carolina at  
Pembroke, United States

### \*Correspondence:

Masoud Yazdanpanah  
yazdanm@asnrkh.ac.ir

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 15 May 2020

**Accepted:** 30 September 2020

**Published:** 16 November 2020

### Citation:

Yazdanpanah M, Abadi B, Komendantova N, Zobeidi T and Sieber S (2020) Some at Risk for COVID-19 Are Reluctant to Take Precautions, but Others Are Not: A Case From Rural in Southern Iran. *Front. Public Health* 8:562300. doi: 10.3389/fpubh.2020.562300

Little is known about the evaluative and cognitive foundations for adopting preventive measures to reduce the spread of COVID-19. Recognizing the existence of a gap in the knowledge describing the intention and behavior of participating in health measures, this study investigated the drivers that contribute to the intention to take health protective measures among 305 rural youth from the Dashtestan Region, Bushehr Province, and southern Iran, reached through an online survey. Protection motivation theory (PMT) served as the theoretical framework for the study. It was able to forecast variation in intentions and behaviors with accuracies of 39 and 64%, respectively. Furthermore, the variables of response efficiency, perceived severity, and self-efficacy had a positive and significant effect on protective intentions. Additionally, perceived severity, self-efficacy, and intention produced a positive and significant impression on behaviors, with most of the behavioral variance being accounted for by intention, as was hypothesized. In conclusion, it is suggested that health development including training measures that take account of both the concrete issues of health resources and technologies and of more abstract ones, such as mindset readiness, are important for engagement in positive health care behaviors. Accordingly, training-based interventions for rural youth should be contemplated, with the object of changing their intentions.

**Keywords:** perceived severity, perceived vulnerability, intention, behavior, protection motivation model

## INTRODUCTION

Recently, leaders in important components and functions of world societies, such as economics, social interactions, health, education, and politics, have been forced to grapple with COVID-19, occasionally in contexts that produce promising news and sometimes with outcomes that exacerbate conditions. In early December 2019, COVID-19, a new form of severe respiratory syndrome, appeared in Wuhan, Hubei Province, China (1). Since that time, approximately 30

million cases of viral infection and a significant number of deaths have been reported throughout the world (2). On January 30, 2020, the World Health Organization (WHO) called the disease's spread a pandemic and announced a global emergency (1).

Most studies of COVID-19 have focused on the medical and technical aspects of the subject, such as the causative agent of the disease and its pathogenesis, epidemiology, diagnosis, and treatment, along with possible preventive interventions (3, 4). These interventions are generally intended for use by urban residents. Although they are a substantial portion of the human population, actions targeting city dwellers leave people in rural areas out of the account, particularly their perception of the interventions. Young villagers are vital stakeholders because they are in direct contact with food resources in supply chains. Their travel to urban areas and remaining there in opposition to health advisories can result in the failure of interventions and can increase the spread of the disease. For this reason, the protection of this group and the encouragement of healthy behaviors within it are of major importance. The study of health protection measures in Iran is important because it was the first low- or middle-income country to suffer a major outbreak including rural areas, and learning from Iran's experience will help all low- and middle-income countries (5).

Using the evaluative-cognitive framework of protection motivation theory (PMT), this study paves the way to investigating the drivers through which protective intentions are established and that can serve as immediate triggers to prompt action to diminish outbreaks of COVID-19. The objectives of this study were to assess the predictive power of PMT, describe the drivers of behavioral intention in this context, and develop determinants for protective behaviors.

## Theoretical Framework

PMT, a well-known and widely used theory in social psychology and health studies, was first proposed by Rogers (6). This theory describes the factors that prompt people to perform or fail to perform a given health behavior (7). In this context, three factors can effectuate fear appeals: the chance that an event will be dangerous, the probability of this event, and the efficacy of the response. Each of these communication variables requires an evaluative cognition process that can change attitudes (6).

Two general and seminal ingredients in the PMT are subset constructs called threat and coping assessments (see **Figure 1**). A threat assessment is conceptualized by the two sub-concepts of perceived severity and perceived vulnerability, where the former refers to individuals' assessment of the negative consequences of a threatening security event (8–11), and the latter describes the extent to which one is likely to be respond to a health danger.

Coping assessment consists of response efficacy, cost, and self-efficacy (**Figure 1**). Response efficacy depends on the individual's belief in the effectiveness of a recommended behavior in reducing or eliminating the health threat (12). Perceived self-efficacy is defined as the person's belief in his or her competence to abide by the recommended behaviors and perform the necessary actions, along with obtaining desired results (13–16). Perceived costs include monetary, temporal, and cognitive costs, which are allocated to prevent the threat of a successful threat to a person's

health (8). The PMT posits that the perception of the severity and vulnerability of a certain health threat contributes to discerning a perception of risk regarding it (6).

(5) found that the perceived severity of COVID-19 has a positive and significant association with behavioral intention. Díaz et al. (17) showed that perceived vulnerability to disease is connected with the fear of becoming contaminated through a disease vector. Helmes (7) provided evidence that PMT can predict 51% of the variance of a latent variable, response efficacy, where it is negatively associated with the motivation. Conversely, (5) reported that response efficacy is positively and significantly correlated with behavioral intention.

In the context of preventive behavioral intentions regarding MERS, Yoo et al. (18) established that self-efficacy has a significant and positive influence on handwashing and cough etiquette intentions. Self-efficacy has been found to be positively and significantly associated with the behavioral intention (5). Furthermore, Helmes (7) provided evidence that the response cost is positively correlated with motivation.

## METHODS AND MATERIALS

This online cross-sectional survey was carried out in the Dashtestan Region, Bushehr Province, in southern Iran. The complete rural youth population (aged between 15 and 30 years old) of the research site was the research population. We used a self-developed, internet-distributed questionnaire that provided items describing behavior (eight items), behavioral intention (four items), response efficacy (five items), self-efficacy (two items), response cost (four items), perceived vulnerability (four items), and perceived severity (five items). The research items are presented in **Table 1**. We used a 5-point Likert scale for responses, from 1, "very low," to 5, "very high." The facial and content validity and psychometric properties of the questionnaire were confirmed by faculty members. The respondents stated that the questionnaire was clear and easy to complete, but in some cases, terms were used to clarify the items to allow them to better represent the variable being questioned.

Internal reliability was confirmed between the measurement items for the research construct. The results showed that all values for composite reliability were above the minimum threshold of 0.70, ranging from 0.762 to 0.913. That is, all multiple-item measures for variables featured a satisfactory level of reliability (19). In the next step we considered the AVE values. As presented in **Table 2**, all AVE values for the research constructs surpassed the cutoff point of 0.50 (20). However, (20) showed that if the composite reliability is  $>0.6$ , an AVE of  $<0.5$  is acceptable. The values ranged from 0.442 to 0.724. This indicated both convergent and discriminant validity. Furthermore, multicollinearity was checked by a correlation between the PMT constructs (**Table 2**). Neither bivariate correlation, however, exceeded the critical 0.70 thresholds (21), which is a robust sign that multi-collinearity problems were absent. Moreover, multi-collinearity problems were evaluated by assessing the tolerance (range = 0.62–0.88) and VIF (range = 1.12–1.60) scores, which fell within acceptable ranges. The



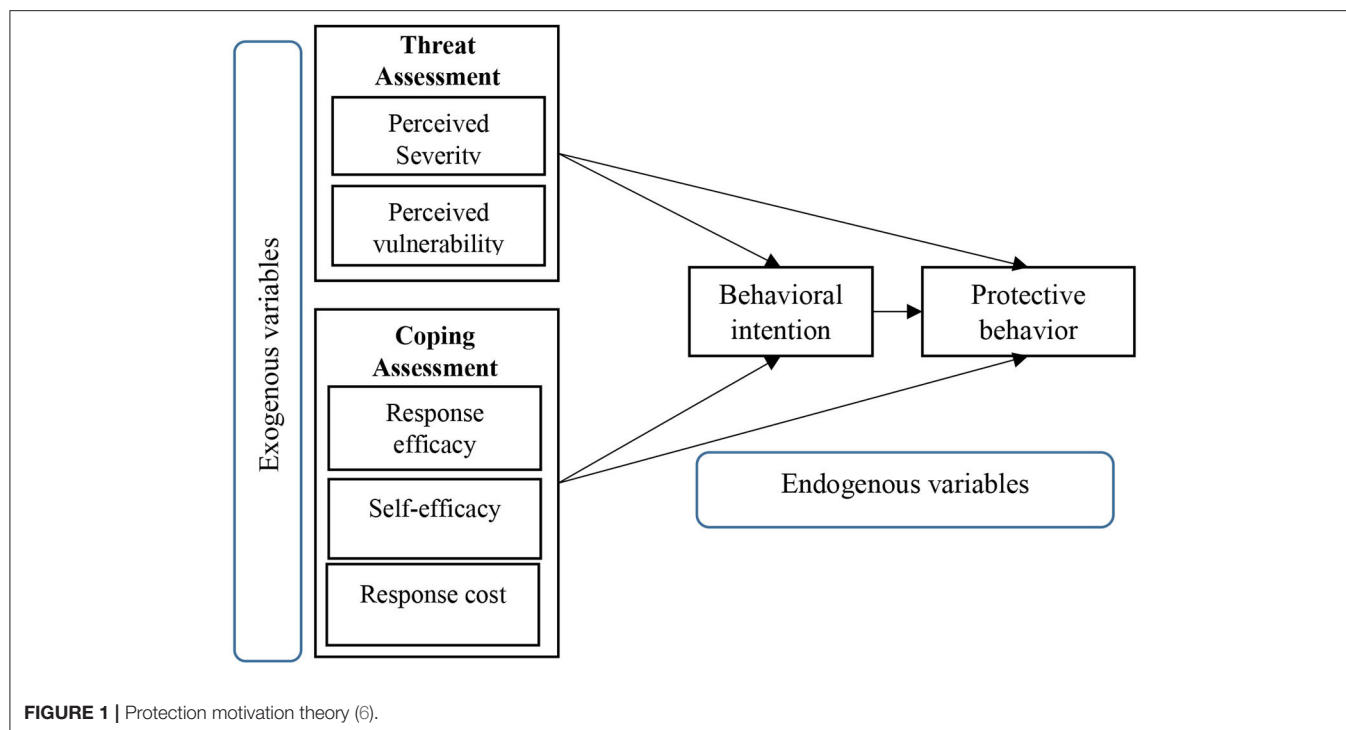


FIGURE 1 | Protection motivation theory (6).

acceptable range for Durbin–Watson values is between 1.5 and 2.5, and in this study, it was equal to 1.89, within that range, which indicates that there was no problem of multicollinearity. SPSS version 24 and AMOS version 20 were also used to analyze the dataset.

## RESULTS

### Descriptive Statistics

The mean age of the respondents to the study was 24.79 years. The youngest respondent was 15 years old, and the oldest was 30 years old. In the complete set of respondents, 125 people (41%) were male, and 180 were female (59%). The average household size was 4.68, with a standard deviation of 1.67 and a range from 1 to 16.

### Inferential Statistics

#### Correlation Between the Research Variables

The Pearson correlation coefficient was used to indicate the association between independent variables and protective behavior, the dependent variable. As shown in **Table 2**, protective behavior is positively and significantly correlated with perceived severity ( $r = 0.30$ ,  $p < 0.01$ ), perceived vulnerability ( $r = 0.38$ ,  $p < 0.01$ ), response efficacy ( $r = 0.39$ ,  $p < 0.01$ ), self-efficacy ( $r = 0.29$ ,  $p < 0.01$ ), and behavioral intention ( $r = 0.69$ ,  $p < 0.01$ ). These results indicate that there is not a high correlation among the independent variables.

Structural equation modeling is an appropriate and commonly used multivariate approach and was used to

develop the structure of the conceptual model. As shown in **Table 3**, the results of the fit indices were compared to the standard cutoff measures to indicate the fit of the conceptual model to the dataset in a tailored manner.

We gained insight into the robust power of the PMT to predict variation in behavior, which was 64%. We also obtained the following observations with respect to the effects of exogenous variables on the behavioral intentions and protective behaviors of rural youth against COVID-19. As shown in **Figure 2**, it was found that perceived severity ( $\beta = 0.207$ ,  $p < 0.05$ ), response efficacy ( $\beta = 0.404$ ,  $p < 0.0001$ ), and perceived self-efficacy ( $\beta = 0.149$ ,  $p < 0.05$ ) have a positive and significant impact on protective intention, and a considerable share of the prediction relates to the response efficiency variable. In total, these variables predicted 39% of variation in protective intention. Moreover, perceived vulnerability and perceived cost had no significant impact on behavioral intention.

The variables of perceived severity ( $\beta = 0.195$ ,  $p < 0.05$ ), perceived self-efficacy ( $\beta = 0.123$ ,  $p < 0.05$ ), and intention ( $\beta = 0.639$ ,  $p < 0.0001$ ) positively and significantly affected protective behavior, and among these variables, intention was the chief contributor to it. The variables of severity, self-efficacy, and intention together were able to predict 64% of the variation in the protective behavior, and perceived vulnerability and perceived cost had no significant impact on behavior. In addition, response efficacy ( $\beta = 0.259$ ,  $p < 0.001$ ), perceived severity ( $\beta = 0.132$ ,  $p < 0.05$ ), and self-efficacy ( $\beta = 0.095$ ,  $p < 0.05$ ) had significant indirect effects on protective behavior.

**TABLE 1** | Concepts, statements, and reliability measured using Cronbach's alpha.

Concepts	Items	X ± SD	Cronbach's alpha
Perceived severity	How likely do you think you are to get COVID-19 if you... go out shopping? go out to work or study? go Out To Meet Your Relatives Or Friends? leave home for any other purpose?	(3.40 ± 1.06)	0.89
Perceived vulnerability	To what extent will it... be dangerous for you if you get COVID-19? be costly for you if you get COVID-19? affect your life if you get COVID-19? affect your family if you get COVID-19? affect your study if you get COVID-19?	(4.18 ± 0.71)	0.79
Response efficacy	The use of preventive measures and protective devices. prevents the transmission of COVID-19. prevents an outbreak of COVID-19 in the village. has no effective consequences.* does not affect the outbreak of COVID-19.* prevents costly of treatment.	(4.06 ± 0.65)	0.71
Self-efficacy	If I want to, I could use preventive measures and protective devices. The use of preventive measures and protective devices is relevant only to myself.	(3.52 ± 0.75)	0.76
Perceived cost	The use of preventive measures and protective devices is ... not worth it due to the cost. expensive and costly. difficult and laborious.	(2.90 ± 0.79)	0.66
Behavioral intention	I want to use COVID-19 protection measures and devices. I intend to use COVID-19 protection measures and devices. I plan to use COVID-19 protection measures and devices. I encourage my friends and relatives to use COVID-19 protection measures and devices.	(4.28 ± 0.79)	0.91
Protective behavior	I stay home as much as possible and I do not go out I wear a mask if I go out. If I go out, I wear gloves. I do not shake hands with people. I regularly use disinfectant to disinfect my hands. I regularly wash my hands with soap and water. I wash and disinfect the materials I bring home from purchases. I do not go to crowded and dangerous places so far as possible.	(4.17 ± 0.80)	0.86

(\*)Statements marked with asterisks were reverse coded.

## DISCUSSION

Perceived severity, an exogenous variable in the model, has an influence on behavioral intention. This shows that the respondents recognized that COVID-19 has a significant effect on health. Of course, part of this perception, as indicated by (22), is due to evaluative representations in memory, which includes experiences derived from altered living and occupational conditions owing to the disease. Furthermore, hearing of the number of people infected or killed and the impact of the disease on livelihoods, market outcomes, income, and human relationships all relate to people's overall experience. This finding is consistent with the results of (5). Perceived severity also

directly affects protective behavior, which is also consistent with previous studies (23–26).

The influence of self-efficacy on behavioral intention is justified by the consideration that when respondents perceive that they have the ability to take preventive measures, they are expressing mental readiness to participate in coping behaviors. This finding is consistent with the work of Yoo et al. (18). Lee and Kang (27) showed that self-efficacy in patient care during an outbreak of infectious disease is the strongest predictor of patient care willingness.

Response efficacy had a significant effect on the willingness to engage in protective behaviors. Respondents perceived that activities and preventive measures are effective for treating

**TABLE 2 |** The Pearson correlation test between all variables.

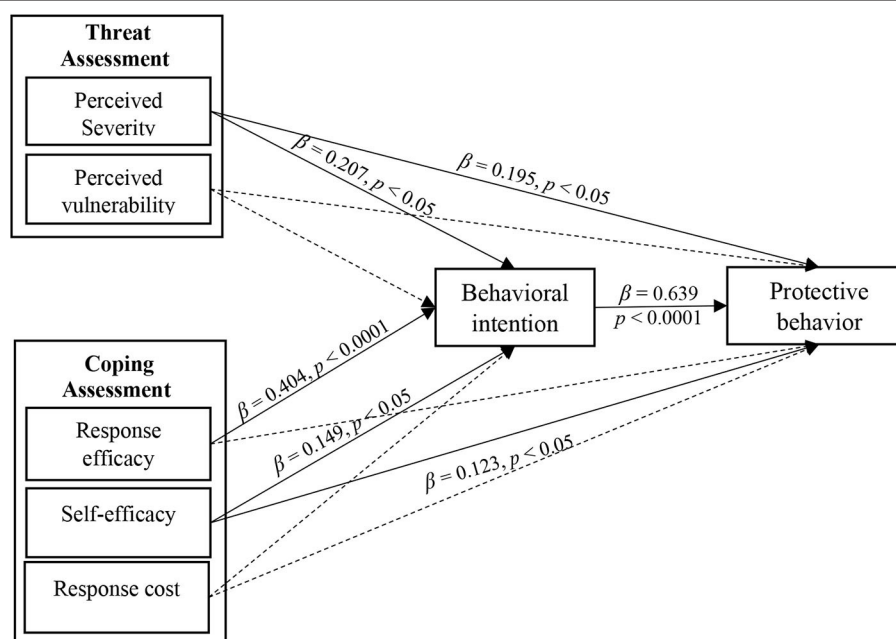
Variables	1	2	3	4	5	6	7
1. Perceived severity	1						
2. Perceived vulnerability	0.53**	1					
3. Response efficacy	0.25**	0.25**	1				
4. Self-efficacy	0.12*	0.14*	0.16*	1			
5. Response costs	−0.09	−0.24**	0.29**	−0.09	1		
6. Intention	0.28**	0.37**	0.43**	0.33**	−0.08	1	
7. Protective behavior	0.30**	0.38**	0.39**	0.29**	−0.04	0.69**	1
CR	0.808	0.889	0.762	0.763	0.804	0.913	0.863
AVE	0.461	0.618	0.457	0.617	0.673	0.724	0.442

Goodness-of-fit statistics: Chi square = 563.097, Df = 354, Relative Chi-Sq = 1.591, AGFI = 0.832, GFI = 0.863, CFI = 0.952, IFI = 0.953, RMSEA = 0.044

\*\* $p < 0.01$  and \* $p < 0.05$ .

**TABLE 3 |** Assessment of the overall fit measurement of the SEM.

	Indexes	RMSEA	CMIN/DF	CFI	NFI	IFI	GFI	AGFI
Fit indices	Cutoff thresholds	≤0.08	≤3	0.9≤	0.9 ≤	0.9 ≤	0.9 ≤	0.9 ≤
	PMT	0.044	1.591	0.952	0.882	0.953	0.888	0.863

**FIGURE 2 |** Structural equations modeling and path coefficients.

COVID-19 disease. This suggests that the use of these measures can help improve health and return the social and economic conditions and even livelihoods to normality. This finding is consistent with those of (5), although their analyses were based on correlation, and in this study, structural modeling was used. Similarly, Camerini et al. (28) showed that understanding

the effectiveness of vaccination response increased the desire for vaccination.

In addition, the effects of behavioral intention on preventive behaviors include being mentally ready and producing the mental willingness to perform preventive behaviors. Behavioral intention is the antecedent to behavior formation. The more that people

follow health advice or plan to do so, the greater the occurrence of preventive behaviors. This finding is consistent with previous research (29).

The impact of self-efficacy on behavior suggests that respondents had the ability and skills and possessed the necessary environmental conditions to engage voluntarily in preventive measures. Respondents' support in terms of their livelihood, infrastructural, economic, and social dimensions produced enrichment of their intentions and behavior. Perceived self-efficacy showed a positive, direct, and significant effect on preventive behavior against COVID-19. The more motivated the respondents felt, the more capable and hopeful they were regarding success in fighting COVID-19 and the more protective behaviors they performed. Self-efficacy denotes the belief in one's own ability to perform a behavior. Individuals' behavior largely depends on the complexity and difficulty of a certain activity (self-efficacy) (30). Here, self-efficacy indicates the extent to which a person feels that he or she can perform protective and preventive practices against COVID-19. In other words, it indicates people's level of motivation and ability to observe healthy behaviors and prevent the spread of COVID-19. The easier it is for people to take preventive behaviors, the more prevention they will engage in. This result is consistent with those of previous studies (26, 31).

## CONCLUSION

This study investigated the determinants of intention and preventive behaviors of rural youth in the context of the COVID-19 pandemic to measure the power of PMT. It was found that the variables of response efficiency, perceived severity, and self-efficacy positively and significantly influenced intentions. Hence, it is suggested that incentive-training courses should be established by the health authorities to encourage rural youth to take protective measures, and the content of the training should be outlined in such a way that rural youth are exposed to the protective measures that have the most substantial potential to prevent the spread of the disease. This could be done by

establishing classes in public places in rural areas. Perceived severity had a significant positive effect on behavioral intention and indicated how far rural youth understand the severity of the crisis. This finding can serve as a starting point for educational and technical initiatives that should be taken to educate rural youth due to the perceptual ground created regarding the severity of the disease. Another influential variable is self-efficacy, and the results for this factor indicated that rural youth have the necessary perceptions to enable them to enact sufficient protective measures. Thus, support for rural youth strengthens their perceived abilities and competencies, particularly in terms of financial resources, to help them cope with the COVID-19 pandemic and to enable them to make use of these measures.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

## AUTHOR CONTRIBUTIONS

MY: conceptualization, methodology, software, formal analysis, investigation, writing—original draft, project administration, and funding acquisition. BA: validation, formal analysis, and writing—review and editing. NK: conceptualization, methodology, formal analysis, and writing—original draft. TZ: writing—review and editing. SS: conceptualization and writing—review and editing. All authors contributed to the article and approved the submitted version.

## REFERENCES

- Harapan H, Itoh N, Yufika A, Winardi W, Keam S, Te H, et al. Coronavirus disease 2019 (COVID-19): a literature review. *J Infect Public Health*. (2020) 13:667–73. doi: 10.1016/j.jiph.2020.03.019
- Hopkins J. *Johns Hopkins Coronavirus Resource Center*. (2020). Available online at: <https://coronavirus.jhu.edu/map.html> (accessed September 17, 2020).
- Cawthorne KR, Cooke RP. Innovative technologies for hand hygiene monitoring are urgently needed in the fight against COVID-19. *J Hosp Infect*. (2020) 105:362–3. doi: 10.1016/j.jhin.2020.04.005
- Javadi M, Haleem A, Vaishya R, Bahl S, Suman R, Vaish A. Industry 4.0 technologies and their applications in fighting COVID-19 pandemic *Diabetes Metab Syndr*. (2020) 14:419–22. doi: 10.1016/j.dsx.2020.04.032
- Barati M, Bashirian S, Jenabi E, Khazaei S, Karimi-Shahanjari A, Zareian S, et al. Factors associated with preventive behaviours of COVID-19 among hospital staff in Iran in 2020: an application of the protection motivation theory. *J Hosp Infect*. (2020) 105:430–3. doi: 10.1016/j.jhin.2020.04.035
- Rogers RW. A protection motivation theory of fear appeals and attitude change. *J Psychol*. (1975) 91:93–114. doi: 10.1080/00223980.1975.9915803
- Helmes AW. Application of the protection motivation theory to genetic testing for breast cancer risk. *Prev. Med.* (2002) 35:453–62. doi: 10.1006/pmed.2002.1110
- Crossler R, Bélanger F. An extended perspective on individual security behaviors: protection motivation theory and a unified security practices (USP) instrument. *ACM SIGMIS Database*. (2014) 45:51–71. doi: 10.1145/2691517.2691521
- Boazar M, Abdeslahi A, Yazdanpanah M. Changing rice cropping patterns among farmers as a preventive policy to protect water resources. *J Environ Plann Manag*. (2020) 63:2484–2500. doi: 10.1080/09640568.2020.1729705
- Bakhtiyari Z, Yazdanpanah M, Forouzani M, Kazemi N. Intention of agricultural professionals toward biofuels in Iran: implications for energy security, society, and policy. *Renew Sustain Energy Rev*. (2017) 69:341–9. doi: 10.1016/j.rser.2016.11.165
- Tajeri Moghadam M, Raheli H, Zarifian S, Yazdanpanah M. The power of the health belief model (HBM) to predict water demand management: a case study



- of farmers' water conservation in Iran. *J Environ Manag.* (2020) 263:110388. doi: 10.1016/j.jenvman.2020.110388
12. Taneja A, Vitrano J, Gengo NJ. Rationality-based beliefs affecting individual's attitude and intention to use privacy controls on facebook: an empirical investigation. *Comput Hum Behav.* (2014) 38:159–73. doi: 10.1016/j.chb.2014.05.027
  13. Yazdanpanah M, Feyzabad FR, Forouzani M, Mohammadzadeh S, Burton RJ. Predicting farmers' water conservation goals and behavior in Iran: a test of social cognitive theory. *Land Use Policy.* (2015) 47:401–7. doi: 10.1016/j.landusepol.2015.04.022
  14. Yazdanpanah M, Komendantova N, Shirazi ZN, Linnerooth-Bayer J. Green or in between? Examining youth perceptions of renewable energy in Iran. *Energy Res Soc Sci.* 8:78–85. doi: 10.1016/j.erss.2015.04.011
  15. Pakmehr S, Yazdanpanah M, Baradaran M. How collective efficacy makes a difference in responses to water shortage due to climate change in southwest Iran. *Land Use Policy.* (2020) 99:104798. doi: 10.1016/j.landusepol.2020.104798
  16. Delfiyan F, Yazdanpanah M, Forouzani M, Yaghoubi J. Farmers' adaptation to drought risk through farm-level decisions: the case of farmers in Dehloran county, Southwest of Iran. *Clim Dev.* (2020). doi: 10.1080/17565529.2020.1737797
  17. Díaz A, Soriano JF, Beleña Á. Perceived vulnerability to disease questionnaire: factor structure, psychometric properties and gender differences. *Pers Individ Diff.* (2016) 101:42–9. doi: 10.1016/j.paid.2016.05.036
  18. Yoo W, Choi DH, Park K. The effects of SNS communication: how expressing and receiving information predict MERS-preventive behavioral intentions in South Korea. *Comput Human Behav.* (2016) 62:34–43. doi: 10.1016/j.chb.2016.03.058
  19. Bagozzi RP, Yi Y. On the evaluation of structural equation models. *J Acad Mark Sci.* (1988) 16:74–94. doi: 10.21106/ijtmrph.99
  20. Fornell C, Larcker DF. Structural equation models with unobservable variables and measurement error: algebra and statistics. *J Mark Res.* (1981) 18:382–8. doi: 10.2307/3150980
  21. Bryman A, Cramer D. *Quantitative Data Analysis with SPSS Release 10 for Windows: A Guide for Social Scientists.* London: Routledge (2002). doi: 10.4324/9780203471548
  22. Albarracín D, Johnson BT, Zanna MP, Kumkale GT. Attitudes: introduction and scope. *Handb Attitudes.* (2005) 2005:3–19.
  23. Wise T, Zbozinek TD, Michelini G, Hagan CC. Changes in risk perception and protective behavior during the first week of the COVID-19 pandemic in the United States. *Preprint.* (2020). doi: 10.31234/osf.io/dz428
  24. Ayosanmi OS, Oden L, Ayosanmi T, Alli B, Wen M, Johnson J. The role of health belief model in HIV screening decision among international students in the United States: a pilot study. *Int J Transl Med Res Public Health.* (2020) 4:4–12. doi: 10.21106/ijtmrph.99
  25. Luquis RR, Kensinger WS. Applying the health belief model to assess prevention services among young adults. *Int J Health Promot Educ.* (2019) 57:37–47. doi: 10.1080/14635240.2018.1549958
  26. Jeihooni AK, Rakhshani T. The effect of educational intervention based on health belief model and social support on promoting skin cancer preventive behaviors in a sample of Iranian farmers. *J Cancer Educ.* (2019) 34:392–401. doi: 10.1007/s13187-017-1317-1
  27. Lee J, Kang SJ. Factors influencing nurses' intention to care for patients with emerging infectious diseases: application of the theory of planned behavior. *Nurs Health Sci.* (2020) 22:82–90. doi: 10.1111/nhs.12652
  28. Camerini AL, Diviani N, Fadda M, Schulz PJ. Using protection motivation theory to predict intention to adhere to official MMR vaccination recommendations in Switzerland. *SSM Popul Health.* (2019) 7:100321. doi: 10.1016/j.ssmph.2018.11.005
  29. Jacob J, Valois P, Aenishaenslin C, Bouchard C, Briand S, Talbot D, et al. Factors leading municipal authorities to implement preventive interventions for lyme disease. *Int J Environ Res Public Health.* (2019) 16:1547. doi: 10.3390/ijerph16091547
  30. Bandura A. The anatomy of stages of change. *Am J Health Promot.* (1997) 12:8–10. doi: 10.4278/0890-1171-12.1.8
  31. Bates BR, Villacís AG, Mendez-Trivino A, Mendoza LE, Grijalva MJ. Determinants of intentions to prevent triatomine infestation based on the health belief model: an application in rural southern Ecuador. *PLoS Neglect Trop Dis.* (2020) 14:0007987. doi: 10.1371/journal.pntd.0007987

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Yazdanpanah, Abadi, Komendantova, Zobeidi and Sieber. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Steering the Private Sector in COVID-19 Diagnostic Test Kit Development in South Korea

Sora Lee\*

*Menzies Centre for Health Governance, School of Regulation and Global Governance (RegNet), ANU College of Asia & the Pacific, The Australian National University, Canberra, ACT, Australia*

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Mi-Na Kim,  
University of Ulsan, South Korea  
Emma Ruth Miller,  
Flinders University, Australia

### \*Correspondence:

Sora Lee  
sora.lee@anu.edu.au

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 19 May 2020

**Accepted:** 24 September 2020

**Published:** 17 November 2020

### Citation:

Lee S (2020) Steering the Private Sector in COVID-19 Diagnostic Test Kit Development in South Korea. *Front. Public Health* 8:563525. doi: 10.3389/fpubh.2020.563525

Responsive private sector engagement in developing test kits for coronavirus disease (COVID-19) in South Korea offers a valuable case study in public-private partnership and infectious disease governance. Korean biotech firms promptly developed diagnostic test kits, and the nation achieved capacity to test more than 20,000 people daily. This was a direct result of the continuous application of lessons learned from the Middle Eastern respiratory syndrome outbreak in 2015. South Korea had been strengthening the private sectors' infectious disease governance and response capacity, creating various new constructive pathways toward public-private partnership. Regulatory amendments were made to better liaise with the private sector. Government-led investment had increased in the research and development of testing technologies over the past 5 years. Furthermore, the Korean government had introduced fast-tracking approval, allowing open competition for more than 20 domestic biotech companies to develop test kits. An overview of test kit governance informs us of the importance of public-private partnership for pandemic threats.

**Keywords:** COVID-19, governance, infectious disease, test kit, private sector, biotech industry, South Korea

## INTRODUCTION

South Korea was one of the most severely hit nations in the early days of the coronavirus disease (COVID-19) outbreak. South Korea experienced a rapid increase of positive cases in the first 2 weeks of its outbreak, reaching more than 800 new cases in late February (1). Since then, the number of new cases dropped steadily, and the country successfully suppressed the disease without restricting movement of people or having long lockdowns. While it is still too early a stage of COVID-19, evidence indicates that the curve of cumulative confirmed patients in Asia is becoming flatter (2). As the virus continues to spread, communicating country-specific responses is critical for countries that have not yet prepared for such severe risks or those who are currently struggling to control the virus. Numerous articles have shed light on South Korea's effective measures to contain the virus when hit by a rapid, exponential increase in infections. Underlying these effective actions was a consistent and coherent strategy to "nurture private capacity and partnership," paving ways that enabled rapid COVID-19 testing. As Huang from the US Council on Foreign Relations says, "South Korea's experiences showed how sound coordination between the state and private sector

can benefit efforts to screen and contain the disease.”<sup>1</sup> It was not a question of state-of-the-art scientific knowledge, rather, a governance question to allocate, and liaise with, existing and potential resources, especially from the private sector.<sup>2</sup>

## MIDDLE EASTERN RESPIRATORY SYNDROME–INVOKED CHANGES IN SOUTH KOREAN INFECTIOUS DISEASE GOVERNANCE

After the COVID-19 outbreak, government assigned clear responsibilities to the private sector for prevention and containment, on-the-ground responses, treatment, and quarantine in South Korea. This was achieved through rigorous implementation of established public health resources, widely available and accessible testing,<sup>3</sup> rigorous contact tracing using big data,<sup>4</sup> and innovation in technologies (11). Since the early phase of the spread, South Korea formed a tight network of screening. More than 18 laboratories and 633 testing sites, including drive-through clinics, ensured fast and affordable public testing. This mass testing was one of the drivers that resulted in early and effective quarantining. This would not have been possible if the nation suffered from a shortage of test kits. Korean biotech firms promptly developed diagnostic test kits, and the nation obtained the capacity to test more than 20,000 people daily (12).

The rapid development of test kits was possible because of the Middle Eastern respiratory syndrome (MERS) outbreak in 2015. The nation learned a painful lesson of quarantining following the 2015 outbreak of MERS. A single imported case of MERS prompted a chain of transmissions in a private hospital, with 186 infected cases and 36 deaths, the highest number anywhere outside the Middle East region. This resulted in the quarantining

**TABLE 1 |** Comparative table on infectious disease governance between MERS and COVID-19.

	MERS	COVID-19
Status of KCDC	Limited authority	Expanded authority and responsibility
Emergency approval	Not available	Available
Private sector testing	No fast-track approval system for commercial diagnostic kits	Active
Department in charge of testing	No specific division in charge	Division of Laboratory Diagnosis Management, Center for Disease Control and Prevention

of 17,000 people, with the government harshly criticized for its slow response. The massive changes in regulations in infectious disease governance occurred after MERS in South Korea (8). An intensive investment in the biotech industry and systematic building of public–private partnership occurred as a result of MERS. The **Table 1** shows the comparison of key indicators of infectious disease governance between the MERS and the COVID-19.

The Infectious Disease Control and Prevention Act, initially enacted in 1954 but revised in 2016, provides government with the necessary powers to distribute resources and engage with a wide range of actors to effectively stop disease transmission. According to Lee (13), the Act was to prepare for future unexpected infectious disease threats. The Act was set up with the purpose of improving communication and coordination in the event of infectious disease outbreaks. The Act specifies responsibilities and accountabilities of the KCDC to exert a certain level of control over regional governments, the private sector, medical practitioners, and the public. The expansion of power and regulatory authority for KCDC has allowed a rapid response from KCDC as a control tower.

## PRIVATE SECTOR ENGAGEMENT FOR COVID-19 TESTING

As seen from the previous section, the conditions did not arise in a vacuum. Actions and changes occurred from different levels and directions after the MERS crisis. Perhaps the single most important actor that South Korea invested in rigorously and continuously was the private sector. The government's direction was strategic with the clear goal to nurture the capacity of the private sector. Such actions enabled an effective public–private partnership for COVID-19 governance. The key events and the timeline are illustrated in **Figure 1** to show the efficacy of governance responses.

## Research and Development and Private Sector Capacity

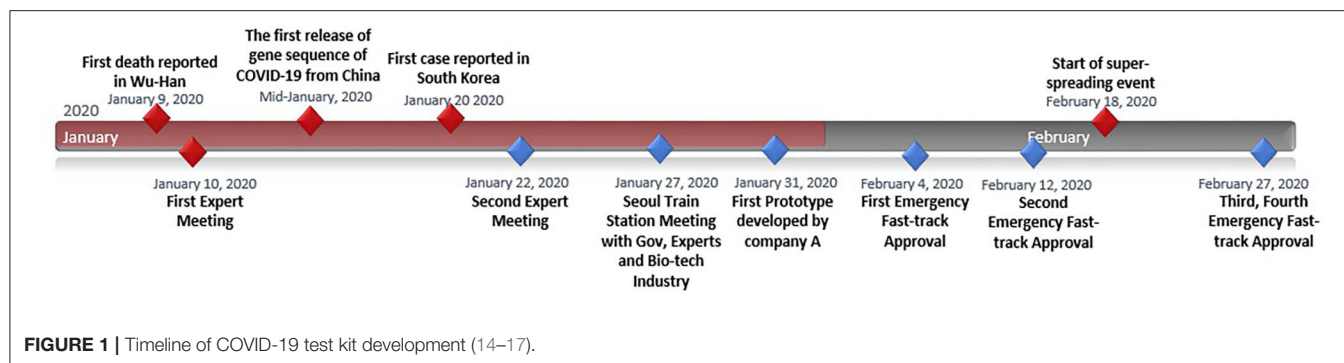
Policies addressing the private sector's role in infectious disease control have gone through significant changes since the MERS

<sup>1</sup>As shown by another spike of new cases in early May, driven by Seoul's Itaewon district night clubs, the pandemic is far from over. This article focuses on test kit development, which allowed South Korea's strategy to test, trace, and quarantine. For more information, see (3).

<sup>2</sup>A brief description of public accountability of private medical institutions in South Korea can be detailed as follows. Under the Public Health and Medical Services Act, last amended in 2012, it is the responsibility of State, local governments, and public and medical institutions that provide “public health and medical services, to effectively provide citizens with higher-quality public health and medical services and contribute to the improvement of national health by prescribing basic matters regarding public health and medical services. (4).” The public interest in hospitals was often considered as public control that impedes private value–profit maximization (5). Others view that the Act can very much be used to outsource public health to the private sector rather than coordinate and regulate (6). Nonetheless, there has been a sizable budget coming from the public sector that needs to be accounted for. So far, the publicness of private sector has only been accounted narrowly for the three main areas: quality of medical services provided, health inequity, and unmet health needs (7).

<sup>3</sup>The testing procedures are detailed in (8).

<sup>4</sup>Smart Management System (SMS) is a regulatory solution that government chose as an innovative technology for epidemiological tracing, which significantly reduces administrative inefficiencies by collaborating data from multiple agencies. See (9). Nonetheless, there is a criticism that it would be more appropriate to train more local field epidemiology officers (10).



outbreak. The biggest lesson for South Korea was that the state of medical care and quarantine were two separate issues. The medical facility (a private hospital), with state-of-the-art medical knowledge and technologies, failed to quarantine, thereby becoming the source of transmission of the extremely contagious MERS. According to Lee (13), the necessity for strong political will and budget expansion on quarantine became the prevailing thoughts of public managers. In 2016, the budget for contagious diseases and quarantine systems was expanded by 134% compared to the previous year, a jump from US \$58 million to \$135 million. In 2020, the budget has continuously risen with an increase of 182% over the last 5 years.

The biggest investment occurred in “preventive measures for newly contagious diseases,” that is, the purchasing of antiviral products and personal protective equipment (US \$37 million). The second highest expenditure was for the “development of preventive treatment technologies for newly contagious diseases” and comprised US \$21 million. This was used to fund research and development (R&D) projects for vaccines, preventive technologies, and test kits. The top five budget allocations were for preventive measures and R&D projects, such as “technology development for contagious diseases management,” “crisis response technology development,” and “establishment and management of a public vaccine development support center.” The sum of R&D projects amounted to US \$67 million of US \$135 million, with 49% of the entire budget on infectious diseases. In 2016, the quarantine management budget rose to US \$6.6 million, up from US \$3.4 million in the previous year (8). This reflected the government’s position that quarantine failure was the direct reason for the 2015 MERS outbreak.

South Korea has a burgeoning biotech industry that comprised scientist-led small-sized entrepreneurial startups. Korea has nurtured R&D-based bio ventures through strong political will and a vision of global markets. After MERS, experts realized that the best strategy to fight infectious diseases was to test early as the development of treatments or vaccines takes time. Therefore, the government actively encouraged companies to acquire the necessary technology to enable quick diagnosis and easy applicability across multiple sites. While criticism of budget expenditure exists, the Korean government recently declared

an extra US \$8 million investment in small and medium entrepreneurial companies to support the development and production of test kits (15). This will further allow the active participation of the biotech industry in seizing business opportunities.

Although biotech companies have developed tests and manufactured equipment, it is the laboratories in universities, hospitals, and government agencies that have played a crucial role during the COVID-19 crisis in South Korea. The Korean Society for Laboratory Medicine (KSLM) is the key actor enabling laboratory preparedness and responsiveness to the infectious disease pandemic. The groundwork for the partnership between laboratories and the KCDC was set during the MERS outbreak. A national accreditation system has since been established by the KCDC for infectious disease laboratories to ensure a consistent response (18). Numerous scholars have predicted the importance of the KSLM maintaining and enhancing laboratory responses in future crises and essential to deploying consistent and coherent nationwide guidelines for laboratory diagnostic tests (19, 20). As will be discussed in the following section, the KSLM also contributed to maintaining the quality of diagnostic testing for prototype test kits developed by biotech firms. KSLM provided unbiased validation sites and procedures crucial to promoting the rigor of KCDC’s fast-track approval process (21).

## Emergency Approval Process

The KCDC used emergency procedures to fast-track the development of test kits. In the very early phase of the COVID-19 spread, South Korean health officials screened the nation’s biotech firms, based on their expertise and outputs, and invited 20 or so companies to a task force meeting.<sup>5</sup> The government’s urgent call for test kit development was delivered to industry partners so that the country was equipped with an effective testing capacity. KCDC shared its knowledge about the virus with these companies and

<sup>5</sup>The implementation of public-private partnerships has not always been positive. A small number of biotech firms who complained about the government’s crude criteria for firm selection were excluded during test kit development. The government then reaffirmed funding and support for companies who had not been preselected, but expressed their interest in test kit development.



announced emergency fast-track approval for those making test kits.

The Ministry of Health and Welfare communicated to the public, the process by which the private sector would develop testing kits through a policy briefing (15). The Korean government started an early series of expert meetings. One week after the first meeting, KCDC had their first diagnostic test kit prototype. Other firms joined in, one after another. KCDC was well aware that initial test kits may be of low quality, given the short period for development. Thus, the KCDC embarked on mass cross-checking of the initial pool of patient samples. Cross-checking involved more than 100 laboratories nationwide confirming the accuracy of the test kits. The KCDC disclosed all information on test methods conducted in order to assist test kit companies. The government's message was clear, decisive, and supportive of the companies. After rapid but rigorous testing, the government announced its first approval on February 4, 2020. A second company received government approval on February 12, 2020, for their product. Shortly after, the nation was hit by a large spread of the disease in the city of Daegu. On February 27, the country acquired two more approved test makers according to the KCDC. More than 654,863 people had been tested as of May 8, 2020 (22). This allowed the biotech industry to share abundant samples to improve test kit accuracy. Korea conducts up to 15,000–20,000 tests a day, with the remainder exported to other countries.

According to *The Diplomat* (23),<sup>6</sup> South Korea's major producers of COVID-19 tests were expected to export up to 5 million test kits per week in May. The sum total of South Korean COVID-19 test kit export rose sharply from US \$50–\$132 million, to more than 60 countries in the first 20 days of April.<sup>7</sup> Aside from commercial revenue, the South Korean government collaborated with the private sector to donate kits for diplomatic and aid purposes. According to the Ministry of Foreign Affairs, 117 countries have asked for kits as humanitarian aid or to import. Of these 117 countries, 37 countries are currently liaising with Korean partners and networks. Officials confirm that additional aid would be provided to remainder countries, based on bilateral relations and partner country's capacity on public health infrastructure (25).

## CONCLUSION

This article focuses on the public–private partnership strategy as one of South Korea's critical enablers of COVID-19 test kit development. The effective steering of the private sector required regulatory preparation, investment, and political decisiveness. The process of weaving the capacities of both public and private

actors had been continuous and coherent since 2015, as seen from this analysis. Significant changes in regulation maximized private capacity for disease control. Massive grants available to the biotech industry for testing technologies provided fertile soil. Following the COVID-19 outbreak, companies were given all the information and support in open competition under emergency fast-tracked approval processes. Simultaneous massive public testing reinforced the technologies of biotech companies through reliable data, improving their inventions. COVID-19 exports of testing kits and personal protection suits increased sharply, uplifting the entire industry, coupled with the development of treatments, vaccines, and other related areas.

It may be too soon to evaluate South Korea's steering of public–private partnership as a more or less effective response to COVID-19, as the battle against COVID-19 continues. Nonetheless, the South Korean COVID-19 response in the public–private governance context can guide the long-term governance strategy of other countries by enabling collective and coherent responses from the private sector as they prepare for the continued threat. The essence of the South Korean case is the process of coordination that reduced the gap between private and public sectors and public interest in the collaboration, which can be intuitively applied to various countries. Furthermore, this article will be particularly relevant for countries with relatively higher portions of private medical care and active public investment in the fast-growing biotech industry, such as Turkey, Brazil, and India. It may be timely for scholars worldwide to engage in discussion on the evolvement of public–private readiness in global COVID-19 governance. The virus reminds us how interdependent we are as individuals and as a nation. International knowledge transmission and reciprocal learning processes on COVID-19 are vital.

## DATA AVAILABILITY STATEMENT

All datasets presented in this study are included in the article/supplementary material.

## AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

## FUNDING

SL was supported by the Australian Postgraduate Award (APA) for her current doctoral program at ANU.

## ACKNOWLEDGMENTS

The author acknowledges the work of the field practitioners and health officials worldwide who are committed to caring for the health and well-being of their citizens, as well as all those working to share knowledge in this pandemic era. The author is also grateful for the two reviewers for their constructive feedback.

<sup>6</sup>For information regarding usage of testing kits as humanitarian aid, please visit <https://thediplomat.com/2020/04/how-south-korea-is-building-influence-through-covid-19-testing-kits/>.

<sup>7</sup>The countries may have overlapping actors involved, from private sector engaged in the community, to official assistance using formal diplomatic channels. For more information, see (24).

## REFERENCES

- KCDC. *Daily Briefing Report*. KCDC (2020). Available online at: <http://cdc.go.kr> (accessed August 20).
- Oh M-D, Park WB, Park S-W, Choe PG, Bang JH, Song K-H, et al. Middle East respiratory syndrome: what we learned from the 2015 outbreak in the Republic of Korea. *Korean J Intern Med.* (2018) 33:233–46. doi: 10.3904/kjim.2018.031
- Tiang J, Ma D, Huang S, Han W. *In Depth: Why South Korea is Winning the Coronavirus Battle* Nikkei Asian Review. (2020). Available online at: <https://asia.nikkei.com/Spotlight/Caixin/In-Depth-Why-South-Korea-is-winning-the-coronavirus-battle> (accessed August 20).
- Statutes of the Republic of Korea, Public Health and Medical Services Act.* (2014). Available online at: [http://elaw.klri.re.kr/eng\\_service/lawPrint.do?hseq=26409](http://elaw.klri.re.kr/eng_service/lawPrint.do?hseq=26409) (accessed August 20). (in Korean).
- Kang KH. MERS outbreak and legal governance between central and local governments. *Human Rights Just.* (2015) 452:20–35. doi: 10.1093/medlaw/fwx011 (in Korean).
- Kwon SM, Jung Y, Son HJ. *Report on Appraising Publicness of Private Medical Institution and Strategy for Carrying Out Public Health Care*. Seoul: Seoul National University (2013).
- Moon J. *A Study on the Public Healthcare Plan and Evaluation for Enhancing Public Interest in Public Hospitals: Foundational Study for the 2<sup>ND</sup> Public Healthcare Plan by KHIDI*. Korea Health Industry Development Institute (2009) (in Korean).
- Lee S. *Fighting COVID 19- Legal Powers and Risks: South Korea*. Verfassungsblog on Matters Constitutional (2020). Available online at: <http://verfassungsblog.de/fighting-covid-19-legal-powers-and-risks-south-korea/> (accessed August 20).
- MOLIT & KCDC *Online Briefing on COVID-19 Smart Management System*. (2020). Available online at: [http://www.youtube.com/watch?v=C9o\\_HGN6v8E](http://www.youtube.com/watch?v=C9o_HGN6v8E) (accessed August 20).
- Kwon GY, Moon S, Kwak W, Gwack J, Chu C, Youn S-K. Epidemic intelligence service officers and field epidemiology training program in Korea. *Osong Public Health Res Perspect.* (2013) 4:215–21. doi: 10.1016/j.phrp.2013.07.001
- Lee D, Lee JH. Testing on the Move South Korea's rapid response to the COVID-19 pandemic. *Transport Res Interdiscip Perspect.* (2020) 5:100111. doi: 10.1016/j.trip.2020.100111
- Kwon S-M. *COVID-19: Lessons from South Korea*. Health Systems Global (2020). Available online at: <http://www.healthsystemsglobal.org/blog/406/COVID-19-Lessons-from-South-Korea.html> (accessed August 20).
- Lee SM. Infectious disease response governance and the budget. *Fut Horizon.* (2020) 44:26–33. (In Korean).
- Korea Centers for Disease Control & Prevention. *COVID-19 Korea profile (March 25, Regular Briefing)*. (2020). Available online at: [https://www.cdc.go.kr/board.es?mid=a20501000000&bid=0015&list\\_no=366619&act=view](https://www.cdc.go.kr/board.es?mid=a20501000000&bid=0015&list_no=366619&act=view) (accessed March 27, 2020).
- Ministry of Health and Welfare, *Policy Briefing*. (2020). Available online at: <http://www.korea.kr/special/policyFocusView.do?newsId=148868670&pkgId=49500742&pkgSubId=&pageIndex=1> (accessed August 20).
- Korea Centers for Disease Control & Prevention. *COVID-19 Triage Working Protocol*. (2020). Available online at: [http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1582276119365\\_20200221180840.hwp&rs=/upload/viewer/result/202003/](http://ncov.mohw.go.kr/upload/viewer/skin/doc.html?fn=1582276119365_20200221180840.hwp&rs=/upload/viewer/result/202003/) (accessed March 27, 2020).
- Ministry of Health and Welfare, *Policy Briefing*. (2020). Available online at: <http://www.gov.kr/portal/ntnadmNews/2233416>
- Park J-S, Park Y-E, Kim GJ, LS. Division of Laboratory Diagnosis Management, Center for Disease Control and Prevention, KCDC Accreditation system for national reference laboratories for infectious diseases. *Public Health Weekly Reports.* (2019) 12:1926–7. Available online at: [https://www.cdc.go.kr/board/board.es?mid=a30501000000&bid=0031&list\\_no=364785&act=view](https://www.cdc.go.kr/board/board.es?mid=a30501000000&bid=0031&list_no=364785&act=view) (assessed May 20, 2020).
- Ki CS, Lee H, Sung H, Kim S, Seong MW, Yong D, et al. The Korean Society for Laboratory Medicine MERS-CoV Laboratory Response Task Force. Korean Society for Laboratory Medicine Practice Guidelines for the molecular diagnosis of middle east respiratory syndrome during an outbreak in Korea in 2015. *Ann Lab Med.* (2016) 36:203–8. doi: 10.3343/alm.2016.36.3.203
- Kim MN, Ko YJ, Seong MW, Kim JS, Shin BM, Sung H. Analytical and clinical validation of six commercial middle east respiratory syndrome coronavirus RNA detection kits based on real-time reverse-transcription PCR. *Ann Lab Med.* (2016) 36:450–6. doi: 10.3343/alm.2016.36.5.450
- Sung H, Yoo CK, Han MG, Lee SW, Lee H, Chun S, et al. Preparedness and rapid implementation of external quality assessment helped quickly increase COVID-19 testing capacity in the Republic of Korea. *Clin Chem.* (2020) 66:979–81. doi: 10.1093/clinchem/hvaa097
- KCDC. *Daily Briefing Report*. KCDC (2020). Available online at: <http://cdc.go.kr> (accessed August 20).
- Ferrier K, Hwang SJ. *How South Korea is building influence through COVID 19 testing kits*. *The Diplomat*. (2020). Available online at: <https://thediplomat.com/2020/04/how-south-korea-is-building-influence-through-covid-19-testing-kits/>
- Khaliq R. *World Turns to South Korea for Virus Testing Kits*. Anadolu Agency (2020). Available online at: <http://www.aa.com.tr/en/asia-pacific/world-turns-to-south-korea-for-virus-testing-kits/1814419> (accessed August 20).
- Yang JH. *Testing Kits Go First to USA, UAE, and Indonesia*. Hankook Ilbo (2020). Available online at: <http://hankookilbo.com/News/Read/202003271615720992> (accessed August 20).

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Lee. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# COVID-19 Infection Process in Italy and Spain: Are Data Talking? Evidence From ARMA and Vector Autoregression Models

Paloma Monllor<sup>1,2</sup>, Zhenyu Su<sup>1,3</sup>, Laura Gabrielli<sup>4</sup> and Paloma Taltavull de La Paz<sup>1,5\*</sup>

<sup>1</sup> Grupo de Investigación en Economía y Vivienda, Economy and Housing Research group, University of Alicante, Alicante, Spain, <sup>2</sup> Department of Physiology, Faculty of Medicine, Instituto de Investigación Sanitaria de Valencia - Valencian's Health Research Institute, University of Valencia, Valencia, Spain, <sup>3</sup> IBSS, Xi'an Jiaotong-Liverpool University, Suzhou, China, <sup>4</sup> Department of Architecture, IUAV University of Venice, Venezia, Italy, <sup>5</sup> Department of Urban Studies and Planning, Massachusetts Institute of Technology (MIT), Cambridge, MA, United States

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Qun (Bella) Mai,  
Government of Western Australia  
Department of Health, Australia  
Nonka Georgieva Mateva,  
Plovdiv Medical University, Bulgaria

### \*Correspondence:

Paloma Taltavull de La Paz  
taltavul@mit.edu;  
paloma@ua.es

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 09 April 2020

**Accepted:** 26 October 2020

**Published:** 23 November 2020

### Citation:

Monllor P, Su Z, Gabrielli L and  
Taltavull de La Paz P (2020) COVID-19  
Infection Process in Italy and Spain:  
Are Data Talking? Evidence From  
ARMA and Vector Autoregression  
Models.  
Front. Public Health 8:550602.  
doi: 10.3389/fpubh.2020.550602

COVID-19 (coronavirus disease 2019) has spread successfully worldwide in a matter of weeks. After the example of China, all the affected countries are taking hard-confinement measures to control the infection and to gain some time to reduce the significant amount of cases that arrive at the hospital. Although the measures in China reduced the percentages of new cases, this is not seen in other countries that have taken similar measures, such as Italy and Spain. After the first weeks, the worry was whether or not the healthcare system would collapse rather than its response to the patient's needs who are infected and require hospitalization. Using China as a mirror of what could happen in our countries and with the data available, we calculated a model that forecasts the peak of the curve of infection, hospitalization, and ICU bed numbers. We aimed to review the patterns of spread of the virus in the two countries and their regions, looking for similarities that reflect the existence of a typical path in this expansive virulence and the effects of the intervention of the authorities with drastic isolation measures, to contain the outbreak. A model based on Autorregressive and moving average models (ARMA) methodology and including Chinese disease pattern as a proxy, predicts the contagious pattern robustly. Based on the prediction, the hospitalization and intensive care unit (ICU) requirements were also calculated. Results suggest a reduction in the speed of contagion during April in both countries, earlier in Spain than in Italy. The forecast advanced a significant increase in the ICU needs for Spain surpassing 8,000 units by the end of April, but for Italy, ICU needs would decrease in the same period, according to the model. We present the following predictions to inform political leaders because they have the responsibility to maintain the national health systems away from collapsing. We are confident these data could help them into decision-taking and place the capitals (from hospital beds to human resources) into the right place.

**Keywords:** COVID-19, forecast, ARMA model, vector-autoregression, Italy, Spain, ICU-beds

## INTRODUCTION

The ongoing outbreak of viral pneumonia caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), globally known as coronavirus disease 2019 (COVID-19), is spreading fast, and it is itself a stress test to the global public health, research, and medical communities. The recent outburst in Italy and Spain along with disease control in China has made the World Health Organization (WHO) establish Europe as the epicenter of the pandemic. A recent study showed that the spread of COVID-19 was unstoppable and has infected more than 1 million people worldwide 150,000 people in 100 countries (1). Today, this number already overpassed a million of deaths cases. COVID-19 is considered as a pandemic threat by WHO (2).

Person-to-person transmission via droplets, contaminated surfaces, or hands has been demonstrated (3) even among asymptomatic carriers to close contacts at mainland China, where the outbreak started in January 2020, and it required of severe population control measures to manage it (4, 5). One month later, the same happened in Italy, with the origin in some imported cases from China. Moreover, 2 weeks later, similar trends emerged in Spain, and the rest of Europe, as well as in the United States, since the beginning due to Asian travelers back and, in the second wave, from European travelers.

The statistical information on the infection pattern happening in China started on January 20, and only 3 days later, Wuhan city was closed in a set of strong measures of isolation, which surprised worldwide. The infection pattern followed in China can be seen in **Supplementary Figure 1**, and it provided an overview of the number of new cases over the time in China that we used as the reference for modeling.

The spread evolution shows three phases: the first one with a significant and apparent exponential expansion and the second one when a diminishing speed on infection follows until the new numbers are almost zero, whereas the third one is reached when the increase on new infection is almost zero. Since the application of the first containment measures, 12 days were needed to reach the peak of contagious speed (first phase), and from then to the zero growth took another 26 days. The virus outbreak in China concentrated in Wuhan and Hubei province with a relatively few dispersion through the rest of the regions, officially as the result of the isolation measures. These measures could have the effect of changing the trend of the infection series but could not avoid the expansion in the first phase at daily rates of 47.3% on average until February 11. The decreasing rates started on February 12 and reached a daily rate of 0.32% at the beginning of March.

The first significant transmission outbreak in Europe was through Italy. From a few cases imported from China, the virus spread after a few days following similar daily patterns: 40% of new infections on average day-to-day during the first period. An average daily growth rate of 24% was occurring when the government applied harder, containing measures on March 8 (**Supplementary Figure 2**). In Spain, the infection started as transmitted by leisure and business travelers from Italy. At the beginning of the first phase, the disease seemed to be under control, but it spread from March 4 accelerating from March 8 as a result of the expansion in Madrid. As far as we can tell, the

territorial virus outbreak pattern of Spanish was similar to the other two countries, with the main focus concentrated in Madrid and other minor outbreaks in the Basque Country and Catalonia (**Supplementary Figure 3**).

This article's central hypothesis was that as COVID-19 is a new virus, there was no immunity against it, so it spread out with no restriction among the population if no isolation measures are taken. Moreover, the virus spread did not depend on the healthcare system because the healthcare system was not prepared for its hardness and did not count on preventive elements such as a vaccine. Under the assumption that COVID-19 followed the same pattern as that observed in China, the spillover effect in the infection process should show a similar pattern in all countries with equivalent live and health levels. We focused on how the first contagion spread out last January in China, to define statistically the potential systematic pattern shown and to forecast when and where the process could end after the measures applied by the governments. The systematic updates of data (daily) and the model estimation supported such a hypothesis with substantial evidence in its favor.

The patterns were modeled using signal extraction techniques to forecast the future evolution of the contagious process. Based on those estimations, this article predicted the number of intensive care unit (ICU) needs at the time of writing this article and the public health intensive care requirements due to COVID-19 in Italy and Spain. The predictions made with this model with April data are compared with the real data several months later showing a very precise forecast and supporting this methodology to advance future potential disease evolution and support political decisions.

## METHODS AND MODELING PREDICTIONS

We obtained information on cases with confirmed COVID-19 infection and diagnosis in China, Italy, and Spain based on official reports from Health Minister in the case of Spain (6), from the Italian Department of Civil Protection (7) and the National Health Commission of the People's Republic of China (8). The data were collected in real time each morning, and it may be updated in the afternoon as new cases became publicly available. The latest update to this dataset was on April 6, 2020. Specifically, we collected the dates of accumulated infected people, ICU, and recovered each day.

The analysis of the data that was carried out in this article is purely statistical, based on a well-known signal extraction technique by using ARMA models (9) (Box-Jenkins methodology). It was done in several steps. First, a univariate analysis of the series of infected persons was carried out to identify the autoregressive pattern that shows them. The results revealed a common pattern of disease spread in all three cases in all phases of the contagion. Second, the levels of acceleration were analyzed, and a model was estimated in order to forecast the future infection path in Italy and Spain. The predictive model was estimated first by using an out-of-sample period with high precision and then used to forecast future time. The third model approached the time pattern between the contagious and the number of people in ICU.



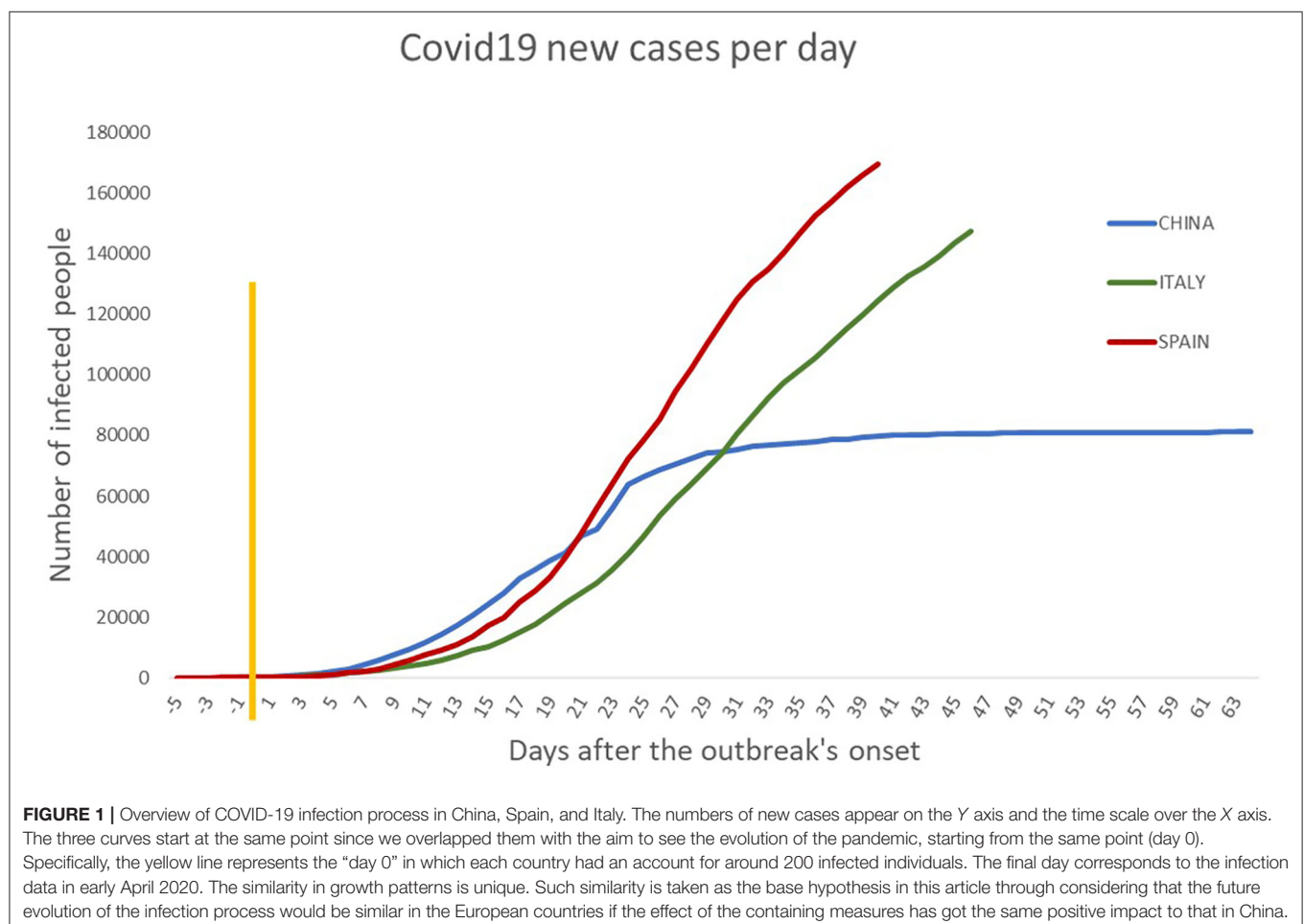
The infection forecast was used to predict the future needs of ICUs between the two analyzed countries.

This article estimated ARMA models for three countries: China, Italy, and Spain, at an aggregate level to demonstrate the similarities in the contagious pattern (supporting the use of Chinese case as a proxy variable). The reason for choosing China is evident as it was the first country that experienced the pandemic and applied drastic measures for its control, constituting the unique evidence of the process to be considered. Second, Italy was selected because it was the first European country where the disease spread virulently. Its appearance occurred 1 month later than China, and its origin was a result of the contagion of few people traveling between the two countries. The Italian economic center was the first to be affected (Lombardy with Milan followed by Venice) as a clear reflection of the fact that business or leisure global trips on that area contributed to the spread of the disease. Spain was the third country affected as a result of its relationship with Italy. Spain warned of the effect and applied drastic measures starting on March 14.

Moreover, a further model was estimated to predict the ICU beds needed. It is not possible to identify all variables affecting the need for ICU beds (for instance, previous comorbidities,

the severity of the symptoms at the onset of COVID-19, the availability of the treatments, among others). Here we used a sophisticated methodology to calculate how the number of infected people could result in ICU need, following both a stable pattern (so-called long-run effect) and unexpected pattern (so-called short-run effect).

The method is known as vector autoregression model (VECM) (10, 11), and it is defined as an econometric tool that would capture the causal relationships among variables and how one influenced others regarding a time lag pattern. The model was able to calculate the total number of beds in ICUs resulting from two sources. The first was the predictable number of beds reflecting the amount of existing cases that could be required (this component is recognized to represent the permanent or stable in the long-run effect in the influences among the variables in a VECM). The second source was an estimation of unexpected extra cases that should attend in ICU departments influenced by COVID-19. These cases may belong to the patients who unexpectedly developed severe complications (this component is the so-called short-run effect). The total number given by the model was the number of beds that should be available at ICU service, taking into account the two mentioned categories. The distinction between both components could be used to



forecast the future need for ICUs, which was the aim of this third step.

This research identified the time pattern of the infectious process in Italy and Spain and estimated the number of new cases that could be reached in these countries. Also, we deepened on its implications in healthcare resources devoted to the number of ICU required.

## RESULTS

Before starting with the results from the model, **Figure 1** is useful as an overview of the number of new cases ( $Y$  axis) over time ( $X$  axis) during the period the model was built. Nevertheless, with illustrative purposes, we overlapped the graphs and made a standard “day 0” for the three countries (marked with a yellow line), and from there, we started to count the days.

First, with empirical evidence, the model estimated new infections for every country. With this step, we asked the model to tell us the “story” of what happened in the three countries under study from day 0 to day 45 (in China, since data were available) and until day 20 (in Italy and Spain). The estimated parameters (called AR and MA) are a measure of how the contagion was expanding across the territory, and they are shown in **Table 1** when they were significant. If left in blank, the coefficient showed no significant result, and we left intentionally empty the cell for explanation purposes. AR(1) and AR(2) parameters showed the speed of infection, positive in all three countries. Specifically, the model estimated the new infections, taking into account the number of infected people the day before and the trend of the preceding days. Moreover, there was a key difference between AR(1) and AR(2): AR(1) reflected the endogenous rise of the infection in the population, whereas AR(2) showed the rise of the infection affected by external infected people.

On the other hand, the M.A. parameters reflected the influence on the viral spread of unexpected and nonobservable reasons, such as individuals moving across regions not being registered (in the case of positive impact), or the effect of measures applied, such as isolation (in the case of negative value). The two patterns allowed to discriminate the “direct infection”

(with the AR estimated parameters) from the “indirect effect on the contagion” (M.A. parameters).

During the first phase of infection in China, AR(1) values ranged from 1.1 to 1.3, and they did not diminish as days are added in the expanding-windows models. It suggested an intense spread process, dependent only on the number of infected inside the country, which was what happened. It was important to note that China does not show any AR(2) parameter significant, suggesting that no exogenous infection happened in this country. It made sense as the current outbreak of COVID-19 had its origin in that country.

In Italy, during the first phase, the parameter associated with exogenous infection [AR(2), which measured a direct effect from not local infections] suggested that the first cases came from abroad. The value was also explosively capturing the rapid expansion, and on days 15 and 20, Italy showed endogenous expansion from the virus, meaning that the virus dwells within the country. Curiously, this is the same path, followed by Spain. In this country, in the beginning, the infection spread by exogenous factors, and as the series went on in time, endogenous expansion gained strength and explained the current outbreak.

Focusing now on M.A. parameters, there was a positive value of MA(1) in China for the first 15 days, meaning that unknown components were enhancing the infection. The same happened in Spain during the first 11 days when restrictive measures were not taken. Nevertheless, MA(1) turns negative in Italy and Spain on day 15 of the outbreak, possibly capturing how the application of restriction measures contributed to reducing the infection. The same happened with MA(2) parameter: it became negative as the series went on, reflecting external factors that were helping to reduce infection outbursts. The effect of those unknown components was to reduce the spread of the endogenous infection [AR(1)].

In all three cases, there was an extra moving average component [MA(3)] with a positive parameter that acted in the opposite direction of MA(1) and MA(2), representing the power of some factors increasing infection from the past. The value of MA(3) component was very similar during the last period in Italy and Spain, and a bit smaller for China. The interpretation of those results was that the negative M.A.s captured the effect of the locally taken initiatives to deal with the crisis: isolation

**TABLE 1 |** Time autoregressive pattern in COVID-19 infection process in the three countries of study.

Sample	Spain			Italy			China		
	10 days	15 days	20 days	10 days	15 days	20 days	15 days	30 days	45 days
AR(1)		1.101 ± 0.361	1.009 ± 0.400		1.573 ± 0.366	1.176 ± 0.274	1.068 ± 0.439	1.285 ± 0.237	1.506 ± 0.345
AR(2)	0.918 ± 0.433			1.4 ± 0.254					
MA(1)	1.604 ± 0.563	−5.90 ± 0.201	−1.970 ± 0.739		−1.095 ± 0.197	−0.695 ± 0.075	0.678 ± 0.278	−0.616 ± 0.244	−0.992 ± 0.3
MA(2)		−0.492 ± 0.242	1.262 ± 0.409	−0.981 ± 0.219	1.151 ± 0.203	−0.68 ± 0.188		−0.645 ± 0.266	
MA(3)		0.835 ± 0.144	−2.027 ± 0.590			0.874 ± 0.076		0.970 ± 0.115	0.531 ± 0.18

*The estimated parameters (called AR and MA) are a measure of how the contagion expands across the territory. If left in blank, the coefficient shows no statistically significant result, and we left intentionally empty the cell for explanation purposes. AR(1) and AR(2) parameters show the speed of infection, whereas MA parameters reflect the influence on the viral spread of unexpected and nonobservable reasons, like individuals moving across regions not being registered (in the case of positive impact), or the effect of measures applied, like isolation (in the case of negative value).*

and restriction. These measures seemed to have had a sudden and rapid impact in all three countries, faster in Spain, with the time pattern changing in only 3 days in an equilibrium manner. In Italy, it took a bit more time to effect until the 20 first days. In China, the broader contention effects seemed to happen since the 30th days (not before) as all previous periods registered time pattern with a positive impact in the infection spread.

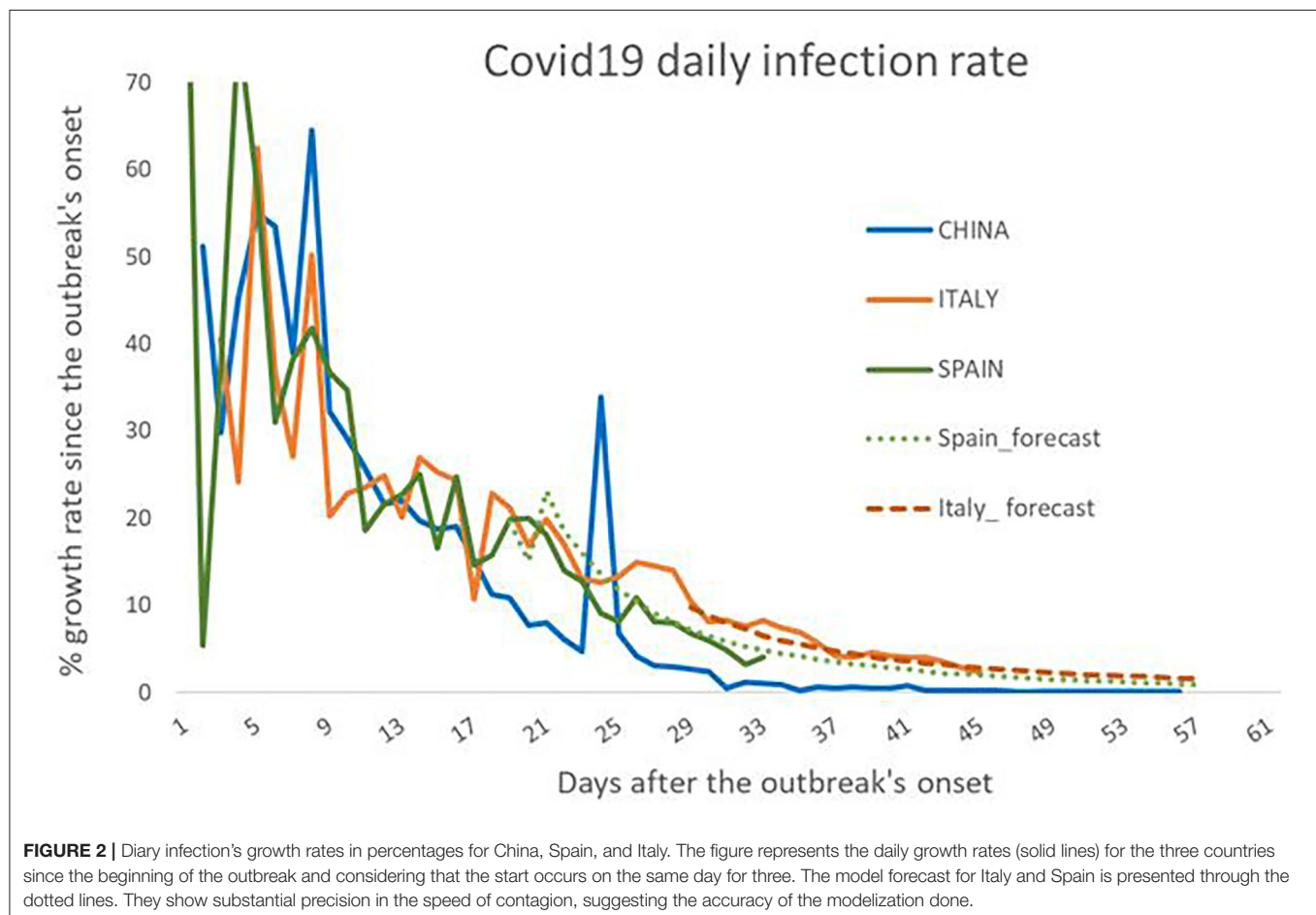
With the current data, the ARMA model supported that both Spain and Italy followed China's time path, and this could also be shown in **Figure 2**, representing the daily growth rates. If the first part of the outbreak showed these similarities among countries, we hypothesized that the contagion patterns would have a common time path among the three countries. We assumed that the time pattern found was reliable, and therefore, we think that the event of infection growth could be predicted.

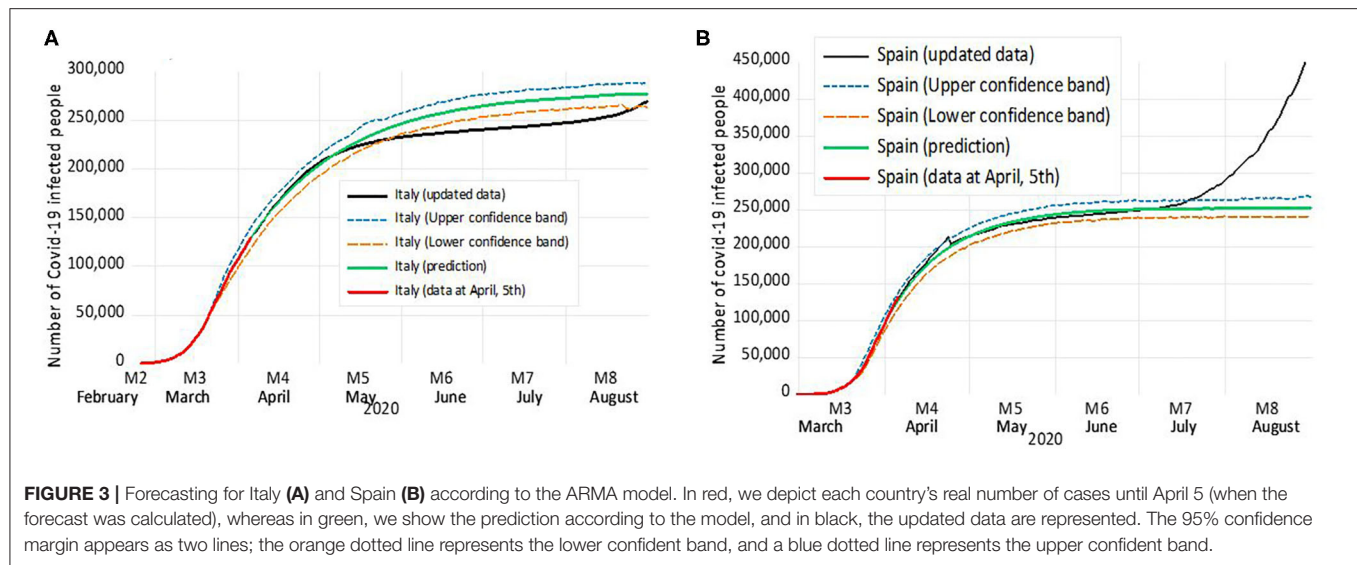
With all the above, a model was defined for forecasting purposes. This model tested the hypothesis that Spanish and Italian's contagion processes followed the path shown in China and adjusted it to their own ARMA pattern. It assumed that there existed a common way of the virus to expand itself adapted to each reality. The results of forecasting for Italy and Spain are shown in **Figure 3**. We also performed a panel prediction by regions in the case of Italy and by autonomous communities in

Spain using the Chinese process as an instrument variable in the autoregressive model to forecast infections (data not shown).

Italy was the European country that first showed a significant infection process and the first where the authorities reacted by applying strong measures of isolation to contain the virus expansion. There was a similar time pattern to the one that happened at the first moments in China, and this further supported the hypothesis of a common global expansion pattern. Besides, Italy showed strongly significant differences by region in terms of the number of infected people, just like China. Specifically, Lombardy, Veneto, Piemonte, and Emilia-Romagna carried a 43.3, 8.6, 8.1, and 13.4%, respectively, of the total number of infected in the country as of March 26. ARMA model predicted a reduction in the contagion speed during the second week of April in Italy and smooth reduction until the peak flattened, with control on new infection happening in most regions including Piamonte and Veneto, but not in Lombardy and Emilia-Romagna. The real attenuation was faster than the one estimated by the model since in mid-May, Italy was in the middle of strong containing measures.

Spain started later the contagion process, and it evolved quickly. Results reflected a precise association with the Chinese pattern during the first phase of the infections as the Spanish process seemed to reach the turning point experienced by China





in a similar moment. Just like Italy and China, in Spain, some regions showed a stronger relationship with the global infection pattern. In this case, Madrid and Catalonia had around 30 and 20%, respectively, of all the infected. In the case of Spain, the model predicted that infections still could grow fast until early May, and at that moment, the speed of contagion would be reduced.

Regarding the prediction until the actual data, the maximum level of contagion in Spain surpassed that in Italy because of faster growth in the Spanish number of cases. The precision of this comparison depends on the moment when the infection rate reached the turning point (observed in Italy at the end of March and in Spain early April), and also on the reducing infection speed. The latter relied on success on the isolation and other public measures taken by authorities and fulfilled by population. Note that Italy applied isolation only for Lombardy on March 1st after successive measures of contention since February 25, whereas Spain on March 13 for all the territory and nonessential activities. The updated information for Spain provides a high precision forecast until mid-July (4 full months). From this date onward, Spain has started a new growth in the infection process, enhanced by the ending of confinement measures.

On the other hand, the VECM model estimated different ICU resources in Spain and Italy. First, we showed that the relationship between the total numbers of ICU beds expected due to the affected population size was statistically significant, showing different proportions. The model estimated that 4.2% of total infected by COVID-19 would require a bed in ICUs in Spain the next day, whereas in Italy, this percentage was lower (2%), shown in Table 2. The difference was relevant, and it suggested more challenging implications of the disease in Spain than in Italy, as, with a similar number of infected people in both countries, there was a more intensive use of the ICU in Spain than in Italy.

Regarding the “unexpected” effects, their relevance was captured by the short-term sensibility parameters, which

**TABLE 2 |** Vector autocorrection model (VECM) of ICU requirements for the infection process of COVID-19 in Italy and Spain.

	Spain	Italy
Sample period, until 4/5/2020, starting date	03/09/2020	03/12/2020
Dependent variable: changes on no. of ICU used beds Variables	Coef	Coef
No. of infected people (−1)	<b>0.042***</b>	<b>0.02***</b>
(standard error)	(0.012)	(0.003)
c	817.7	—
Convergence parameter of speed to equilibrium	<b>−0.307**</b>	0.013
<b>Short-term sensibility:</b>	0.014	<b>−0.0343***</b>
D [infected people (−1)]		
(standard error)	(0.025)	(0.0136)
D [infected people (−2)]	0.021	<b>0.0344***</b>
(standard error)	(0.029)	(0.0169)
D [infected people (−3)]	0.012	−0.016
(standard error)	(0.029)	(0.0142)
Global model tests		
R <sup>2</sup>	0.816	0.873
Log likelihood	−160,075	−184,816
<b>Maximum ICU beds</b>	<b>4,068</b>	<b>7,843+</b>
Date for the peak of ICU beds	April 4	April 19

+ Estimated. \*\*\*p-value < 0.01, \*\*p-value < 0.05.

This table contains selected results from a VEC Model estimated with four lags for Spain and three lags for Italy relating the changes in ICU bed requirement associated with an increase in infected people. The cointegration parameter and short-term parameters showing the relationship between ICU and infection are presented. Full results are available under request.

measured the speed at which the new contagions determined the ICU requirements unexpectedly. The model results gave no significant parameters for Spain suggesting that short-term shocks did not determine the ICU needs; in the case of Italy, all



parameters were statistically significant, showing that ICU needs in Italy were unexpected in a large number and associated to registered cases at any time.

Besides, the component calculated as “convergence parameter” (part of the VECM model) referred to the capacity of the “stable” number of infections to explain the new ICU numbers. The fact that such parameter was statistically significant for Spain but not for Italy suggested that the ICU requirements in Spain could depend on the new number cases but not in Italy. Therefore, the Spanish ICU needs could be foreseen through the stable relationship between cases and ICU beds and did not depend on some unexpected shock. On the contrary, in Italy, it seemed that the “stable proportion” was not affecting so much the total ICUs, and the evolution of its number depended on several unexpected and short-run-effect events. Those results were supported by the strong significance of the short-term parameters of the newly infected people in Italy, given by the VECM model.

Prediction of ICU needs is shown in **Figure 4** and displayed how the Spanish ICU would increase until needing around 8,000 units by the end of April 2020 and rises until 11,000 units. Here the prediction remains stable. On the contrary, the prediction for Italy shows a decrease in the number of ICUs after an initial peak. In the latter case, the model predicted an unexpected rise in ICU needs that did not take place. We think this never happened thanks to the ongoing confinement measures applied during that month (also captured in the forecast of infection process model).

On the other hand, the prediction for Spain was highly precise with the needs of ICU beds, and it shows almost constant until September. This result may seem odd, but it is explained by the fact that the Spanish ICU data correspond to the accumulated number of beds. Therefore, the interpretation is that there is not an increase in ICU demand in this country until September. Instead, the data from Italy refer to new beds required each day,

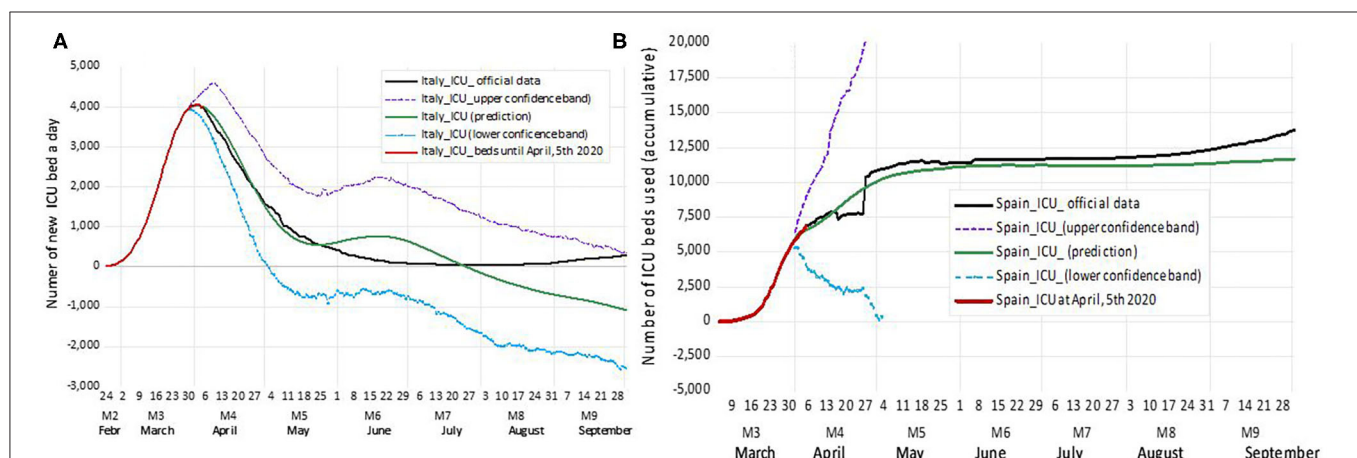
so the interpretation we think is the one above. Note that the increase in the use of intensive care beds in both countries after summer shows a lower speed than at the beginning of infection, reflecting new variables playing a role in the disease control.

In summary, the interpretation of the VECM results suggested that the Spanish COVID-19-infected people were associated with more ICU care in a very stable way, whereas in Italy, the infected people required less coverage immediately. Nevertheless, in this country, the number of ICU needed could rise unexpectedly. If so, the Spanish health system made a significant effort to prepare the ICU services than in Italy, but the latter had the risk to experience a sharp rise in the ICU needs unexpectedly and faced the lack of resources. The application of new contention measures reduced such risk, fortunately, during May in Italy.

## DISCUSSION

This article shows a similar behavior of the infection in all the studied countries, and based on this fact, we use ARMA and VECM methodologies to predict the status quo curve for COVID-19 infection and ICU bed requirement. The results show that with the restrictive measures, we estimate around 180,000 cases for Italy during April and around 240,000 cases in the maximum peak of the curve, and the numbers for Spain are similar, although reached earlier than in Italy. This prediction is based on research tools to give an idea of what might be the damage to the healthcare system or the load burden in a second wave. The infection process requires around 4,000 ICU units in Italy to be available to cover the COVID-19 needs, but they could be more due to the volatile dynamics.

Regarding Spain, we estimate 220,000 cases by mid-April and 250,000 in the maximum peak of the curve. We also estimate a need of around 7,500 ICU beds in Spain on average (although



**FIGURE 4 |** ICU Forecast for Italy (A) and Spain (B) according to the VECM model. In red, we depict each country's ICU beds in use when the model was estimated (April 5), whereas in green, we show the prediction according to the model. The 95% confidence margin appears as two lines: the blue dotted line represents the lower confident band, and a purple dotted line represents the upper confident band. In black appear the data updated in October 2020 for comparison purposes after the original estimation. The precision in the trajectory and the values, longer for Spain (the model forecast ICU needs with high precision until mid-August) and shorter for Italy (the forecast is highly precise until May 25 and after it predicts a rebound, which has not taken place).

the accumulated final use was around 11,000 beds), as a peak in both cases.

Fortunately, not all the infected cases involve urgent medical assistance, such as an ICU, and this is the crucial point to maintain the most rigid restrictions on the population's mobility. Regardless of the numbers being handled, perhaps this prediction can help the authorities to make better decisions on how to manage the available resources because it gives an idea of what could happen in the future.

We acknowledge the existence of underdiagnosis that may affect the data provided by authorities. Diagnostic precision depends on the number of COVID-19 detection tests, their accuracy, and the way the sample is taken. In Spain, as our knowledge goes, COVID-19 detection tests were made only in people admitted into the hospitals and their close contacts during the first COVID-19 wave. Therefore, the real number of cases could be higher than the ones we estimate in this study on the first wave of the pandemic. This fact does not affect the model estimation as the observations are representative of the whole pattern. Besides, the number of ICU is the total number of used resources (beds), which guarantee more precision in forecasting these variables, as there was no underdiagnosis in this case. In this country, by the end of June and with the aim of controlling small outbreaks, the use of test and contact trackers was implemented in all the territory. As a result, asymptomatic people were detected and included in the statistical data. We think this would be one of the reasons to understand the sharp increase in infection shown in **Figure 4** for Spain.

Also, this prediction was made while the confinement measures in Italy and Spain were happening; thus, the number could vary (increase) if people could move freely and face the risk of new exposure to the virus or the measures become greater restrictive. Our model could be refined if we consider the differences between the actual scenarios in Italy and Spain, as, despite looking alike, they are not the same. For example, the characteristics of the population (mean age, disease profiles) or the political, social, or socioeconomic profiles could affect the community's behavior and willingness to accept and follow the rules. There are also differences between the two healthcare systems, which have not been considered in this study. For example, in Spain, besides the several years of low finance support of the healthcare system, the responsibility for health is devolved to 17 very diverse regions, and the coordination of all of them depends on the central government. The effectiveness of the two healthcare systems to detect and treat the disease is different, but we think that the total numbers of cases provided by authorities surpass these limitations and could barely affect our model.

Moreover, the time patterns estimated do capture some of the differences the referee mentions in a lower extent in the infection process but much more clearly in the ICU requirements. For

instance, **Table 2** shows the time pattern for ICUs needs in Spain and Italy. Spain shows a fast convergence in ICU requirement with the total number of infected people. It means that an increase in infection is immediately transmitted to the need of ICUs; there is no statistically significant lag, which suggests that infected people go to the hospital straight ahead. It is not the case in Italy. The lagged parameter shows half of effected than in Spain, suggesting that less infected people go to the hospital at the very beginning, but they attend later on, as the lagged parameter confirms. These differences in time pattern may reflect, from our understanding, a difference in the population behavior or healthcare structure between both countries, which should be analyzed deeper when more information is available.

Finally, this estimation has been obtained in developed countries that applied efficient contention measures in a very short time; thus, we fear the hardness of the outbreak in less developed countries with fewer resources or in cases where restriction measures are not taken. There will be a constant increase in the number of cases in the following weeks, and all the healthcare systems must be ready to take the lead, as it has already happened in China, Italy, and now Spain. We encourage all the authorities to take strong measures to minimize the effect of the outbreak in their countries, such as social distancing, forbid people's movement, and promote basic preventive measures such as hand washing.

## DATA AVAILABILITY STATEMENT

Publicly available datasets were analyzed in this study. This data can be found here: <https://www.msccs.gob.es>; <http://www.nhc.gov.cn>; <http://www.salute.gov.it/portale/home.html>.

## AUTHOR CONTRIBUTIONS

PM, ZS, and LG were responsible for data recollecting. PM did the data analysis and statistical models. PM and PT wrote the manuscript. All authors contributed to the article and approved the submitted version.

## FUNDING

PT acknowledges the institutional support given by the Generalitat Valenciana through the Catedra de Transformación del Modelo Económico Valenciano in the development of this paper.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2020.550602/full#supplementary-material>

## REFERENCES

1. Callaway E. Time to use the p-word? Coronavirus enter dangerous new phase. *Nature*. (2020) 579:10–38. doi: 10.1038/d41586-020-00551-1
2. WHO Director-General's Opening Remarks at the Media Briefing on COVID-19. Available online at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-march-2020> (accessed 12 March 2020).

3. Paules CI, Marston HD, Fauci AS. Coronavirus infections—more than just the common cold. *JAMA*. (2020) 323:707–8. doi: 10.1001/jama.2020.0757
4. Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, et al. Presumed asymptomatic carrier transmission of COVID-19. *JAMA*. (2020) 323:1406–7. doi: 10.1001/jama.2020.2565
5. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med*. (2020). 382:1199–207. doi: 10.1056/NEJMoa2001316
6. Italian Ministero della Salute. *Covid-19 Bollettino, Protezione Civile*. Available online at: <http://www.salute.gov.it/portale/home.html> (accessed October 4, 2020).
7. Spanish Ministry of Sanidad. Available online at: <https://www.mscbs.gob.es/~profesionales/saludPublica/ccayes/alertasActual/> (accessed October 4, 2020).
8. National Health Commission of the People's Republic of China (中华人民共和国国家卫生健康委员会). Available online at: <http://www.nhc.gov.cn/> and <http://en.nhc.gov.cn/DailyBriefing.html> (English version). (accessed October 4, 2020).
9. Box GE, Jenkins GM, Bacon DW. Models for forecasting seasonal and non-seasonal time series. In Harris, B, editor. *Spectral Analysis of Time Series*. New York, NY: John Wiley and Sons, Inc (1967).
10. Johansen S. *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models*. Oxford: Oxford University Press (1995)
11. Johansen S. Interpretation of cointegrating coefficients in the cointegrated vector autoregressive model. *Oxf Bull Econ Stat*. (2005) 67:93–104. doi: 10.1111/j.1468-0084.2005.00111.x

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Monllor, Su, Gabrielli and Taltavull de La Paz. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Improving Public Access to COVID-19 Pandemic Data in Indonesia for Better Public Health Response

Pande Putu Januraga<sup>1,2\*</sup> and Ngakan Putu Anom Harjana<sup>2†</sup>

<sup>1</sup> Department of Public Health and Preventive Medicine, Faculty of Medicine, Udayana University, Denpasar, Indonesia,

<sup>2</sup> Center for Public Health Innovation, Faculty of Medicine, Udayana University, Denpasar, Indonesia

**Keywords:** transparency, data management, Indonesia, pandemic, COVID-19

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Emma Ruth Miller,  
Flinders University, Australia

### \*Correspondence:

Pande Putu Januraga  
januraga@unud.ac.id

### †ORCID:

Pande Putu Januraga  
orcid.org/0000-0002-2926-0856  
Ngakan Putu Anom Harjana  
orcid.org/0000-0002-4649-7185

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 18 May 2020

**Accepted:** 02 November 2020

**Published:** 24 November 2020

### Citation:

Januraga PP and Harjana NPA (2020)  
Improving Public Access to COVID-19  
Pandemic Data in Indonesia for Better  
Public Health Response.  
Front. Public Health 8:563150.  
doi: 10.3389/fpubh.2020.563150

Since the outbreak of Spanish flu from 1918 to 1920, which killed an estimated 20 million people, the world has suffered through other pandemics of respiratory infections (1). They include the Asian flu (1957–1958), Hong Kong flu (1968–1970), Swine flu (2009–2010), and coronavirus infections: severe acute respiratory syndrome (SARS) (2002–2003), Middle East respiratory syndrome (MERS) (2012–2013), and the ongoing COVID-19 (1–3).

One of the underlying causes of the pandemics caused by respiratory viruses is the increasingly high levels of population mobility across the globe. Consequently, every country has a high risk of becoming a *hotspot* for a disease outbreak with the potential to cause a global pandemic (4). Pandemics can affect any country regardless of location or socioeconomic status (1, 5). The occurrence of a pandemic is influenced by many factors. The COVID-19 and earlier infections are perfect examples of in-country epidemics that result in worldwide pandemics. The spread of pandemics is closely related to a region/country's readiness and ability to mitigate disease outbreaks that have a pandemic potential (6).

According to the findings by the *International Health Regulation State Party Annual Reporting* (IHR SPAR) across 182 countries amid the COVID-19 outbreak, many countries are not ready to deal effectively with a pandemic (7). This readiness measure is based on five aspects: (i) prevention, (ii) detection, (iii) response, (iv) availability of supporting facilities, and (v) operational readiness (8). One crucial factor used to assess the readiness of a region/country in dealing with a pandemic is the availability of adequate health data and information. Such data is crucial for healthcare provision and government decision-making during the crisis (9).

Insights obtained from high-quality data are key to effective decision-making. Pandemics are characterized by public health emergencies that require quick and accurate decisions to minimize the impacts of the disease and accompanying losses. The experience of various countries and health organizations in dealing with epidemics underscore the importance of transparent data collection systems for access to useful health information that augments the readiness of the government and other stakeholders to face the next pandemic. The various benefits that accrue from such data before, during, and after an outbreak are summarized in **Table 1**.

Since March 2, 2020, when the first case of COVID-19 was confirmed in Indonesia, the number of cases in the country has continued to increase, and no signs of flattening the epidemic's curve are evident. As of May 6, 2020, 12,438 COVID-19 cases had been reported with 895 deaths translating to 7.2% of confirmed cases (20). Indonesia reports a stable number of cases per day as many neighboring countries begin to relax their lockdown policies in response to reduced incidence of the disease. For example, Australia reported only 20 new cases on May 7, 2020, while at its



**TABLE 1 |** Benefits of health data related to outbreaks.

No	Plague period	Benefits of health data
1	Before the pandemic	<ul style="list-style-type: none"> <li>- Mapping the potential dangers and risks of diseases that could potentially cause an outbreak/ pandemic (10).</li> <li>- Strengthening surveillance systems through <i>early warning systems</i> and mitigating potential disease outbreaks/ pandemics (11, 12).</li> <li>- Strengthening preparedness against epidemics through the provision of integrated emergency response mechanisms and promoting cross-sector collaboration at the local, national, and global levels (13).</li> <li>- Provides knowledge related to disease risk and the level of public trust in the relevant authorities in preparing for an outbreak (14).</li> </ul>
2	During a pandemic	<ul style="list-style-type: none"> <li>- Patient data, case contact lists, and transmission patterns are useful in coordinating rapid response efforts to control outbreaks (16). This information can also be used as a basis for conducting <i>syndromic surveillance</i> (6, 15).</li> <li>- Extracting risk factors from positive cases and determining the onset of the disease. This information can be gathered through contact tracing or community surveys.</li> <li>- The number of cases, morbidity, mortality, <i>attack rate</i>, prevalence, or incidence determines the magnitude of the outbreak, its pattern of spread, and the affected population.</li> <li>- Measurement of risk factors for a disease through <i>case-control</i> studies to obtain information on vulnerable groups (15).</li> <li>- Mathematical and epidemiological modeling to determine patterns of spread, pandemic periods, and vaccine/drug effectiveness, in addition to types of interventions/ treatments that are <i>cost-effective</i> in dealing with outbreaks/ pandemics (16, 17).</li> <li>- Satisfaction levels, public response, and public trust in the relevant authorities in dealing with the epidemic in progress (18). This is useful in increasing the active role of the community in efforts to prevent and control outbreaks.</li> </ul>
3	After the pandemic	<ul style="list-style-type: none"> <li>- Data on patients who recover or die to aid further investigation for scientific development, especially in efforts to develop vaccines/treatments.</li> <li>- Creating pandemic models for likely diseases (<i>emerging</i> and <i>re-emerging</i>) to minimize the impact of losses incurred.</li> <li>- Data on losses experienced and analysis of factors that cause such losses. This is useful for increasing community resilience and formulating public policies related to the prevention and control of future outbreaks (19).</li> </ul>

peak, it reported more than 200 new cases per day (21). Many questions surround the Indonesian government's response to COVID-19: has it been adequate and evidence-based, or scattered and reactive without a clear strategy? These concerns about the optimal use of data to inform effective coping strategy for COVID-19 were strengthened on April 13, 2020, when President of Indonesia, Joko Widodo, ordered the COVID-19 National Task Force to provide the broadest possible public access to COVID-19 data (22). Previously, the national data trends included only the number of confirmed cases of COVID-19, recoveries, and fatalities. There was no information on suspected COVID-19 patients who died. Moreover, the national data trends did not capture demographic and geographical details of the reported cases. Similar patterns of incomplete data also occurred at the provincial and district levels, which harmed the efficacy of policy initiatives at the local level.

Furthermore, the state control over information related to pandemics has limited data access and utilization in public and academic realms, yet such data would be useful to handle current and future epidemics in Indonesia. Until May 9, 2020, we managed to find only three scientific articles related to COVID-19 based on primary and secondary data in Indonesia. They included an article regarding the effect of weather on the COVID-19 transmission rate in Jakarta (23), a case study on patients who present with complaints of chest pain and digestive tract symptoms (24), and an article on modeling COVID-19 and health system readiness based on a press-release report from the Provincial Government of Bali, Indonesia (25). In addition, we found one literature review on COVID-19 in an Indonesian Journal, but the analysis of mortality risk associated with COVID-19 and patient age groups did not include any

Indonesian data despite multiple reports by the government on COVID-19 cases and deaths (26).

In contrast, South Korea reported its first case on February 18, 2020, in Daegu, but various articles relating to the use of confirmed-case data and contact tracing continue to be widely published in the country's media and scientific journals. A PubMed search on May 9, 2020 using the keywords ((COVID-19 [Title/Abstract]) OR (CORONA [Title/Abstract]) OR SARS-CoV2 [Title/Abstract]) AND [Korea (Title/Abstract)] returned 124 articles. We easily found reports related to the COVID-19 case index (27), the epidemiological profile of COVID-19 in Korea (28), and the severity of COVID-19 in South Korea (29).

Furthermore, a similar developing country in the same South East Asia region, Vietnam, reported its first case on January 23, 2020, but multiple reports relating to the COVID-19 epidemic pattern (30) and transmission potential of asymptomatic cases (31) have already been published. A PubMed search using the keywords ((COVID-19 [Title/Abstract]) OR (CORONA [Title/Abstract]) OR SARS-CoV2 [Title/Abstract]) AND [Vietnam (Title/Abstract)] on PubMed on July 22, 2020, returned 49 articles.

The Indonesian government runs a website that reports on the spread of COVID-19 (<https://covid19.go.id/peta-sebaran>) and presents COVID-19 case data by age group as well as patient condition data, that is available in graph format. We accessed this website on May 9, 2020, and found a myriad of weaknesses related to the data. First, 10% of the cases did not include age-group data. Second, in 96% of cases, it is unclear whether the patients suffered from comorbidities as no data were available. Further, this website fails to explain to the public or academia how to access

the raw data for analysis of epidemic conditions, a feature that is available on several European countries' COVID-19 websites. For instance, the Dutch government's website (<https://www.rivm.nl/coronavirus-covid-19/actueel>) provides public access to raw data on COVID-19 that is available for download in CSV or XLS formats. Turning to Indonesia's neighbors, Singapore's website (<https://www.moh.gov.sg/covid-19/situation-report>) allows the public to access detailed daily reports about COVID-19 cases, including the numbers of patients treated in hospitals, those in quarantine, and other conditions, in numerical format and graphs. These daily reports contain data from the previous 14 days.

The lack of quality data for the public and academia in Indonesia, especially for epidemiologists to analyze the development of the current epidemic, will cause long-term losses related to the inability to develop appropriate coping strategies for the current conditions. An analysis published in <https://theconversation.com/id>, a popular online scientific platform that discusses issues in Indonesia, decried the failure by the Indonesian government to produce the appropriate epidemic curve of COVID-19 owing to difficulties in reporting daily actual new cases (32). The current data available at the Government website captured only the newly reported cases by the National Task Force. It is widely known that, with a lack of capacity for

testing across the country, the time needed for sample collection, analysis, and reporting could be varied. However, no information on these critical dates is available on the government website.

In conclusion, as illustrated in **Table 1**, failing to translate raw data into useful information for public consumption will hamper the development of science-based approaches to control disease outbreaks. Indonesia may not derive maximum benefit from its experience of tackling the COVID-19 pandemic as lessons learned are not documented and will likely be overlooked. The Government of Indonesia, especially the Indonesian Ministry of Health, should begin to manage COVID-19 data properly and provide unfettered public and academic access to the raw data for transparency. Importantly, it should allow the analysis of this data to inform current and future public health responses.

## AUTHOR CONTRIBUTIONS

PJ: conceptualization, data curation and analysis, and writing-review and editing. NH: writing-original draft.

## ACKNOWLEDGMENTS

We would like to thank Editage ([www.editage.com](http://www.editage.com)) for English language editing.

## REFERENCES

- Saunders-Hastings PR, Krewski D. Reviewing the history of pandemic influenza: understanding patterns of emergence and transmission. *Pathogens*. (2016) 5:66. doi: 10.3390/pathogens5040066
- Bauch CT, Oraby T. Assessing the pandemic potential of MERS-CoV. *Lancet*. (2013) 382:662–4. doi: 10.1016/S0140-6736(13)61504-4
- WHO. *Coronavirus Disease 2019 (COVID-19): Situation Report*. Geneva: World Health Organization (2020), 72.
- Cockerham WC, Cockerham GB. Health and Globalization. In: *Wiley Blackwell Encyclopedia Health Illness Behavior Society Wiley Online Library*. Chichester (2014). p. 954–72. doi: 10.1002/9781118410868.wbehb514
- Ross AGP, Crowe SM, Tyndall MW. Ross AG, Crowe SM, Tyndall MW. Planning for the next global pandemic. *Int J Infect Dis*. (2015) 38:89–94. doi: 10.1016/j.ijid.2015.07.016
- Paterson BJ, Durrheim DN, Hardie K. Pandemic response in low-resource settings requires effective syndromic surveillance. *Influenza Other Respir Viruses*. (2013) 7:887–8. doi: 10.1111/irv.12098
- Kandel N, Chungong S, Omaar A, Xing J. Health security capacities in the context of COVID-19 outbreak: an analysis of International Health Regulations annual report data from 182 countries. *Lancet*. (2020) 395:1047–53. doi: 10.1016/S0140-6736(20)30553-5
- World Health Organization (WHO). *State Party Self-Assessment Annual Reporting Tool*. Geneva: World Health Organization (2018).
- Reed C, Biggerstaff M, Finelli L, Koonin LM, Beauvais D, Uzicanin A, et al. Novel framework for assessing epidemiologic effects of influenza epidemics and pandemics. *Emerg Infect Dis*. (2013) 19:85–91. doi: 10.3201/eid1901.120124
- Cahill BP, Collins RD, Jurko RC, Zivic TR, Crowther KG, Haimes YY. Collaborative risk-based preparedness for pandemic influenza in southeastern Virginia. In: *2008 IEEE Systems and Information Engineering Design Symposium*. Charlottesville, VA: IEEE (2008). p. 323–8. doi: 10.1109/SIEDS.2008.4559733
- Moghadas SM, Pizzi NJ, Wu J, Yan P. Managing public health crises: the role of models in pandemic preparedness. *Influenza Other Respir Viruses*. (2009) 3:75–9. doi: 10.1111/j.1750-2659.2009.00081.x
- Milunovich GJ, Williams GM, Clements ACA, Hu W. Internet-based surveillance systems for monitoring emerging infectious diseases. *Lancet Infect Dis*. (2014) 14:160–8. doi: 10.1016/S1473-3099(13)70244-5
- Kandel N, Sreedharan R, Chungong S, Sliter K, Nikkari S, Ijaz K, et al. Joint external evaluation process: bringing multiple sectors together for global health security. *Lancet Glob Heal*. (2017) 5:e857–8. doi: 10.1016/S2214-109X(17)30264-4
- Bangerter A. Investigating and rebuilding public trust in preparation for the next pandemic. *Eur Psychol*. (2014) 19:1–3. doi: 10.1027/1016-9040/a000173
- Lipsitch M, Swerdlow DL, Finelli L. Defining the epidemiology of Covid-19—studies needed. *N Engl J Med*. (2020) 382:1194–6. doi: 10.1056/NEJMp2002125
- Akselrod H, Mercon M, Kirkeby Risoe P, Schlegelmilch J, McGovern J, Bogucki S. Creating a process for incorporating epidemiological modelling into outbreak management decisions. *J Bus Contin Emer Plan*. (2012) 6:68–83.
- Baguelin M, Van Hoek AJ, Jit M, Flasche S, White PJ, Edmunds WJ. Vaccination against pandemic influenza A/H1N1v in England: a real-time economic evaluation. *Vaccine*. (2010) 28:2370–84. doi: 10.1016/j.vaccine.2010.01.002
- Siegrist M, Zingg A. The role of public trust during pandemics. *Eur Psychol*. (2014) 19:23–32. doi: 10.1027/1016-9040/a000169
- Berkes F, Ross H. Panarchy and community resilience: sustainability science and policy implications. *Environ Sci Policy*. (2016) 61:185–93. doi: 10.1016/j.envsci.2016.04.004
- Government of Indonesia. *COVID-19 Update*. (2020). Available online at: <https://covid19.go.id/> (accessed May 6, 2020).
- Government of Australia. *Coronavirus (COVID-19) in Australia*. (2020). Available online at: <https://www.covid19data.com.au/> (accessed May 7, 2020).
- Kompas. Jokowi Minta Data Covid-19 Transparan, Termasuk Jumlah ODP dan PDP. Jakarta (2020). Available online at: <https://nasional.kompas.com/read/2020/04/13/10190201/jokowi-minta-data-covid-19-transparan-termasuk-jumlah-odp-dan-pdp> (accessed May 9, 2019).
- Tosepu R, Gunawan J, Effendy DS, Lestari H, Bahar H, Asfian P. Correlation between weather and Covid-19 pandemic in Jakarta, Indonesia. *Sci Total Environ*. (2020) 725:138436. doi: 10.1016/j.scitotenv.2020.138436

24. Azwar MK, Kirana F, Kurniawan A, Handayani S, Setiati S. Gastrointestinal presentation in COVID-19 in Indonesia: a case report. *Acta Med Indones.* (2020) 52:63–7.
25. Wirawan IMA, Januraga PP. Forecasting COVID-19 transmission and healthcare capacity in Bali. *Korean J Prev Med Public Health.* (2020) 53:158–63. doi: 10.3961/jpmph.20.152
26. Susilo A, Rumende CM, Pitoyo CW, Santoso WD, Yulianti M, Sinto R, et al. Coronavirus Disease 2019 : Tinjauan Literatur Terkini Coronavirus Disease 2019. *Review Curr Literatures.* (2020) 7:45–77. doi: 10.7454/jpdi.v7i1.415
27. Lim J, Jeon S, Shin HY, Kim MJ, Seong YM, Lee WJ, et al. Case of the Index Patient Who Caused Tertiary Transmission of COVID-19 Infection in Korea: the Application of Lopinavir/Ritonavir for the Treatment of COVID-19 Infected Pneumonia Monitored by Quantitative RT-PCR. *J Korean Med Sci.* (2020) 35:e79. doi: 10.3346/jkms.2020.35.e89
28. Report on the epidemiological features of coronavirus disease 2019 (covid-19) outbreak in the republic of korea from january 19 to march 2, 2020. *J Korean Med Sci.* (2020) 35:e112. doi: 10.3346/jkms.2020.35.e112
29. Shim E, Tariq A, Choi W, Lee Y, Chowell G. Transmission potential and severity of COVID-19 in South Korea. *Int J Infect Dis.* (2020) 93:339–44. doi: 10.1016/j.ijid.2020.03.031
30. Hoang VM, Hoang HH, Khuong QL, La NQ, Tran TTH. Describing the pattern of the COVID-19 epidemic in Vietnam. *Glob Health Action.* (2020) 13:1776526. doi: 10.1080/16549716.2020.1776526
31. Chau NVV, Lam VT, Dung NT, Yen LM, Minh NNQ, Ngoc NM, et al. The natural history and transmission potential of asymptomatic SARS-CoV-2 infection. *Clin Infect Dis.* (2020) 4:ciaa711. doi: 10.1093/cid/ciaa711. [Epub ahead of print].
32. Elyaxar I, Lestari KD, Ekawati LL, Lina RN. Indonesia belum punya kurva epidemi COVID-19: kita harus hati-hati membaca klaim pemerintah kasus baru melambat. *theconversation.com.* (2020). Available online at: <https://theconversation.com/indonesia-belum-punya-kurva-epidemi-covid-19-kita-harus-hati-hati-membaca-klaim-pemerintah-kasus-baru-melambat-137497> (accessed May 11, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Januraga and Harjana. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Longitudinal Evidence of How Media Audiences Differ in Public Health Perceptions and Behaviors During a Global Pandemic

Thomas Frissen<sup>1,2\*</sup>, David De Coninck<sup>3</sup>, Koenraad Matthys<sup>3</sup> and Leen d'Haenens<sup>1</sup>

<sup>1</sup> Faculty of Social Sciences, Institute for Media Studies, KU Leuven, Leuven, Belgium, <sup>2</sup> Department of Society Studies, Faculty of Arts and Social Sciences, Maastricht University, Maastricht, Netherlands, <sup>3</sup> Faculty of Social Sciences, Centre for Sociological Research, KU Leuven, Leuven, Belgium

## OPEN ACCESS

### Edited by:

Victoria Ann Newsom,  
Olympic College, United States

### Reviewed by:

Junfeng Wang,  
University of Illinois at Springfield,  
United States  
Margo Bergman,  
University of Washington Tacoma,  
United States

### \*Correspondence:

Thomas Frissen  
t.frissen@maastrichtuniversity.nl

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 14 July 2020

**Accepted:** 10 November 2020

**Published:** 02 December 2020

### Citation:

Frissen T, De Coninck D, Matthys K  
and d'Haenens L (2020) Longitudinal  
Evidence of How Media Audiences  
Differ in Public Health Perceptions and  
Behaviors During a Global Pandemic.  
Front. Public Health 8:583408.  
doi: 10.3389/fpubh.2020.583408

The current study investigates how public attitudes and perceptions about the COVID-19 pandemic evolve over time and influence self-reported health behaviors (e. g., social distancing). Specific attention was paid to respondents' exposure to different news media channels (public vs. commercial). We used data from a two-wave panel study with a 3-week interval (W1 at the start and W2 at the peak of the pandemic) and a large sample of the adult population in Flanders, Belgium ( $n = 870$ ). The results of mixed ANOVAs indicate that besides a time-effect there was also a significant effect of the different types of news media exposure and respondents' support for protective health measures and behaviors. Whereas, perceived vulnerability to disease, feelings of loneliness, and solidarity were mostly determined by respondents' overall frequency of media exposure, support of governmental measures and self-reported health behaviors were mostly determined by the type of news media exposure. Respondents with a predominantly public/quality news media diet had the highest scores on these variables. A stepwise linear regression analysis with individual's change scores demonstrated that (self-)protective behavior was positively determined by respondents' age, solidarity, and the belief that the measures are necessary, but negatively determined by one's cumulative exposure to commercial/tabloid news media. This longitudinal study provides a new perspective on the role of news media in times of a public health crisis. It offers support for (A) the "double bind hypothesis" (i.e., while news media consumption encourages (self-)isolation, it fosters feelings of loneliness); and (B) the "dual effects hypothesis" (i.e., exposure to commercial/tabloid news media generates different outcomes than exposure to public/quality news media). Affective responses and socio-psychological perceptions are influenced by overall news media exposure, whereas support for the government and its handling of the crisis are mainly determined by one's selection of media channels, whereby audiences of public news media evaluate these outcomes more positively than the audiences of commercial news media channels.

**Keywords:** COVID-19, public health behavior, media exposure, media audiences, longitudinal survey data, public health communication



## INTRODUCTION

Recently, the coronavirus disease 2019 (COVID-19) has been rapidly expanding across the globe. In order to respond to this pandemic, many countries are combining suppression and mitigation activities aimed at delaying major surges of patients and leveling the demand for hospital beds, while protecting the most vulnerable from infection (1). It is crucial for the public's health that information about these measures is accurately and quickly disseminated throughout the population, especially when considering that threat perceptions of novel viral infections are higher compared to perceptions of common threats like influenza (2). The global scale of the current crisis, and the introduction of measures such as social distancing leads to increased anxiety and stress, which in turn have a detrimental impact on the public's physical and mental health over time, as evidenced by longitudinal studies following other health or societal crises (3, 4). Furthermore, in addition to disseminating and contextualizing information regarding public health measures, it is also important to stimulate public support for these measures, especially given their fundamental impact on daily life. A lack of support for such measures may result in the public not abiding by certain guidelines, which may in turn endanger public health (5).

Currently, traditional news media (e.g., television, radio, newspapers) and social media are the main platforms through which this dissemination of information takes place (6, 7). In fact, traditional media are even believed to have experienced a "revival" during the COVID-19 pandemic, as most people "retrogressed back" to these "established" media environments that provide them with "trustworthy" and verified information or news updates (8). The public's reliance on news media to convey accurate information is especially important during this crisis, with a large share of the population working from or locked down in their homes (3). Two elements of media exposure have been found to affect psychological and physical responses to a community-wide traumatic event: the amount of media exposure, and its content (7).

Concerning the total amount of exposure to the media: Garfin et al. (7) use the Boston Marathon bombings as an example, where they found a "strong positive association between the total amount of exposure to bombing-related media coverage and acute stress symptoms. People who reported the highest media exposure reported higher acute stress than people who were directly exposed to the bombings" (7, 9). These associations accumulate over time: as threats continue to emerge, repeated high levels of media exposure to these kinds of events create a cycle of distress (7, 10).

As for the context of this coverage: studies found that overly sensationalized and tabloidized coverage of traumatic events (e.g., graphic imagery) is related to higher stress levels among the public, even after controlling for the overall amount of media exposure (7). In that regard, it is important to note that not all media types frame stories the same way. An international comparison of media systems showed that commercial media present significantly more sensationalized news than public media (11). Recent Belgian data corroborate this trend. Jacobs

et al. found that Belgian public news media are significantly less sensationalist and "tabloidized" than commercial news media in the context of contentious and crisis-related topics (such as immigration) and that the audiences of both news types differ in their attitudes toward the covered topics. In this context, it has been assumed that outcomes of mediated communication are not uniform across all individuals. Instead, media effects tend to vary across different media channels (i.e., "dual effects hypothesis") (12–14), and exposure to a given news medium means exposure to multiple messages that may be incongruent and exert therefore conflicting and contradictory influences within an individual (i.e., "double bind hypothesis") (15, 16).

In the current longitudinal study, we aim to test how public fears and attitudes toward public health measures evolve over time during the COVID-19 pandemic (research question (RQ)1) while accounting for one's exposure to different news media channels (public vs. commercial) in Flanders (Belgium) (RQ2). Additionally, we aim to examine how later-stage self-reported health behaviors (e.g., social distancing) are associated with (a) evolutions in public perceptions and attitudes regarding the disease and (b) respondents' accumulative exposure to different news media channels (RQ3).

## MATERIALS AND METHODS

### Sampling Procedure

We used the data of a two-wave online panel study that was conducted in locked-down Flanders with an interval of 3 weeks. The first wave (W1) took place 3 days after the government installed the first set of restrictive measures in the country, such as social distancing and telecommuting, and ran from March 17, 2020 to March 22, 2020. Additionally, on the first day of the data collection, the government decided to go in full lockdown—i.e., the closing down of all non-essential shops and business and non-essential movements were forbidden. The second wave (W2) data were collected at the peak of the outbreak in Belgium in terms of new cases and COVID-related deaths, and ran from April 6, 2020 to April 18, 2020.

Adults ranging from 18 to 70 years of age from Flanders, the northern, Dutch-speaking region of Belgium, made up the research population. Respondents were recruited through polling agency iVOX. Their large pool of research candidates was contacted by e-mail and the survey was distributed via the agency's survey software. The survey language was Dutch. Prior to filling out the survey, respondents had to accept an informed consent form in which they were briefed about the study's design and approach. Only those respondents who answered all questions were retained in the final sample.

At baseline (W1), 1,000 adults participated (response rate = 32%). Three weeks later, in the follow-up survey (W2), 870 out of the 1,000 respondents who participated in W1 participated again (response rate between W1 and W2 = 87%). Only the respondents of the final sample were used for the analyses of the current study ( $n = 870$ ) and their characteristics can be found in **Table 1** (17).

**TABLE 1 |** Sample description of respondents who took part in both W1 and W2 ( $n = 870$ ).

		Frequency (%)
Sex	Male	446 (51.3%)
	Female	424 (48.7%)
Age (W1)	18–34	239 (27.5%)
	35–54	257 (29.5%)
	55–70	374 (43%)
Educational attainment (W1)	Secondary education or lower	456 (52.4%)
	Tertiary education	414 (47.6%)
Symptoms of COVID-19 (W1)	Yes	31 (3.6%)
	No	839 (96.4%)
Symptoms of COVID-19 (W2)	Yes	83 (9.5%)
	No	787 (90.5%)
Symptoms of COVID-19 (W1 or W2)	Yes	93 (10.7%)
	No	777 (89.3%)

## Instruments of Measurement

### Exposure to News Media and Membership of Different Media Audience (W1 and W2)

In order to assess participants' exposure to news media about the COVID-19 pandemic, we gauged the frequency of exposure to eight Flemish news media sources. This was done by asking respondents in both waves to rate how often they had consulted the media sources in the week prior to the survey: (1) public television, (2) public radio, (3) quality newspapers, (4) social media channels of public/quality news media, (5) commercial television, (6) commercial radio, (7) tabloids, and (8) social media channels of commercial/tabloid news media. Examples of each media source were provided (for instance the "VRT" for public television news; "VTM" for commercial television news; "De Standaard" and "De Morgen" for quality press, and "HLN" and "Het Nieuwsblad" for tabloid press). Respondents were asked to respond to each item on a 5-point Likert scale ranging from 1 "never" to 5 "multiple times a day." Principal component analysis with varimax rotation yielded a two-factor structure: one factor with the public news media and quality press items and one with the commercial and tabloid press items. Both components showed reasonable reliability in both W1 and W2 (Cronbach's Alpha for public/quality media sources = 0.60 (W1) and 0.62 (W2); Cronbach's Alpha for commercial/tabloid media sources = 0.60 (W1) and 0.57 (W2). A composite measure for each component was created. A higher score means a higher frequency of exposure to the specific news media sources.

In order to assign each respondent to a unique media audience condition, we used a two-step approach. First, we used a median split on the composite measures to create a high/low categorical variable of both the public/quality news media variable and the commercial/tabloid news media variable. Second, we made a 2x2 matrix with both binary news media variables, which enables the creation of four distinct groups: (1) respondents who scored low on public/quality news media and low on commercial/tabloid news media were assigned to the group "Low

overall news media consumption" ( $n = 246$ ), (2) respondents who scored high on public/quality news media and high on commercial/tabloid news media were assigned to the group "High overall news media consumption" ( $n = 199$ ), (3) respondents who scored high on public/quality news media and low on commercial/tabloid news media were assigned to the group "Predominant public/quality news media consumption" ( $n = 195$ ), and (4) respondents who scored high on commercial/tabloid news media and low on public/quality news media were assigned to the group "Predominant commercial/tabloid news media consumption" ( $n = 230$ ).

Important to note here is that we use the term "quality news media" in our manuscript in order to connect with the existing body of literature that has followed a similar dichotomy of "quality press" vs. "tabloid press" (or "infotainment") (12). Other dichotomies that are well-known in the existing journalism literature are "hard news" vs. "soft news" or "high-brow" vs. "low-brow news" (18, 19). Quality press (or "hard news" or "high-brow news," or originally referred to as "broadsheet press") is used for news outlets that differ from tabloid press in terms of the format, themes, focus, and style. Generally speaking, the term quality press refers to news that is more serious, more detailed, less emotional and less personal (e.g., The Guardian and The New York Times). Quality is therefore not used as a normative label in this study [cfr. the quality news vs. "fake news"-debate (20)] but as conceptual/analytical label that is derived from the quality vs. tabloid dichotomy in the journalism literature.

### Perceived Vulnerability to Disease (W1 and W2)

To measure respondents' perceived vulnerability to disease over the course of time we used the 15-item self-report measurement as developed and validated by Duncan et al. (21), in both W1 and W2. Participants were asked to answer each statement on the basis of a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree." Six items had to be reversed coded, so that a higher score on the item meant higher perceived vulnerability. This scale contains two subscales: perceived infectability (seven items) and germ aversion (eight items). Perceived infectability assesses one's "beliefs about immunological functioning and personal susceptibility to infectious diseases" [(21), p. 542]. Germ aversion assesses one's "aversive affective responses to situations that connote a relatively high likelihood of pathogen transmission" [(21), p. 542]. Principal component analysis with varimax rotation confirmed this factor structure in the present data. Internal consistency was satisfactory for both subscales in both waves [Cronbach's alpha for perceived infectability = 0.85 (W1) and 0.84 (W2); Cronbach's alpha for germ aversion = 0.69 (W1) and 0.68 (W2)].

### Socio-Economic and Socio-Psychological Perceptions (W1 and W2)

We included three items in both waves to measure respondents' socio-economic and socio-psychological perceptions of the measures taken by the government to contain the COVID-19 pandemic over time. These were (1) to what extent respondents believed that the measures will result in an economic crisis

(perception of economic crisis), (2) whether respondents believed they will experience loneliness in the coming weeks (loneliness), and (3) to what extent respondents are willing to go in quarantine if they feel unwell (solidarity). All items were measured on a 5-point Likert scale ranging from “strongly disagree” to “strongly agree.”

### Attitudes Toward Public Health Measures (W1 and W2)

We used two items to measure respondents' attitudes toward the public health measures taken by the Belgian government. The first item gauged to what extent respondents believed that the measures taken by the government were necessary to protect the population. The second one measured the extent to which participants believed that the Belgian government was handling the crisis well. For both items, a 5-point Likert scale was used ranging from 1 = “strongly disagree” to 5 = “strongly agree.”

### (Self-)Protective Behavior (W2 Only)

In contrast to the other variables in this study, (self-)protective behavior was measured only in Wave 2. We asked respondents to self-report on a 5-point Likert-scale (1 = “I don't follow this at all; 5 = “I follow this perfectly”) to what extent they followed the several COVID-19 measures to protect themselves and to prevent propagation of the virus. Four (self-)protective behaviors were assessed: (1) non-essential travel, (2) social distancing (i.e., keeping a distance of 1.5 m), (3) washing hands regularly, and (4) no gatherings of more than two people. Principal component analysis with varimax rotation and parallel analysis indicated that all four items load on one factor. As such, we computed for each respondent a mean score for (self-)protective behaviors with a good reliability (Cronbach's alpha = 0.79).

## RESULTS

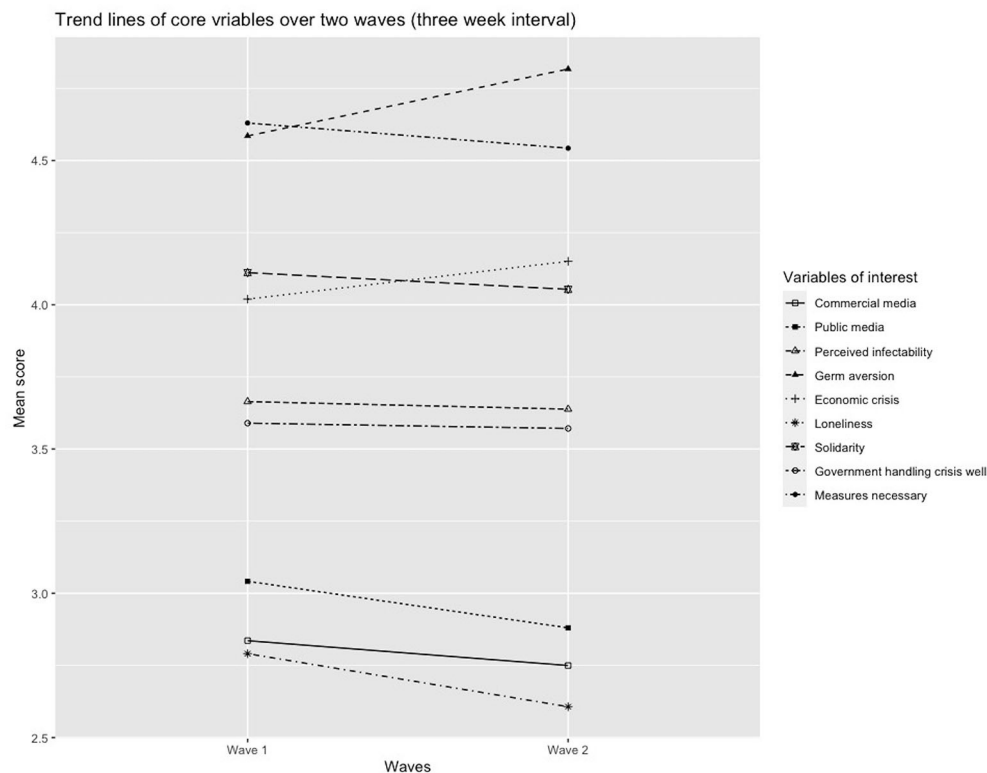
In reference to our first two research questions, we started with an explorative analysis of how the core variables evolved over time. The trendlines in **Figure 1** visualize the paths for each variable (see also Appendix). Additionally, we conducted multiple mixed ANOVAs, to analyze the effects of both the time (within groups) and the four different media audiences (between groups) on the dependent variables (see **Table 2**). We used pairwise comparisons with Bonferroni correction to compare mean scores between both time points and across the four media audiences at W1 and the dependent variables in W2.

A significant effect for time was found for four variables. Respondents' germ aversion (mean difference = 0.23) and perceptions of an economic crisis (mean difference = 0.13) increased significantly during the lockdown. In contrast, feelings of loneliness (mean difference = -0.18), and the belief that measures are necessary (mean difference = -0.09) declined significantly. In the case of the latter, it cannot go unmentioned that a potential ceiling effect was at play. At baseline, respondents rated the necessity of the restrictive measures taken by the government already relatively high ( $M_{W1} = 4.63$ ). Respondents' exposure to public news media [mean difference = -0.16,  $t_{(869)} = -6.52$ ,  $p < 0.05$ ] and commercial news media [mean

difference = -0.09,  $t_{(869)} = -6.52$ ,  $p < 0.05$ ] has decreased over time.

A significant effect of the media audiences was found for nearly all variables, with an exception for participants' economic perceptions [ $F_{(3,866)} = 2.189$ ,  $p = 0.088$ ]. For perceived infectability, the data show that respondents in the high overall media exposure group scored significantly higher ( $M = 3.8$ ;  $SD = 1.15$ ), than respondents in the low overall exposure group ( $M = 3.53$ ,  $SD = 1.05$ ) and respondents in the predominantly public/quality media group ( $M = 3.56$ ,  $SD = 0.99$ ). For germ aversion, respondents in the low overall exposure condition had on average a significantly lower score for germ aversion ( $M = 4.58$ ,  $SD = 1.03$ ) than the respondent of all other media audiences ( $M_{\text{high exposure}} = 4.99$ ,  $SD = 1.01$ ;  $M_{\text{commercial dominant}} = 4.94$ ,  $SD = 0.94$ ;  $M_{\text{public dominant}} = 4.80$ ,  $SD = 0.97$ ). Respondents in the high overall media exposure condition scored the highest on perceptions of loneliness ( $M = 2.76$ ,  $SD = 1.20$ ). This was significantly lower for the low media exposure condition ( $M = 2.47$ ,  $SD = 1.26$ ) and the public/quality news media condition ( $M = 2.48$ ,  $SD = 1.19$ ). Interestingly, respondents who chose to consume mainly public/quality news media were also less lonely than those who consumed mainly commercial/tabloid news media ( $M = 2.73$ ,  $SD = 1.25$ ). In terms of solidarity, the high overall media exposure group had the highest tendency to go in quarantine if necessary ( $M = 4.25$ ,  $SD = 0.78$ ). This was significantly lower for the people who chose for either a commercial-dominant media diet ( $M = 3.96$ ,  $SD = 0.93$ ) or just little media exposure in general ( $M = 3.94$ ,  $SD = 0.88$ ). In contrast to the latter, also respondents in the public/quality media condition reported a higher degree of solidarity ( $M = 4.12$ ,  $SD = 0.83$ ). The results of these four analyses seem to suggest that people's perceptions of vulnerability to disease (i.e., perceived infectability and germ aversion) and socio-psychological outcomes (i.e., loneliness and solidarity) are mainly dependent on respondents' overall frequency of media exposure and to a lesser extent influenced by the specific type of news media source that is consumed.

Interestingly, the data show a different pattern for the two items that gauge respondents' attitudes toward the measures taken by the Belgian government. The audiences of the public/quality news media tend to be the most supportive toward the way in which the government is handling the crisis ( $M = 3.8$ ,  $SD = 0.784$ ) compared to all other audience groups ( $M_{\text{high exposure}} = 3.54$ ,  $SD = 0.96$ ;  $M_{\text{low exposure}} = 3.50$ ,  $SD = 0.96$ ;  $M_{\text{commercial dominant}} = 3.48$ ,  $SD = 0.97$ ). People with a predominantly commercial media diet tend to be the least supportive for how the government is handling the crisis. A similar finding emerges when we compare the belief that the measures taken by the government were necessary across the four audience groups. Respondents with a predominantly public/quality news media diet rate the necessity of the measures significantly higher ( $M = 4.68$ ,  $SD = 0.54$ ) than respondents in the high overall exposure group ( $M = 4.53$ ,  $SD = 0.72$ ) and in the low overall exposure group ( $M = 4.44$ ,  $SD = 0.88$ ). Even though the difference between the public/quality news media group and the commercial/tabloid news media group was not statistically significant, the latter rated the necessity of the



**FIGURE 1 |** Visualization of the evolution of the core variables over time (3 week interval). All variables were measured on a 5-point scale, except for perceived infectability and germ aversion (7-point scale).

measures substantially lower ( $M = 4.54$ ,  $SD = 0.77$ ). These findings indicate that in our sample it is mainly the type of the news source (i.e., public/quality vs. commercial/tabloid), that seems to play an important role in terms of governmental support in times of crisis.

To evaluate whether one's (self-)protective behavior was significantly different across the four media audiences, a one-way ANOVA was performed. The analysis shows that respondents' behavior to protect themselves and to prevent the virus from spreading did indeed differ significantly between the media audiences [ $F_{(3,866)} = 3.756$ ,  $p > 0.05$ ]. Respondents in the low overall exposure group were the least willing to behave in a (self-)protective manner ( $M = 3.54$ ,  $SD = 0.699$ ). Pairwise comparison using Bonferroni correction showed that this was significantly lower than respondents in the high overall exposure group ( $M = 3.70$ ,  $SD = 0.77$ ) and the ones in the public/quality news media group ( $M = 3.75$ ,  $SD = 0.498$ ). In fact, respondents who consume a predominantly public/quality news media diet appear to behave most favorable in order to protect themselves and to prevent the virus from spreading.

Finally, in reference to research question three, we conducted a stepwise linear regression model to investigate whether the changes over time affect respondents' (self-) protective behavior at time 2. In order to do this, we calculated an evolution score for each variable. This was done by subtracting the mean of the W1 score from the mean of the W2 score (e.g., evolution in

perceived infectability = mean of perceived infectability W2—mean of perceived infectability W1). In all steps, we controlled for sex, age, educational attainment, and whether the respondent had reported to have been suffering from COVID-19 symptoms in either W1 or W2 (see **Table 3**). In the last block, we also included an interaction between both types of news media exposure in order to control for the potential influence of an overall increase in news media exposure over time.

In the full model, the predictors enable us to explain 10% of the variance of (self-) protective behavior. Thereby, the strongest determinant is the respondent's age ( $\beta = 0.27$ ,  $p < 0.01$ ). Older respondents tend to follow the (self-)protective health measures better than the younger respondents. Furthermore, the analysis also indicates that an increased solidarity over time ( $\beta = 0.08$ ,  $p < 0.01$ ), and an increase in the belief that the measures are necessary ( $\beta = 0.09$ ,  $p < 0.01$ ) lead to more (self-)protective behavior at time 2. Interestingly, a change in the consumption of commercial/tabloid news media over time was also a significant determinant for respondent's (self-)protective behavior ( $\beta = -0.08$ ,  $p < 0.01$ ). More specifically, a higher consumption of commercial media in time 2 in comparison to time 1 is associated with lower levels of (self-)protective behavior. This suggests that respondents who increased their exposure to commercial/tabloid news media over the course of 3 weeks were less likely to follow the public health measures taken by the government.



**TABLE 2 |** Results of mixed ANOVAs of the core variables.

		F-test and effects size						
		Media audience group				Time		
		High	Low	P/Q	C/T		W1	W2
Perceived infectability	$F_{(3,866)} = 3.53, \eta^2_G = 0.01^*$	<b>3.80 (1.15)</b>	3.53 (1.05)	3.56 (1.00)	3.68 (1.14)	$F_{(1,866)} = 1.703, n.s.$	3.66 (1.10)	3.64 (1.09)
Germ Aversion	$F_{(3,866)} = 9.641, \eta^2_G = 0.03^{***}$	<b>4.99 (1.01)</b>	4.58 (1.03)	4.80 (0.97)	4.94 (0.94)	$F_{(1,866)} = 85.57, \eta^2_G = 0.02^{***}$	4.59 (1.00)	<b>4.82 (1.00)</b>
Perceptions of economic crisis	$F_{(3,866)} = 2.189, n.s.$	4.19 (0.83)	4.07 (0.85)	4.15 (0.74)	4.20 (0.81)	$F_{(1,866)} = 19.296, \eta^2_G = 0.01^{***}$	4.02 (0.89)	<b>4.15 (0.81)</b>
Loneliness	$F_{(3,866)} = 4.780, \eta^2_G = 0.01^{**}$	<b>2.76 (1.20)</b>	2.47 (1.26)	2.48 (1.19)	2.73 (1.25)	$F_{(1,866)} = 25.623, \eta^2_G = 0.01^{***}$	<b>2.79 (1.26)</b>	2.61 (1.24)
Solidarity	$F_{(3,783)} = 5.880, \eta^2_G = 0.02^{***}$	<b>4.25 (0.78)</b>	3.94 (0.88)	4.12 (0.83)	3.96 (0.93)	$F_{(1,783)} = 3.825, n.s.$	4.11 (0.85)	4.05 (0.87)
Handling well	$F_{(3,866)} = 6.648, \eta^2_G = 0.02^{***}$	3.54 (0.96)	3.50 (0.96)	<b>3.80 (0.78)</b>	3.48 (0.97)	$F_{(1,866)} = 0.51, n.s.$	3.59(1.01)	3.57 (0.93)
Measures necessary	$F_{(3,866)} = 5.556, \eta^2_G = 0.02^{***}$	4.53 (0.72)	4.44 (0.88)	<b>4.68 (0.54)</b>	4.54 (0.77)	$F_{(1,866)} = 15.247, \eta^2_G = 0.04^{***}$	<b>4.63 (0.68)</b>	4.54 (0.75)
(Self-)protective behavior	$F_{(3,866)} = 3.756, \eta^2_G = 0.013^*$	3.70 (0.77)	3.54 (0.70)	<b>3.75 (0.50)</b>	3.63 (0.75)	N.A.		

The interaction between media group and time was for none of the variables significant.  $\eta^2_G$  = generalized effect size; \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ , n.s., not significant; P/Q, Public/quality news media group; C/T, Commercial/tabloid news media group. Bold indicates the highest mean score between groups.

**TABLE 3 |** Results of a stepwise linear regression with (self-)protective behavior as the criterion and changes over time for the predictor variables (i.e., differences in means).

Predictor		Model 1	Model 2	Model 3	Model 4	Model 5
Socio demographics	Sex	0.06	0.07	0.06	0.06	0.07
	Age	0.27**	0.27**	0.26**	0.27**	0.27**
	Educational attainment	0.05	0.05	0.05	0.05	0.05
	COVID-19 symptoms	0.03	0.03	0.02	0.02	0.02
Perceived vulnerability to disease	Perceived infectability		−0.06	−0.06	−0.05	−0.05
	Germ aversion		0.06	0.06	0.05	0.05
Socio-economic and socio-psychological perceptions	Solidarity			0.08*	0.08*	0.08*
	Perceptions of economic crisis			0.05	0.05	0.06
	Loneliness			−0.01	−0.01	−0.01
Attitudes toward government and public health measures	Government is handling well				0.03	0.03
	Measures necessary				0.08*	0.09*
Type of media exposure	Commercial/tabloid news media					−0.08*
	Public/quality news media					−0.01
	Overall exposure (i.e., interaction; commercial*public media)					−0.06
		$R^2 = 0.074^{**}$	$\Delta R^2 = 0.006$ $R^2 = 0.081^{**}$	$\Delta R^2 = 0.010^*$ $R^2 = 0.090^{**}$	$\Delta R^2 = 0.008^*$ $R^2 = 0.098^{**}$	$\Delta R^2 = 0.007$ $R^2 = 0.106^{**}$

Standardized regression weights ( $\beta$ ) are presented. \* $p < 0.05$ , \*\* $p < 0.01$ .

## DISCUSSION

The dissemination and contextualization of information during a public health crisis such as the COVID-19 pandemic is crucial to mobilize nation-wide support for restrictive public health measures taken by the government and to prevent the crisis from further escalation. Traditional media, both public and commercial, remain the most important channels through which such information is communicated. Traditional media are even believed to have experienced a “revival” during the COVID-19 pandemic, as most people “retrogressed back” to the environments they knew would provide them with “trustworthy”

and established information or news updates (8). However, the way in which different traditional media channels (publicly vs. commercially funded) cover a (nation-wide or global) crisis differs significantly and generates different outcomes in public's attitudes and behaviors (11–13). The current study set out to test how (self-)protective behaviors, public perceptions and attitudes, and support toward public health measures taken by the Belgian government evolve over time during the COVID-19 pandemic, while accounting for one's exposure to different news media channels (“dual effects” and “double bind”). Two-wave panel data that were collected over the course of 3 weeks in a locked-down Belgium provided some interesting new insights.

First, in terms of perceived vulnerability to disease, results show that public's germ aversion increased significantly while perceived infectability did not change over time. Apparently, perceived infectability, which refers to one's beliefs of personal immunological functioning and susceptibility, is a rather stable trait that has not affected meaningfully by the COVID-19 pandemic. However, germ aversion, referring to one's affective reactions to situations with a relatively high risk of infectious pathogen transmission, tends to increase when the pandemic expands and even peaks. This finding is meaningful because it indicates that if individuals are confronted with a virus outbreak such as the COVID-19 pandemic, they also have an increasing affective reaction (i.e., repulsion and disgust) toward situations in which disease transmission is a risk (22). Yet, at the same time, their perception of personal susceptibility does not change over time and remains relatively low.

Looking at the news media consumption, the data show that it is predominantly the overall frequency of news media exposure that determines one's perceived infectability and germ aversion and not so much the choice of a specific news media channel. That suggests that one's affective responses to the crisis are in fact most strongly affected by the mere quantity of media messages rather than by the content, the source, or the sender of the messages [cf. mere exposure (23)].

Second, in terms of socio-economic and socio-psychological perceptions toward the health crisis, the data show that the belief that the COVID-19 pandemic will result in an economic crisis rose substantially over time. Surprisingly, this was the only outcome that did not differ across the four media conditions. As such, the belief that the Belgian economy is headed toward a crisis appeared to be independent of one's quantity and type of news media exposure and increased equally in all groups during the lockdown. One possible explanation for this could be that all news media channels in Belgium equally covered the subject of an economic crisis with messages of crashing stock markets and unprecedented low oil prices because those were *de facto* serious global (macro-) economic realities (24, 25). Yet, previous studies have shown that Belgian public news media devote more attention to news of economic crises than commercial/tabloid news media (26). Another explanation could be that, independent of any form of media exposure, respondents simply started to experience the (macro-)economic consequences of crisis personally at the moment that W2 data were collected. As in many other countries, all Belgian non-essential shops and enterprises, schools, and industry remained closed for nearly a month, and as a result more than a million Belgians became temporarily unemployed (27).

In contrast to perceptions of an economic crisis, levels of solidarity and loneliness dropped over the course of time. Rather paradoxically, this suggests that while the pandemic was peaking in terms of new cases and COVID-19 related deaths—and thus (self-)isolation and solidarity were most needed—the Belgian public was less willing to be solidary [i.e., willingness to go in (self-)quarantine if one felt sick] and felt at the same time less lonely. Future studies should explore this trend more into detail. Could this mean that self-isolation and loneliness are interrelated in the sense that (the fear of) being lonely (i.e., living

in solitary) withholds people from being solidary which in turn may threaten personal and public health? Previous studies have indeed indicated that social isolation resulting in loneliness might be better avoided as it induces anxiety and psychological strain and could perhaps lead to COVID-related suicides (28).

This notion brings us to our findings about a so-called “double bind.” Loneliness and solidarity were both most strongly predicted by the overall frequency of news media exposure. More specifically, the audiences in the high exposure to news media condition experienced the highest levels of loneliness and solidarity. This suggests that news media consumers indeed seem to be caught in a dilemma or “double bind”: on the one hand, news media consumption encourages (self-)isolation, on the other hand, it stimulates feelings of loneliness. Also the media channels are caught in this dilemma: if they wish to prevent feelings of loneliness, they have to advocate against self-isolation. This is also true the other way around: if they wish to promote self-isolation, they have to accept that their audiences feel lonely. Messages of solidarity and harmony indeed permeated the news media. Nearly all news media channels covered for example—with audiovisual materials—the “#applausvoordezorg”-movement, whereby every night at 8 p.m., many Belgian citizens left their homes to applaud for medical staff (29, 30). However, recent studies investigating the media-loneliness nexus, found that increased exposure to similar messages of harmony on social media are in fact related to one's feelings of loneliness (31). Clearly, more work is needed in order to understand whether such messages of harmony and solidarity in traditional media also affect solidarity and loneliness in a double bind during a global pandemic.

Third, concerning attitudes toward the government and the public health measures: over the course of time and independent of one's media exposure, the belief that the government was handling the crisis well, remained stable. Both in W1 and W2 the Belgian government received relatively high levels of support. However, the belief that the restrictive measures were necessary to prevent the virus from spreading declined substantially. In only 3 weeks the average score for this indicator shifted from principally approval to principally disapproval. Future research should consider multiple-wave and cross-national study designs to test whether this trend continues over a longer period of time and whether it is unique to the Belgian context or rather a globally observed phenomenon.

Interestingly, participants in the predominantly public/quality news media group rated both indicators (i.e., whether the government is handling the crisis well and whether the measures are necessary) higher than those in all other media conditions. This points in the direction that the audiences of public/quality media channels—which are at least partly state-funded—are more in favor of the government and the actions they are taking to curtail the pandemic than audiences of commercial/tabloid media and overall news media consumers. While this finding offers support for the “dual effects hypothesis,” it provokes two potential follow-up questions: (1) to what extent do public/quality news media report more positively about the government than commercial/tabloid media, and (2) Are commercial/tabloid media more critical about the government?

Future content analysis of the news media in times of COVID-19 should shed more light on these questions. Additionally, it raises the question of whether the audiences of public and commercial media perhaps differ in terms of trust/distrust in the government. It is not unimaginable that people with lower trust in the government would actually avoid public media channels and rather prefer commercial media because of their actual independence (32). This could then explain why commercial media audiences would be less in favor of the government's decisions, given the known link between trust in the government and support for policy [e.g., (33)]. Future studies should explore this strand more concretely. Is distrust in the government indeed associated with distrust in public news media specifically and does this influence the willingness to support necessary public health policies?

Fourth, in line with the “dual effects hypothesis,” the data showed that (self-)protective behaviors differ significantly across the four media audiences, with respondents in the public/quality media condition reporting the highest levels of (self-)protective behavior. Respondents who consume a predominantly public/quality news media diet appear to behave most favorable in order to protect themselves and to prevent the virus from spreading. In line with this finding, a linear regression model indicated that an increased, cumulative exposure to commercial/tabloid news media during the lockdown predicted lower levels of (self-)protective behavior. A future content analysis of the different news media channels seems necessary in order to explain these findings. Perhaps, the persuasiveness and frames used to stimulate such behaviors differ in both media channels. Indeed, it has been argued that news reporting of a sensationalist and tabloidized nature could undermine democratic outcomes, such as following up on nation-wide restrictive health behaviors (12). From a more media theoretical perspective, the question should be asked whether the commercial/tabloid news media do enough to stimulate their audiences to follow the measures, thereby taking into account the fact that the restrictive public health behaviors are *de facto* conflicting with the potential commercial interests of the sponsors of the commercial media. At the same time, it could be possible that both audiences differ in terms of trust in the government and established institutions (such as the public service media) and therefore differ to the extent to which they would follow their behavioral guidelines. As such, a more sociological study is needed in order to assess whether audiences differ in terms of trust in the government, establishment, and institutions.

Lastly, in summarizing the discussion above, it is of essential importance to discuss the main news media trends that came to surface in the current study. The data clearly demonstrate that news media exposure affects public health outcomes in times of crisis in two very distinct ways. Affective responses such as people's perceptions of vulnerability to disease and socio-psychological outcomes are mainly dependent on respondents' overall frequency of media exposure. In

contrast, attitudinal and (self-reported) behavioral outcomes, such as governmental support and (self-)protective behavior are predominantly determined by the channel through which one gets the information and the news (i.e., public/quality vs. commercial/tabloid). Whether this is an effect of the actual media contents or whether this is rather caused by a person's attitude-congruent media selectivity [cfr. selective exposure; reinforcing spirals (34)] remains to be investigated. Similarly, important questions concerning the underlying personal characteristics of the media audiences remain unanswered. For example, who are exactly the commercial/tabloid news media consumers and to what extent do they differ from public/quality news media audiences in terms of social and personality characteristics? Nevertheless, this study offers support for the “dual effects hypothesis,” stating that exposure to different news media channels may generate different outcomes. Furthermore, this study provides new perspectives on the ways in which media audiences are affected by a pandemic or health emergency and to what extent they differ in public health perceptions, attitudes, and behaviors.

The main contribution of this study lies in the differential approach to news media audiences. Both the public health literature as well as the media effects literature seem to be far too often preoccupied with studying the effects of overall frequency of media exposure, without considering the multidimensional nature of the news media and thus the subtle—though meaningful—effects of different lingo, topics, frames, and contents across different news media channels. Future studies are encouraged to combine (automated) content analyses (e.g., topic modeling) of different media channels (publicly vs. commercially funded) with a longitudinal survey design in order to explore this direction more in detail.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

TF designed the study, conducted the analyses, wrote the methods, results, and discussion sections. DD co-designed the study and developed the introduction section. KM and Ld'H initiated the study, collected the data, and revised earlier versions of the manuscript. All authors contributed to the article and approved the submitted version.

## REFERENCES

- Bedford J, Enria D, Giesecke J, Heymann DL, Ihekweazu C, Kobinger G, et al. COVID-19: towards controlling of a pandemic. *Lancet*. (2020) 395:P1015–8. doi: 10.1016/S0140-6736(20)30673-5
- Hong S, Collins A. Societal responses to familiar versus unfamiliar risk: comparisons of influenza and SARS in Korea. *Risk Anal*. (2006) 26:1247–57. doi: 10.1111/j.1539-6924.2006.00812.x
- Ball-Rokeach SJ, DeFleur ML. A dependency model of mass-media effects. *Commun Res*. (1976) 3:3–21. doi: 10.1177/009365027600300101
- Thompson RR, Garfin DR, Holman EA, Silver RC. Distress, worry, and functioning following a global health crisis: a national study of Americans' responses to Ebola. *Clin Psychol Sci*. (2017) 5:513–21. doi: 10.1177/2167702617692030
- De Coninck D, d'Haenens L, Matthijs K. Forgotten key players in public health: news media as agents of information and persuasion during the COVID-19 pandemic. *Public Health*. (2020) 183:65–6. doi: 10.1016/j.puhe.2020.05.011
- Merchant RM, Lurie N. Social media and emergency preparedness in response to novel coronavirus. *JAMA*. (2020) 323:2011–2. doi: 10.1001/jama.2020.4469
- Garfin DR, Silver RC, Holman EA. The novel Coronavirus (COVID-2019) outbreak: amplification of public health consequences by media exposure. *Health Psychol*. (2020) 39:355–7. doi: 10.1037/hea0000875
- Lindgren, S. What is viral about the virus? Digital social research in the age of covid-19. *Medium.com*. (2020). Available online at: <https://medium.com/@simonlindgren/what-is-viral-about-the-virus-85ebe0824b47>.
- Holman EA, Garfin DR, Silver RC. Media's role in broadcasting acute stress following the Boston Marathon bombings. *Proc Natl Acad Sci USA*. (2014) 111:93–8. doi: 10.1073/pnas.1316265110
- Thompson RR, Jones NM, Holman EA, Silver RC. Media exposure to mass violence events can fuel a cycle of distress. *Sci Adv*. (2019) 5:eav3502. doi: 10.1126/sciadv.aav3502
- Arbaoui B, De Swert K, van der Brug W. Sensationalism in news coverage: a comparative study in 14 television systems. *Commun Res*. (2016) 47:299–320. doi: 10.1177/0093650216663364
- Jacobs L, Meeusen C, d'Haenens L. News coverage and attitudes on immigration: public and commercial television news compared. *Eur J Commun*. (2016) 31:642–60. doi: 10.1177/0267323116669456
- Strömbäck J, Shehata A. Media malaise or a virtuous circle? Exploring the causal relationships between news media exposure, political news attention and political interest. *Eur J Polit Res*. (2010) 49:575–97. doi: 10.1111/j.1475-6765.2009.01913.x
- Aarts K, Semetko HA. The divided electorate: media use and political involvement. *J Polit*. (2003) 65:759–84. doi: 10.1111/1468-2508.00211
- Duffy BE, Pruchniewska U. Gender and self-enterprise in the social media age: a digital double bind. *Inform Commun Soc*. (2017) 20:843–59. doi: 10.1080/1369118X.2017.1291703
- Bateson G, Jackson DD, Haley J, Weakland JH. A note on the double bind. *Fam Process*. (1963) 2:154–7. doi: 10.1111/j.1545-5300.1963.00154.x
- De Coninck D, d'Haenens L, Matthijs K. Perceptions and opinions on the COVID-19 pandemic in Flanders, Belgium: data from a three-wave longitudinal study. *Data Brief*. (2020) 32:106060. doi: 10.1016/j.dib.2020.106060
- Reinemann C, Stanyer J, Scherr S, Legnante G. Hard and soft news: a review of concepts, operationalizations and key findings. *Journalism*. (2012) 13:221–39. doi: 10.1177/1464884911427803
- Slaets A, Verhoest P, d'Haenens L, Minnen J, Glorieux I. Fragmentation, homogenisation or segmentation? A diary study into the diversity of news consumption in a high-choice media environment. *Eur J Commun*. (2020). doi: 10.1177/0267323120966841
- Farkas J, Schou J. Fake news as a floating signifier: hegemony, antagonism and the politics of falsehood. *Javnost*. (2018) 25:298–314. doi: 10.1080/13183222.2018.1463047
- Duncan LA, Schaller M and Park JH. Perceived vulnerability to disease: development and validation of a 15-item self-report instrument. *Pers Individ Diff*. (2009) 47:541–6. doi: 10.1016/j.paid.2009.05.001
- De Coninck D, d'Haenens L, Matthijs K. Perceived vulnerability to disease and attitudes towards public health measures: COVID-19 in Flanders, Belgium. *Pers Individ Diff*. (2020) 166:110220. doi: 10.1016/j.paid.2020.110220
- Zajonc RB. Attitudinal effects of mere exposure. *J Pers Soc Psychol*. (1968) 9:1–28. doi: 10.1037/h0025848
- Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg*. (2020) 78:185–93. doi: 10.1016/j.ijsu.2020.04.018
- Barua S. *Understanding Coronanomics: The Economic Implications of the Coronavirus (COVID-19) Pandemic*. (2020). Available online at: <https://ssrn.com/abstract=3566477>.
- Joris W, d'Haenens L, Van Gorp B. The euro crisis in metaphors and frames: focus on the press in the Low Countries. *Eur J Commun*. (2014) 29:608–17. doi: 10.1177/0267323114538852
- De Preter W. Een op tien tijdelijk werklozen krijgt bijpassing van werkgever. *De Tijd*. (2020). Available online at: <https://www.tijd.be/dossiers/coronavirus/een-op-tien-tijdelijk-werklozen-krijgt-bijpassing-van-werkgever/10219386.html>.
- Thakura V, Jain A. COVID 2019-suicides: a global psychological pandemic. *Brain Behav Immun*. (2020) 88:952–3. doi: 10.1016/j.bbi.2020.04.062
- VRT. Van Antwerpen tot Brussel: ons land applaudisseert voor "onze helden van de zorg". VRT. (2020) Available online at: <https://www.vrt.be/vrtnws/nl/2020/03/18/applaus-voor-alle-artsen-en-verpleegkundigen-van-het-land/>.
- De Standaard. Oproep tot massaal applaus voor zorgpersoneel: 'Laat merken dat we aan hen denken'. *De Standaard*. (2020) Available online at: [https://www.standaard.be/cnt/dmf20200318\\_04893541](https://www.standaard.be/cnt/dmf20200318_04893541).
- Pittman M, Reich B. Social media and loneliness: why an Instagram picture may be worth more than a thousand Twitter words. *Comput Hum Behav*. (2016) 62:155–67. doi: 10.1016/j.chb.2016.03.084
- Kalogeropoulos A, Suiter J, Udris L, Eisenegger M. News media trust and news consumption: factors related to trust in news in 35 countries. *Int J Commun*. (2019) 13:3672–93.
- Kulin J, Johansson Sevä I. (2020). Who do you trust? How trust in partial and impartial government institutions influences climate policy attitudes. *Climate Policy*. (2020) 1–14. doi: 10.1080/14693062.2020.1792822
- Slater, MD. Reinforcing spirals: the mutual influence of media selectivity and media effects and their impact on individual behavior and social identity. *Commun Theor*. (2007) 17:281–303. doi: 10.1111/j.1468-2885.2007.00296.x

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Frissen, De Coninck, Matthys and d'Haenens. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



## APPENDIX

**TABLE A1** | Pearson correlations between the change scores (i.e., differences between the mean in W1 and W2) of the core variables.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Perceived infectability	−0.03	0.66								
2. Germ aversion	0.23	0.74	0.14**							
3. Perceptions of economic crisis	0.13	0.87	0.02	0.06						
4. Loneliness	−0.18	1.08	−0.03	−0.03	0.08*					
5. Solidarity	−0.06	0.84	−0.01	0.08*	0.06	0.07				
6. Handling well	−0.02	0.88	−0.01	−0.01	−0.05	−0.07*	0.00			
7. Measures necessary	−0.09	0.67	0.02	0.06	−0.01	−0.02	0.01	0.14**		
8. Public media/ quality press	−0.16	0.73	0.01	0.07*	−0.02	0.01	−0.04	0.02	0.03	
9. Commercial media/ tabloid press	−0.09	0.72	0.03	0.03	0.04	−0.03	−0.02	0.03	0.05	0.40**

*M* and *SD* are used to represent mean and standard deviation, respectively. \* $p < 0.05$ . \*\* $p < 0.01$ .



# Public Health Responses to COVID-19: Whose Lives Do We Flatten Along With “The Curve?”

Aravind Ganesh<sup>1,2</sup>, Joao M. Rato<sup>3,4</sup>, Venu M. Chennupati<sup>5</sup>, Amanda Rojek<sup>6,7</sup> and Anand Viswanathan<sup>8,9\*</sup>

<sup>1</sup> Department of Clinical Neurosciences, University of Calgary, Calgary, AB, Canada, <sup>2</sup> Team Leader, Alberta COVID-19 Exposure Response Team (ACERT), Alberta Health Services, Calgary, AB, Canada, <sup>3</sup> Chairman of Banco CTT, Lisbon, Portugal, <sup>4</sup> Information Management School, Universidade Nova de Lisboa, Lisbon, Portugal, <sup>5</sup> Chief Executive Officer, ZOLT Health Systems, Hyderabad, India, <sup>6</sup> Fellow in Emerging Infectious Diseases, Emergency Department, Royal Melbourne Hospital, Melbourne, VIC, Australia, <sup>7</sup> Centre for Integrated Critical Care, University of Melbourne, Melbourne, VIC, Australia, <sup>8</sup> Director, Telestroke Services, Massachusetts General Hospital and Partners Healthcare, Boston, MA, United States, <sup>9</sup> Harvard Medical School, Boston, MA, United States

**Keywords:** COVID 19, public health, socio-economic aspects, lockdown, social distancing

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Rupam Bhattacharyya,  
University of Michigan, United States

### \*Correspondence:

Anand Viswanathan  
aviswanathan1@partners.org

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 20 May 2020

**Accepted:** 06 November 2020

**Published:** 02 December 2020

### Citation:

Ganesh A, Rato JM, Chennupati VM,  
Rojek A and Viswanathan A (2020)  
Public Health Responses to  
COVID-19: Whose Lives Do We  
Flatten Along With “The Curve?”  
Front. Public Health 8:564111.  
doi: 10.3389/fpubh.2020.564111

The Coronavirus 2019 (COVID-19) pandemic has received varying and evolving public health responses worldwide (1). Sweden remained largely open with health measures aimed most substantively at vulnerable groups, while South Korea implemented a large testing program, combined with extensive efforts to isolate infected people and trace/quarantine contacts. The United Kingdom (UK) considered various approaches before deciding on measures to isolate, quarantine, and promote social-distancing that were eased in mid-July (1); lockdown is now being re-implemented with a surging second wave (2). In contrast to early social-distancing measures in Canada to “flatten the curve,” American states adopted varying approaches, with many states having now relaxed their measures to differing extents (3). China adopted an aggressive approach of quarantining the affected Hubei province and isolating infected populations (4). India was under an ambitious 40-day lockdown, which was then extended until May-31 with districts designated as red/orange/green based on cumulative cases and doubling rate; red zones continued under full lockdown whereas orange/green zones had more relaxed measures (5). Gradual easing of restrictions (“unlock” 1.0 through 5.0) ensued, with lockdown measures nevertheless continuing in designated containment zones (6). Millions of people around the world still face public health measures of one form or another, raising the question: how stringent should government responses be in such pandemics (7), and how long can (or should) such measures continue?

## ARGUMENTS FOR STRICT MEASURES

There are clear medical, socio-economic, and humanitarian arguments favoring strict, ongoing social-distancing or quarantine/lockdown measures, pending a resolution to the pandemic. Foremost, they may help rapidly halt COVID-19 spread (8). This can prevent healthcare systems from being overwhelmed, which can be catastrophic even in developed nations, as witnessed in Italy and Spain (9). In such “sharp curve” scenarios, acute/severe cases exceed hospital capacity in terms of equipment procurement, staffing, and bed number/acuity, with insufficient time to build further capacity. Healthcare providers can also be placed at unacceptable risk by community spread and dwindling personal protective equipment, further crippling the system and driving up deaths. Furthermore, groups like the elderly or those with disability become especially vulnerable to exclusionary practices, as utilitarian philosophies – predominant in such crises – unfortunately discriminate against these patients when allocating scarce resources like ventilators (10). The proportion in these categories will differ from country to country. For example, 6.2% of the Indian

population is over 65-years of age vs. 22.8% in Italy; in contrast, 11.8% live with disability in higher-income countries vs. 18.0% in lower-/middle-income countries (LMICs) (11). A blanket lockdown may also circumvent the challenge of achieving completeness in case/contact isolation, posed in part by variable false-negative test results and the substantial prevalence of asymptomatic cases (12). A blanket lockdown can also be justified by criteria of economic efficiency, as infected individuals may not fully internalize the impact of their consumption/work decisions on viral transmission and may maintain unacceptable levels of economic interactions (13). This rationale is further supported if mortality becomes an increasing function of infections due to healthcare capacity issues (14). It may be economically optimal to tighten containment measures as the infection rate increases and relax them as it decreases.

In this regard, Sweden was an outlier in its decision to remain largely open, with closure of only high-schools/universities whilst advising isolation by symptomatic individuals and those over 70 (15). Unfortunately, Sweden experienced a higher mortality rate (about 559 per 1 million) than its Scandinavian neighbors and most other European nations except Italy, Spain, and the UK. Swedish intensive care unit (ICU) utilization rates remained lower than predicted, but this was correlated with more deaths in non-ICU patients, suggesting that patient prognosis may have driven ICU admissions, reducing healthcare load but at the cost of decreased survival in non-admitted patients (15).

## ARGUMENTS AGAINST AGGRESSIVE OR PROLONGED MEASURES

On the other hand, there are equally compelling socio-economic and humanitarian arguments against aggressive/prolonged lockdown measures. Social-distancing is a tremendous economic privilege. To do so successfully, the person must have a home permitting isolation, whilst being able to obtain supplies without putting themselves/others at risk – this is not an option for slum-dwellers or homeless individuals. The person should also be able to work from home or have back-up income. This is far from reality for daily-wage workers/laborers and small-business owners who suddenly find themselves without income, as was the case for roughly 434 million members of the Indian labor force during lockdown. Particularly in LMICs, governments may only be able to sustain economic freezing for a few months, especially if subsidizing wages for those unable to work or laid off. For example, the Center for Monitoring of Indian Economy (CMIE) projects that unemployment could spike to over 23%, with 50 million workers already estimated to lose their jobs (16). A survey by the non-profit organization Jan Sahas found that 42% of Indian migrant workers already ran out of rations half-way into the lockdown, with over 90% lacking any income (17). Consequently, many migrant workers were forced to return to their villages, creating further transmission risk. These challenges prompted the Indian government to intervene with a basic cash benefit of \$40/month with some free food incentives for the unemployed. Even with such support, we may anticipate non-virus deaths among impoverished populations lacking

resources to feed/shelter their families. This can be amplified by failure of preventative healthcare services, as seen with the Ebola outbreak in West Africa, during which deaths attributable to such failures exceeded those due to Ebola itself (18).

In addition, school closures may deprive socio-economically disadvantaged children of free meals, disrupt mental health, and place untenable child-care obligations on struggling families (19). Other unintended consequences include hospital avoidance by patients with emergent conditions (20) like heart disease or stroke, resulting in worse outcomes, and spikes in domestic violence as victims find themselves cooped up with their abusers (21). The very same seniors and people with disabilities whom we seek to protect from COVID-19 can end up worse off from loss of services and support networks (21). Furthermore, the longer the lockdown, the higher the number of companies that must close and the greater the loss of economic infrastructure. Workers who have accumulated valuable firm-specific skills will lose their jobs and part of their human capital is irrecoverable. This destruction of value is what governments are trying to avoid by providing support to firms to keep workers on their payroll during lockdown, and by facilitating credit to sustain treasuries of companies unable to produce (22). Of course, LMICs that cannot afford subsidizing firms will be unable to maintain part of their productive capabilities, hampering recovery prospects when this crisis abates.

## THE CHALLENGES OF FINDING A BALANCED APPROACH

Seeking a compromise, some have advocated an intermediate approach, dubbed “the hammer and the dance,” where initial weeks of lockdown-style measures are followed by a period of relaxed measures allowing return-to-work for most healthy people, while presumably building healthcare capacity and increasing testing (23). However, with limited resources, a dramatic expansion of capacity may be infeasible for most nations in the short-term. Many lives are still doomed by “the hammer”; the most socio-economically deprived groups still will be devastated by weeks of lockdown unless there is extraordinary financial support, likely unaffordable for many LMICs. Furthermore, not everyone can “dance”: relaxation of distancing measures will likely generate a second peak within a few months, and medically vulnerable populations will again risk infection, but this time facing pressure to return to economic productivity.

Indeed, the *timing* and *duration* of public health interventions are just as critical as their stringency. Delays in applying these interventions and sub-optimal duration can limit their efficacy. One model suggested that extending measures by 1 month in Wuhan would delay a resurgence by two additional months; this may give systems a chance to recoup some resources and capacity (24). Another model examining India's initial 21-day lockdown strategy suggested that a 42–56 day lockdown would indeed be epidemiologically preferable (25). Yet such decisions are almost inevitable political minefields; epidemiological models indicate that the socially optimal lockdown length is always

longer than the privately optimal length for individuals (26). The aforementioned Indian model also recognized a tremendous price to social and economic health with a longer lockdown (25).

In this regard, rather than a sustained uniform national lockdown, a region-specific approach based on geographic risk of spread may be a reasonable compromise. For example, the strictness of travel restrictions and associated penalties could be higher in areas with high population density (26). Others have advocated for a demographically-guided strategy, arguing that most gains of uniform policies may be realized by having stricter/longer lockdown policies for the oldest and/or most vulnerable groups alone. Such targeted policies, combined with measures to reduce between-group interactions, increased testing and isolation of infected individuals, appear to minimize economic losses and deaths in some models (27). Proponents of this approach (encapsulated in “the Great Barrington Declaration”) argue it will facilitate the development of “herd immunity” in the lower-risk population, eventually protecting vulnerable groups (28). However, as argued by proponents of the “John Snow Memorandum,” a separation of lower- and higher-risk groups is easier said than done, and uncontrolled transmission among younger people again risks substantial morbidity/mortality for the overall population (29). Furthermore, at present, there is little evidence for lasting protective immunity following COVID-19 infection.

Of course, it would be ideal if we could confidently differentiate between susceptible, infected, and recovered individuals, as we could fine-tune the intensity of economic interactions, consumption, and work, for these three groups. The first group would be more lightly contained, the second would be in lockdown, and the third would be making up for lost work as much as possible. To achieve a near-optimal situation, accurate testing becomes crucial for effective lockdown of infected individuals. However, testing standards vary worldwide, and different tests like RT-PCR (reverse transcriptase polymerase chain reaction) or rapid antigen tests have different false-positive/false-negative rates. Limited access to testing, lack of reporting infrastructure, and asymptomatic infections further complicate the picture, resulting in variable under-reporting of COVID-19 cases/deaths around the world and limiting the accuracy of testing/monitoring-based strategies (30). For instance, a study of testing data from 86 countries estimated cases and deaths as being 10.5 and 1.47 times official reports, respectively (31).

Reopening societies before adequate testing and contact tracing are in place can be catastrophic, as experienced by American states that led the pack in reopening their economies in early May. For example, Florida saw a 1,393% jump in daily cases since reopening and South Carolina experienced a 999% jump, with health officials estimating that they are still able to identify only about 14% of cases (32). On the other side of the world, its economy reeling from the prolonged nationwide lockdown, and forcing a graduated approach to reopening, India is now reckoning with the challenges of a great rise in

COVID-19 cases (currently second-highest in the world) despite still having similar healthcare capacity limitations as at the start of the pandemic (33). As policy-makers in India and other affected countries envision a life of greater economic reopening beyond the devastating summer/fall of 2020, they will no doubt seek to draw lessons from the experiences of their American counterparts about the perils involved.

## CONCLUSION

In the first instance, it can be easy to characterize either a full lockdown or relatively relaxed measures as being bold or decisive vs. callous or cold-hearted, but on closer examination it is evident that there are substantial proportions of the population that will be placed at risk in each case. Indeed, it can be exceptionally challenging to find strategies to address the pandemic that do not risk endangering one vulnerable population or another. Countries are therefore forced to play an unenviable optimization game of sorts to decide which group they are willing to “risk,” relatively speaking, and for how long, and what amount of economic consumption they are willing to trade off to avoid COVID-19-related deaths. As seen in the experiences of nations around the world, incentives for one approach or the other will be country-specific and driven by economic and demographic factors as well as prevailing cultural or political philosophies. Regardless of what approach is chosen in our race to “flatten the curve,” we must take into account the lives that we risk flattening with it, and do all we can to mitigate the damage.

## AUTHOR CONTRIBUTIONS

The article was conceived through an inter-professional, international discussion among the authors who are clinician-scientists and economists. AG and AV are clinician-scientists with post-graduate training in epidemiology and population health, while AR has expertise in advancing clinical research during emerging infectious disease outbreaks, having done so during the Ebola outbreak. JR is a finance and public policy expert and was previously the chairman of the Portuguese Treasury and Public Debt Management Agency who worked with Portugal’s debt restructuring after the 2008 financial crisis. VC is CEO of ZOLT health Technologies which runs one of the largest telehealth platforms for the Government of India, delivering medical care to millions of Indians in rural areas across the country. AG wrote the first draft and revised the paper. JR, VC, AR, and AV added conceptual insights, helped revise the paper, and approved the final manuscript. AG was the guarantor of the article. All authors contributed to the article and approved the submitted version.

## PATIENT AND PUBLIC INVOLVEMENT

JR and VC are non-medical authors. Patients and other members of the public were not involved in the creation of the article.



## REFERENCES

- Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet*. (2020) 395:931–4. doi: 10.1016/S0140-6736(20)30567-5
- Covid-19: PM announces four-week England lockdown: BBC News. (2020). Available online at: <https://www.bbc.com/news/uk-54763956> (accessed October 31, 2020).
- Renken E, Wood D. *Tracking the Pandemic: How Quickly is the coronavirus Spreading State by State?* NPR (2020). Available online at: <https://www.npr.org/sections/health-shots/2020/03/16/816707182/map-tracking-the-spread-of-the-coronavirus-in-the-u-s> (accessed May 30, 2020).
- Zhang J, Litvinova M, Wang W, Wang Y, Deng X, Chen X, et al. Evolving epidemiology and transmission dynamics of coronavirus disease 2019 outside Hubei province, China: a descriptive and modelling study. *Lancet Infect Dis*. (2020) 20:793–802. doi: 10.1016/S1473-3099(20)30230-9
- Sudan P. *Government of India Department of Health and Family Welfare - Ministry of Health and Family Welfare report*. New Delhi: The Hindu (2020).
- Pal R, Yadav U. COVID-19 pandemic in india: present scenario and a steep climb ahead. *J Prim Care Community Health*. (2020) 11:2150132720939402. doi: 10.1177/2150132720939402
- Hale T, Webster S, Petherick A, Phillips T, Kira B. *Oxford COVID-19 Government Response Tracker Oxford: Blavatnik School of Government*. (2020). Available online at: <https://www.bsg.ox.ac.uk/research/research-projects/oxford-covid-19-government-response-tracker> (accessed October 31, 2020).
- Lewnard JA, Lo NC. Scientific and ethical basis for social-distancing interventions against COVID-19. *Lancet Infect Dis*. (2020) 20:631–3. doi: 10.1016/S1473-3099(20)30190-0
- Rosenbaum L. Facing Covid-19 in Italy - ethics, logistics, and therapeutics on the epidemic's front line. *N Engl J Med*. (2020) 382:1873–5. doi: 10.1056/NEJMp2005492
- Emanuel EJ, Persad G, Upshur R, Thome B, Parker M, Glickman A, et al. Fair allocation of scarce medical resources in the time of Covid-19. *N Engl J Med*. (2020) 382:2049–55. doi: 10.1056/NEJMs2005114
- World Health Organization. *World Report on Disability*. Geneva: WHO (2011).
- Niu Y, Xu F. Deciphering the power of isolation in controlling COVID-19 outbreaks. *Lancet Glob Health*. (2020) 8:e452–3. doi: 10.1016/S2214-109X(20)30085-1
- Eichenbaum M, Rebelo S, Trabandt M. *The Macroeconomics of Epidemics*. Cambridge, MA: National Bureau of Economic Research (2020). doi: 10.3386/w26882
- Jones CJ, Philippon T, Venkateswaran V. *Optimal Mitigation Policies in a Pandemic: Social Distancing and Working from Home*. Cambridge, MA: National Bureau of Economic Research (2020). doi: 10.3386/w26984
- Kamerlin SCL, Kasson PM. Managing COVID-19 spread with voluntary public-health measures: Sweden as a case study for pandemic control. *Clin Infect Dis*. (2020) ciae864. doi: 10.1093/cid/ciae864
- Sreevatasan A. Covid-19 lockdown impact: unemployment rate rises to 23.4%. *Live Mint*. (2020). Available online at: <https://www.livemint.com/news/india/covid-19-lockdown-impact-unemployment-rate-rises-to-23-4-11586202041180.html> (accessed April 30, 2020).
- Special Correspondent. *42% of Labourers don't Have Even a day's Worth Rations Left: Survey New Delhi: The Hindu* (2020).
- Parpia AS, Ndeffo-Mbah ML, Wenzel NS, Galvani AP. Effects of response to 2014–2015 ebola outbreak on deaths from malaria, HIV/AIDS, and tuberculosis, West Africa. *Emerg Infect Dis*. (2016) 22:433–41. doi: 10.3201/eid2203.150977
- Bayham J, Fenichel EP. Impact of school closures for COVID-19 on the US health-care workforce and net mortality: a modelling study. *Lancet Public Health*. (2020) 5:e271–8. doi: 10.1016/S2468-2667(20)30082-7
- Chang HJ, Huang N, Lee CH, Hsu YJ, Hsieh CJ, Chou YJ. The impact of the SARS epidemic on the utilization of medical services: SARS and the fear of SARS. *Am J Public Health*. (2004) 94:562–4. doi: 10.2105/AJPH.94.4.562
- Abel T, McQueen D. The COVID-19 pandemic calls for spatial distancing and social closeness: not for social distancing! *Int J Public Health*. (2020) 65:231. doi: 10.1007/s00038-020-01366-7
- Guerrieri V, Lorenzoni G, Straub L, Werning I. *Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages?* Cambridge, MA: National Bureau of Economic Research (2020).
- Pueyo T. *Coronavirus: The Hammer and the Dance: Medium*. (2020). Available online at: <https://medium.com/@tomaspuoyo/coronavirus-the-hammer-and-the-dance-be9337092b56> (accessed March 19, 2020).
- Prem K, Liu Y, Russell TW, Kucharski AJ, Eggo RM, Davies N, et al. The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study. *Lancet Public Health*. (2020) 5:e261–70. doi: 10.1101/2020.03.09.20033050
- Ray D, Salvatore M, Bhattacharyya R, Wang L, Du J, Mohammed S, et al. Predictions, role of interventions and effects of a historic national lockdown in India's response to the COVID-19 pandemic: data science call to arms. *Harv Data Sci Rev*. (2020). doi: 10.1162/99608f92.60e08ed5. [Epub ahead of print].
- Oum TH, Wang K. Socially optimal lockdown and travel restrictions for fighting communicable virus including COVID-19. *Transp Policy*. (2020) 96:94–100. doi: 10.1016/j.tranpol.2020.07.003
- Acemoglu D, Chernozhukov V, Werning I, Whinston MD. *A Multi-Risk SIR Model with Optimally Targeted Lockdown*. Cambridge, MA: National Bureau of Economic Research (2020).
- Horton R. Offline: science and politics in the era of COVID-19. *Lancet*. (2020) 396:1319. doi: 10.1016/S0140-6736(20)32221-2
- Alwan NA, Burgess RA, Ashworth S, Beale R, Bhadelia N, Bogaert D, et al. Scientific consensus on the COVID-19 pandemic: we need to act now. *Lancet*. (2020) 396:e71–2. doi: 10.1016/S0140-6736(20)32153-X
- Bhattacharyya R, Bhaduri R, Kundu R, Salvatore M, Mukherjee B. Reconciling epidemiological models with misclassified case-counts for SARS-CoV-2 with seroprevalence surveys: a case study in Delhi, India. *MedRxiv*. (2020). doi: 10.1101/2020.07.31.20166249
- Rahmandad H, Lim TY, Sterman J. *Estimating COVID-19 Under-Reporting Across 86 Nations: Implications for Projections and Control SSRN*. (2020). doi: 10.1101/2020.06.24.20139451
- Gamio L. *How Coronavirus Cases Have Risen Since States Reopened* New York, NY: The New York Times. (2020).
- Pulla P. The epidemic is growing very rapidly: Indian government adviser fears coronavirus crisis will worsen. *Nature*. (2020) 583:180. doi: 10.1038/d41586-020-01865-w

**Conflict of Interest:** JR was employed by the company Banco CTT. VC was employed by the company ZOLT Health Systems.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Ganesh, Rato, Chennupati, Rojek and Viswanathan. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Spies and the Virus: The COVID-19 Pandemic and Intelligence Communication in the United States

Ana Maria Lankford<sup>1</sup>, Derrick Storzieri<sup>2</sup> and Joseph Fitsanakis<sup>3\*</sup>

<sup>1</sup> The COVID-19 Intelligence Project, Department of Politics, Coastal Carolina University, Conway, SC, United States, <sup>2</sup> The Chanticleer Intelligence Brief, Intelligence and National Security Studies Program, Department of Politics, Coastal Carolina University, Conway, SC, United States, <sup>3</sup> Intelligence and National Security Studies Program, Department of Politics, Coastal Carolina University, Conway, SC, United States

## OPEN ACCESS

### Edited by:

Christian Alexander Vukasovich,  
University of Southern Maine,  
United States

### Reviewed by:

Ganiu Oladega Okunnu,  
Crescent University, Nigeria  
Desiree Montenegro,  
Long Beach City College,  
United States

### \*Correspondence:

Joseph Fitsanakis  
jfitsanak@coastal.edu

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 11 July 2020

**Accepted:** 06 November 2020

**Published:** 03 December 2020

### Citation:

Lankford AM, Storzieri D and  
Fitsanakis J (2020) Spies and the  
Virus: The COVID-19 Pandemic and  
Intelligence Communication in the  
United States.  
Front. Commun. 5:582245.  
doi: 10.3389/fcomm.2020.582245

This paper introduces a crucial parameter to the novel coronavirus response in the United States, by shedding light on the early-warning role of intelligence agencies. It argues that the intelligence components of the federal government's Biological Defense Program offered actionable forewarning about an impending pandemic in the years leading to the COVID-19 outbreak. Yet, almost from the opening stages of the pandemic, senior US government officials, including President Donald Trump, have repeatedly claimed that the virus "came out of nowhere" and that "nobody saw it coming." We show that these assertions contradict more than 15 years of pandemic preparedness warnings by intelligence professionals, and disregard the existence of intelligence-led federal pandemic response strategies of every US administration in our time. However, rather than simply placing blame on the White House for discounting these warnings, we advance a conceptual analysis of what many in the US Intelligence Community view as a critical breakdown in strategic communication between intelligence professionals and key government decision-makers. This study agrees with those who suggest that the White House disregarded its own pandemic experts. However, it also posits that the means of strategic communication employed by intelligence experts to alert the White House to the threat were unproductive. These alerts were communicated largely through the President's Daily Brief, an archaic, and ineffectual method of communication that is not designed to facilitate the kind of laser-focused, unequivocal exchange of information needed when potentially catastrophic threats confront the world. This study suggests that the Intelligence Community must implement more direct, immediate and conclusive methods of communicating intelligence to decision-makers, and should seriously consider creating a new line of products that addresses existential challenges to national security. Lastly, we contend it is time to re-evaluate existing rules that prevent intelligence analysts from offering advice on policy. Although we agree that intelligence professionals should refrain from providing policy advice on routine

matters, we question the value of preventing these highly knowledgeable experts from communicating strategic policy advice to decision-makers when it comes to threats of a catastrophic nature, which may prove potentially existential for the US, its allies, and the world.

**Keywords:** biosecurity, biosurveillance, disease intelligence, warning intelligence, pandemic preparedness, intelligence dissemination, emergency management, crisis communication

## INTRODUCTION

From the very onset of SARS-CoV-2 (also known as the novel coronavirus), United States President Donald Trump has led his senior administration officials in a chorus of statements claiming that the pandemic “came out of nowhere” (Trump, 2020a) and that “nobody saw it coming” (Trump, 2020b). The US President has repeatedly described the virus as an “invisible enemy,” which “snuck up on us” and which “nobody could have predicted” (Bump, 2020). Such statements have no basis in fact. A growing body of evidence demonstrates that the US Intelligence Community (IC) has been repeatedly warning policy- and decision-makers for well-over a decade about the potentially catastrophic effects of highly infectious respiratory viruses. In numerous reports, which date to at least 2004, the IC has cautioned US decision-makers of the impending human security threat of a global health pandemic. In these reports, IC analysts use stark language to warn that the United States lacks the capacity to contain a fast-spreading disease and stabilize the economy amidst an impending—not a possible—health pandemic (Miller P., 2020).

The Trump administration’s emphasis on the alleged lack of forewarning is likely part of a political strategy designed to shield the president and other senior officials from mounting criticism over the federal government’s slow response to the novel coronavirus outbreak. The administration did not begin taking moderate steps toward a nationwide response to the virus until 16 March, several weeks after leading epidemiologists began calling for the imposition of aggressive measures to combat the disease. The dramatic impact of the absence of early containment and mitigation in the US can be observed in a comparative data assessment of the US and two other leading industrialized countries, Japan and South Korea. On February 29, 2020, Japan (population 126 million) had recorded five deaths due to COVID-19—the disease caused by the novel coronavirus. On the same day, South Korea (population 51 million) had recorded 17 novel coronavirus-related deaths, while the US (population 328 million) had recorded a single death from the disease. By 5 July, Japan had recorded 977 deaths from COVID-19, which equated to 7.7 deaths per million people. South Korea had recorded 283 deaths, which equated to 5.5 deaths per million people. The United States had reached 132,318 deaths, or 403 deaths per million people (Johns Hopkins University, 2020). Epidemiological models produced in recent months show that “an estimated 90 percent of the cumulative deaths in the United States from COVID-19 [...] might have been prevented by putting social distancing policies into effect 2 weeks earlier, on March 2” (Jewell and Jewell, 2020). As research from Columbia

University shows, even if such measures had been put in place only a week earlier, on 9 March, the US could have seen “~60 percent reduction in deaths” nationwide (Kandula and Shaman, 2020).

In this paper, we review the warnings issued by the US IC in recent years, which challenge the Trump administration’s representation of the novel coronavirus as an unanticipated threat. We show that the administration’s claims contradict over 15 years of pandemic preparedness warnings, as well as federal response strategies implemented by three different US administrations, including President Trump’s own. These claims also contradict numerous IC reports that have guided the current and previous administrations’ pandemic preparedness plans. Yet, we do not place the blame for the substandard US response to the pandemic solely on the White House. Instead, we assess some of the lessons of the novel coronavirus pandemic for established models of strategic communication between the US intelligence and decision-making communities. This study suggests that, aside from flaws in US national preparedness for disease outbreaks, the experience of COVID-19 indicates a disastrous breakdown in strategic communication between the IC and US decision-makers. Additionally, we draw on lessons gained from the novel coronavirus experience to suggest methods of enhancing the efficiency of communication between the IC and US decision-makers.

## BIOSURVEILLANCE AND DISEASE INTELLIGENCE FUNCTIONS OF THE US GOVERNMENT

In addition to posing major challenges in the areas of healthcare and public health, disease outbreaks can test the limits of national security doctrines. At the pandemic level, such outbreaks—whether naturally occurring or bioengineered—can quickly and irreversibly degrade complex economic systems by severing their production and distribution functions, and even severing demand for goods and services. In the words of former US Director of National Intelligence Dan Coats, disease outbreaks can lead to “major economic and societal disruptions” (Office of the Director of National Intelligence, 2018a), which, if left unchecked, can deliver mortal blows to the stability of states. It follows that the monitoring of disease outbreaks falls within the operational scope of the US IC, an amalgamation of 17 organizations, whose mission is to gather, analyze and disseminate intelligence to American policy- and decision-makers. Consumers of intelligence products use them

to inform their judgment in the course of pursuing sound and effective governance.

In the US, federal biosurveillance and biodefense tasks are diffused within an extremely wide spectrum, which is known as the US Biological Defense Program. It includes analytical units, such as the Department of Homeland Security's Chemical and Biological Defense Division. It also encompasses protection units, such as the Office of Preparedness and Response of the Department of Health and Human Services (DHHS). Importantly for this paper, it also features units that combine intelligence collection and analysis tasks, such as the Disease Intelligence Program of the Central Intelligence Agency's (CIA) Directorate of Science and Technology. The latter constitutes one of the earliest components of the US Biological Defense Program, with roots that date to the 1966 cerebrospinal meningitis outbreak in Beijing, China (Kawai, 2014). The outbreak prompted the Chinese government to shut down schools and implement a military takeover of the healthcare system. This prompted the CIA's Office of Scientific Intelligence to launch Project IMPACT, an effort to aggregate disease data in order to assess the political fallout of the disease (Carey and Maxfield, 1972). In 1968, when the Hong Kong/A2/68 influenza killed an estimated 4 million people, including around 100,000 Americans (Vuboud et al., 2005), Project IMPACT was merged with a grander effort, codenamed Project BLACKFLAG. Its goal was to "computerize disease information and derive trends, cycles and predictions" (Ferran, 2020) on a global scale. Through BLACKFLAG, the CIA was also able to warn its teams of operatives abroad, instructing them to shield themselves from the flu as it spread in East Asia and, eventually, the world (Ferran, 2020).

The CIA's early disease intelligence efforts showed that data aggregation was critical in helping monitor and forecast outbreaks at a quick pace. They also demonstrated the direct integration of such data with political, military and economic intelligence. Finally, they helped shape the 3-fold mission of disease intelligence, which remains fundamentally unchanged to this day, and is as follows: (a) collect intelligence about the extent and spread of diseases abroad, which may vary widely from data provided by official state sources; (b) forecast the consequences of these trends for American interests in the affected regions; and (c) provide policy- and decision-makers with the information they need to protect American lives and property from the effects of diseases. Since 1966, disease intelligence data have been disseminated to American decision- and policy-makers in a variety of formats and without interruption.

It is important to call attention to the fact that the mandate of the US IC does not include making policy decisions. These are left to elected or appointed decision-makers in the civilian and military realms. Thus, the role of intelligence analysts in the US Biological Defense Program ends once they disseminate the information that has been collected, analyzed and incorporated into finished intelligence products. Dissemination—i.e., the communication of finished intelligence products to the consumer—is a distinct phase of what is known as "the intelligence cycle"—a term that refers to the process that intelligence professionals utilize in order to effectively analyze

and communicate information collected in the field. Conceptual models of the intelligence cycle differ, but most versions consist of five phases: planning and direction; collection; processing; analysis and production; and dissemination [Johnston, 2005]. These steps are interchangeable, allowing for intelligence practitioners to begin at any phase of the intelligence cycle, or to revert to previous phases, in order to create effective intelligence products.

The intelligence cycle typically begins when an intelligence agency assigns tasks to its employees to carry out. This can be an independent action by an agency, or can result once it is tasked by decision-makers—referred to as "customers"—with providing a deliverable, whether that be information, or a physical piece of evidence that could be analyzed to produce effective, actionable intelligence. This process is referred to as Planning and Direction. The completion of this stage leads to the collection of raw data. Collection can be categorized as open-source, clandestine, and covert. Open-source collection utilizes unrestricted networks and officially released documents to obtain information. Clandestine collection involves engagement into secret collection efforts, which is broadly acknowledged by governments—since most governments generally admit to maintaining clandestine collection capabilities. This could involve the use of field agents in the form of diplomats or assets (spies) to collect data. Covert collection involves actions that are tasked by the government, but not sanctioned, so as to avert escalating conflict between nations if collection operations are detected. Consequently, this method of collection must include a high degree of deniability regarding the information collected and the methods used to collect it.

Upon successful collection, raw data enter the processing stage, which is sometimes referred to as "processing and exploitation." Depending on the type of information collected, analysts may need to translate or decrypt the raw information into a form that helps synthesize analysis. Next, intelligence professionals turn the gathered raw data into actionable intelligence. During the analysis and production stage, analysts are tasked with evaluating the data, in an effort to assess developing trends and forecast future events. This process is time consuming, consisting of multiple possibilities being assessed per event, so as to consider all possible outcomes. Analytical assessments are then evaluated with statements of confidence and likelihood—terminology used by intelligence professionals to communicate the likelihood and credibility of sources and information—to aid in the dissemination of the product to the customer. One of the most important parts of this stage is the absence of bias or influence, since, as explained earlier, the task of intelligence analysts is to provide information, not to determine, or even advise toward, policy options. It follows that the customer, for example a senator, needs to be presented with unbiased information, as any bias, no matter how subtle, could potentially influence the outcome of the customer's overall decision.

Dissemination is arguably the most demanding and critical phase of the intelligence cycle. In the words of one expert, "this step can 'make or break' the entire process" (Jensen et al., 2018). In this stage, the compiled and analyzed intelligence



product is communicated to the agencies or professionals that the information was analyzed for. In an effort to hamper espionage efforts by adversaries, in 2008 Director of National Intelligence Mike McConnell reinforced the policy of “responsibility to provide” (Brewin, 2008). This means that intelligence products are communicated only to those that are tasked with receiving the information. Dissemination also poses the risk of adversaries intercepting and exploiting finished intelligence products to further their own aims, making security a major priority at this stage. Finished intelligence products will be briefed to policy- or decision-makers in either a written or oral briefing. The importance or usefulness of the information is ultimately decided by the customer.

## PANDEMIC-RELATED WARNINGS IN RECENT INTELLIGENCE PRODUCTS

The earliest known intelligence product that specifically describes a health pandemic similar to SARS-CoV-2 is contained in a 2004 estimative report from the National Intelligence Council (NIC). The NIC operates under the Office of the Director of National Intelligence (ODNI), which is the coordinating body of the US IC (Office of the Director of National Intelligence, 2018b). Its primary mission is to provide American policy- and decision-makers with long-term strategic analysis of existing and emerging threats. The NIC report, entitled *Mapping the Global Future*, offers a descriptive projection of security threats the world could face by 2020. It states that it is “only a matter of time before a new pandemic appears, such as the 1918–1919 influenza virus that killed an estimated 20 million worldwide” (United States National Intelligence Council, 2004a). That assessment was sparked by security concerns raised by the 2002 coronavirus Severe Acute Respiratory Syndrome (SARS) outbreak in China. The NIC reiterated its assessment in 2008, when it issued its *Global Trends 2025* report; it features an entire section discussing the possibility of a global pandemic. Notably, the section describes a now-familiar scenario, centering on “the emergence of a novel, highly transmissible, and virulent human respiratory illness for which there are no adequate countermeasures” (United States National Intelligence Council, 2004b). While the report sees such a pandemic as likely being caused by a pathogen like the Highly Pathogenic Asian Avian Influenza A (H5N1), it warns that “pathogens such as the SARS coronavirus or other influenza strains also have this potential” (United States National Intelligence Council, 2004b). The report also indicates that such an outbreak would likely originate in China, as it is a densely populated country where humans live in close quarters with livestock.

In 2012, amidst the outbreak of the Middle East Respiratory Syndrome (MERS), the NIC published *Global Trends 2035*. The report describes a global pandemic as a “black swan,” and states bleakly that

[a]n easily transmissible novel respiratory pathogen that kills or incapacitates more than one percent of its victims is among the most disruptive events possible. Such an outbreak could result in millions of people suffering and dying in every corner of the

world in less than six months (United States National Intelligence Council, 2012).

Expressed concerns of the threat of a global pandemic are not contained solely in NIC reports. On the contrary, similar warnings were communicated for over a decade via the *Worldwide Threat Assessment*. Known officially as the *Worldwide Threat Assessment of the US Intelligence Community*, this annual intelligence product provides a summary of current and emerging threats to US national security. It is produced annually for use by the US Senate Select Committee on Intelligence, which in turn makes it available to the White House. In its “Human Security” section, the 2013 edition of the report states that

humans will continue to be vulnerable to pandemics, most of which will probably originate in animals. An easily transmissible, novel respiratory pathogen that kills, or incapacitates more than one percent of its victims is among the most disruptive events possible. Such an outbreak would result in a global pandemic that causes suffering and death in every corner of the world, probably in fewer than six months (Office of the Director of National Intelligence, 2013).

This statement appears to forecast with remarkable accuracy the place of origin and mode of global transmission of SARS-CoV-2. Further on, the report employs stark language to caution policy-makers, stating that “[t]his is not a hypothetical threat. History is replete with examples of pathogens sweeping populations that lack immunity, causing political and economic upheaval, and influencing the outcomes of wars” (Office of the Director of National Intelligence, 2013). Similar threats were discussed in the 2015 edition of the *Worldwide Threat Assessment*, which states that “infectious diseases are among the foremost health security threats. A more crowded and interconnected world is increasing the opportunities for human and animal diseases to emerge and spread globally” (Office of the Director of National Intelligence, 2015). It is notable that the mounting concerns of the IC about a global pandemic were largely driven by the unparalleled growth of a globalized transportation infrastructure.

The annual *Worldwide Threat Assessment* reports have not only elaborated on the potential of a highly damaging health pandemic, but have also cautioned that the international community is not adequately prepared for such an event. This was noted in the 2016 assessment, which suggests that “the international community remains ill prepared to collectively coordinate and respond to disease threats” (Office of the Director of National Intelligence, 2016). Similar concerns were projected again in 2018, where we read about the possibility that a global health pandemic could lead to “a strain on governmental and international resources, and increase calls on the United States for support” (Office of the Director of National Intelligence, 2018a). The most recent *Worldwide Threat Assessment*, produced in 2019, specifically notes that current global health security regimes may not be sufficiently effective in the event of a global pandemic. The assessment includes the statement: “[a]lthough the international community has made tenuous improvements to global health security, these gains may be inadequate” (Office of the Director of National Intelligence, 2019).

In addition to the above strategic-intelligence products, which were made available to presidential administrations dating back to 2004, other elements of the US government have discussed repeatedly in recent years the potentially catastrophic effects of a global pandemic. In 2017, a Department of Defense pandemic and influenza response plan, which was drafted following the MERS coronavirus, stated that “the most likely significant pathogen threat is a novel respiratory disease, particularly a novel influenza disease” (United States Northern Command, 2017a). More recently, press reports have suggested that both the CIA and the Defense Intelligence Agency briefed senior officials in the Trump administration about the SARS-CoV-2 (Arciga, 2020). These briefings are believed to have taken place in early February, before the virus made its way into the US in a major way—though the question of whether the White House was briefed before COVID-19 arrived on American soil remains unanswered for the time being, given that the precise timing that the virus’ entry into the US is itself under debate (Arciga, 2020).

The intelligence products discussed above demonstrate a clearly discernible evolution in the language used by their authors to alert their customers. One can observe the terminology change from estimative and speculative in feel at first, to gradually formulating direct warnings about the catastrophic consequences of a pandemic. Overall, it is clear that these concerns grew substantially in the 15 years following 2004 and the publication of *Mapping the Global Future*. Furthermore, the evolution of the language in these reports provides strong evidence of a growing trajectory of apprehension among disease-intelligence experts. By 2018, these experts were openly sounding the alarm about the threat of a global pandemic caused by a respiratory virus.

Intelligence products disseminated in the early stages of that period tend to discuss the broader context of pandemic threats, such as their effects on globalization. For instance, in a section titled “The Contradiction of Globalization,” the National Intelligence Council’s 2004 report, *Mapping the Global Future*, highlights the rapid expansion of globalization due to Chinese and Indian economic liberalization, the collapse of the USSR, and the technological revolution of the information era. It argues that the rapid advancements in globalization could simultaneously hinder, and even reverse, the process if certain events, such as a pandemic, were to unfold. The report characteristically states that: “experts believe it is only a matter of time before a new pandemic appears, such as the 1918–1919 influenza virus that killed an estimated 20 million worldwide” (United States National Intelligence Council, 2004b). The analysts plainly articulate their greatest concerns regarding a pandemic, namely the human death toll and the adverse impact on the world economy. They also note that globalization would be threatened “if the death toll rose into the millions in several major countries and the spread of the disease put a halt to global travel and trade during an extended period” (United States National Intelligence Council, 2004b).

The context discussed in these earlier reports lays the foundation that successive *Worldwide Threat Assessment* releases stand on from 2008 onward. In sections titled “PLA Modernization,” and “Infectious Disease and US Security,” the 2008 report points to concerns about China’s “high incidence of chronic and infectious disease” (McConnell, 2008), and even

raises alarms about the United States’ insufficient response to prior disease outbreaks, such as the avian H5N1 (“swine flu”) virus. The 2009 edition of the *Worldwide Threat Assessment* expands upon the threat of a pandemic, by including a section titled “Global Health.” As late as 2014, a full decade following the initial warnings issued by the NIC, Director of National Intelligence James R. Clapper continued to insist that, if a novel respiratory pathogen that had the ability to kill or incapacitate more than 1 percent of its victims were to become easily transmissible, “the outcome would be among the most disruptive events possible” (Clapper, 2015).

In another notable instance, the ODNI’s 2017 *Worldwide Threat Assessment* explicitly notes that “a novel or remerging microbe that is easily transmissible between humans remains a major threat because such an organism has the potential to spread rapidly and kill millions.” The 2018 edition of the report includes a similar statement about the next health pandemic, which can be described as a direct warning, rather than a precautionary comment. The warning explicitly mentions a strain of coronaviruses as potentially being responsible for causing the next health pandemic (Office of the Director of National Intelligence, 2018a). Shortly after that report was issued, the NSC’s director of medical and biodefense preparedness warned that the threat of a pandemic flu was the world’s foremost health security concern, something that the US was not prepared for (Sun, 2018).

Also in 2017, the Department of Defense’s US Northern Command Branch *Plan 3560: Pandemic Influence and Infectious Disease Response* was published, based on an earlier plan drafted in 2006. The document is in essence a policy draft that details the US military’s response to the causes of disease in humans. It describes in stark language how “a catastrophic biological incident could threaten the Nation’s human, animal, plant, environmental, and economic health, as well as America’s national security” (United States Northern Command, 2017b). The report goes into acute detail, discussing the strategic capabilities of the US military, a classification system for sorting the types of diseases and their methods of transmission, as well as the agencies responsible for the various stages of plans, establishing a chain of command in the event of an outbreak of “unique or novel pathogens” (United States Northern Command, 2017b).

In January of 2019, the ODNI’s *Worldwide Threat Assessment* again included a warning about the next global health pandemic, this time explicitly stating that the US remained extremely vulnerable to the next pandemic. In September of 2019, the President’s Council of Economic Advisors warned that the next pandemic would cause great economic damage and loss of life (Council of Economic Advisors, 2019). The following month, the DHHS concluded that the US biodefense infrastructure was underfunded, underprepared, undercoordinated, and generally incapable of combatting a flu-like pandemic as determined by a precautionary exercise (Sanger, 2019). Finally, between late November and early December of 2019, the Department of Defense’s National Center for Medical Intelligence warned of a rapidly spreading and novel virus in Wuhan, China (Margolin and Meek, 2020).

## DISMISSAL AND INACTION BY THE TRUMP WHITE HOUSE

In 2018, on the day after the NSC's director of medical and biodefense preparedness warned about the threat of a pandemic flu and the US' lack of preparedness, he was removed from his position and was never replaced. In the same breath, the NSC disbanded its Global Health Security Team overnight. Only days following that development, two members of the House Committee on Foreign Affairs wrote a letter to the President's National Security Advisor, expressing concern that the recent actions of the NSC "downgraded the importance of health security in the US" (Connolly and Bera, 2018). These moves signaled major departures from the pandemic-related preparedness planning of prior administrations, including that of George W. Bush Jr., which was the first to develop a nationwide global health pandemic response plan (The White House, 2007). That plan was put in motion shortly after the NIC released its *Mapping the Global Future* report mentioned earlier, which explicitly discussed the threat of a global health pandemic. In November of 2005, President Bush delivered a speech on his plan, entitled "National Strategy for Pandemic Influenza Preparedness and Response" (The White House, 2007), in which he highlighted three key elements of that plan, which his administration saw as the most critical. The first element was the importance of bio-surveillance, which would ensure the early detection of viruses occurring anywhere in the world. The second element was the need to develop a national stockpile of critical virus-fighting vaccines and antiviral drugs, and to increase the nation's capability of developing new vaccines at faster rates. The third key element centered on the importance of pandemic preparedness at all levels of government, to include federal, state, and local (The White House, 2007).

To achieve these goals, in May of 2006 the Bush administration officially released its *National Strategy for Pandemic Influenza Implementation Plan*—a national security plan to combat the threat of a global health pandemic. In addition to that step, the Bush administration continued to fund the World Health Organization (WHO) Global Outbreak Alert and Response Network. It also invested in state and local government outbreak preparedness plans and developed a plan for dispersing critical medical resources in the event that they became scarce (The White House, 2007). In its reports, the Bush White House noted there were areas in pandemic preparedness that would continue to be in need in the coming years. Some of these areas included: strengthening US capabilities in clinical bio-surveillance, so as to better-detect outbreaks within the United States; strengthening medical capacity in order to properly care for and treat patients in the event of a pandemic; and continuing to work with international agencies like the WHO so as to properly prepare on a global scale for a health pandemic (The White House, 2007). These efforts by the Bush administration closely mirrored the critical developments proposed in relevant intelligence reports made available to the White House.

The major elements of the pandemic preparedness planning by the administration of President Barack Obama are highlighted in a cumulative report entitled *Playbook for Early Response to High-Consequence Emerging Infectious Disease Threats and Biological Incidents* (United States National Security Council, 2015). This report, better known as "The Pandemic Playbook," was produced by the National Security Council toward the end of the Obama administration, with the expressed purpose of passing on strategic pandemic preparedness knowledge to the incoming Trump administration (Knight, 2020). This publicly available document describes at length various pandemic preparedness procedures and includes a guide on how to assess public health threats, descriptions of how various pathogens originate and spread, and numerous charts to guide in risk assessments. It also highlights and describes the threat of a "novel coronavirus" similar to the current COVID-19 pandemic (Knight, 2020). The most pronounced distinction between the Bush and Obama administration's plans on pandemic preparedness is that the Obama administration's "Pandemic Playbook" focuses heavily on tracking a pathogen with pandemic potential before it poses an imminent threat to the United States—something that represents a clear enhancement of the previously available planning model. This appears to have been implemented in direct response to preparedness and containment shortcomings that the IC's *Worldwide Threat Assessment* indicated.

In 2017, just days after the inauguration of Donald Trump as the 45th president of the United States, officials from the Trump and Obama administrations participated in a pandemic preparedness exercise. The goal of the exercise was for the departing officials to inform their incoming counterparts of existing policies in the "Pandemic Playbook," which were designed to respond to a national health crisis. Most Trump administration officials who attended that exercise were no longer in office by the time of the outbreak of SARS-CoV-2 (Sun, 2018). Later that year, the Trump administration decided not to adopt the "Pandemic Playbook" created by Obama administration officials. Instead, it created its own pandemic preparedness plan, which is called the *Pandemic Influenza Plan* and is a product of the DHHS.

Shortly after developing its *Pandemic Influenza Plan*, the White House proposed a total of \$277 million in budget cuts affecting the government's pandemic preparedness program. The plan included cutting \$136 million from the Office of Public Health Preparedness and Response, \$65 million from the National Center for Emerging and Zoonotic Infectious Diseases, and \$76 million from the Centers of Disease Control and Prevention's (CDC) Center for Global Health (Baumgaertner, 2017). These cuts were rejected by Congress in May of 2017, but on February of next year the Trump administration did manage to withdraw \$1.25 billion in funding from the CDC's Public Health Fund (Sun, 2018). On April 10, 2018, President Trump's newly hired National Security Advisor, John Bolton, dismissed the White House's Homeland Security Advisor, days after he had called for "a comprehensive biodefense strategy against biological attacks and pandemics" (Toosi et al., 2020). Budget cuts



continued in the coming year, with the White House proposing once again a budget cut of \$252 billion for global health. In May 2018, these efforts prompted a letter to the president from Senator Sherrod Brown, who expressed concern that cutting federal and global health and pandemic preparedness budgets could “cost American lives” (Goodman and Schulkin, 2020). In September of that year, on orders from the president, the DHHS diverted \$266 million from the CDC to the Unaccompanied Alien Children program, which provides housing for detained immigrant children (Goodman and Schulkin, 2020). That same month, the president announced the launch of a new “National Biodefense Strategy” and the creation of a Biodefense Coordination to “ensure a comprehensive and coordinate approach to biological incidents” (The White House, 2018). That strategy closely models the response plan implemented by the 2004 Bush administration, by highlighting the need for a well-stocked national stockpile of critical medical equipment, accelerating vaccine production capabilities, and increasing pathogen detection capabilities, specifically for influenza viruses (The White House, 2018). However, as we have seen, this plan failed to materialize in the critical early stages of the SARS-CoV-2 pandemic.

## DISCUSSION: SARS-CoV-2 AND INTELLIGENCE COMMUNICATION

The actions of the Trump administration in the years leading to the novel coronavirus outbreak reveal a systematic demotion of pandemic preparedness at the level of national strategy. They also provide a telling context for the administration’s inaction in the early stages of the outbreak. It is therefore difficult—indeed impossible—to propose a forensic evaluation of America’s response to COVID-19 without placing a significant portion of the responsibility on the door of the White House. The question, however, remains, and is at the heart of the issue: why were the warnings of the IC not heeded by the president and his administration? We believe that this query can be addressed on multiple levels, including political, economic, and even cultural. At least one of them, however involves the role of the IC in protecting American national security, specifically through the dissemination of intelligence, which, as explained earlier, is arguably the most critical step of the intelligence cycle. Addressing this issue is vital for the future of American national security, because it points to the desperate need for efficient communication between the IC and the highest levels of government, especially on matters of critical importance to the safety of the nation.

It has become apparent to intelligence agencies that the communications revolution in our century has multiplied the channels of readily available information that are available to consumers of intelligence (Liaropoulos, 2006). As a result, US intelligence finds itself operating today in “an extraordinarily competitive environment,” in which it is “competing for business, and consumers” (Degaut, 2016). The latter are now increasingly questioning the value of intelligence products given to them, and constantly compare these products to a host of open-source channels of information, such as 24-h television news, as well as

Internet sites. This tendency has arguably seen its culmination with President Trump. According to insiders like Susan Gordon, until recently Principal Deputy Director of National Intelligence, the president is known to consistently confront his intelligence briefers with comments such as: “I don’t think that’s true” or “I’m not sure I believe that,” even when presented with conclusive evidence on a topic of concern (Gordon, 2019). This potentially points to a breakdown in communication between the IC and the president, during meetings that are often combative and cut short due to the president’s other obligations.

This growing problem is compounded by what former senior CIA Directorate of Intelligence officer Martin Petersen describes as “the most precious commodity in Washington”—not information, of which there is an abundance, “but time” (Petersen, 2011). Decision-makers understand the importance of being informed. However, their scarcity of time forces them to prioritize sources of information that offer easily digestible analyses with immediacy and certainty. This poses major challenges for authors of finished intelligence products, who tend to prioritize quality over speed. Unlike the raw information collected by intelligence agencies, finished intelligence products are meticulously analyzed so as to lessen the degree of uncertainty of a particular issue. Consequently, they rarely—if ever—present the reader with absolute answers to questions, which makes them appear inconclusive. It is therefore imperative that the IC places emphasis on the speed of communication between it and key consumers as a matter of policy. A major way of facilitating increased immediacy is by focusing less on “the incremental addition of new intelligence from human sources or technical sensors” (Hulnick, 2006) and more on already available data to answer questions. According to former CIA intelligence analyst Hulnick, such a methodology is realistic, given that existing data “is already so large that a competent analyst could write about most events without any more than open sources to spur the process” (Hulnick, 2006).

The time-constraint factor in intelligence communication is especially prevalent in interactions between the IC and the president. Since 1946, American presidents have been the main recipients of what has been described as “the finest intelligence publication in the world” (Wilder, 2011), namely the President’s Daily Brief (PDB). The PDB provides the president, and a small number of senior officials selected by the president, with snippets of current intelligence on pressing global developments. It is produced by the ODNI in coordination with the President’s Analytic Support Staff of the CIA Directorate of Analysis, and contains descriptive and estimative reports based on information provided by practically every agency in the IC. Reports in the press have stated that President Trump received information about the novel coronavirus through the PDB. According to these reports, successive PDBs “raised the prospect of dire political and economic consequences” with a frequency that “reflected a level of attention comparable to periods when analysts have been tracking active terrorism threats, overseas conflicts or other rapidly developing security issues” (Miller, G., 2020). However, the degree to which the PDB can be expected to deliver warning intelligence to the president is questionable. According to CIA analysts, the PDB is typically viewed by intelligence managers



and decision-makers alike as “educational in nature,” and “not [...] the kind of intelligence product used for warning” (Hulnick, 2006). Moreover, decision-makers often find it difficult to focus on the details contained in PDBs, due to their highly specific and technical nature. The latter contrasts with the abstract and strategic mode of thinking that presidents and other senior officials are accustomed to engage in. Consequently, it is often the case that the consumer of the PDB leaves the meeting without having retained the information that the briefer, as well as the authoring analysts, view as paramount (Wolfberg, 2014).

The unpredictability and arbitrariness of PDB encounters only increases when the consumer is someone like President Trump, who has admittedly limited experience in statecraft or intelligence matters. Trump’s background in these fields lacks in comparison to most prior presidents, including, for instance, George Bush Sr., a former ambassador, who also served as director of the CIA before entering the Oval Office. Even in the best of times, PDB meetings are awkward and involve “both briefer and policymaker [sitting] down in the same room, physically near each other, while the policymaker reads the written material” (Wolfberg, 2014). The consumer peruses the material “under the gaze of the briefer,” who is often reduced to “carefully [watching] the policymakers’ gestures, body language, and facial expressions,” following “the policymaker’s eyes, attempting to detect which sections the policymaker [is] spending the most amount of time on reading” and even paying “attention to the pattern the policymaker’s finger [makes] as he or she [views] each page of the briefing book” (Wolfberg, 2014). The awkwardness of this mostly silent exchange is compounded by the pressing schedule the consumer is under, which inevitably leads to “difficulty in absorbing all the material in the briefing book” during the relatively short PDB meeting. Inevitably, therefore, policymakers filter the information, “paying attention to some things, ignoring other things” (Wolfberg, 2014).

It should also be noted that, even though the PDB is delivered to the consumer in a written format, many presidents expect to be guided through the document orally by the briefer. President Trump has been repeatedly criticized in the press for allegedly having a “style of learning” that does not involve reading. The president is alleged to have eventually made it clear to his briefer that “he was not interested in reviewing a personal copy of the written intelligence report known as the PDB.” Instead, he has relied on exclusively “oral sessions,” according to administration officials (Leonnig, 2018). This has been seen as a radical—even alarming—departure from established practice, and must have been looked down upon by the IC, where the prevailing notion has always been that “policymakers who do not devote time on a regular basis to read intelligence reports [...] are clearly not doing their jobs” (Degaut, 2016). It is equally true, however, that “[t]he history of the PDB is one of flexibility and remarkable adaptation of support to fit each president’s needs and information acquisition styles” (Wilder, 2011). This statement, made by an IC insider, implies that it is the IC’s briefing conventions that must adapt to the consumer’s style of retaining and digesting the information, rather than the other way around. It also points to further communication breakdown between President Trump and his IC briefers—an unfortunate

state of affairs that may be at least partially responsible for the administration’s slow response to the novel coronavirus pandemic. We can thus infer that, as has been reported in the press, PDBs in November and December of 2019 made repeated mentions of COVID-19. By that time, however, the president was viewing the product as, in the words of former CIA analyst Martin Petersen, “optional equipment” (Petersen, 2011).

How can this problem be corrected? We believe that the PDB continues to be an efficient method for communicating current intelligence to the highest levels of government. However, as the COVID-19 experience shows, this mode of intelligence communication cannot serve as an effective warning mechanism. The same can be stated for the myriad of in-depth intelligence reports produced annually by the analytic components of the IC, such as *Global Trends* and the *Worldwide Threat Assessment*. As Hulnick has remarked, these intelligence products are “meant more for policy officials at working levels rather than senior decision makers, who rarely have the time to read them” (Hulnick, 2006). Like the PDB, these annual reports cannot be seen as replacing what the IC refers to as “deep dives,” namely in-depth presentations on pressing matters of concern that bring together decision-makers with the IC’s domain experts, rather than just trained briefers (Wolfberg, 2014). Such deep dives—30-min to an hour-long interactive sessions on specific topics of concern—must become more prevalent as a form of strategic communication between the IC and key customers. Moreover, we believe that the IC must give serious thought to the possibility of producing a separate version of the PDB that will focus strictly on warning intelligence—that is, critical information on topics that are not on the radar of decision-makers. This version of the PDB—let us call it the President’s Critical Brief, or PCB—does not need to be produced daily, though it should be disseminated at least weekly. Additionally, it should concentrate heavily on catastrophic and existential threats to national security, including threats by new and unfamiliar actors, large-scale biosecurity concerns, weapons of mass destruction, climate change indicators, and other similar topics.

Lastly, we propose a thorough reconsideration of the principle of preventing IC analysts from proposing policy options to decision-makers. As explained earlier, the line that divides the relaying of information from proposing policy options is engrained in the very operational modality of the US IC—though interestingly it is not a feature of intelligence work in other Western countries. However, the case of the novel coronavirus may point to the need to reconsider this division when it comes to topics that pose existential or otherwise catastrophic challenges to national security. As NSC analyst Dennis Wilder has astutely observed

increasingly today, policymakers and legislators find that the intelligence analysts’ adherence to this article of faith robs the policymaker of the ideas and suggestions for policy that a highly informed analyst can provide (Wilder, 2011).

The reasoning that informs this “article of faith,” as Wilder calls it, is a sound one—namely the need to preserve the intelligence analyst’s political objectivity and professional integrity, by

keeping them at arm's length from the policy domain. However, as Wilder notes, preventing an analytical expert from advising on policy—especially on threats of an existential nature—denies the policymaker “some of the most useful byproducts of analytic depth and sophistication” that the IC is known for Wilder (2011).

## CONCLUSION: TOWARD AN EFFECTIVE MODEL OF INTELLIGENCE COMMUNICATION

The Trump administration is being untruthful when it portrays the novel coronavirus pandemic as a strategic surprise. Its assertions that COVID-19 “came out of nowhere” fly in the face of over 15 years of pandemic preparedness warnings by the IC. Moreover, such claims insult the intelligence professionals whose work has consistently informed the pandemic preparedness strategies of three presidential administrations, including President Trump's. Consequently, we believe that it is impossible to forensically evaluate the slow US response to the pandemic without placing much of the responsibility for it on the White House. It is equally impossible, however, to assess the inaction of the Trump administration without examining the deeper breakdown in strategic communication between key decision-makers and the IC. Indeed, the breakdown in communication between these two actors points to the urgent need to re-evaluate the standard methods of intelligence dissemination to the highest levels of government.

It is clear that, in the decade leading to 2020, the IC drew on over 70 years of experience in disease intelligence to warn policy- and decision-makers about the impending threat of a respiratory virus. These warnings became increasingly stark between 2014 and 2018, by which time IC experts were openly and directly sounding the alarm about what they correctly saw as an imminent threat. That the Trump administration downplayed pandemic preparedness as a matter of national policy is unquestionable. It is equally unquestionable, however, that the means of strategic communication employed by the IC to alert the White House to

the threat were unproductive. These alerts were communicated largely through the PDB, an archaic and ineffectual method of communication, which is not typically seen as an instrument of warning. The awkwardness, unpredictability, and randomness of PDB exchanges do not facilitate the kind of laser-focused, unequivocal exchange of information that is needed when potentially catastrophic threats are upon the nation. Instead, the IC must implement communication methods that favor more direct, immediate and conclusive intelligence dissemination, and should seriously consider the creation of a new line of products that address existential and potentially catastrophic challenges to national security. Lastly, we believe it is high time to reconsider the division between intelligence reporting and policy advising. We agree with the view that intelligence analysts should stay clear of providing policy advice during routine reporting to customers. However, we do not see the value of preventing highly knowledgeable and capable intelligence professionals from offering policy advice to decision-makers when it comes to threats that are considered catastrophic or potentially existential for the US and its people.

## AUTHOR CONTRIBUTIONS

AL and DS assembled and compiled the data used in this article from a variety of declassified United States Government sources. AL provided the information regarding the responses of various administrations to the pandemic response documents produced by the United States Intelligence Community. DS authored the description of the intelligence cycle. JF provided the institutional context of the analysis and wrote the discussion of the findings, as well as the recommendations and conclusion. All authors contributed to the article and approved the submitted version.

## ACKNOWLEDGMENTS

The authors would like to thank intelligence practitioners Rachel Panichella and Maeve Stewart for their advice on this paper.

## REFERENCES

- Arciga, J. (2020). “US intelligence sounded coronavirus alarm in January: WaPo,” in *The Daily Beast*. Available online at: <https://www.thedailybeast.com/us-intelligence-agencies-reportedly-sounded-coronavirus-alarm-in-january> (accessed March 12, 2020).
- Baumgaertner, E. (2017). *Trump's Proposed Budget Cuts Trouble Bioterrorism Experts*. The New York Times. Available online at: <https://www.nytimes.com/2017/05/28/us/politics/biosecurity-trump-budget-defense.html> (accessed May 28, 2017).
- Brewin, B. (2008). *New Intelligence Sharing Strategy Shifts From 'Need to Share' to 'Responsibility to Provide'*. Government Executive. Available online at: <https://www.govexec.com/defense/2008/04/new-intelligence-sharing-strategy-shifts-from-need-to-share-to-responsibility-to-provide/26642/> (accessed April 04, 2020).
- Bump, P. (2020). “How trump's rhetoric on testing in the US compared with what was—or wasn't—being done,” in *The Washington Post*. Available online at: <https://www.washingtonpost.com/politics/2020/03/31/how-trumps-rhetoric-testing-us-compared-with-what-was-or-wasnt-being-done/> (accessed March 31, 2020).
- Carey, W. F., and Maxfield, M. (1972). Intelligence implications of disease. *Stud. Intell.* 16, 71–78.
- Clapper, J. (2015). *Worldwide Threat Assessment of the US Intelligence Community*. Washington, DC: Office of the Director of National Intelligence. Available online at: [https://www.dni.gov/files/documents/Unclassified\\_2015\\_ATA\\_SFR\\_-\\_SASC\\_FINAL.pdf](https://www.dni.gov/files/documents/Unclassified_2015_ATA_SFR_-_SASC_FINAL.pdf) (accessed February 15, 2020).
- Connolly, G. E., and Bera, A. (2018). *Letter to National Security Advisor*. Available online at: [https://connolly.house.gov/uploadedfiles/connolly\\_bera\\_letter\\_to\\_nsa\\_john\\_bolton\\_on\\_global\\_health\\_security.pdf](https://connolly.house.gov/uploadedfiles/connolly_bera_letter_to_nsa_john_bolton_on_global_health_security.pdf) (accessed May 15, 2018).
- Council of Economic Advisors (2019). “Mitigating the impact of pandemic influenza through vaccine innovation,” in *The White House* (United States Government). Available online at: <https://www.whitehouse.gov/wp-content/uploads/2019/09/Mitigating-the-Impact-of-Pandemic-Influenza-through-Vaccine-Innovation.pdf>
- Degaut, M. (2016). Spies and policymakers: intelligence in the information age. *Intell. Natl. Security* 31, 509–531. doi: 10.1080/02684527.2015.1017931
- Ferran, L. (2020). Project impact: disease intelligence and how the cia traced epidemics out of Cold War Asia. *ABC News*. Available online at: <https://>

- abcnews.go.com/Politics/project-impact-disease-intelligence-cia-traced-epidemics-cold/story?id=71299224 (accessed June 20, 2020).
- Goodman, R., and Schulkin, D. (2020). *Timeline of the Coronavirus Pandemic and US Response*. Available online at: <https://www.justsecurity.org/69650/timeline-of-the-coronavirus-pandemic-and-u-s-response/> (accessed May 07, 2020).
- Gordon, S. (2019). *Former Trump Administration Officials on National Security*. Washington, DC: Women's Foreign Policy Group. Available online at: <https://www.c-span.org/video/?466944-3/trump-administration-officials-national-security> (accessed December 3, 2019).
- Hulnick, A. S. (2006). What's wrong with the intelligence cycle. *Intell. Natl. Security* 21, 959–979. doi: 10.1080/02684520601046291
- Jensen, C., III, McElreath, D., and Graves, M. (2018) *Introduction to Intelligence Studies*. New York, NY: Routledge.
- Jewell, B. L., and Jewell, N. P. (2020). *The Huge Cost of Waiting to Contain the Pandemic*. The New York Times. Available online at: <https://www.nytimes.com/2020/04/14/opinion/covid-social-distancing.html> (accessed April 14, 2020).
- Johns Hopkins University (2020). *COVID-19 Global Map*, Center for Systems Science and Engineering. Baltimore, MD: Johns Hopkins University. Available online at: <https://coronavirus.jhu.edu/map.html>
- Johnston, R. (2005). *Analytic Culture in the U.S. Intelligence Community: An Ethnographic Study*. Washington, NY: Central Intelligence Agency.
- Kandula, S., and Shaman, J. (2020). Differential effects of intervention timing on COVID-19 spread in the United States. *medRxiv*. doi: 10.1101/2020.05.15.20103655
- Kawai, F. (2014). Epidemic cerebrospinal meningitis during the cultural revolution. *Extrême-Orient Extrême-Occident*. 37. Available online at: <http://journals.openedition.org/extremeorient/341>
- Knight, V. (2020). *Evidence Shows Obama Team Left A Pandemic 'Game Plan' For Trump Administration*. Kaiser Health News. Available online at: <https://khn.org/news/evidence-shows-obama-team-left-a-pandemic-game-plan-for-trump-administration/> (accessed May 15, 2020).
- Leonnig, C. D. (2018). *Breaking With Tradition, Trump Skips President's Written Intelligence Report and Relies on Oral Briefings*. The Washington Post. Available online at: [https://www.washingtonpost.com/politics/breaking-with-tradition-trump-skips-presidents-written-intelligence-report-for-oral-briefings/2018/02/09/b7ba569e-0c52-11e8-95a5-c396801049ef\\_story.html](https://www.washingtonpost.com/politics/breaking-with-tradition-trump-skips-presidents-written-intelligence-report-for-oral-briefings/2018/02/09/b7ba569e-0c52-11e8-95a5-c396801049ef_story.html) (accessed February 9, 2020).
- Liaropoulos, A. N. (2006). *A (R)evolution in Intelligence Affairs? In Search of a New Paradigm*. Research Paper No. 100. Athens: Research Institute for European and American Studies.
- Margolin, J., and Meek, J. G. (2020). *Intelligence Report Warned of Coronavirus Crisis as Early as November: Sources*. ABC News. Available online at: <https://abcnews.go.com/Politics/intelligence-report-warned-coronavirus-crisis-early-november-sources/story?id=70031273> (accessed April 08, 2020).
- McConnell, M. J. (2008). *Annual Threat Assessment of the Intelligence Community*. Washington, DC: Office of the Director of National Intelligence. Available online at: [https://www.dni.gov/files/documents/Newsroom/Testimonies/20080227\\_testimony.pdf](https://www.dni.gov/files/documents/Newsroom/Testimonies/20080227_testimony.pdf) (accessed February 27, 2008).
- Miller, G. (2020). *President's Intelligence Briefing Book Repeatedly Cited Virus Threat*. Washington Post. Available online at: [https://www.washingtonpost.com/national-security/presidents-intelligence-briefing-book-repeatedly-cited-virus-threat/2020/04/27/ca66949a-8885-11ea-ac8a-fe9b8088e101\\_story.html](https://www.washingtonpost.com/national-security/presidents-intelligence-briefing-book-repeatedly-cited-virus-threat/2020/04/27/ca66949a-8885-11ea-ac8a-fe9b8088e101_story.html) (accessed April 27, 2020).
- Miller, P. (2020). "How the intelligence community predicted COVID-19," in *The Dispatch*. Available online at: <https://thedispatch.com/p/how-the-intelligence-community-predicted>
- Office of the Director of National Intelligence (2013). *Worldwide Threat Assessment of the US Intelligence Community 2013*. Washington, DC: Office of the Director of National Intelligence. Available online at: <https://www.dni.gov/index.php/nctc-newsroom/nctc-speeches-testimonies-and-interviews/item/1707-2013-worldwide-threat-assessment-of-the-us-intelligence-community> (accessed March 12, 2013).
- Office of the Director of National Intelligence (2015). *Worldwide Threat Assessment of the US Intelligence Community 2015*. Washington, DC: Office of the Director of National Intelligence. Available online at: [https://www.dni.gov/files/documents/Unclassified\\_2015\\_ATA\\_SFR\\_-\\_SASC\\_FINAL.pdf](https://www.dni.gov/files/documents/Unclassified_2015_ATA_SFR_-_SASC_FINAL.pdf) (accessed February 26, 2015).
- Office of the Director of National Intelligence (2016). *Worldwide Threat Assessment of the US Intelligence Community 2016*. Washington, DC: Office of the Director of National Intelligence. Available online at: [https://www.dni.gov/files/documents/SASC\\_Unclassified\\_2016\\_ATA\\_SFR\\_FINAL.pdf](https://www.dni.gov/files/documents/SASC_Unclassified_2016_ATA_SFR_FINAL.pdf) (accessed February 09, 2016).
- Office of the Director of National Intelligence (2018a). *Worldwide Threat Assessment of the US Intelligence Community 2018, United States Office of the Director of National Intelligence*. Office of the Director of National Intelligence. Available online at: <https://www.dni.gov/files/documents/Newsroom/Testimonies/2018-ATA---Unclassified-SSCI.pdf>
- Office of the Director of National Intelligence (2018b). *Worldwide Threat Assessment of the US Intelligence Community 2018*. Washington, DC: Office of the Director of National Intelligence. Available online at: <https://www.dni.gov/files/documents/Newsroom/Testimonies/2018-ATA---Unclassified-SSCI.pdf> (accessed February 13, 2018).
- Office of the Director of National Intelligence (2019). *Worldwide Threat Assessment of the US Intelligence Community 2019*. Washington, DC: Office of the Director of National Intelligence. Available online at: <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf> (accessed January 29, 2019).
- Petersen, M. (2011). What I learned in 40 years of doing intelligence analysis for US foreign policymakers. *Stud. Intelligence*. 55, 13–20.
- Sanger, D. (2019). *Before Virus Outbreak, a Cascade of Warnings Went Unheeded*. The New York Times. Available online at: <https://www.nytimes.com/2020/03/19/us/politics/trump-coronavirus-outbreak.html>
- Sun, L. H. (2018). "Top white house official in charge of pandemic response exits abruptly," in *The Washington Post*. Available online at: <https://www.washingtonpost.com/news/to-your-health/wp/2018/05/10/top-white-house-official-in-charge-of-pandemic-response-exits-abruptly/> (accessed May 10, 2020).
- The White House (2007). *Pandemic Flu: Preparing and Protecting against Avian Influenza, United States Government*. Available online at: <https://georgewbush-whitehouse.archives.gov/infocus/pandemicflu/> (accessed July 17, 2007).
- The White House (2018). *National Biodefense Strategy, United States Government*. Available online at: <https://www.whitehouse.gov/wp-content/uploads/2018/09/National-Biodefense-Strategy.pdf>
- Toosi, N., Lippman, D., and Diamond, D. (2020). *Before Trump's Inauguration, a Warning: 'The Worst Influenza Pandemic Since 1918'*. Politico. Available online at: <https://www.politico.com/news/2020/03/16/trump-inauguration-warning-scenario-pandemic-132797> (accessed March 03, 2020).
- Trump, D. (2020a). "Remarks at signing of the coronavirus preparedness and response supplemental appropriations act, 2020," in *The White House* (Washington: DC). Available online at: <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-signing-coronavirus-preparedness-response-supplemental-appropriations-act-2020/> (accessed March 06, 2020).
- Trump, D. (2020b). "Remarks in roundtable on border security," in *The White House* (Washington, DC). Available online at: <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-roundtable-border-security-yuma-az/> (accessed June 23, 2020).
- United States National Intelligence Council (2004a). *Mapping the Global Future*. Washington, DC: Office of the Director of National Intelligence. Available online at: [https://www.dni.gov/files/documents/Global%20Trends\\_Mapping%20the%20Global%20Future%202020%20Project.pdf](https://www.dni.gov/files/documents/Global%20Trends_Mapping%20the%20Global%20Future%202020%20Project.pdf)
- United States National Intelligence Council (2004b). *Global Trends 2025, Office of the Director of National Intelligence*. Washington, DC: United States National Intelligence Council. Available online at: [https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025\\_Global\\_Trends\\_Final\\_Report.pdf](https://www.dni.gov/files/documents/Newsroom/Reports%20and%20Pubs/2025_Global_Trends_Final_Report.pdf)
- United States National Intelligence Council (2012). *Global Trends 2030, Office of the Director of National Intelligence*. Washington, DC: United States National Intelligence Council. Available online at: [https://www.dni.gov/files/documents/GlobalTrends\\_2030.pdf](https://www.dni.gov/files/documents/GlobalTrends_2030.pdf)
- United States National Security Council (2015) *Playbook for Early Response to High-Consequence Emerging Infectious Disease Threats and Biological Incidents*. Washington, DC: Office of the Director of National Intelligence.
- United States Northern Command (2017a). *Department of Defense Influenza/Pandemic Response Plan*. Colorado Springs, CO: Department

- of Defense, Peterson Air Force Base. Available online at: <https://www.scribd.com/document/454422848/Pentagon-Influenza-Response> (accessed January 06, 2017).
- United States Northern Command (2017b). *USNORTHCOM Branch Plan 3560: Pandemic Influenza and Infectious Disease Response*. Colorado Springs, CO: Department of Defense, Peterson Air Force Base. Available online at: <https://www.cenae.org/uploads/8/2/7/0/82706952/pentagon-influenza-response.pdf> (accessed January 06, 2017).
- Vuboud, C., Grais, R. F., Lafont, B. A. P., Miller, M. A., and Simonsen, L. (2005). Multinational impact of the 1968 Hong Kong influenza pandemic: evidence for a smoldering pandemic. *J. Infect. Dis.* 192, 233–248. doi: 10.1086/431150
- Wilder, D. C. (2011). An educated consumer is our best customer. *Stud. Intell.* 55, 23–31. doi: 10.1037/e741172011-003
- Wolfberg, A. (2014). Communication patterns between the briefer and the policymaker. *Int. J. Intell. Counterintell.* 27, 509–528. doi: 10.1080/08850607.2014.872534
- Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Lankford, Storzieri and Fitsanakis. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# The Online Education Mode and Reopening Plans for Chinese Schools During the COVID-19 Pandemic: A Mini Review

Xuanzhen Cen<sup>1</sup>, Dong Sun<sup>1</sup>, Ming Rong<sup>1</sup>, Gusztáv Fekete<sup>2</sup>, Julien S. Baker<sup>3</sup>, Yang Song<sup>4</sup> and Yaodong Gu<sup>1\*</sup>

<sup>1</sup> Faculty of Sports Science, Ningbo University, Ningbo, China, <sup>2</sup> Savaria Institute of Technology, Eötvös Loránd University, Szombathely, Hungary, <sup>3</sup> Department of Sport and Physical Education, Hong Kong Baptist University, Hong Kong, China, <sup>4</sup> Faculty of Engineering, University of Szeged, Szeged, Hungary

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Wu Zhou,  
Huazhong University of Science and  
Technology, China  
Dusan Radivoje Mitic,  
University of Belgrade, Serbia

### \*Correspondence:

Yaodong Gu  
guyaodong@hotmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 27 May 2020

**Accepted:** 19 November 2020

**Published:** 10 December 2020

### Citation:

Cen X, Sun D, Rong M, Fekete G,  
Baker JS, Song Y and Gu Y (2020)  
The Online Education Mode and  
Reopening Plans for Chinese Schools  
During the COVID-19 Pandemic: A  
Mini Review.  
Front. Public Health 8:566316.  
doi: 10.3389/fpubh.2020.566316

Recently, an unprecedented coronavirus pandemic has emerged and has spread around the world. The novel coronavirus termed COVID-19 by the World Health Organization has posed a huge threat to human safety and social development. This mini review aimed to summarize the online education mode and plans for schools to resume full-time campus study in China during COVID-19. Chinese schools have made significant contributions to the prevention and control of the transmission of COVID-19 by adopting online learning from home. However, normal opening and classroom teaching have been affected. For education systems at all levels, online education may be an effective way to make up for the lack of classroom teaching during the epidemic. To protect staff and students from COVID-19, the timing of students returning to full-time campus study needs to be considered carefully. Reviewing and summarizing of the Chinese education system's response to the virus would be of great value not only in developing educational policy but also in guiding other countries to formulate educational countermeasures.

**Keywords:** online education, back-to-school, corona virus disease, novel coronavirus, reopening time

## INTRODUCTION

Since December 2019, atypical pneumonia has been widely spreading throughout the world (1), and the number of recorded cases has increased dramatically. On February 11, 2020, the International Committee on Taxonomy of Viruses (ICTV) announced that the new virus responsible for atypical pneumonia would be named "severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)." The name created unintended fear in the public, especially in Asia which was affected badly by SARS in 2003. From a risk communications perspective, the World Health Organization (WHO) has begun announcing "the COVID-19 virus" as the name of the new virus when communicating and providing updates for the public (2). This new outbreak has impacted massively on worldwide populations, especially on health and economy toll globally (3). The outbreak of COVID-19 has also resulted in huge health and economical toll globally. Modeling and analysis have revealed that even if the outbreak is effectively controlled, the global economy will experience a massive decline (4). In China, for example, COVID-19 spread rapidly from a single city to the whole country in just 30 days since the outbreak (5). This rate of transmission is alarming, and the transmission seems to be taking place via individuals in close contact. Studies have shown that COVID-19 has a higher

susceptible population, is more widespread, and is more contagious than the SARS coronavirus (6). As of May 26, 2020, the total number of confirmed cases in China reached 84,543. Worldwide, the number of recorded cases has reached 5,505,801 (7).

It should be mentioned, that the outbreak coincided with the traditional Spring Festival, which is the most important festival of the year in China. During this time, several hundred million people move and relocate, and residents and tourists mostly choose to travel by using crowded planes, trains, and buses (8). This means that infected individuals may have close contact with other individuals for long periods when traveling long distances (9), which leads that the spread of COVID-19 was hardly controlled. The rapid spread of the epidemic which is due in part to large population movements is considered one of the main reasons for the large-scale transmission of the disease (9, 10). Fortunately, schools were closed during the Chinese Lunar New Year that enabled the government to carefully consider measures needed for schools to protect staff and students. China has a large and dense student population located in both urban and rural areas. According to statistics recorded in 2018 (11), there are 518.8 thousand schools of all levels and types in China, with 276 million students and 16.7 million full-time teachers. Social isolation is undoubtedly effective in reducing virus transmission, although COVID-19 rarely affects children in asymptomatic cases, and infection and virus transmission characteristics are not clear in this group (12).

At present, the most important method of containment during the COVID-19 Pandemic is isolation (13). As the most severely affected area in China, Wuhan city was in lockdown on January 23, 2020. The subsequent spread of the COVID-19 virus led to the imposition of a cordon sanitaire, limiting the population movements among 16 cities in Hubei province and affecting more than 50 million people (13). And this restriction has gradually expanded to most areas of China. Public transport including planes, high-speed trains and subways, entertainment venues including cinemas, bars and amusement parks, and schools at all levels were forced to close, leading to an unprecedented nationwide lockdown in China (8, 13). Despite quarantine representing an effective method of curbing viral spread, WHO advises against the enforcement of limitations to travel and trade (13, 14).

In response to the COVID-19 epidemic, the Chinese educational mode is transiting online. During the outbreak, the Ministry of Education of the People's Republic of China (MOE) launched an emergency policy of Suspending Classes without Learning Termination (SCWLT) to encourage the development of online education and resource sharing (15). Online education has partly made up for the lack of classroom teaching provision during the crisis. However, deficiencies in network environments and hardware facilities are still worthy of attention. Another challenge is making a new plan for the reopening of schools. Closing schools and postponing the reopening of schools are a mitigation measure during the current COVID-19 epidemic. Although these measures are conducive to reducing the spread of the virus, they cannot be advocated as a long-term solution.

The main purpose of this paper was to summarize the online education mode and plans for schools to resume a full-time campus study adopted by the Chinese education system at all levels during the outbreak of COVID-19. An understanding and evaluation of the current condition of the Chinese education system would be of great value not only in creating further educational policies but also assisting in guiding other countries to formulate educational provision countermeasures.

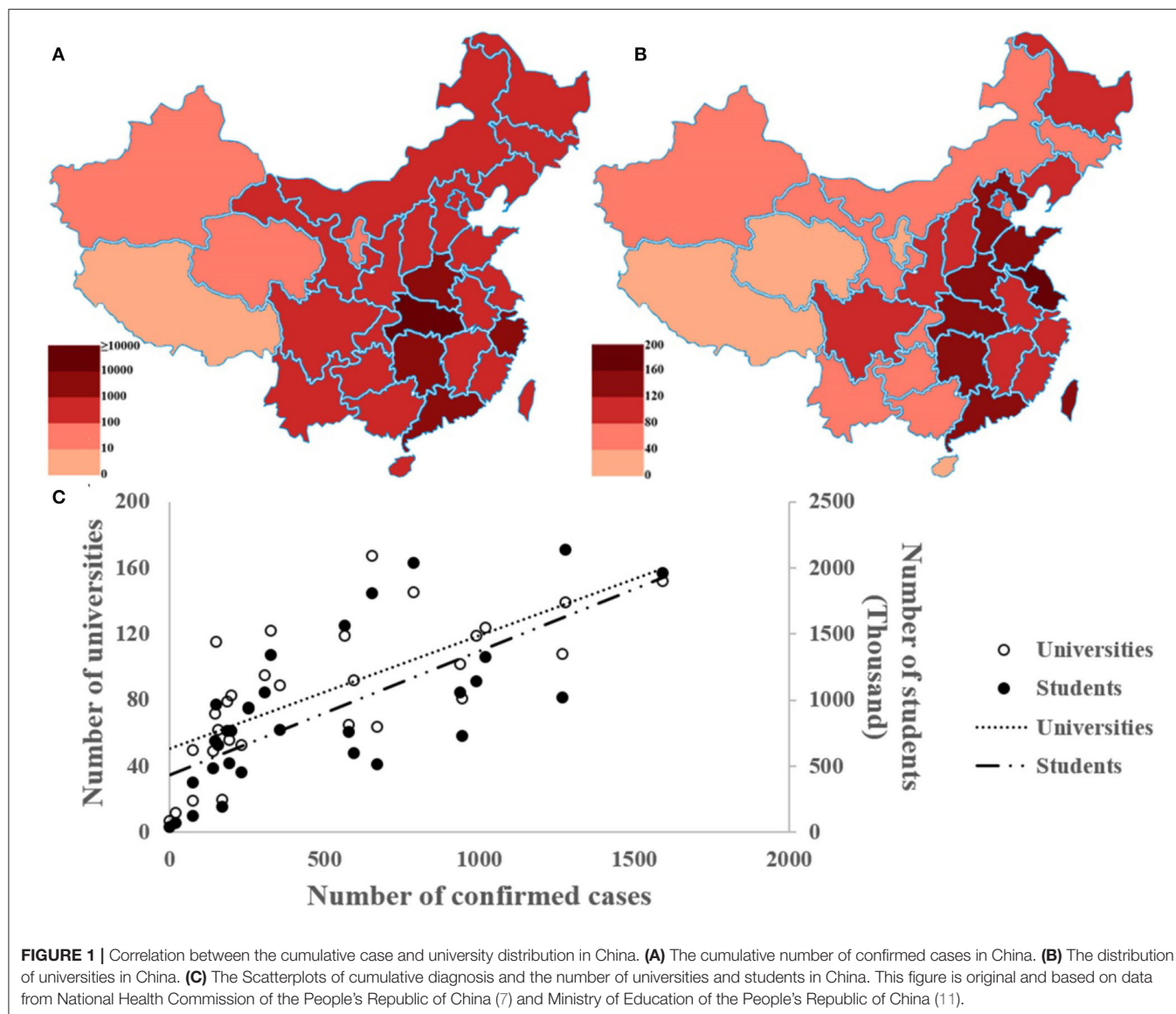
## VIRAL TRANSMISSION AND SPREAD IN CHINA

As of May 26, 2020, 84,543 cases of COVID-19 were confirmed in China, 68,135 of which were confined to Hubei (7). Confirmed cases have been reported in 34 provinces, cities, and in the autonomous regions of China. **Figure 1A** outlines the distribution of cumulative confirmed cases in China (data as of May 26, 2020).

As the mainstay of Chinese society, Chinese universities have made important contributions to emergency risk management, including the collection of alumni resources, medical rescue and emergency management, mental health maintenance, personnel mobility control, and innovation in online education models (16). However, due to the large population base of the school (including students and staff), this also creates great challenges in the prevention of the disease and management of the school. China currently has 518,800 schools at all levels, including more than 2,600 universities (excluding Hong Kong, Macao, and the Taiwan regions) (11). If we consider the region of Hubei as an example, this province has 128 colleges and universities with a total enrollment of more than 1.438 million students. Most universities in the Hubei region are in Wuhan, the provincial capital, which is the most severely affected area. **Figure 1B** shows the distribution of colleges and universities in various provinces, cities, and autonomous regions across the country. Moreover, the cumulative number of cases, the number of universities, and the number of university students in each province are highly correlated (**Figure 1C**, excluding Hong Kong, Macao, and Taiwan regions) (11).

## DEVELOPMENT OF AN ONLINE EDUCATION MODE

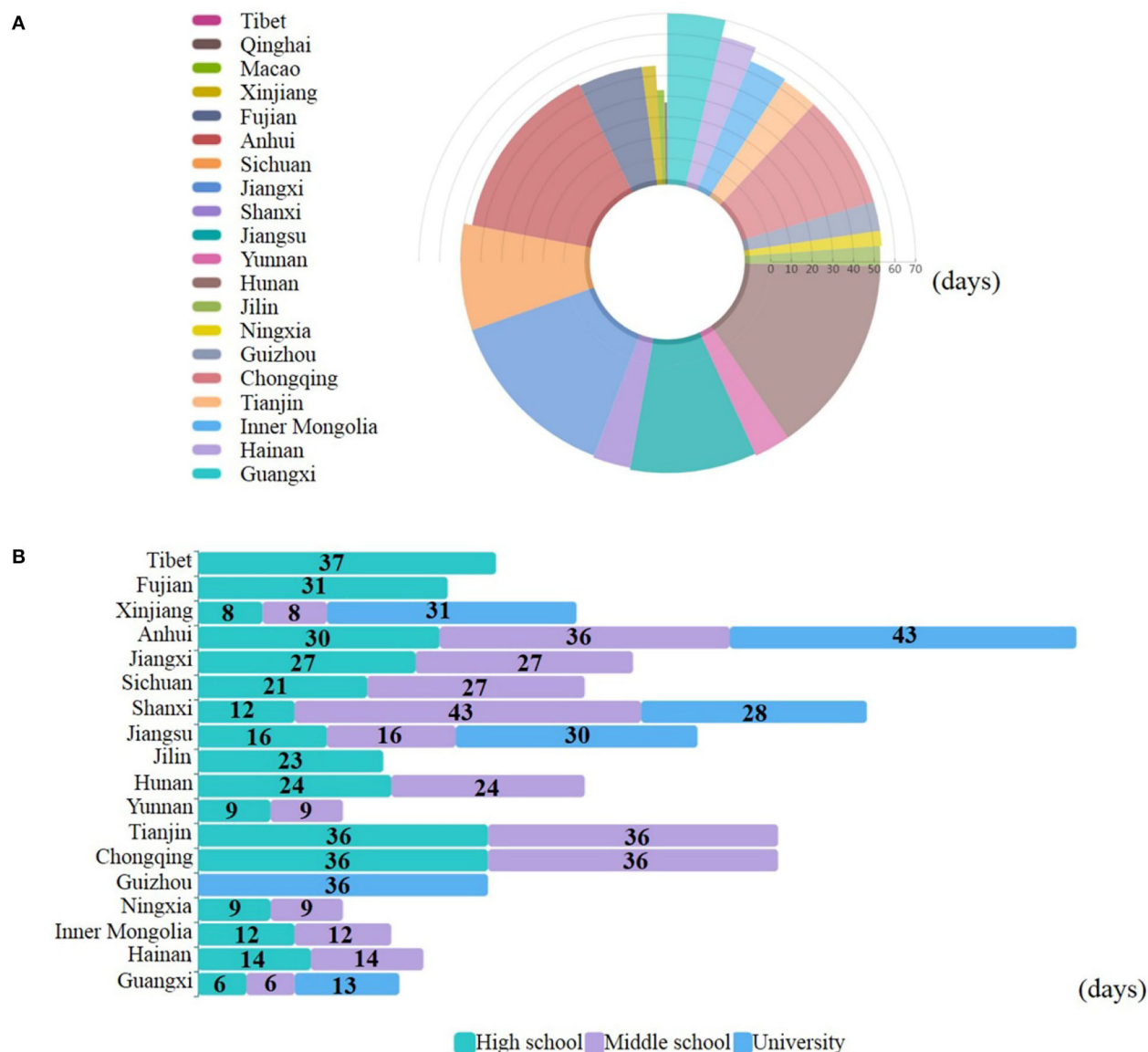
Due to the outbreak of COVID-19, the normal teaching provision of all schools has been affected to varying degrees. During the extraordinary period of epidemic prevention and control, online education seems to make up for the lack of classroom teaching. Online education meets the needs of students and achieves high-quality resource sharing. Since the MOE issued the emergency policy of SCWLT in February 2020, efforts have been made to integrate high-quality teaching resources from the country, relevant provinces, cities, and schools to provide free learning resources during the delayed school term (17). Details of how the emergency policy will be implemented and what impacts it may cause are still being debated (18).



Online education can be traced back to correspondence education in the 19th century. Since the beginning of the 20th century, with the progress of communication technology, the way of learning has been constantly evolving, and the Internet and open-source learning have created an environment for large-scale distance education (18–20). There are more than 230,000 related companies engaged in the online education industry in China. In the past decade, online education companies have experienced explosive growth, and more than 60,000 related companies were further established in 2019. In the past 5 years, the concentration of online education increased, with more than 130,000 companies being established in 1–5 years, accounting for 57.6%.

Online education, through the application of information technology and Internet technology for content dissemination and distance learning, has to some extent reduced the risk of epidemic spread. The number of daily active users of education

and learning apps during the epidemic period rose from 87 million to 127 million, an increase of 46%. Among the increase, the number of daily active users of basic education increased by more than 23 million (21). During the 8-week teaching period of the emergency policy of SCWLT, nearly 270 million students from universities, high schools, junior high schools, and primary schools in China were engaged in course learning online. At the same time, nearly 20 million teachers from universities, high school, junior high school, and primary schools performed teaching activities via the Internet. The SCWLT policy has created the largest number of online students and has refreshed the online currency of Internet use (15). Facing the big challenge of online education, whether it is a school, university, teacher, or parent, will take time to adapt to the process. Zhang et al. (18) summarized the difficulties in the implementation of the SCWLT. They suggested that there are at least five major



**FIGURE 2 |** The status of the COVID-19 and the time of back-to-school in China's provinces. **(A)** The time from the first diagnosis to the first time of no existing case in each province. **(B)** The number of days between the first time of no existing case and the reopening times of high school, middle school, and university in each province. This figure is original and based on data from National Health Commission of the People's Republic of China (7).

difficulties in policy implementation that need to be addressed, including: (1) Infrastructure constraints; (2) Low proportion and low efficiency of the use of resources; (3) The outcome effect is contingent on teachers' teaching ability and experience; (4) A variety of unpredictable teaching and learning problems; (5) It remains unclear what pedagogical method may suit the online education best.

The traditional teaching method is "passive learning," which is usually delivered in a large classroom, with little interaction. Teachers often occupy a dominant position in classroom teaching, which leads to the weakening of students'

subjective innovation ability and critical spirit. Offline education mode generally has certain problems for students' including personalized learning and differentiated teaching. Online education, through the information database management technology and two-way interactive function of computer network, realizes the complete system tracking record of individual information and learning process, to provide a practical and effective way for personalized teaching. SCWLT is not a simple transition from classroom teaching/offline education to the Internet platform. Its essence is a large-scale and far-reaching practice of educational mode (15). Online education



**TABLE 1** | The detailed information about the outbreak and the time of back-to-school in China's provinces.

Provinces	Cumulative cases	Cumulative recovery	The time of the first case	The first time of no existing case	The time of back-to-school		
					Grade 3 of high school	Grade 3 of middle school	Universities
Beijing	593	509	January 20	-	April 27	May 11	-
Tianjin	189	173	January 21	March 15	April 20	April 20	-
Hebei	328	316	January 22	-	April 23	May 7	-
Shanxi	197	135	January 22	March 13	March 25	April 25	April 10
Inner Mongolia	193	104	January 23	March 18	March 30	March 30	-
Liaoning	146	142	January 22	-	April 15	-	-
Jilin	102	97	January 22	March 15	April 7	-	-
Heilongjiang	892	472	January 22	-	April 7	April 13	-
Shanghai	628	512	January 20	-	April 27	April 27	-
Jiangsu	653	643	January 22	March 14	March 30	March 30	April 13
Zhejiang	1,268	1,246	January 21	-	April 13	April 13	April 26–May 10
Anhui	991	984	January 22	March 8	April 7	April 13	April 20
Fujian	355	336	January 22	March 7	April 7	-	-
Jiangxi	937	936	January 21	March 11	April 7	April 7	-
Shandong	787	765	January 21	-	April 15	-	-
Henan	1,276	1,254	January 21	-	April 7	-	-
Hubei	68,128	63,494	-	-	-	-	-
Hunan	1,019	1,015	January 21	March 14	April 7	April 7	-
Guangdong	1,579	1,482	January 21	-	April 27	April 27	-
Guangxi	254	252	January 22	April 1	April 7	April 7	April 14
Hainan	168	162	January 22	March 24	April 7	April 7	-
Chongqing	579	570	January 21	March 15	April 20	April 20	-
Sichuan	561	553	January 21	March 11	April 1	April 7	-
Guizhou	147	144	January 22	March 16	March 16	March 16	April 21
Yunnan	184	177	January 21	March 14	March 23	March 23	-
Tibet	1	1	January 29	February 12	March 20	-	-
Shanxi	256	252	January 23	-	March 30	April 7	-
Gansu	139	137	January 23	-	April 9	April 13	-
Qinghai	18	18	January 25	February 21	March 9–13	March 16–20	April 1–15
Ningxia	75	75	January 22	March 16	March 25	March 25	-
Xinjiang	76	73	January 23	March 8	March 16	March 16	April 8
Taiwan	398	178	January 30	-	-	-	-
Hong Kong	1,023	568	January 29	-	-	-	-
Macao	45	17	February 2	March 6	-	-	-
Total	84,185	77,792	-	-	-	-	-

Data from National Health Commission of the People's Republic of China and as of April 18, 2020 (7); "-": Data not presented or not applicable.

is a combination of teaching technology, education concepts, and traditional education to form a new educational mode suitable for modern educational requests. As 5G and artificial intelligence technologies develop, online education might effectively solve problems related to offline education. Although the key features of 5G Technology greatly increase the technology complexity, resulting in a much higher capital-intensive level compared with previous generations, most governments in developing

countries tend to encourage 5G deployment as a strategic priority (22). Therefore, online and offline integration is imperative. At present, governments and schools are taking this opportunity and are encouraging teachers to test and validate online and offline teaching methods exploring this practice, using artificial intelligence, and big data to conduct academic analysis and educational evaluation to investigate, design, and implement future educational provision (15).

## PLANS OF THE REOPENING OF SCHOOLS

As the transmission of the virus increased, students (including all ages and educational levels) in many regions of the world were forced to stay at home. This meant that all educational provision was affected. The 77th edition of the WHO's new outbreak report shows that 90% of students and more than 150 million children and young adults worldwide have been affected by school suspensions (23). In China, the epidemic situation has improved significantly since December 31, 2019, when atypical pneumonia in Wuhan was first reported. **Figure 2A** shows the number of days between the first diagnosis and the first time of no existing case in each province (data as of April 18, 2020). The number of confirmed cases in Tibet reached zero within 14 days of the first confirmed cases. It took Guangxi 70 days to achieve that goal. China's students are now starting to return to campus, and the new opening plan needs further careful consideration.

With the decreasing of infection rates across the country, most provinces and cities in China decided their own time of back-to-school at all levels based on the epidemiological evidence (**Table 1**). **Figure 2B** presents the number of days between the first time of existing cases of zero and the reopening times of high school, middle school, and university in each province (data as of April 18, 2020). In China, the back-to-school plan of each province was not made by the national central government, but by the local education management department, which was distributed the power by the central government. And the education management department of each province independently made the plan according to the epidemic situation. For most provinces, grade 3 students attending high and middle school are regarded as important objectives for back-to-school plans, as they are expected to progress to higher-level education. Another important group is university graduates, who are facing the pressure of employment. The decision making on the time of back-to-school based on the following five main points;

- The status of the COVID-19 epidemic in the province, including the cumulative cases, cumulative recovery, existing cases, presence of asymptomatic infections, etc.
- Different reopening plans depending on the school and grade level. Students in grade three of high schools and middle schools, as well as fresh university graduates, are generally preferred to return to education.
- The perfection and implementation of self-quarantine and disease prevention. The specific implementation includes self-monitored quarantine not <14 days after returning to school, health diagnosis of students from different areas, school disinfection work, etc.
- The connection between online courses and offline courses. Since students generally receive online education during

school closure, they need to make a transition to offline education after returning to school. The educational experience should be of high quality and the quality of teaching should be ensured.

- The establishment of multiple collaborative governance mechanisms including "government-family-school-society." The formulation of the back to school plan is not only realized by the school but also needs the resource and information sharing between the government, family, and society.

Large population movements, particularly of college students from all over the country that are returning to school, and detection of possible transmission by asymptomatic carriers will also be a challenge to prevent and control further COVID-19 infections (24). The nation needs to be prepared for a possible rebound of the outbreak (5), especially in schools, with disastrous consequences and health implications that want to be avoided.

## CONCLUSIONS

Globally, the number of COVID-19 confirmed cases is still increasing. Although isolation alone may not be enough to prevent the spread of the epidemic, it is undoubtedly one of the most economical and effective ways to minimize its risk. For educational systems at all levels, online education may be an effective way to compensate for the lack of classroom teaching during the epidemic. However, issues such as the network environment, hardware equipment, and educational quality and educational experience for the students deserve special attention. From the perspective of the safety of teachers and students, whether it is primary, secondary school, or university, the organization of educational establishments reopening strategies need careful consideration.

## AUTHOR CONTRIBUTIONS

XC, DS, and YS conceived the presented idea, developed the framework, and wrote the manuscript. MR, GF, JB, and YG provided critical feedback and contributed to the final version. All authors have read and agreed to the published version of the manuscript.

## FUNDING

This study was sponsored by the Key Project of the National Social Science Foundation of China (19ZDA352), National Natural Science Foundation of China (No. 81772423), NSFC-RSE Joint Project (81911530253), National Key R&D Program of China (2018YFF0300905), and K. C. Wong Magna Fund in Ningbo University.

## REFERENCES

1. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. (2020) 395:497–506. doi: 10.1016/S0140-6736(20)30183-5
2. World Health Organization. *Naming the Coronavirus Disease (COVID-19) and the Virus That Causes It*. World Health Organization (2020). Available online at: [https://www.who.int/zh/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-\(covid-2019\)-and-the-virus-that-causes-it](https://www.who.int/zh/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it) (accessed March 6, 2020).

3. Song Y, Ren F, Sun D, Wang M, Baker JS, István B, et al. Benefits of exercise on influenza or pneumonia in older adults: a systematic review. *Int J Environ Res Public Health*. (2020) 17:2655. doi: 10.3390/ijerph17082655
4. McKibbin W, Fernando R. The global macroeconomic impacts of COVID-19: seven scenarios. *SSRN Electron J*. (2020) 19. doi: 10.2139/ssrn.3547729
5. Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. *Chin J Epidemiol*. (2020) 41:145–51. doi: 10.3760/cma.j.issn.0254-6450.2020.02.003
6. Liu Y, Gayle AA, Wilder-Smith A, Rocklöv J. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *J Travel Med*. (2020) 27:taaa021. doi: 10.1093/jtm/taaa021
7. National Health Commission of the People's Republic of China. *COVID-19 Real-Time Big Data Report*. National Health Commission of the People's Republic of China (2020). Available online at: [https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari\\_pc\\_3](https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari_pc_3) (accessed May 26, 2020).
8. *The New York Times*. Coronavirus in New York: Lunar New Year events canceled over fears. *The New York Times*. (2020). Available online at: <https://www.nytimes.com/2020/01/29/nyregion/coronavirus-nyc.html> (accessed January 29, 2020).
9. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese center for disease control and prevention. *JAMA*. (2020) 323:1239–42. doi: 10.1001/jama.2020.2648
10. Zhang C, Chen C, Shen W, Tang F, Lei, H, Xie, Y, et al. Impact of population movement on the spread of 2019-nCoV in China. *Emerg Microbes Infect*. (2020) 9:988–90. doi: 10.2139/ssrn.3546090
11. Ministry of Education of the People's Republic of China. *Statistical Bulletin on the Development of National Education in 2018*. Ministry of Education of the People's Republic of China (2020). Available online at: [http://www.moe.gov.cn/jyb\\_sjzl/sjzl\\_fztjgb/201907/t20190724\\_392041.html](http://www.moe.gov.cn/jyb_sjzl/sjzl_fztjgb/201907/t20190724_392041.html) (accessed July 24, 2019).
12. Cohen J, Kupferschmidt K. Mass testing, school closings, lockdowns: countries pick tactics in “war” against coronavirus. *Science*. (2020). doi: 10.1126/SCIENCE.ABB7733 Available online at: <https://www.sciencemag.org/news/2020/03/mass-testing-school-closings-lockdowns-countries-pick-tactics-war-against-coronavirus> (accessed March 18, 2020).
13. Sohrabi G, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, et al. World Health Organization declares global emergency: a review of the 2019 novel coronavirus (COVID-19). *Int J Surg*. (2020) 76:71–6. doi: 10.1016/j.ijsu.2020.02.034
14. Madhav N, Oppenheim B, Gallivan M, Mulembakani P, Rubin E, Wolfe N. Pandemics: risks, impacts, and mitigation. In: Jamison DT, Gelband H, Horton S, editors. *Disease Control Priorities: Improving Health and Reducing Poverty*. 3rd ed. Washington, DC: The International Bank for Reconstruction and Development/The World Bank (2017). p. 316–45.
15. Zhou L, Li F, Wu S, Zhou M. “School's out, but class's on”, the largest online education in the world today: taking China's practical exploration during the COVID-19 epidemic prevention and control as an example. *Best Evid Chin Edu*. (2020) 4:501–19. doi: 10.15354/BECE.20.AR023
16. Wang C, Cheng Z, Yue XG, McAleer M. Risk management of COVID-19 by universities in China. *J Risk Financial Manag*. (2020) 13:36. doi: 10.3390/jrfm13020036
17. Ministry of Education of the People's Republic of China. *Notice on Work Arrangements for “Suspending Classes Without Stopping Learning” During the Delayed Start of Primary and Middle Schools*. Ministry of Education of the People's Republic of China (2020). Available online at: [http://www.moe.gov.cn/srcsite/A06/s3321/202002/t20200212\\_420435.html](http://www.moe.gov.cn/srcsite/A06/s3321/202002/t20200212_420435.html) (accessed February 12, 2020).
18. Zhang W, Wang Y, Yang L, Wang C. Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak. *J Risk Financial Manag*. (2020) 13:55. doi: 10.3390/jrfm13030055
19. Volery T. Online education: an exploratory study into success factors. *J Educ Comput Res*. (2001) 24:77–92. doi: 10.2190/F0DY-BNYJ-18RB-NNNY
20. Orozco-Messana J, Martínez-Rubio JM, González-Pons AM. Sustainable higher education development through technology enhanced learning. *Sustainability*. (2020) 12:3600. doi: 10.3390/su12093600
21. *People's Daily Online*. Improving the quality of online education requires concerted efforts. *People's Daily Online*. (2020). Available online at: <http://capital.people.cn/n1/2020/0323/c405954-31644107.html> (accessed March 23, 2020).
22. Forge S, Vu K. Forming a 5G strategy for developing countries: a note for policy makers. *Telecommun Policy*. (2020) 44:101975. doi: 10.1016/j.telpol.2020.101975
23. World Health Organization. *Coronavirus Disease 2019 (COVID-19) Situation Report-77*. World Health Organization (2020). Available online at: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200406-sitrep-77-covid-19.pdf?sfvrsn=21d1e632\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200406-sitrep-77-covid-19.pdf?sfvrsn=21d1e632_2) (accessed April 6, 2020).
24. Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, et al. Presumed asymptomatic carrier transmission of COVID-19. *JAMA*. (2020) 323:1406–7. doi: 10.1001/jama.2020.2565

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Cen, Sun, Rong, Fekete, Baker, Song and Gu. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Actual Politics on Physical Activity Challenged by Crisis. The Italian Case of Reaction to the COVID-19 Pandemic

**Federico Ranieri\***

*Department of Neuroscience, Biomedicine and Movement Sciences, University of Verona, Verona, Italy*

**Keywords:** promotion of physical activity, stigma, movement restriction, social distancing, SARS-CoV-2, noncommunicable diseases

## INTRODUCTION

### OPEN ACCESS

#### **Edited by:**

Anca Birzescu,  
Xi'an International Studies  
University, China

#### **Reviewed by:**

Rasha El-Ibiary,  
Future University in Egypt, Egypt  
Martin John Bull,  
University of Salford, United Kingdom

#### **\*Correspondence:**

Federico Ranieri  
federico.ranieri@univr.it

#### **Specialty section:**

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Sociology

**Received:** 29 May 2020

**Accepted:** 12 November 2020

**Published:** 15 December 2020

#### **Citation:**

Ranieri F (2020) Actual Politics on  
Physical Activity Challenged by Crisis.  
The Italian Case of Reaction to the  
COVID-19 Pandemic.  
Front. Sociol. 5:566885.  
doi: 10.3389/fsoc.2020.566885

In 2018, the World Health Organization (WHO) promoted a global action plan on physical activity as a primary health preservation strategy and estimated a 280% total return on investments to obtain a 15% relative reduction in the global prevalence of physical inactivity by 2030 (World Health Organization, 2018a,b). Indeed, physical inactivity is estimated to account for 1–3% of national health-care costs, excluding those associated with mental and musculoskeletal conditions (World Health Organization, 2018a). The potential economic return derives from multiple factors, including prevention and treatment of noncommunicable diseases, improved mental health, indirect benefits from reduced pollution, increased earning capacity, increased public resources, and reduced health-care expenditure (World Health Organization, 2018b). To these ends, the WHO recommends “a ‘systems-based’ approach with a strategic combination of ‘upstream’ policy actions aimed at improving the social, cultural, economic and environmental factors that support physical activity, combined with ‘downstream,’ individually focused (educational and informational) approaches.” (World Health Organization, 2018a).

In March 2020, the outbreak of the SARS-CoV-2 pandemic forced most countries all over the world to limit freedom of movement and outdoor activities. Here, I analyze the possible outlasting impact of emergency interventions on the psychosocial dynamics governing promotion of physical activity. The Italian case is taken as representative of dynamics that can replicate in different countries over the world.

After the initial outbreak in China, Italy was the first European country to face a rapid increase of infections, and it reacted with strict social distancing measures (Boccia et al., 2020). Starting from March 9, 2020, the entire country was put under lockdown, and going out was allowed only for strict necessities. While national legislation preserved the possibility of performing physical activity individually and in the proximity of the house, within the scope of “daily necessities,” many local administrations invoked the state of necessity to prohibit any kind of outdoor activity such as walking or running. The respect of rules was ensured with police rounds and drones and with a diffuse campaign of “stay home” publicity. Therefore, millions of people were forced to a reduced level of aerobic exercise. Starting from the first half of April, restrictions on physical activity were finally mitigated toward a return to normality.



## IMPACT OF EMERGENCY RESPONSE ON PHYSICAL ACTIVITY

In the WHO recommendations (World Health Organization, 2018a), facilitating physical activity is based on four strategic objectives: (1) “active societies” through communication campaigns, mass participation initiatives, and training of involved professionals; (2) “active environments” for equitable access of all people to safe spaces; (3) “active people” by creating opportunities for regular physical activity; and (4) “active systems” through governance, resource mobilization, and coordinated actions.

In Italy, the importance of physical activity has been recognized since the 2003–2005 National Health Program, and it was confirmed in the following programs and in the National Prevention Plans, inspired to the WHO European Office policies. These plans acknowledge the relationship between a sedentary lifestyle and worsening of noncommunicable disorders (De Mei et al., 2018). Based on economic analyses (Centre for Economics Business Research, 2015), physical inactivity accounts for 14.6% of deaths in Italy and for a direct cost for the National Health Service of about 1.6 billion euros per year (by considering the four major diseases influenced by physical inactivity: breast and colon cancer, type 2 diabetes, and coronary artery disease). Total cost, including loss of productivity, is estimated to be much higher, in the order of 32 billion euros, corresponding to about 2% of gross national product (De Mei et al., 2018). In a latest report on the sports practice in Italy by the National Statistics Institute, it emerges that, in 2015, ~39% of the population is totally inactive, ~26% practices only some kind of physical activity, and ~35% practices sports occasionally or continuously. Data of previous years indicate that from 1995 to 2015, the number of people practicing sports increased to the expense of those performing only some kind of activity, while the number of inactive people was substantially unchanged (Italian National Statistics Institute, 2015).

The implementation of different lines of interventions is within the competence of the Ministry of Health, the Government Sport Office, and the Italian National Olympic Committee, a public noneconomic institution supervised by the head of government. The National Institutes of Health performs control, research, and counseling activities for the Ministry of Health. Moreover, the recently created “Sports and Health” public company, owned by the Ministry of Economic Affairs, is intended to translate into action public health policies related to physical activity. Among interventions in the last 2 years, particular attention has been paid to the promotion of physical activity among disadvantaged population, especially through financing of facilities in suburban areas or small towns. Other usual activities include financing of nonprofessional sport associations and organization and promotion of big sport events, such as the Olympic games and the European championships.

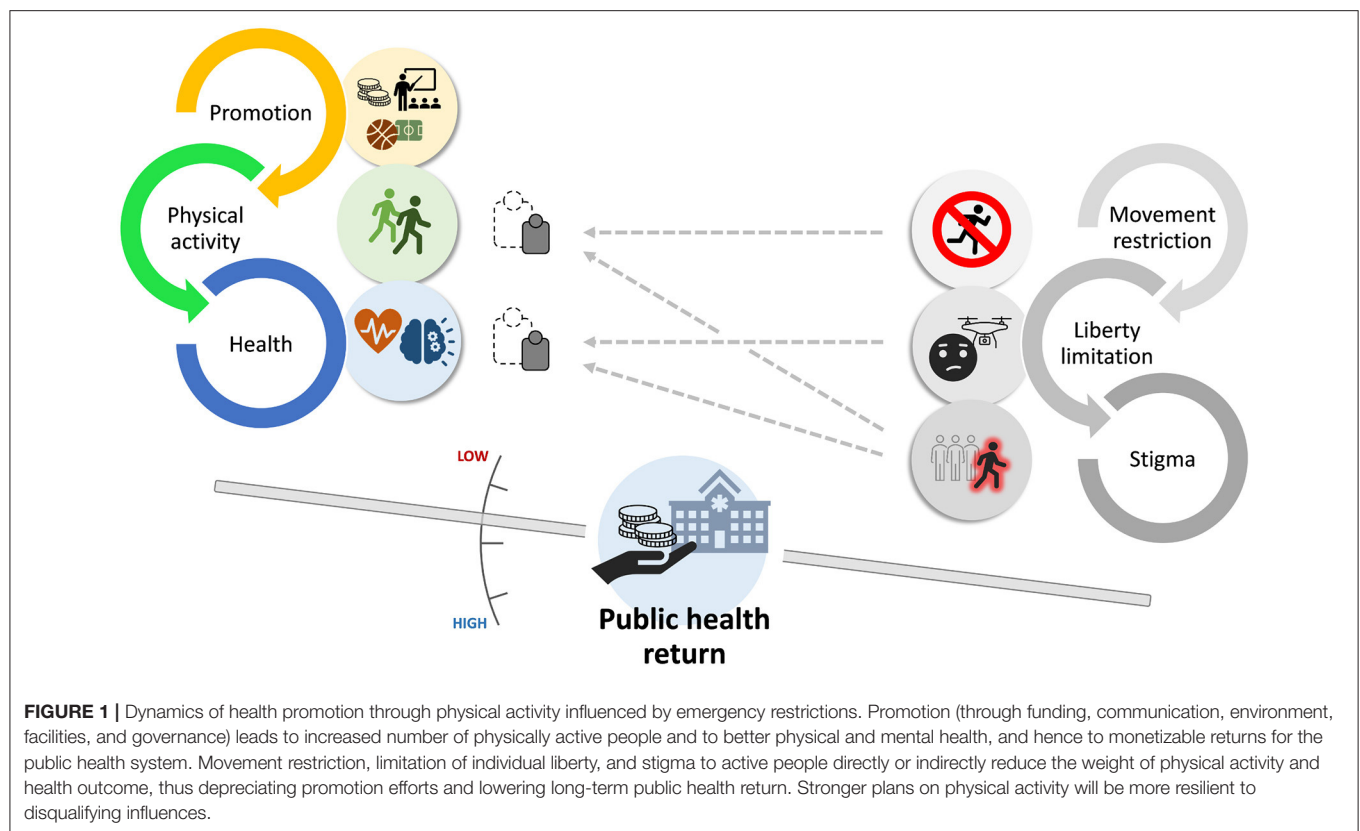
When facing current crisis, the “stay home” message recurred as a key element in the strategic narrative in Italy and in most other countries, being stressed as the necessary behavior to succeed in the so-called “war” against

the pandemic and legitimating exceptional restrictions and penalties. In this context, the decision of banning outdoor activities, even performed individually and outside interdicted areas, was essentially taken to prevent violation of social distancing measures (i.e., by people invoking physical activity as a justification for staying out and meeting others). Thus, the restriction on physical activity appears as a fear-driven decision to ensure absolute control, facing the risk of breakdown of intensive care units (<1.0 bed available every 10,000 inhabitants). Indeed, a direct effect on limiting infections is unlikely, considering that virus transmission through droplets is prominent at short distance and in confined environments (World Health Organization, 2020). To confirm this assumption, the Italian National Institute of Health reports that most traced contagions diagnosed after lockdown mitigation continued to happen inside closed communities (May 1–20: 49.5% nursing homes; 24.3% private houses; 7.2% hospitals—June 1–30: 35.1% nursing homes; 24.6% private houses/relatives; 6.6% hospitals) (Italian National Institute of Health (ISS), 2020a,b).

While the pandemic can be resisted effectively by ensuring observation of social distancing rules and contact tracing (Giordano et al., 2020), there is risk of a negative balance to pay for disproportionate restrictions of movement in terms of efficacy of plans on physical activity, due to several reasons.

The first direct impact is on the “active people” objective, with consequent threats on physical and mental health. Despite several initiatives promoting home training, the overall reduction of aerobic exercise is destined to increase the burden of many chronic diseases. This concerns not only cardiovascular, metabolic, immunological, and musculoskeletal disorders but also brain health, with an expected impact on cognitive function throughout a person’s lifespan and on people affected by cognitive decline (Hillman et al., 2008; Liu et al., 2019). Moreover, forced and prolonged home confinement, and restriction of individual liberty, can cause mental distress, especially for people already at risk (Gallagher, 2014; Alonzi et al., 2020; Brooks et al., 2020).

Second, the stigma with sports might derive from the implicit misleading message that physical activity must unavoidably be sacrificed to protect human life. Hence, physically active people are marked as unacceptably different and devalued (Goffman, 1963). Indeed, movement restrictions have been frequently associated with narrative by mass media and by some institutional representatives pointing to physically active people as the negative example of those neglecting the “stay home” directive, hence as a danger for the community, or depicting them as persons unrespectful of others’ sufferance. This kind of narrative is believed to have found a fertile ground in the high prevalence of physical inactivity (Guthold et al., 2018) and poor health literacy among population (Paakkari and Okan, 2020), and to have facilitated the diffusion of intolerance sentiments leading to hate speech and cases of verbal and physical aggressions, as reported by media. This creates a condition in which fear for an invisible enemy (the virus) easily turns into hate for a physical enemy, for example, the runner, the perfect scapegoat for the pandemic. The risk here is amplifying social tensions



and reducing the value attributed to active lifestyle (the “active societies” objective) well beyond the emergency.

Third, it should also be considered whether it is ethically acceptable to limit the rights of a large number of people because someone will not respect rules. Yet, unjustified restrictions of individual liberty might have even worse general consequences on the value attributed to human rights, creating a base for inequalities. The issue has even been raised that in fragile democracies, there is a risk that exceptional situations undermine human rights in the long-term (Nay, 2020). It must be clarified that the loss of value of human rights is usually far from the aims of governments’ decisions. This is exemplified in one Italian Prime Minister’s speech to parliament, on April 30, 2020, in which it is stressed that all exceptional and urgent decisions were carefully taken to protect human life, based on available scientific data (Italian Prime Minister’s Speech to Parliament on the Restart of Economic Activities, 2020). It may then happen, through the communication chain, that the valuable and easily agreeable assertion that human life comes first, when put out of its specific context and taken as an absolute reference, favors the acceptance by the public opinion that all other rights can be sacrificed, without critically evaluating if they really threaten human life.

All the above analyzed conditions can strongly depreciate the efforts toward active life promotion and, in turn, the occurrence of these conditions can be facilitated by vulnerabilities in politics on physical activity (Figure 1).

## CONCLUSIONS

Crises typically expose vulnerabilities. In Italy, the pandemic emergency uncovered risks of failure of long-term plans on physical activity, making manifest that they are not valued as part of the upstream of health protection strategy. While the general directives strongly point to promotion of physical activity, actual policies are dramatically challenged. This weakness, while revealed by crisis, remains as a predictor of failure independently from current emergency. It is assumed that the phenomena analyzed here characterize a dynamic that can be found elsewhere in the world.

This analysis does not put on balance health protection from the pandemic on one side (by means of social distancing) and from physical inactivity on the other; rather, it concludes that the control of the pandemic can be achieved while preserving physical activity in compliance with social distancing rules. Indeed, the consequences of disproportionate restrictions and of negative narratives risk to generate a public health damage that go beyond the reduced level of activity during lockdown.

The main threat to politics on physical activity appears to be in the intrinsic incoherence of promotion strategies, where physical activity is communicated as a main objective, but it is actually undervalued. This creates a vicious circle with exogenous factors, such as any kind of barriers and stigma, further reducing the power of promotion strategies. Disparity between national

and regional legislations also emerges as a critical factor for the efficacy of policy actions.

By revealing weaknesses, a crisis turns into an occasion for future improvement. For an effective promotion of physical activity, the following are proposed as key elements to preserve:

- 1) Keeping a long-time vision. Interventions should have a decade perspective: returns should be evaluated in the long-term perspective and not on a day-by-day basis; when facing dramatic contingencies, policies should be adapted to the extent that is strictly necessary.
- 2) Keeping a coherent action, ensuring that local measures do not contrast with national measures or with general principles, unless it cannot be avoided due to local contingencies.

## REFERENCES

- Alonzi, S., La Torre, A., and Silverstein, M. W. (2020). The psychological impact of preexisting mental and physical health conditions during the COVID-19 pandemic. *Psychol. Trauma*.12, S236–S238. doi: 10.1037/tra0000840
- Boccia, S., Cascini, F., McKee, M., and Ricciardi, W. (2020). How the Italian NHS is fighting against the COVID-19 emergency. *Front. Public Health*.8:167. doi: 10.3389/fpubh.2020.00167
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., et al. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*.395, 912–20. doi: 10.1016/S0140-6736(20)30460-8
- Centre for Economics and Business Research. (2015). *The Economic Cost of Physical Inactivity in Europe. An ISCA/CEBR Report*. London: CEBR. Available online at: [https://inactivity-time-bomb.nowwemove.com/download-report/The%20Economic%20Costs%20of%20Physical%20Inactivity%20in%20Europe%20\(June%202015\).pdf](https://inactivity-time-bomb.nowwemove.com/download-report/The%20Economic%20Costs%20of%20Physical%20Inactivity%20in%20Europe%20(June%202015).pdf) (accessed November 29, 2020).
- De Mei, B., Cadeddu, C., Luzi, P., and Spinelli, A. (2018). *Movement, Sport and Health: The Importance of Policies for Physical Activity Promotion and Impact on Community*. ISTISAN 18/9 report of the Italian National Institute of Health. Available online at: <https://www.iss.it/rapporti-istisan/> (accessed November 29, 2020).
- Gallagher, S. (2014). The cruel and unusual phenomenology of solitary confinement. *Front. Psychol.* 5:585. doi: 10.3389/fpsyg.2014.00585
- Giordano, G., Blanchini, F., Bruno, R., Colaneri, P., Di Filippo, A., Di Matteo, A., et al. (2020). Modelling the COVID-19 epidemic and implementation of population-wide interventions in Italy. *Nat. Med.* 26:855–60. doi: 10.1038/s41591-020-0883-7
- Goffman, I. (1963). *Stigma: Notes on the Management of Spoiled Identity*. Englewood Cliffs, NJ: Prentice-Hall.
- Guthold, R., Stevens, G. A., Riley, L. M., and Bull, F. C. (2018). Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1.9 million participants. *Lancet. Glob. Health.* 6, e1077–86. doi: 10.1016/S2214-109X(18)30357-7
- Hillman, C. H., Erickson, K. I., and Kramer, A. F. (2008). Be smart, exercise your heart: exercise effects on brain and cognition. *Nat. Rev. Neurosci.* 9, 58–65. doi: 10.1038/nrn2298
- Italian National Institute of Health (ISS) (2020a). *Report of 3rd July*. Available online at: [https://www.epicentro.iss.it/coronavirus/bollettino/Bollettino-sorveglianza-integrata-COVID-19\\_30-giugno-2020.pdf](https://www.epicentro.iss.it/coronavirus/bollettino/Bollettino-sorveglianza-integrata-COVID-19_30-giugno-2020.pdf) (accessed November 29, 2020).
- Italian National Statistics Institute. (2015). *Sports Practice in Italy*. Available online at: [https://www.istat.it/it/files/2017/10/sports\\_practice\\_2015.pdf](https://www.istat.it/it/files/2017/10/sports_practice_2015.pdf) (accessed November 29, 2020).
- Italian Prime Minister's Speech to Parliament on the Restart of Economic Activities. (2020). *held on 30th April*. Available online at: <http://www.governo.it/it/articolo/covid-19-informativa-del-presidente-conte-alla-camera/14550> (accessed November 29, 2020).
- Liu, Y., Yan, T., Chu, J. M., Chen, Y., Dunnett, S., Ho, Y. S., et al. (2019). The beneficial effects of physical exercise in the brain and related pathophysiological mechanisms in neurodegenerative diseases. *Lab. Invest.* 99, 943–57. doi: 10.1038/s41374-019-0232-y
- Nay, O. (2020). Can a virus undermine human rights? *Lancet Public Health*.5:e238–e9. doi: 10.1016/S2468-2667(20)30092-X
- Paakkari, L., and Okan, O. (2020). COVID-19: health literacy is an underestimated problem. *Lancet Public Health.* 5, e249–e50. doi: 10.1016/S2468-2667(20)30086-4
- World Health Organization. (2018a). *Global Action Plan on Physical Activity 2018-2030: More Active People for a Healthier World*. Geneva: World Health Organization Available online at: <https://apps.who.int/iris/bitstream/handle/10665/272722/9789241514187-eng.pdf> (accessed November 29, 2020).
- World Health Organization. (2018b). *Saving Lives, Spending Less: A Strategic Response to Noncommunicable Diseases*. Geneva: World Health Organization. Available online at: <https://apps.who.int/iris/bitstream/handle/10665/272534/WHO-NMH-NVI-18.8-eng.pdf> (accessed November 29, 2020).
- World Health Organization. (2020). *Report of the WHO-China Joint Mission on Coronavirus Disease 2019*. Geneva: World Health Organization. Available online at: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf> (accessed November 29, 2020).

- 3) Keeping a coherent communication, by avoiding delivering negative or incoherent messages affecting the perception of the value of physical activity among society.
- 4) Promoting active interventions to counteract an infodemic of misinformation.

## AUTHOR CONTRIBUTIONS

FR entirely conceived and prepared the manuscript.

## ACKNOWLEDGMENTS

I wish to thank Prof. Antonio La Torre for its valuable advice on the draft of this manuscript.

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Ranieri. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# “Wars” on COVID-19 in Slovakia, Russia, and the United States: Securitized Framing and Reframing of Political and Media Communication Around the Pandemic

Marta N. Lukacovic\*

Communication Studies, Furman University, Greenville, SC, United States

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Yik Chan Chin,  
Xi'an Jiaotong-Liverpool  
University, China  
Michael D. High,  
Xi'an Jiaotong-Liverpool  
University, China

### \*Correspondence:

Marta N. Lukacovic  
mnlukacovic@gmail.com

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 14 July 2020

**Accepted:** 17 November 2020

**Published:** 23 December 2020

### Citation:

Lukacovic MN (2020) “Wars” on  
COVID-19 in Slovakia, Russia, and the  
United States: Securitized Framing  
and Reframing of Political and Media  
Communication Around the  
Pandemic.  
Front. Commun. 5:583406.  
doi: 10.3389/fcomm.2020.583406

This study analyzes securitized discourses and counter narratives that surround the COVID-19 pandemic. Controversial cases of security related political communication, salient media enunciations, and social media reframing are explored through the theoretical lenses of securitization and cascading activation of framing in the contexts of Slovakia, Russia, and the United States. The first research question explores whether and how the frame element of moral evaluation factors into the conversations on the securitization of the pandemic. The analysis tracks the framing process through elite, media, and public levels of communication. The second research question focused on fairly controversial actors— “rogue actors” —such as individuals linked to far-leaning political factions or militias. The proliferation of digital media provides various actors with opportunities to join publicly visible conversations. The analysis demonstrates that the widely differing national contexts offer different trends and degrees in securitization of the pandemic during spring and summer of 2020. The studied rogue actors usually have something to say about the pandemic, and frequently make some reframing attempts based on idiosyncratic evaluations of how normatively appropriate is their government’s “war” on COVID-19. In Slovakia, the rogue elite actors at first failed to have an impact but eventually managed to partially contest the dominant frame. Powerful Russian media influencers enjoy some conspiracy theories but prudently avoid direct challenges to the government’s frame, and so far only marginal rogue actors openly advance dissenting frames. The polarized political and media environment in the US has shown to create a particularly fertile ground for rogue grassroots movements that utilize online platforms and social media, at times going as far as encouragement of violent acts to oppose the government and its pandemic response policy.

**Keywords:** securitization, framing and cascading activation, political communication, media, COVID-19, Slovakia, Russia, United States



## INTRODUCTION

COVID-19 exemplifies a far reaching and multidimensional type of global emergency, where communication plays an important role. The spectrum of communication-related concerns ranges from a type of deliberate strategic messaging by governmental authorities to an "infodemic" of misinformation that spreads online. Interdisciplinary theoretical approaches offer comprehensive tools for analyses to illuminate such a complex maze of phenomena. This paper specifically presents an analytical lens for the examination of frames within securitized discourses and counter narratives that surround the pandemic. The proposed approach is applied to explore controversial cases of security related political communication and subsequent salient media enunciations on COVID-19 responses in Slovakia, Russia, and the United States (US).

Scholars (Vultee, 2010a,b; Watson, 2012) have made a convincing argument for integrating the political science theory of *securitization* (Buzan et al., 1998) with the media/communication model of *framing* (Goffman, 1974; Gitlin, 1980; Entman, 1993, 2003). Securitization reflects on the discursive acts of justification of extraordinary means to eliminate a threat. This sort of process can be essentially understood as a strategic persuasive master frame that is articulated by elites and passed through media coverage, to convince various publics of the appropriateness of the employed measures. In recent years, both conceptions have further evolved within their respective disciplines. Researchers expand and hone *securitization* to address emerging questions and changing dynamics of political communities within current contexts such as globalization. Important examples of these novel endeavors are in the growth of literature on *just securitization* (e.g., Floyd, 2019a) or the *health security* sector (e.g., Bengtsson and Rhinard, 2019). Communication scholars advise the revamping of *framing* to acknowledge disruptions of global media environments amid digitalization and the proliferation of internet platforms. A noteworthy example is a focus on *rogue actors* who disrupt persuasive framing routes initiated by elite politicians and legacy media organizations (Entman and Usher, 2018). These current developments are yet to be translated to the theoretical and empirical intersections between framing and securitization. Such a course is arguably necessary as it can reveal important insights on some of the highly concerning developments related to COVID-19.

Three cases are examined to verify the extent of applicability of securitization/framing as an updated analytical lens. Slovakia offers an instance of high and midlevel political elites contesting securitization of public health, economic threats, and human rights. One particularly controversial aspect of Slovakia's pandemic response involves unconstitutional surveillance legislation. The Russian case illustrates how legacy and digital media opinion leaders compete over the dominance of different framing streams. Nationalistically oriented Russian pundits discuss the situation around the novel coronavirus outbreak with frequent allusions to WWII commemoration and other remarks to reassert Russian exceptionalism. The US state of Michigan is an example of a place where anti-government and

far-right militias protested in a standoff against the Governor's administration. The case gained international notoriety when militia members, armed with assault rifles, stormed the Capitol building in protest of stay-at-home orders. This type of "activist" activity reflects deeper issues within American society, which has been intensely polarized long before the infectious illness reached the country. This is painfully clear as the Boogaloo online movement attempts to co-opt the pandemic to start a civil war. The cases encompass a diverse set of circumstances and different types of political systems. All three cases exemplify controversial securitized framings around the threat of COVID-19, while the main arena of each manifests a distinct level of the framing process. Interesting contrasts and linkages materialize when considering the normative dimensions of the securitization argument and counterarguments emerging in the negotiations over how morally just is the "war on COVID." The details of the process are further investigated through qualitative frame analysis. This study indeed puts the explanatory validity of the proposed theoretical framework to the test. Interdisciplinary theory building effort benefits from validation across such varied situations.

Beyond the scholarly theory building interest, this study offers valuable insights into communication surrounding problematic sociopolitical developments that are occurring in different locales around the world. Henceforth, practitioners of public relations, political consultants, journalists, and several other types of specialists can find valuable information through securitization/framing analysis. Impacts of COVID-19 are likely to be massive across numerous dimensions of global life. Rigorously informed approaches can become vital for mitigating the negative impacts of the pandemic. This article aims to provide one step toward the facilitation of an analytically informed look into the political and media communication processes that accompany the pandemic in Central Europe, Eurasia, and North America.

## REVIEW OF LITERATURE

The Copenhagen School's securitization as conceptualized by Buzan et al. (1998) represents an influential theory which is widely cited and utilized not just within its original international relations field, but across a plethora of fields and areas of inquiry (Baele and Thomson, 2017). In short, Buzan et al. characterize securitization as a speech act process, through which an actor implies that an existential threat looms over a significant referent object, and therefore certain extraordinary measures must be imposed to protect the referent object. Among the most noteworthy contributions of the securitization theory is widening the comprehension of the phenomenon of security and its accompanying occurrences. The following paragraphs first highlight some of these noteworthy components of securitization theory and then offer an account of the role that communication, specifically framing, plays in the securitization processes.

Buzan et al. (1998) conceive securitization as a situation where the referent object is not limited to just a nation-state. Several other collective units may and frequently do perform as referent

objects; for instance, an ethnic group, a political group, a religious group, or even such broad collective units as an international pact, or a civilization (Buzan and Waever, 2009; Sperling and Webber, 2019). Furthermore, the possible assortment of referent objects is not restricted to human collectives but may include other concepts, such as a culture, an ideology, the cyberspace, or the climate. The defining feature determines that a referent object is accepted as worthy of protection and preservation by the larger society, or is accepted as such within a vital enough segment of the society.

Copenhagen School also argues that military related and sovereignty related understandings of securitization as applied to nation-state level are too constricted and do not fully capture a set of phenomena that are perceived and treated as security risks in societies (Buzan et al., 1998). Securitization scholars propose various security sectors including cybersecurity (e.g., Hart et al., 2014); economic security (e.g., Floyd, 2019b); health security (e.g., Kelle, 2007; Youde, 2018; Bengtsson and Rhinard, 2019); environmental security (e.g., Floyd, 2007; Fischhendler et al., 2016; Maertens, 2019); climate security (e.g., Scott, 2012); food security (e.g., Nussio and Pernet, 2013); or water security (e.g., Allouche et al., 2011). Depending on the context, the list of prospective security sectors is virtually unlimited, as long as other conditions for securitization are met. Floyd (2011, 2019a) also stresses the normative stipulation of the referent object, which ought to be an ethically appropriate entity to be protected.

A security threat does not necessarily imply complete physical destruction but might imply changing, or seriously altering, the essence of the referent object (Buzan et al., 1998). This is still in a way an existential threat. An example can be drawn from the environmental and ecological security sector. While with the extinction of certain species, an ecosystem does not necessarily completely cease to exist, it is altered from its previous form (Inouye, 2005). This alteration is considered securitized if it is believed to corrupt the essence of the referent object; the essential characteristics of the particular ecosystem in the example. So the threat must contravene an existential factor in the interpretation of the securitized discourse. Just as a military conflict does not always lead to the total obliteration of a political nation or a genocide of its people, wars bring other risks such as abridging traditions or liberties, which also represent existential attacks on the nation's defining essential features.

A crucial tenet of the theory poses that securitization is used for advocating extraordinary measures to mitigate the threat (Buzan et al., 1998). The Copenhagen School defines these types of measures as such procedures and actions that stray away from normal politics and at times even the usual principles of liberal democracy. Henceforth, securitization has been initially propositioned as a rather problematic occurrence. From this understanding, securitization is a power grabbing tool, which allows politicians and elites to bend the democratic principles that they should uphold. This reasoning reflects the formula that more security means less liberty and vice-versa, but also it pre-supposes that issues usually have possible liberal-democratic political solutions that should fit within the "normal politics" and do not necessitate extraordinary measures.

However, other securitization scholars challenge the validity of the assumptions around extraordinary measures. Bourbeau (2014) points out many securitization processes are accompanied by very non- extraordinary measures. Leonard (2010) illustrates that securitization can be accompanied by measures which might be new to the specific issue but in of themselves are rather routine practices. Floyd (2016) explains how measures that result from securitization may simply encompass a change in behavior, and does not have to be particularly extraordinary but is nevertheless relatively substantial. Floyd (2011, 2019a) problematizes the theory's normative assumption, which is against extraordinary measures, as she instead proposes a just security theory inspired by the just war theory.

Upon reflecting on the key arguments of the securitization theory as well as some resonant critiques, the following working definition of securitization is employed in this article. The first tenet; securitization is a discursive act (Buzan et al., 1998). The second tenet; through securitization, a securitizing actor persuades that a normatively worthwhile referent object is under an existential threat (Buzan et al., 1998; Floyd, 2011, 2019a). The third tenet; the securitizing actor further argues that specific measures must be implemented to mitigate the threat; while the characteristics of the mitigating measures vary, some may include relatively extraordinary emergency procedures that are normally not employed in relation to the situation (Floyd, 2011, 2019a). The fourth tenet; securitization and its measures may be negative, positive, or mixed depending on a holistic normative evaluation of the relevant circumstances (Floyd, 2011, 2019a). This assemblage of defining tenets retains some important key arguments of the Copenhagen School but also incorporates significant amendments and additions that have emerged in the last two decades.

Buzan et al. (1998) describe securitization as a speech act implying a constructivist notion where the persuasive discursive process leads to the formation of particular realities. So, for some actors, securitization handily serves as a useful strategic tool enabling certain (perhaps extraordinary) measures, which consequently fortify the competitive positions of the actors in the political arena. The point that securitization is a speech act, an act of communication, pre-supposes there is an audience interacting with the persuasive message articulated by the actor. Copenhagen Schools poses that securitization succeeds when the audience accepts the actor's securitizing move with threat allegation and the prescription of response measures.

Communication scholarship has understandably taken notice of the securitization theory. However, Watson (2012) alleges the American academia, which is the largest and rather dominating in the global communication literature, has not engaged the securitization theory as much as is possible, and as can be possibly useful for the explanation of important phenomena related to communication aspects of securitizing processes. Within the more recent years, communication researchers continue to involve securitization theory (e.g., Engelbert and Awad, 2014; Vultee et al., 2015; Fischhendler et al., 2016; Chouliraki and Georgiou, 2017), but the aggregate body of the integrated communication securitization literature remains rather thin.

Vultee (2010a,b) and Watson (2012) propose conceptual merging between securitization and the media/communication model of *framing* (Goffman, 1974; Gitlin, 1980; Entman, 1993, 2003). The model/theory of framing has several paradigmatically diverse articulations within the field of communication (e.g., Entman, 1993; Pan and Kosicki, 1993; Scheufele, 1999; D'Angelo, 2002). One of the most widely cited formulations of framing is Entman's frame as a structure that defines a problem, attributes causes, makes moral evaluations, and proposes solutions to the problem. According to Entman, the structure of the frame exists in several incarnations. First, it is a discursive structure within persuasive messages of political figures and other elites who make appeals within the sociopolitical conversation arena. A frame is also a media coverage structure. Within this incarnation, a frame serves to select particular discursive features to accompany the news coverage. These discursive features include the choice of words, definitions, illustrations, visuals, etc. Another incarnation of a frame is when it functions as a cognitive shortcut—a psychological schema, which serves in the perception of individuals—of the public—to interpret events. The multiform character of frames is summarized by Entman et al. (2009) in that "framing is an individual psychological process, but it is also an organizational process and product, and a political strategic tool" (p. 175).

The various incarnations of frames are linked within Entman (2003) cascading activation model. This process suggests that frames are frequently conceived by members of the elite, including but not limited to governmental officials. The individuals with such influence and media visibility are considered to be positioned at the top of the cascade. Then the elite discursive frames go through the filter of mass media organizations, which are the middle portion of the cascade, where some type of reframing may or may not occur. For instance, if a frame is highly contested among the elites, likely, this frame also gets more challenged within the media coverage. Finally, the media content frames are depicted to the mass audiences via the media coverage. The interpretations suggested through the mediated frames interact with the cognition of the viewers, listeners, or readers, who consequently accept or reject the frame. Frames can originate within any level of the cascade, not just among the elites. But for a frame to travel metaphorically up-the-cascade, it is rather challenging and rare. Hence, first political elites, then the media elites, and then members of the public have a different magnitude of ability to advance their framing through the cascade. The metaphorical gravity force privileges those with power and media access.

The cascading activation model allows for an explanation of the functioning of securitization as a communication framing phenomenon. Elite actors strategically assert securitizing frame, which defines the problem as an existential threat, and where the suggested solution involves a specific set of measures. Vultee (2010a) suggests that securitization is "an organizing principle invoked by political actors—and, crucially, amplified, or tamed down by the news media—in an effort to channel the ways in which issues are thought about" (p. 78). Buzan et al. (1998) consider securitization "successful" once the target audience, for instance, the voters among the public, accepts

securitization and the specific measures it has requested to employ. So it can be concluded that from the Copenhagen School's perspective, securitization is complete once the frame remains rather intact as it traverses through the cascade and is embraced by the media and the public. Entman (2003) posits that the success of a frame depends on a number of factors, including the degree of contestation of a frame on different levels, the interaction of the frame with other significant frames, and the overall cultural congruence of the frame. Accordingly, empirical studies demonstrate that securitization may fail under certain circumstances when crossing through the media level (Vultee, 2010b) or also it may be rejected by members of the media audience (Vultee et al., 2015).

Watson (2012) asserts framing and securitization create promising theoretical tandem: "not only that these two bodies of work are compatible and based on strongly overlapping theoretical and normative commitments, but also that "security" operates as a distinct master frame similar to "rights" and "injustice" and that securitization theory may usefully be understood as a subfield of framing" (p. 280). Consequently, this paper attempts to advance the theoretical combination by considering the recent advances in both theoretical reservoirs, identifying noteworthy overlaps, and applying the framework to an important contemporary issue – the COVID-19 pandemic.

## KNOWLEDGE BUILDING AND THEORETICAL FRONTIERS

Copenhagen School stresses the audience's acceptance of the securitizing move and consequent measures is central to the actualization of securitization (Buzan et al., 1998). The audiences of securitization primarily include the other elites, the security professionals, and the public (Salter and Piche, 2011). A larger number of these stakeholders receive the majority of the securitizing messages through media. Except for the already referenced works of communication framing scholars, the media are not receiving a substantial place in securitization literature. Some studies offer a limited scope for mentions of the media as sites of manifestations or as mere tools for the securitizing actors (e.g., Bengtsson et al., 2019). However, it is rare to see more extensive discussions of the active role of media organizations and media elites in securitization, such in Engelbert and Awad (2014) and Lorenzo-Dus and Marsh (2012). A discussion of the role that digital media platforms play within the processes of securitization is rarely analyzed (e.g., Chouliaraki and Georgiou, 2017). Literature offers works where cyberspace is considered a referent object of securitization (e.g., Christou, 2019). Cascading network activation of framing highlights the level of media, where media-elites, other important media gate-keepers, and other journalistic professionals exercise a degree of influence, through which frame elements are subdued or emphasized (Entman, 2003). Thus, cascading activation stipulates an analytical tool, which can significantly enrich the understanding of the process of securitization. Specifically, cascading activation can provide an insight into what happens

as a securitized frame is processed through the mass media level before arriving to the target audience.

When discussing contemporary media theory, there are some arguments that the theoretical frameworks may have to be revamped to fully account for emerging media technologies and platform, which in some cases alter the nature of experiences, effects, or normative implications beyond the specifications that the older theories describe (Bennett and Iyengar, 2010; Holbert et al., 2010; Ward and Wasserman, 2010; Ward, 2014; Aruguete and Calvo, 2018). Analogously, Entman and Usher (2018) acknowledge that with the development of new digital media platforms, some previously proposed models—including cascading activation—must be revisited and updated. The authors assert that the cascading activation still provides an important explanatory tool, as even in the environment of digital media platforms, elite figures such as top level politicians have an upper position within the cascade. While many citizens now enjoy more opportunities to voice their opinion thanks to social media and other products of digital technologies, the citizens still cannot rival the agenda-setting power of elites and mainstream media. Yet, for certain strata of the population, the influence of elite or mainstream media over the agenda decreased through what Entman and Usher label as “pump-valves” (p. 298) that redirect the stream of frames through the cascade. Examples of the pump-valves include *ideological media* or *rogue actors*. It is yet to be explored what such pump-valves of framing do when intersecting with a securitization process.

The COVID-19 pandemic provides an opportunity to explore the above outlined quandaries. The measures that were implemented across different global societies were already

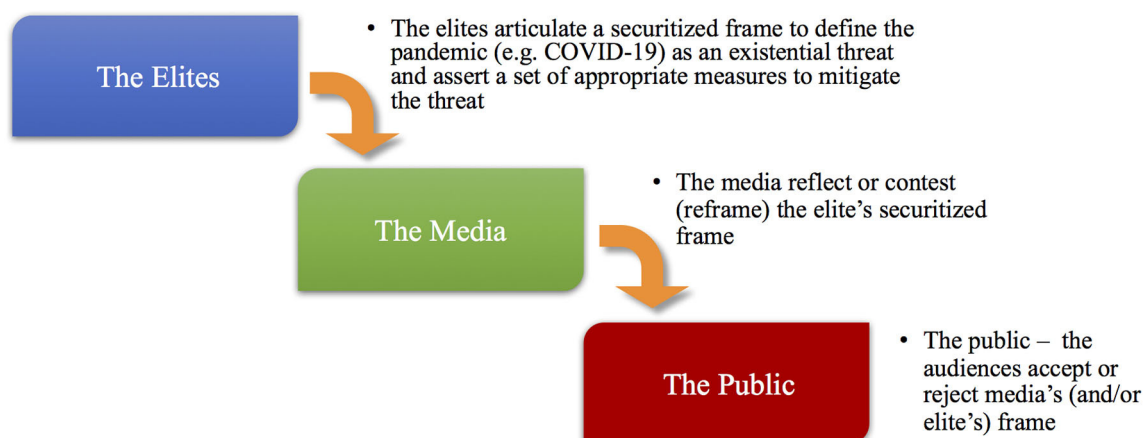
identified as cases of securitization by pundits and researchers (Al-Sharafat, 2020; Eves and Thedham, 2020; Krasna, 2020; Sears, 2020). Hence, the pandemic offers a natural laboratory of cases with various characteristics (see **Figure 1**).

An important theoretical and ethics related discussion that is occurring in connection to securitization within the health sector addresses the normative dimension—or simply put the questions on whether it is right or wrong to securitize health (Roemer-Mahler and Elbe, 2016). Authors document serious ethics issues (e.g., Youde, 2008) as well as compelling cases for normative strengths that stem from health securitization (e.g., Aradau, 2004; Sjostedt, 2008). The perplexing normative deliberations around health securitization reflect a broader conversation on the ethicality of securitization. The work of Floyd (2011, 2019a) articulates a just securitization theory, which is inspired by the just war theory. As Floyd stresses, the theory should be informed by other relevant ethics frameworks to define when a case of securitization is right vs. wrong. According to Floyd's work, justice within securitization is determined by certain key factors such as; a presence of a real existential threat, a just referent object, the appropriate motivations of the securitizing actor, an appropriate form of countermeasures against the threat, the reasonable chances of success of the measures, and appropriate termination of the securitization. It has not yet been described through any empirical studies whether and how the normative aspects of securitization debate occupy any prominent position through the framing process as it happens in practice.

Analytical studies can provide insights into whether the discussions on just vs. the unjust character of the securitization of COVID-19 emerge within the multilevel cascade of framing

## Cascading Activation of Securitization

This diagram captures how elite-conceived security master frame passes through the cascading activation process [merging the securitization theory by Buzan et al. (1998) and the cascading activation model by Entman (2003)].



**FIGURE 1 |** Cascading activation of securitization. Elite-conceived security master frame passes through the cascading activation process [based on works of Buzan et al. (1998) and Entman (2003)].



that functions as a stream of securitized discourse. Hence, the first research question guiding this specific analysis aims:

RQ1: How does the "moral evaluation" frame element factor into framing and reframing of securitization of the COVID-19 pandemic?

It also remains curious how the phenomena of (a) the cascading activation of framing, (b) the contemporary platforms such as digital media, and (c) the securitization processes collide. COVID-19 offers a massive depository of case studies where such intersections transpire. Therefore, to narrow the focus, this study hones in on potential rogue actors (Entman and Usher, 2018), so those who are likely to use digital platforms for the advancement of adversarial frames:

RQ2: How do certain controversial actors (or rogue actors) intersect with the framing process of securitization of the COVID-19 pandemic?

Lastly, the article's author hopes that a byproduct of the analysis can supply useful insights for a plethora of practitioners who address processes around the pandemic or some similar problems.

## ANALYSES

### Approach to Analysis and Tools

The analysis of the framing process is the main tool for this exploration. This is accomplished by looking at three different cases, where each offers a noteworthy deeper look into a specific level of the Entman (2003) framing cascade: (a) the elite, (b) the media, and (c) the public. Entman and Usher (2018) propose an update to the model for situations where the framing streams separate as differing ideological pump-valves redirect the framing to particular constituencies. The pump-valve concept is applied within this analysis as well. The systematic approach of analyzing a discursive unit through the lens of frame elements (Matthes and Kohring, 2008) enables tracking the component of moral evaluation in each line of framing that is encountered within every studied case.

The cases were selected based on media prominent controversies around COVID-19, and where it is possible to focus on a different level of the framing cascade. The analysis tracks reactions of radical factions within each context—thus, each context must include some type of possible rogue actors. The comparison of radically oriented groups and personalities offers an interesting cross-sectional look at a spectrum of counter-frames to the government's securitized measures in connection to the health crisis. The cases of Slovakia, Russia, and the US facilitate this type of exploration. It is vital to illuminate cases from a few different parts of the world, as COVID-19 is such a global phenomenon that insightful research can uniquely benefit from internationally eclectic studies. The specific materials that are analyzed include various relevant artifacts that are available, such as news stories, politicians' speeches, press releases, published analytical works, or content posted on the social media profiles of the relevant actors and groups.

### Slovakia; Extra Focus on the Elite Level

The onset of the global crisis surrounding the pandemic of COVID-19 offers a plethora of illustrations of securitization. One such case is Slovakia initiating numerous emergency measures in mid-March 2020. Slovakia was among the first European Union (EU) nations to close borders to all non-residents. This means that the citizens of fellow EU nations could no longer enter. Slovakia belongs to the Schengen area of the EU, meaning before the COVID-19 measures were implemented, the borders would be completely abolished between the other Schengen countries. All this was dismissed due to COVID-19. Additionally, the government promptly imposed a number of restrictions such as business and school closings. Besides mandatory restrictions, the government asked for compliance with other non-mandatory but recommended measures, for example, an appeal to wear facemasks in public. While the set of practices was very unusual, and in some ways disruptive to the typical life in the small East-Central European country, the media and the public showed an intense degree of compliance with the securitization (Beblavy, 2020; Steno, 2020).

The cascading activation of framing model provides an insight into the successful securitization of the pandemic in Slovakia. During the onset of the crisis, the serving Prime Minister (PM)—the executive head of the government of the country—was Peter Pellegrini, who set the initial frame of securitization. Pellegrini has deliberately and consistently framed the situation as a type of "war" with existential repercussions. For instance, he remarked in his speech that the nation is in war and "we must win this war with as little losses as possible" (Pellegrini, 2020, p. n. d.). Other elites across the majority of the political spectrum have employed similar framing of the pandemic as an existential, war-like threat. Thus, the other elites have not contested the securitization of Pellegrini. The consensus proved to be particularly critical as just when the outbreak reached the country in March, the executive branch of the government was in the midst of a transfer of power between outgoing Pellegrini's cabinet and incoming Igor Matovic's cabinet. Media frames mirrored the elite consensus of defining the COVID-19 as an existential threat. So in the language of cascading activation, the frame remained uncontested in March as it was advancing down the cascade.

Yet, the political fights between the government coalition and the opposition are fierce in Slovakia, which tends to be the case within multiparty political establishments. While the defining of COVID-19 as a threat is not subjected to scrutiny within these fights, the measures began to be questioned. The main controversy as related to COVID-19 measures was PM Matovic's coalition's Act on Electronic Communication legislation passed on March 25, 2020. The European Union Agency for Fundamental Rights (2020) writes on the content of the new legislation:

"... the data that are subject to telecommunications secrecy may be made available to the Public Health Authority at the time of emergency in the health service for the purpose of their collection, processing and preservation to the extent of necessary for the

identification of natural persons in order to protect life and health." (p. 12)

International reports also describe the law as a potential breach of commitments to democratic values and the individual rights of the citizens (Verseck, 2020). The members of the opposition, including the former PM Pellegrini, reacted by fervent disagreement with the law, primarily citing the normative concerns over liberties. The opposition politicians nickname the law as "špehovací zákon" meaning the "stalker law." Finally, the oppositional members of the National Assembly appealed the law to the Constitutional Court of Slovak Republic (Ústavný Súd Slovenskej Republiky). On May 13th, 2020, the Court ruled the law conflicts with the country's Constitution and thus terminated its effectiveness (Barr, 2020). The prompt institutional reaction might have not prevented the questionable law from causing further fractures in the general trust that the broader public has in the system's response to COVID-19. This issue and the rise of online misinformation and disinformation campaigns contribute to increased diversion in the acceptance of government's securitization of COVID-19 throughout summer 2020.

Elite contestation of the current securitization frame was introduced by a far right-wing political leader Marian Kotleba, the head of the party LSNS, which received ~8% of the electoral support in the parliamentary election in February 2020. Thus, Kotleba can be considered an elite in a sense of a being leader of the National Assembly party, but he represents a limited segment of the population. His party does not enjoy an association with any significant allies and is rather a pariah on the Slovak political scene. Kotleba has a history of being a member of a militia style organization, the Slovak Brotherhood (Slovenská Pospolitosť). In April, Kotleba published a YouTube video, where he offers criticism of securitization of COVID-19, and asserts that the key interpretation of the situation should be seen as an attempt of foreign powers to take over Slovakia and "enslave Slovaks" through economic means (Kotleba, 2020). Kotleba also adds a large dose of conspiratorial remarks including the infamous "microchip-infested vaccine" trope, which shifts his claims into a rather marginalized arena of conversation. Kotleba's contestation of the general frame was met with reluctant acceptance. Another high-profile member of LSNS, the European Union Parliament Member Milan Uhrík, evaluated Kotleba's statements with some degree of disagreement when asked during a podcast interview in May of 2020. Uhrík even laughed about Kotleba's idea of a nefarious mind-controlling microchip in the vaccine and remarked "it is not likely possible" (Uhrík, 2020, p. n. d). Kotleba's early interpretation of the situation fell short of offering a counter-frame to the strong normative claims of both Pellegrini and Matovic on the commitment to protect the elderly. Perhaps Kotleba's fear of economic enslavement could have served as a normative counterargument, but he does not make that assertion. Kotleba's counter frame was initially failing to build a necessary momentum to seriously challenge the dominant frame. However, during summer, Kotleba along with some rogue actors from among social media influencers continued questioning governmental policy and spreading counter narratives through

the internet. Later in summer 2020, Kotleba centered more on specific arguments of alleged adverse health effects of facemasks and the protection of children from these threats. For instance, Kotleba claims "facemasks are harmful to human organisms due to carbon dioxide" (TV Noviny., 2020, p. n. d.). Facebook has blocked Kotleba's video due to complaints it represents a hoax. Notably, once Kotleba fortified the normative basis of his frame as a matter of freedom, protection of health, and protection of children, his appeals have started to become more popular. Indeed, more of LSNS members and sympathizers started joining Kotleba's calls to actions such as a refusal to wear facemasks (SME., 2020). Another high-profile LSNS member, Milan Mazurek, as well as Uhrík shared a Facebook post that contributes to the "protection of children" spin claiming that the policy of requiring preschoolers to wear facemasks is a product of "heartless hyenas" (Mazurek, 2020, p. n. d.).

Conversely, another active paramilitary organization was involved in the pandemic containment efforts in spring. The militia-style organization Branci—or Slovenski Branci (Slovak Defenders)—was in the past considered by some as a possible threat to the state's security (Turecek and Sabo, 2019). Yet, the organization seems to embrace the current state's securitization of the pandemic situation. Branci used their social media to show activities such as the distribution of groceries to the vulnerable elderly people, distribution of facemasks to the marginalized Romani people in impoverished slums, or training the practice of disinfection procedures. Furthermore, it is visible that the militia members are wearing facemasks and hand gloves during their spring photo ops that are shared via the organization's Facebook page (Slovenski Branci., 2020). Later during the summer, Branci started to stay away from the topic of the pandemic and focus on other issues. It appears that this group is attempting to step out of the shadow of being viewed as a rogue. Branci's normalization attempts are backed up by an important sponsor—the organization is a protégé of Jan Carnogursky, a former PM of Slovakia (Turecek and Sabo, 2019; Carnogursky, 2020).

The general bulk of citizens has thus far complied with both mandatory and requested measures, and as of early summer 2020, Slovakia has belonged to the countries with one of the most contained COVID-19 outbreak on a global level (Beblavy, 2020).

It is also important to remark that just as Entman and Usher (2018) foresee, certain aspects of cascading activation remain powerful even within the environment of widely used and popular alternatives and social media platforms. This is reflected in the fact that popular Pellegrini's Facebook videos, including ones on COVID-19, reach as many as 700 thousand views (Slovakia is a country of ~5.4 million inhabitants). Hence, the elites are on the top of the hill of the metaphorical framing cascade. However, the influence of far right political elites and online rogue actors in impacting the frame should not be dismissed. While only 11.1% of Slovaks was reporting unwillingness to wear facemasks in April, it increased to 35.4% in September of 2020 (Habas, 2020), which is a number that far exceeds the electoral support of Kotleba. Hence, the decreasing compliance among Slovaks is likely to be related to a more complex set of factors, where the influence of other rogue actors might play a role that should be explored by future research.

Still, it is important to consider ripple effects of ruptured public trust in the administration due to missteps such as PM Matovic's "stalker law," which also might play a role in weakening the compliance with counter pandemic measures.

## Russia; Extra Focus on the Media Level

Russia represents a case where the elites are fairly consolidated after two decades of the rule of President Vladimir Putin (between the years 2008–2012 Dmitry Medvedev was the President, but Putin remained vitally influential as the Prime Minister during that period). Putin has experienced numerous crises of varying degrees of intensity including armed conflicts, terrorism, civil unrest, devastating wildfires, and economic sanctions. Besides other crises, Russia deals with public health related problems, which are common for nations of such size and a recent history of political transition. In the past, Putin's administration has securitized the HIV-AIDS pandemic (Sjostedt, 2008), which shows that the elites have utilized the securitization frame to justify novel measures to mitigate a health problem.

With the outbreak of COVID-19, Russia has also adopted broad restrictive measures. Although, Putin has not utilized existential threat framing of the situation with COVID-19, nor has he used an outright "war" assertion, unlike Pellegrini. In his April 28, 2020 speech, Putin describes the pandemic as a "threat" and a "danger," but he does not specify this is a threat of an existential dimension, and therefore it cannot be considered a pure example of straightforward securitization. Putin further asks the citizens for "discipline and mobilization" as "the more careful we will be within the next few days, the faster we can return to the normalcy" (Putin, 2020, p. n. d.). Thus, Putin leaves the interpretation of the situation somewhat ambiguous and keeps his own remarks agreeable and general enough. This might be a deliberate strategy of Putin to allow himself a maneuver space if certain policies do not work out well. Some critics of the President allege that Putin's typical strategy is to associate his name with successful projects and "scold" other officials for failed projects. But more insights can stem from an examination of the media framing of the situation—particularly how the media elites retell or expand the frame.

Russia serves as an interesting case to consider in connection to the media level framing, especially as certain Russian media elites are considered imperative opinion setters and influencers. An important media elite figure is Vladimir Solovyov, who hosts a popular nightly show on Russian federal television as well as a daily online podcast show. Solovyov is a vocal supporter of Putin and his policies, and he employs a particularly confrontational style during interviews of his guests, which leads some critics to label him the regime's lead propagandist. Solovyov is also identified as an influential media agenda-setter; for example, he started to frame the Russian response to the Ukrainian crisis through an ethno-nationalist perspective before Putin started employing that specific frame (Tolz and Teper, 2018).

In spring and early summer 2020, Solovyov has offered extensive time to coverage of COVID-19 and still periodically remarks on the pandemic. Throughout Solovyov's narrative, he characteristically expresses trust in Putin administration's

response and management of the pandemic. In terms of normative aspects, he uses the situation to reassert the superiority of the value system, which he believes is characteristically intrinsic for Russia. For example, on July 7th, Solovyov proclaims that COVID-19 helps to demonstrate that the Western assertion of freedom as the major value is wrong (Solovyov, 2020). His guest reminds Solovyov that the mainstream Western conception defines one's freedom as ending exactly where another one's freedom begins, and thus the needs of practicing social distancing to prevent the spread of disease still fit well within the Western framework on the superiority of liberty. To this assertion, Solovyov responds highlighting that it is not about where another individual's freedom begins, to him it is more about the benefit of the society as a whole. Further, Solovyov explains his argument as based on Russia's cultural commitment to a more collectivism-inspired hierarchy of values. This type of argumentation is usual for Solovyov; philosophical deliberations are common for his shows.

Several other media elites appear on Solovyov's shows as pundits. For further analysis, the focus is on some specific individuals from among those pundits who, besides Solovyov's show, have an additional high profile legacy media or social media presence and an established track record of attempts to influence the public agenda, even if it involves some radical actions. First, one such media elite pundit is Sergei Kurginian (another version of English spelling of his name is Sergey Kurginyan). Besides frequently appearing on Solovyov's Sunday show, Kurginian is a well-known commentator (Lichtenstein et al., 2019). He appears on federal media and also on the YouTube channel of his Marxist-nationalist organization Sut' Vremeni. This organization includes a paramilitary wing and was involved in the war in Eastern Ukraine, which started in 2014. On the Sut' Vremeni channel, Kurginian stars in a series of lectures on the geopolitics of COVID-19. Through these lengthy narratives, Kurginian offers a number of alternative accounts including certain conspiratorial versions. However, the dominant reoccurring common frame of his interpretation asserts the necessity for reemergence of Russia as a global leader to advance new articulations of the Marxist-Leninist philosophy. One episode of Kurginian's series prominently uses a phrase "arise, vast country," which is a line from the famous WWII song "Sacred War" (Kurginian, 2020). So Kurginian alludes to the paramount Russian national myth, which is deeply rooted in commemoration of the WWII victory (Khrebtan-Horhager, 2016). In the atmosphere of the celebration for the 75th anniversary of the defeat of the Nazi Axis, the topic is particularly relevant. For Kurginian, the country needs to arise now to face the broader threat of the anti-humanist capitalist system, which is trying to gain advances through the exploitation of COVID-19. Hence, Kurginian twists the pandemic crisis to further reaffirm the exceptionalism of Russia. Also, he proclaims his usual point of the moral decline of capitalism. Kurginian's perspective is representative of one whole line of reasoning among recognizable Russian media personalities, which is cooption of COVID-19 toward an argument of proving the previously advocated points. Some pundits like Kurginian and famous filmmaker Mikhalkov

(2020) develop more conspiratorially leaning ideas than Solovyov who is fully supportive of the official government's line of explanation and action.

The second illustrative type of pundit is the writer Zakhar Prilepin. His background includes a successful career of fiction writer, pro-nationalist activism, and involvement in paramilitary warfare on the side of pro-Russian irredentists for the self-proclaimed Donetsk People's Republic in Eastern Ukraine (Laruelle, 2019). His public influence has been increased by Prilepin's membership in the official state committee that worked on the Amendments to the Russian Constitution in 2020. Prilepin appears on federal media channels as host, interviewee, and additionally, much of this content is also available on digital platforms such as YouTube. Two spring episodes of the show that he hosts for the federal-reaching channel NTV, titled "Russian Lessons," were devoted specifically to COVID-19. Prilepin proposes that pandemics are occurrences that periodically plight societies. However, Prilepin stresses that the society is not likely to change due to this difficult situation and it is crucial to focus and work toward what according to him is essential for Russians; "honor, family, children, dignity, motherland, nation, kin, and God" (Prilepin, 2020, p. n. d). Thus, Prilepin challenges the definition of a problem amid the securitization. For him, the normative hierarchy predetermines what needs to be the central focus of attention instead of the focus on the pandemic.

The individuals like Kurginian and Prilepin are at times criticized as tolerated or even "controlled" opposition in Russia. An example of an outside-of-the-system critic of the government is Igor Girkin, also well-known under the nom-de-guerre Strelkov (Laruelle, 2019). He is considered to be the best known Russian warlord, who took part in several armed conflicts in and outside of Russia, including most recently in the war in Eastern Ukraine. He uses alternative media options such as the internet and social media to present his views. There he ridicules the government's measures around COVID-19 and makes derogatory statements about people who wear masks. He expresses displeasure that many Moscow residents wear masks. Girkin (2020) asserts he refuses to wear a mask because it is "cowardly." Overall, he does not provide any alternative course of action. His somewhat grumpy criticism is resembling the early iteration of Slovak Kotleba's underdeveloped frame without coherent ethical reasoning, rather than the more robustly crafted normative arguments of his Russian rivals Prilepin or Kurginian. As Laruelle (2019) observes, Girkin generally tends to present positions that are adversarial toward Putin's government, but currently Girkin does not possess a massive public influence and thus hardly represents a true challenger to the regime, so the authorities let him roam and talk. His weak COVID-19 counter-frame is an example of rogue media diversion, but it will hardly mobilize any masses—at least not in any foreseeable future.

The scrutinized Russian media personalities' reactions to the pandemic either support the government or offer an indirect or laconic criticism. It is important to note that the government imposed a strict anti-hoax policy, which criminalizes "COVID-19 dissidents." That may be an explanation why the reframing attempts must be sandwiched between long hours of commentary as Kurginian does, or just described as less significant issues

than others as Prilepin does. The ideological pump-valves are actively at work within the Russian media-sphere, while still playing the game safe enough within the rules as determined by the system of "managed democracy" in the country. The Russian pump-valve operators (the pundits) frequently develop arguments based on moral evaluations and normative reasoning. Various segments of Russian society can find their niche among the media personalities' camps. The analysts and practitioners focusing on pandemic-related communication in Russia should pay attention to how the influence patterns of Russian political and media communication work. An extensive understanding of the culturally appealing themes and the public communication system with its logic is crucial. For instance, the WWII narratives play a more significant role in Russian framing of COVID-19 than would be true in other countries, but missing such an important component may weaken a broader campaign.

## United States; Extra Focus on the Public Level

In Slovakia and Russia, the elevation of COVID-19 to the high salience of public interest was accompanied by a rather coherent narrative on the issue and relative elite agreement on the main interpretations. The onset of the pandemic was accompanied by more perplexing political communication in the US. Initially, President Donald Trump has made several statements that can be interpreted as normalizing the disease by comparing it to a common cold for instance (Brooks, 2020). However, Trump and his administration have also adopted a type of securitized framing, particularly when the pandemic had begun to occupy the main public agenda in March 2020. Specifically, Trump and some of his high officials started to compare the situation to war, but in a sense of economic security and/or security against an external threat, specifically China (Hansen, 2020). The Chinese Communist party is frequently framed as the key enemy culprit, which aligns with the culturally congruent demonization of Communism that happened during the decades of the Cold War (Herman and Chomsky, 1988). The left of the American political spectrum has been generally calling for more robust containment measures. One of the gravest normative issues raised across the public conversation addresses the problematic tendency of dismissing the concerns for those who are more vulnerable to severe consequences of the illness—who are disproportionately more likely to be the elderly and people of color (Harrington, 2020). Raising concerns that ageist, racist, and also classist tendencies are at play, leads to rather intense conflicts within the American political arena and general public communication sphere.

The elite cleavages within the US were quickly woven into the framing competition over COVID-19. This is very interesting in the sense that various securitizations are happening on the elite level and can be seen transferred into the media discourse, along with the track of ideologically informed pump-valves (Entman and Usher, 2018). The conflicting securitization discourses are perplexed as different states of the US implement not just different measures, but also different framings surrounding the measures.



Certain radical grassroots organized events and actions in the US have reached a level of national and even international attention. An internationally covered event was a protest in Michigan, which gained notoriety as several men with firearms and paramilitary gear entered the building of the State Capitol (Beckett, 2020). The visuals of the event resembled an armed takeover of a government administration building, which can be comprehended as an act of insurgency. The organization behind the protest is a small local group, Michigan Liberty Militia. The leader of the organization, Phil Robinson, denied any attempt of militancy or coup-oriented activity (The Vegas Take., 2020). The guns, in their view, guarantee the peacefulness of the assembly. On their social media accounts and in interviews for legacy media, the Michigan Liberty Militia have reasserted they just want to exercise their right to peacefully protest to show disagreement with the extent of COVID-19 measures as ordered by the Michigan Governor Gretchen Whitmer. The group and sympathizing social media profiles strongly criticize the Governor; some would even go as far as to share meme material that equates Whitmer to Adolph Hitler. The core argument by the group affiliates reflects on their interpretation of the normative basis of the individual rights and liberties as guaranteed by the US Constitution [Michigan Liberty Militia (MLM), 2020].

The Michigan Liberty Militia is a relatively small organization. However, its positions resonate with a broader subgroup of the American public, who are gathered in numerous organizations, including paramilitary types of groups (Southern Poverty Law Center., 2019). The one unifying sentiment is strong anti-government attitudes. For some of them, the popular normative argument is a strong adherence to libertarian oriented privileging of individual freedoms. This narrative was present in several protests against the COVID-19 measures across the US. The Lansing City Pulse (2020) documented that Robinson and other members of his group did personally know at least a few of the men who were arrested for suspected domestic terrorism conspiracy in October 2020. The charges against the obscure militia organization Wolverine Watchmen include alleged plans to kidnap Governor Whitmer, attack police officers, and bomb a bridge (Baldas and Egan, 2020).

Other extremely radical actions on behalf of the liberty stressing American movements, but also on behalf of extreme right-wing tendencies, are attributed to the online movement Boogaloo. This is a relatively new movement that has emerged on the darknet within the last decade, and later has grown to a social media meme of the regular internet, inspiring different groups of like-minded individuals across the web (Finkelstein et al., 2020). Boogaloo incorporates several different political lines of thinking, but the shared orientation embraces anti-government, anti-police, pro-gun, and pro-White supremacy ideology. The goal of the group is to start a civil unrest, even a civil war, to use the violence for advancing their demands and taking revenge on ideological enemies. Boogaloo sympathizers have been photographed at protests against stay-at-home orders and other COVID-19 containment-related measures. Some Boogaloo affiliates saw the COVID-19 crisis as an opportunity to spread fear and chaos. FBI has intercepted and killed a Boogaloo

sympathizer, who was planning a bomb terror attack against a hospital in Missouri on the first day of the pandemic containment stay-at-home order (Pineda, 2020).

Hence, in the US, several ideologically motivated organizations find the securitization of COVID-19 as highly antagonistic to their value system, which they quickly pointed out—some by just reframing the crisis via social media, others by protests, and others by acts of violence. COVID-19 is also co-opted to advance a particular cause, as in the case of Boogaloo. Similarly, Boogaloo tried to exploit the Black Lives Matter protests to entice more violence. When Boogaloo sympathizers were arrested as main suspects in the ambush murders of a US Federal Officer and California Sheriff's Sergeant, the organization finally reached visibility in the mainstream US media coverage (Pineda, 2020; TASR., 2020). Perhaps due to a broader pressure of public attention, Facebook and Instagram blocked hundreds of social media groups and profiles affiliated with Boogaloo in late June (Collins and Zadrozny, 2020). The issue is that this will be unlikely to serve as a long term solution. While a specific set of networks and connections was severed (for now), the volatility of further problems continues to exist and is likely to continue to grow and find new ways to exploit contemporary technologies as well to manipulate situations such as securitization surrounding COVID-19. Finkelstein et al. (2020) warn:

"civil society should seek to enfranchise an effort to create trusted, systematic reporting on these kinds of emerging threats at scale... this approach has the promise to prove more effective and more consistent with First Amendment values than the approach of either excessive censorship—which has limited effectiveness—and over-reach in government surveillance, both of which carry risk of feeding into suspicion of totalitarianism that fuels the militia sphere itself." (p. 12)

The above-cited concerns draw attention to the significance of the normative element within an extremist movement privileging a particular hierarchy of values. For Boogaloo the uppermost values reflect libertarianism with pronounced streaks of White supremacy. Their interpretations of the normative frameworks pose a direct opposition to the current nation-state of the US. Thus, securitization of COVID-19 represents an ideological issue for these factions, and the more extreme ones were apparently ready to go as far as terrorism to defy it.

Rogue actors have activated their pump-valves with fervor in the case of the US. Other countries with comparable extreme factions may need to pay attention to the case. Boogaloo groups were housing tens of thousands of users on Facebook (Finkelstein et al., 2020). It is important to highlight that this platform is an international site. Cross-contamination might have already happened. Unfortunately, the case of Slovenski Branci in Slovakia may not serve as a useful universal recipe to keep militias harmless or even useful, because the Slovak organization is fundamentally different and statist in its core normative values, and does not pledge an apocalyptic desire to provoke a civil war. Henceforth, the members of Branci prioritize the defense of the state against the microbiological enemy, while Boogaloo

figuratively collaborates with the microbiological enemy to take down the despised state.

## Limitations and Future Research Suggestions

The current analysis focuses primarily on breadth in terms of both theoretical grounding and analyzed cases. Consequently, deterministic in-depth conclusions cannot be made solely based on observations that are offered in this analysis. It is recommended that future researchers develop additional comparative and empirical studies of COVID-19 related securitized framing. New projects can build on descriptions provided in this piece and further explicate the situations in different countries and across diverse securitized and non-securitized responses to the pandemic. Also, new studies can deliver additional reflections on processes that happen along with various levels of the metaphorical framing cascade.

While this study offers some succinct remarks of comparison between the three illuminated cases, it should not be treated as a primarily comparative study. The selected cases have an extensive number of differences. Plus, the focus was shifted toward a different level of the cascading activation of framing in each case. Therefore, the analogies can and hopefully will inform further research inquiries, but should not be taken as a definite verdict on why particular things happened or failed to happen.

The COVID-19 crisis is still evolving as this article is written. All outcomes have not yet fully formed. Hence, the article should be taken as a useful cross-sectional insight into the stage of development of the securitized framing of the pandemic as of the time of the article's submission to the publisher. Follow-up research is paramount to grasp the events in an additionally precise way, specifically once the crisis ends, and researchers can enjoy the irreplaceable benefits of hindsight.

## CONCLUSION

COVID-19 is met by political and media communication as well as by a range of response measures that can be described as securitization. The study presented in this article offers securitization process analysis, which utilizes the communication perspective of framing as the principal mode of exploration. Therefore, this study offers a systematic look into pandemic securitization, while also advancing the role that framing, and communication inquiry in general, should play in an examination of securitization processes. The argument for championing framing is not a mere "disciplinary chauvinism" as the author is a communication academic, but the fact that the securitization process is, as the key Copenhagen School's definition characterized it, a "speech act." Thus, communication research must continue to play a role in illuminating the very phenomenon of securitization. Communication is a vital component behind securitization processes. Further comprehension of communication within securitization provides a more precise and profound description of the phenomenon. The development of knowledge brings benefits not just for knowledge's sake, but also for the work of

practitioners. In the case of COVID-19, political administrators, strategic communication professionals, or journalists, among others, can find useful information for their work through a better understanding of securitized framing, as it offers an explanation for how certain types of persuasion work for certain persuaders and certain target segments of the public. For instance, successful counterstrategies might need to properly assess and incorporate a securitization related element in a campaign.

The first research question of this inquiry explores whether and how the frame element of moral evaluation factors into the conversations on the securitization of the pandemic. The normative aspects of the securitization are a growing subarea of the pertinent academic literature. This analysis is unique in exploring the actual framing process as it traverses through elite, media, and public levels of communication on the topic. The analysis demonstrates that morals and values were discussed in each case but to a varying degree. One prominently shared theme of the normative dimension that occurs in Slovakia, Russia, and the US involves discussion on the ethical tensions between individual's liberties and freedoms on the one hand vs. collective responsibility and loyalty to the government on the other hand. However, the interpretations, preferences, and conclusions significantly differ for various factions and each studied context. The previously existing sociopolitical idiosyncrasies and issues robustly impact how the responses to COVID-19 securitization advance. Therefore, the politicians, public health professionals, and other relevant professionals must be particularly well-educated and informed about deep-rooted characteristics of the specific culture and the state's situation.

The second main research question determined that the analysis focused on fairly controversial actors; rogue actors. The progress of digital media technologies has given numerous new opportunities to various actors to get involved in publicly visible conversations on critical issues such as the pandemic. As the analysis demonstrates, the studied rogue actors usually have at least something to say about COVID-19, and frequently make some evaluations of how moral or normatively appropriate is their respective government's "war" on COVID-19. Securitization research usually does not explore securitizing attempts of obscure or regular citizen actors as these types of actors were initially envisioned as not having enough social credit to be able to securitize. However, when it comes to enterprises such as terrorism, a rogue actor does not necessarily need a massive number of supporters or—for that matter—online subscribers. The ability of the persuasive message to radicalize a few specific individuals is more vital for extremist projects. Interestingly, COVID-19 has become a paramount trigger for some radically oriented groups and individuals, as well as for some outright violent extremists.

This study aspires to connect various bodies of literature by applying the intersecting areas as a lens of analysis to examine three different cases. In other words, it is a cross-disciplinary and cross-case analysis. This type of analysis is not common, but they are crucial for advancing connections between separated bodies of knowledge. Real phenomena in the world, like a pandemic, are not purely biological, nor purely

political, nor purely discursive, etc. Phenomena have many different dimensions that are interconnected in many different ways. The ability of researchers and practitioners to embrace this diverse nature of world phenomena will predict the degree of understanding and consequently the level of effectiveness of the responses that societies can perform in reaction to new challenging situations.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## REFERENCES

- Allouche, J., Nicol, A., and Mehta, L. (2011). Water security: towards the human securitization of water? *Whitehead J. Dipl. Int. Rel.* 12, 153–171.
- Al-Sharafat, S. (2020). *Securitization of the Coronavirus Crisis in Jordan: Successes and Limitations*. Washington Institute for Near East Policy. Retrieved from: <https://www.washingtoninstitute.org/fikraforum/view/COVID-19-Jordan-Middle-East-Securitization>
- Aradau, C. (2004). Security and the democratic scene: desecuritization and emancipation. *J. Int. Relat. Dev.* 7, 388–413. doi: 10.1057/palgrave.jird.1800030
- Aruguete, N., and Calvo, E. (2018). Time to #protest: Selective exposure, cascading activation, and framing in social media. *J. Commun.* 68, 480–502. doi: 10.1093/joc/jqy007
- Baele, S. J., and Thomson, C. P. (2017). An experimental agenda for securitization theory. *Int. Stud. Rev.* 19, 646–666. doi: 10.1093/isr/vix014
- Baldas, T., and Egan, P. (2020). *Feds Say Plot was Bigger Than Kidnapping Gov. Whitmer. It was a Civil war Attempt*. Detroit Free Press. Retrieved from: <https://www.freep.com/story/news/local/michigan/2020/10/08/whitmer-wolverine-watchmen-militia-michigan/5924617002/?fbclid=IwAR0FrjmQIoucNwXgDQK4pQwEgs-oex8OqPSdG8dp1M4IFxzazc03QyfN2FI>
- Barr, L. (2020). *Boogaloo: The Movement behind Recent Violent Attacks*. ABC News. Retrieved from: <https://abcnews.go.com/Politics/boogaloo-movement-recent-violent-attacks/story?id=71295536>
- Beblavy, M. (2020). *How Slovakia Flattened the Curve*. Foreign Policy. Retrieved from: <https://foreignpolicy.com/2020/05/06/slovakia-coronavirus-pandemic-public-trust-media/>
- Beckett, L. (2020). *Armed Protesters Demonstrate Against Covid-19 Lockdown at Michigan Capitol*. The Guardian. Retrieved from: <https://www.theguardian.com/us-news/2020/apr/30/michigan-protests-coronavirus-lockdown-armed-capitol>
- Bengtsson, L., Borg, S., and Rhinard, M. (2019). Assembling European health security: Epidemic intelligence and the hunt for cross-border health threats. *Sec. Dialog.* 50, 115–130. doi: 10.1177/0967010618813063
- Bengtsson, L., and Rhinard, M. (2019). Securitization across borders: the case of 'health security' cooperation in the European Union. *West Eur. Polit.* 42, 346–368. doi: 10.1080/01402382.2018.1510198
- Bennett, W. L., and Iyengar, S. (2010). The shifting foundations of political communication: responding to a defense of the media effects paradigm. *J. Commun.* 60, 35–39. doi: 10.1111/j.1460-2466.2009.01471.x
- Bourbeau, P. (2014). Moving forward together: Logics of the securitization process. *Millen. J. Int. Stud.* 43, 187–206. doi: 10.1177/0305829814541504
- Brooks, B. (2020). *Like the Flu? Trump's Coronavirus Messaging Confuses Public, Pandemic Researchers Say*. Reuters. Retrieved from: <https://www.reuters.com/article/us-health-coronavirus-mixed-messages/like-the-flu-trumps-coronavirus-messaging-confuses-public-pandemic-researchers-say-idUSKBN2102GY>
- Buzan, B., and Waever, O. (2009). Macrosecuritization and security constellations: reconsidering scale in securitization theory. *Rev. Int. Stud.* 35, 253–276. doi: 10.1017/S0260210509008511
- Buzan, B., Waever, O., and de Wilde, J. (1998). *Security: A New Framework for Analysis*. Boulder, CO: Lynne Rienner Pub
- Carnogursky, J. (2020). *Slovenskí Branci 2020. O Súčasnosti; Ján Carnogurský Weblog*. Retrieved from: <http://www.jancarnogursky.sk/clanky/189/slovensk-branci-2020>
- Chouliaraki, L., and Georgiou, M. (2017). Hospitality: the communicative architecture of humanitarian securitization at Europe's borders. *J. Commun.* 67, 159–180. doi: 10.1111/jcom.12291
- Christou, G. (2019). The collective securitization of cyberspace in the European union. *West Eur. Polit.* 42, 278–301. doi: 10.1080/01402382.2018.1510195
- Collins, B., and Zadrozny, B. (2020). *Facebook to Remove Anti-Government 'Boogaloo' Groups*. NBC News. Available online at: [https://www.nbcnews.com/tech/tech-news/facebook-remove-anti-government-boogaloo-groups-n1232579?fbclid=IwAR387b\\_Pk7DYc\\_NFJQSBH2ispOuUqrVUDVy7lBTztTtMegyRZMYsUv9pDo](https://www.nbcnews.com/tech/tech-news/facebook-remove-anti-government-boogaloo-groups-n1232579?fbclid=IwAR387b_Pk7DYc_NFJQSBH2ispOuUqrVUDVy7lBTztTtMegyRZMYsUv9pDo)
- D'Angelo, P. (2002). News framing as a multiparadigmatic research program: a response to Entman. *J. Commun.* 52, 870–888. doi: 10.1111/j.1460-2466.2002.tb02578.x
- Engelbert, J., and Awad, I. (2014). Securitizing cultural diversity: dutch public broadcasting in post-multicultural and de-pillarized times. *Glob. Media Commun.* 10, 261–274. doi: 10.1177/1742766514552352
- Entman, R. M. (1993). Framing: toward clarification of a fractured paradigm. *J. Commun.* 43, 51–58. doi: 10.1111/j.1460-2466.1993.tb01304.x
- Entman, R. M. (2003). Cascading activation: contesting the white house's frame after 9/11. *Polit. Commun.* 20, 415–432. doi: 10.1080/10584600390244176
- Entman, R. M., Matthes, J., and Pellicano, L. (2009). "Nature, sources, and effects of news framing," in *Handbook of Journalism Studies*, eds K. Wahl-Jorgenson and T. Hanitzsch (New York, NY: Routledge), 175–190
- Entman, R. M., and Usher, N. (2018). Framing in a fractured democracy: Impacts of digital technology on ideology, power and cascading network activation. *J. Commun.* 68, 298–308. doi: 10.1093/joc/jqx019
- European Union Agency for Fundamental Rights. (2020). *Coronavirus COVID-19 Outbreak in the EU Fundamental Rights Implications*. Slovakia. Retrieved at [https://fra.europa.eu/sites/default/files/fra\\_uploads/slovakia-report-covid-19-april-2020\\_en.pdf](https://fra.europa.eu/sites/default/files/fra_uploads/slovakia-report-covid-19-april-2020_en.pdf)
- Eves, L., and Thedham, J. (2020). *Applying Securitization's Second Generation to COVID-19*. E-International Relations. Retrieved from: <https://www.e-ir.info/2020/05/14/applying-securitizations-second-generation-to-covid-19/>
- Finkelstein, J., Donohue, J. K., Goldenberg, A., Baumgartner, J., Farmer, J., Zannettou, S., et al. (2020). *COVID-19, Conspiracy and Contagious Sedition: A Case Study of the Militia-Sphere*. Network Contagion Research Institute. Retrieved from: <https://ncri.io/reports/covid-19-conspiracy-and-contagious-sedition-a-case-study-on-the-militia-sphere/>
- Fischhendler, I., Boymel, D., and Boykoff, M. T. (2016). How competing securitized discourses over land appropriation are constructed: the promotion of solar energy in the Israeli desert. *Environ. Commun.* 10, 147–168. doi: 10.1080/17524032.2014.979214
- Floyd, R. (2007). Towards a consequentialist evaluation of security: Bringing together the Copenhagen and the Welsh Schools of security studies. *Rev. Int. Stud.*, 33, 327–350. doi: 10.1017/S026021050700753X

## AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

## ACKNOWLEDGMENTS

The author is immensely grateful to Deborah Uecker (Professor Emerita at Wisconsin Lutheran College) for providing feedback on the draft. The author also deeply appreciates constructive feedback and suggestions from the reviewers and editors.



- Floyd, R. (2011). Can securitization theory be used in normative analysis? towards a just securitization theory. *Sec. Dialog.* 42, 427–439. doi: 10.1177/0967010611418712
- Floyd, R. (2016). Extraordinary or ordinary emergency measures: what, and who, defines the 'success' of securitization? *Camb. Rev. Int. Affairs* 29, 677–694. doi: 10.1080/09557571.2015.1077651
- Floyd, R. (2019a). Collective securitization in the EU: normative dimensions. *West. Eur. Polit.* 42, 391–412. doi: 10.1080/01402382.2018.1510200
- Floyd, R. (2019b). Evidence of securitization in the economic sector of security in Europe? *Russia's economic blackmail of Ukraine and the EU's conditional bailout of cyprus*. *Eur. Sec.* 28, 173–192. doi: 10.1080/09662839.2019.1604509
- Girkin, I. (2020). Игорь Стрелков по "обнулению" Путина и голосованиям по поправкам в Конституцию РФ [Igor Strelkov on "Zeroing" Putin and Voting on Amendments to the Constitution of the Russian Federation]. Игорь Стрелков. Retrieved from: <https://www.youtube.com/watch?v=lp9pSzjL038>
- Gitlin, T. (1980). *The Whole World is Watching: Mass Media in the Making and Unmaking of the New Left*. Berkeley, CA: University of California Press.
- Goffman, E. (1974). *Frame Analysis: An Essay on the Organization of Experience*. New York, NY: Harper and Row.
- Habas, J. (2020). *Prieskum; Ochota Ľuďi Nadalej Nosit Rúška Klesla [Poll; People's Willingness to Continue to Wear Facemasks Decreased]*. SME. Retrieved from: <https://domov.sme.sk/c/22487344/koronavirus-na-slovenskuno-senie-rusok-prieskum.html>
- Hansen, S. (2020). *Trump Suggests China May Have Intentionally Allowed Coronavirus to Spread*. Forbes. Retrieved from: <https://www.forbes.com/sites/sarahhansen/2020/06/18/trump-suggests-china-may-have-intentionally-allowed-coronavirus-to-spread/#3a8080ea33f1>
- Harrington, C. N. (2020). *Opinion: Poor, Older Black Americans are an Afterthought in the COVID-19 Crisis*. PBS. Retrieved from: <https://www.pbs.org/wnet/chasing-the-dream/stories/opinion-poor-older-black-americans-afterthought-covid-19/>
- Hart, C., Jin, D. Y., and Feenberg, A. (2014). The insecurity of innovation: a critical analysis of cybersecurity in the United States. *Int. J. Commun.* 8, 2860–2878.
- Herman, E. S., and Chomsky, N. (1988). *Manufacturing Consent*. New York, NY: Pantheon Books.
- Holbert, R. L., Garrett, R. K., and Gleason, L. S. (2010). A new era of minimal effects? A response to Bennett and Iyengar. *J. Commun.* 60, 15–34. doi: 10.1111/j.1460-2466.2009.01470.x
- Inouye, D. W. (2005). "Biodiversity and ecological security," in *From Resource Scarcity to Ecological Security: Exploring New Limits TO Growth*, eds D. Pirages and K. Cousins (Cambridge, MA: MIT Press), 203–215.
- Kelle, A. (2007). Securitization of international public health: Implications for global health governance and the biological weapons prohibition regime. *Glob Govern.* 13, 217–235. doi: 10.1163/19426720-01302006
- Khrebant-Horhager, J. (2016). Collages of memory: Remembering the second world war differently as the epistemology of crafting cultural conflicts between Russia and Ukraine. *J. Intercult. Commun. Res.* 45, 282–303. doi: 10.1080/17475759.2016.1184705
- Kotleba, M. (2020). *M. Kotleba: Koronavírus ako Zámenka na Zotročenie Ľuďi (15. 4. 2020) [M. Kotleba; Coronavirus as a Means to Enslave People (4/15/2020)]*. LS Naše Slovensko v NR SR. Retrieved from: [https://www.youtube.com/watch?v=sbHOWit8wdE&fbclid=IwAR2QO8GWArhCwqb2ImoHb9Aheh4o19q5MwKrGFS1bo6xKHONbE\\_wKLWbP40](https://www.youtube.com/watch?v=sbHOWit8wdE&fbclid=IwAR2QO8GWArhCwqb2ImoHb9Aheh4o19q5MwKrGFS1bo6xKHONbE_wKLWbP40)
- Krasna, J. (2020). *Securitization and Politics in the Israeli COVID-19 Response*. Foreign Policy Research Institute. Retrieved from: <https://www.fpri.org/article/2020/04/securitization-and-politics-in-the-israeli-covid-19-response/>
- Kurginian, S. (2020). Кургиния о коронавирусе: почему врачи гибнут от covid 19, а Россия спит? Вставай, страна огромная [Kurginian About Coronavirus: Why Doctors Die of COVID-19, and Russia Sleeps? Arise, Vast Country!]. Суть времени. Retrieved from: <https://www.youtube.com/watch?v=LFjGTvY-Cmo>
- Lansing City Pulse (2020). *Alleged Whitmer Plotters had Interactions, Ties to Other Militias*. Lansing City Pulse. Retrieved from: <https://www.lansingcitypulse.com/stories/alleged-whitmer-plotters-had-interactions-ties-to-other-militias,15057>
- Laruelle, M. (2019). Back from utopia: how Donbas fighters reinvent themselves in a post-Novorossiya Russia. *Natl. Pap.* 47, 719–733. doi: 10.1017/nps.2019.18
- Leonard, S. (2010). EU border security and migration into the European union: FRONTEX and securitization through practice. *Eur. Sec.* 19, 231–254. doi: 10.1080/09662839.2010.526937
- Lichtenstein, D., Esau, K., Pavlova, L., Osipov, D., and Argyrov, N. (2019). Framing the Ukraine crisis: a comparison between talk show debates in Russian and German television. *Int. Commun. Gazette* 81, 66–88. doi: 10.1177/1748048518755209
- Lorenzo-Dus, N., and Marsh, S. (2012). Bridging the gap: interdisciplinary insights into the securitization of poverty. *Discour. Soc.* 23, 274–296. doi: 10.1177/0957926511433453
- Maertens, L. (2019). From blue to green? Environmentalization and securitization in UN peacekeeping practices. *Int. Peacekeeping* 26, 302–326. doi: 10.1080/13533312.2019.1579648
- Matthes, J., and Kohring, M. (2008). The content analysis of media frames: toward improving reliability and validity. *J. Commun.* 58, 258–279. doi: 10.1111/j.1460-2466.2008.00384.x
- Mazurek, M. (2020). *Milan Uhrík: Takéto Opatrenie Môzu Nariadiť Len Bezcitné Hyeny! [Sic Capitalization] [Milan Uhrík: This Type of Measures Can be Ordered Only by Heartless hyenas!]* Milan Mazurek - Poslanec NR SR @MilanMazurek. NRSR Politician. Retrieved from: <https://www.facebook.com/MilanMazurek.NRSR/posts/826179748152254>
- Michigan Liberty Militia (MLM), (2020). *Facebook Page*. Retrieved from: <https://www.facebook.com/MLMmichiganlibertymilitia/> (accessed May 8, 2020).
- Mikhalkov, N. (2020). «Над пропастью во лжи» [Demon-chaserTV "The Catcher in the lie"]. *БесогонTV*. Retrieved from: [https://www.youtube.com/watch?v=xTE9bqGJ\\_2M](https://www.youtube.com/watch?v=xTE9bqGJ_2M)
- Nusso, E., and Pernet, C. A. (2013). The securitization of food security in Colombia, 1970 – 2010. *J. Lat. Am. Stud.* 45, 641–668. doi: 10.1017/S0022216X1300117X
- Pan, Z., and Kosicki, G. M. (1993). Framing analysis: an approach to news discourse. *Polit. Commun.* 10, 55–75. doi: 10.1080/10584609.1993.9962963
- Pellegrini, P. (2020). *Bolo mi ctou [It was my Honor]*. Facebook Videos. Peter Pellegrini. Retrieved from: [https://www.facebook.com/watch/live/?v=618998052165295&ref=watch\\_permalink](https://www.facebook.com/watch/live/?v=618998052165295&ref=watch_permalink)
- Pineda, K. (2020). *The Boogaloo Movement is Gaining Momentum. Who are the Boogaloo 'Bois' and What do They Want?* USA Today. Retrieved from: <https://www.usatoday.com/story/news/nation/2020/06/19/what-is-boogaloo-movement/3204899001/>
- Prilepin, Z. (2020). Захар Прилепин. Уроки русского": Урок №103. COVID-19: как изменится мир после эпидемии ["Zakhar Prilepin. Russian lessons": Lesson Number 103. COVID-19: How the world will change after the epidemic.] *HTB*. Retrieved from: <https://www.youtube.com/watch?v=vICdH4EofbU&fbclid=IwAR15YodFu2ohxRGb-q7pwFaRniH6-2GtoM0Fyiu0HNS7S-Kx4a0uPtmMRw>
- Putin, V. (2020). Обращение Владимира Путина по ситуации с коронавирусом. 28.04.2020 [The Address of Vladimir Putin on the Situation With the Coronavirus 04/28/2020]. *Первый канал*. Retrieved from: <https://www.youtube.com/watch?v=cXraExKxjE8>
- Roemer-Mahler, A., and Elbe, S. (2016). The race for ebola drugs: pharmaceuticals, security and global health governance. *Third World Q.* 37, 487–506. doi: 10.1080/01436597.2015.1111136
- Salter, M. B., and Piche, G. (2011). The securitization of the US-Canada border in American political discourse. *Can. J. Polit. Sci.* 44, 929–951. doi: 10.1017/S0008423911000813
- Scheufele, D. A. (1999). Framing as a theory of media effects. *J. Commun.* 49, 103–122. doi: 10.1111/j.1460-2466.1999.tb02784.x
- Scott, S. V. (2012). The securitization of climate change in world politics: How close have we come and would full securitization enhance the efficacy of global climate change policy? *Rev. Eur. Comp. Int. Environ. Law* 21, 220–230. doi: 10.1111/reel.12008
- Sears, N. A. (2020). The securitization of COVID-19: three political dilemmas. *Glob Policy J.* Retrieved from: <https://www.globalpolicyjournal.com/blog/25/03/2020/securitization-covid-19-three-political-dilemmas>
- Sjostedt, R. (2008). Exploring the construction of threats: the securitization of HIV/AIDS in Russia. *Sec. Dialog.* 39, 7–29. doi: 10.1177/0967010607086821



- Slovenski Branci. (2020). *Facebook Page*. Retrieved from: <https://www.facebook.com/slovenskibranci1/> (accessed December 8, 2020).
- SME. (2020). *Niektorí Poslanci Si Odmietli Dať Rúšku, Kollár Prerušil Schôdzu [Some Deputies Refused to Put on a Facemask, Kollar Adjourned the Meeting]*. SME. Retrieved from: <https://domov.sme.sk/c/22479948/niektori-poslanci-si-odmietli-dat-ruska-kollar-prerusil-schodzu.html>
- Solovyov, V. (2020). Воскресный вечер с Владимиром Соловьевым от 05.07.2020 [Sunday Evening With Vladimir Solovyov from 07/05/2020]. *Вечер с Владимиром Соловьевым*. Retrieved from: <https://www.youtube.com/watch?v=UUhsazKLEFI>
- Southern Poverty Law Center. (2019). *Antigovernment Movement*. Southern Poverty Law Center. Retrieved from: <https://www.splcenter.org/fighting-hate/extremist-files/ideology/antigovernment>
- Sperling, J., and Webber, M. (2019). The European Union: Security governance and collective securitization. *West Eur. Polit.* 42, 228–260. doi: 10.1080/01402382.2018.1510193
- Steno, A. (2020). *Facemasks Against COVID-19: Why Slovakia Became the Trailblazer*. Euractiv. Retrieved from: <https://www.euractiv.com/section/coronavirus/opinion/facemasks-against-covid-19-why-slovakia-became-the-trailblazer/>
- TASR. (2020). *Constitutional Court Suspends Force of Part of Telecommunications Act*. TASR—The News Agency of the Slovak Republic. Retrieved from: <https://newsnow.tasr.sk/policy/constitutional-court-suspends-force-of-part-of-telecommunications-act/>
- The Vegas Take. (2020). *Phil Robinson of Michigan Liberty Militia "We Did Not Storm the Capitol & Very Few Had Guns."* Retrieved from: [https://www.youtube.com/watch?v=vzolulimV4Y&feature=share&fbclid=IwAR2r7s4WHdIrlqONGUta9CiN\\_LkSp9RwsJEWzGVyoWAOVqf8h2o5qaF0Dr2I](https://www.youtube.com/watch?v=vzolulimV4Y&feature=share&fbclid=IwAR2r7s4WHdIrlqONGUta9CiN_LkSp9RwsJEWzGVyoWAOVqf8h2o5qaF0Dr2I)
- Tolz, V., and Teper, Y. (2018). Broadcasting agitaionment: a new media strategy of Putin's third presidency. *Post Soviet Affairs* 34, 1–15. doi: 10.1080/1060586X.2018.1459023
- Turecek, M., and Sabo, P. (2019). Slovenski branci: a military hobby or armed threat? *Vsquare.org*. Retrieved from: <https://vsquare.org/slovenski-branci-uniformed-fools-or-an-armed-threat/>
- TV Noviny. (2020). *Rázný Krok Facebooku: Siet Zmazala Video Mariana Kotlebu, v Ktorom Zláhčoval Koronavírus [A Resolute Step by Facebook: The Network Deleted Marian Kotleba's Video, in Which He Downplayed the Coronavirus]*. TV Noviny. Retrieved from: [https://www.tvnoviny.sk/domace/2004779\\_razny-krok-facebooku-siet-zmazala-video-mariana-kotlebu-v-ktorom-zlahcoval-koronavirus](https://www.tvnoviny.sk/domace/2004779_razny-krok-facebooku-siet-zmazala-video-mariana-kotlebu-v-ktorom-zlahcoval-koronavirus)
- Uhrik, M. (2020). *Politicky Nekorektne – Kulturblog 9.5.2020 [Politically Incorrect – Kulturblog 5/9/2020]*. Kulturblog. Retrieved from: [https://www.youtube.com/watch?v=8haaIiQhD\\_8](https://www.youtube.com/watch?v=8haaIiQhD_8)
- Verseck, K. (2020). *Coronavirus: Rule of Law Under Attack in Southeast Europe*. Deutsche Welle. Retrieved from: <https://www.dw.com/en/coronavirus-rule-of-law-under-attack-in-southeast-europe/a-52905150>
- Vultee, F. (2010a). "Securitization as a media frame," in *Securitization Theory: How Security Problems Emerge and Dissolve*, ed T. Balzacq (New York, NY: Routledge), 77–93
- Vultee, F. (2010b). Securitization: a new approach to the framing of the 'war on terror.' *J. Prac.* 4, 33–47. doi: 10.1080/17512780903172049
- Vultee, F., Lukacovic, M., and Stouffer, R. (2015). Eyes 1, brain 0: Securitization in text, image and news topic. *Int. Commun. Res. J.* 50, 111–138.
- Ward, S. J. A. (2014). Radical media ethics. Ethics for a global digital world. *Dig. J.* 2, 455–471. doi: 10.1080/21670811.2014.952985
- Ward, S. J. A., and Wasserman, H. (2010). Towards an open ethics: implications of new media platforms for global ethics discourse. *J. Mass Media Ethics* 25, 275–292. doi: 10.1080/08900523.2010.512825
- Watson, S. D. (2012). 'Framing' the copenhagen school: integrating the literature on threat construction. *Millen. J. Int. Stud.* 40, 279–301. doi: 10.1177/0305829811425889
- Youde, J. (2008). Who's afraid of a chicken? Securitization and avian flu. *Democ. Sec.* 4, 148–169. doi: 10.1080/17419160802020264
- Youde, J. (2018). The securitization of health in the trump era. *Aust. J. Int. Affairs* 72, 535–550. doi: 10.1080/10357718.2018.1534936

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2020 Lukacovic. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# A Resilient Health System in Response to Coronavirus Disease 2019: Experiences of Turkey

Bekir Keskiniliç<sup>1</sup>, Irshad Shaikh<sup>2</sup>, Ahmet Tekin<sup>1</sup>, Pavel Ursu<sup>3</sup>, Adil Mardinoglu<sup>1</sup> and Emine Alp Mese<sup>1\*</sup>

<sup>1</sup> Ministry of Health (Turkey), Ankara, Turkey, <sup>2</sup> World Health Organization (Turkey), Ankara, Turkey, <sup>3</sup> World Health Organization (Switzerland), Geneva, Switzerland

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Lan Hoang Nguyen,  
Hue University, Vietnam  
Emel Parlar Dal,  
Marmara University, Turkey

### \*Correspondence:

Emine Alp Mese  
emine.alp.mese@gmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 28 June 2020

**Accepted:** 12 November 2020

**Published:** 07 January 2021

### Citation:

Keskiniliç B, Shaikh I, Tekin A, Ursu P,  
Mardinoglu A and Mese EA (2021) A  
Resilient Health System in Response  
to Coronavirus Disease 2019:  
Experiences of Turkey.  
Front. Public Health 8:577021.  
doi: 10.3389/fpubh.2020.577021

Turkey's response experience thus far with the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) pandemic affords the globe and the region a unique opportunity for and distinctive insights into combating this novel virus. The country's pandemic response, having one of the lowest case fatality ratio (2.8%; 52.5 infections/million population), particularly among the elderly (the high-risk group), rising to the occasion to shoulder its long-standing role in global solidarity and humanitarian support by providing personal protective equipment (globally scarce) to many countries in their desperate time of fight against the pandemic while also meeting its own critical domestic needs, stands out. This paper aims to highlight key decisions, actions, and partnerships behind Turkey's successful fight against the SARS-CoV-2 pandemic that have enabled the country to turn the corner, as well as the components of its success story.

**Keywords:** SARS-CoV-2, management - healthcare, pandemic (COVID-19), public policies, health system - organization and administration

## INTRODUCTION

Turkey's response to and experience thus far with the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) pandemic affords the world and the region a unique opportunity for and distinctive insights into combating this novel virus. On the one hand, Turkey has one of the lowest case fatality ratios (2.8%; 52.5 infections/million population), particularly among the elderly aged 65 years and older (the high-risk group). It has also risen to the occasion and shouldered its role as a long-standing propagator of global solidarity and provider of humanitarian support. Turkey's success in scaling up local manufacturing of personal protective equipment (PPE), a globally scarce commodity, and dispatching supplies on humanitarian grounds to many countries in their time of desperate need to fight against the pandemic, while still able to meet critical domestic needs, offers key lessons in manufacturing and adjusting supply chains. This paper aims to highlight key policies and practices and partnerships behind Turkey's effective and successful fight against the SARS-CoV-2 pandemic until the end of May 2020. These have enabled the country to significantly lower the case load and to expand upon the elements behind this success.

## PREVENTION AND PREPAREDNESS

### Health Systems Reforms

Turkey, though geographically located between Europe and Asia, is also a Mediterranean country with Mediterranean heritage and culture. Close contact and conviviality is part of its long-standing and rich tradition. Spending time together and congregating during social events and hugging and cheek-to-cheek contact are very common greeting gestures in daily life. Such physical contact-based cultural factors become particularly important when considering infection prevention and control measures at the population level for an affliction that is inherently spread by droplet and close contact.

Turkey has been implementing a health reform initiative called the Health Transformation Program since 2002 (1). This program has covered and changed nearly all building blocks of health systems in Turkey—from governance to health financing to health service delivery, with heavy investments in health infrastructure, redefining the roles of all key relevant stakeholders for the better (2).

Three key macrolevel features of this health system transformation that have played critical enabling roles during the pandemic are as follows:

1. Strengthening of primary health care (PHC). With accessibility and equity as foundational principals, staff in PHC facilities links peoples and communities through a network of nearly 8,000 hubs with 25,000 family medicine units. Each serves, free of charge, a surrounding catchment unit of 3,000 persons and thus traversing the geographical and social extent of the country. Every person in this 3,000 catchment population unit thus has an assigned family physician in charge of their health, facilitated by electronic health records for each, including street address records of all. This comprehensive PHC network with improved access to and an up-to-date health and geographical information on each person made community outreach and engagement for the SARS-CoV-2 response efficient, effective, and timely, from risk communication to testing to contact tracing.
2. Turkey built large “healthy cities” harnessing a public–private partnerships model that boosted its health infrastructure manifold, especially intensive care bed capacity (3),<sup>1</sup> with some hospitals specifically equipped with negative pressure rooms—assets and capacities that proved decisive in saving lives among those severely ill with SARS-CoV-2 without seriously straining critical care systems and capacities.
3. The population was extensively covered with a reliable information technology (IT) infrastructure that enabled and supported critical response elements. These ranged from timely reporting of surveillance and early warning to telemedicine for the elderly and those with chronic diseases, as well as those with mental health problems and home/facility-bound persons. It also connected those who were “healthy but worried” with a healthcare provider, precluding crowding

of health facilities and possibly excessive healthcare worker (HCW) infections.

Before the pandemic, Turkey had one of the most comprehensive Universal Health Coverage schemes [accessible by 99% of all inhabitants including over 3.6 million Syrians seeking refuge in Turkey—Syrians under Temporary Protection (SuTP)] (4).

### Strong Culture of Health Emergencies and Disaster Management

Supported by Health Transformation Program, the country also has a long-standing strong and resilient health system, tested and retested by many natural and man-made disasters and emergencies. A WHO publication of 2011 entitled “Assessment of Health Systems’ Crisis Preparedness: Turkey” concluded that “With its broad experience in disaster situations and its advanced disaster and emergency management system, Turkey could play a leading role in training and research related to disaster risk reduction at global level” (5). It is this realization and appreciation of Turkey’s expertise in health emergencies and disaster management that has made it appropriate for the WHO Regional Office for Europe to house its new regional center of excellence on Preparedness for Humanitarian and Health Emergencies in Istanbul. This center is part of a system of the WHO Regional Office for Europe’s outposts (centers) also called geographically dispersed offices (GDOs)<sup>2</sup> (6), with each working on and offering expertise in thematic areas.

### Pandemic Influenza Preparedness

Another supporting WHO initiative has been the implementation of an intersectoral approach-based, multidimensional process entitled the Pandemic Influenza Preparedness (PIP) Framework to help Member States prepare for and to be ready to respond to pandemic influenza.

After the publication of the National Pandemic Influenza Preparedness Plan with a presidential decree, members were selected and assigned to the PIP Scientific Consultancy Board (7). Provincial pandemic plans were prepared by provincial health directorates and the Ministry of Health (MoH) organized a workshop for the evaluation of the developed provincial plans. The MoH also organized training of trainers for PIP implementation and training of healthcare workers and the public.

### WHO and International Health Regulations (IHR, 2005)

After restructuring and re-aligning its position on global health emergencies within the United Nations system, the WHO established the WHO Health Emergencies Programme (WHE) in 2016 (8). The IHR (2005) have also defined the core capacities of a strong health system, built on an all-hazards, intersectoral coordination approaches, to manage any public health emergency. Guided by the IHR (2005), the WHE has been

<sup>1</sup>The number of ICU beds was 2,214 in 2002, 869 of which were in public hospitals. As of 2019, the total number of total ICU beds in Turkey is 39,279, including 16,887 in public hospitals.

<sup>2</sup>GDOs are defined as entities that constitute a fully integrated part of the WHO Regional Office for Europe and its programs but which are physically located outside Copenhagen.

leading and coordinating the coronavirus disease 2019 (COVID-19) pandemic and has been ready to respond to other public health emergencies by strengthening preparedness and readiness capacities at country and subcountry levels.

## Progressive Policies and Historical Measures

Turkey has had a long history of prevention and control of communicable diseases starting from the early Ottoman Empire era with its quarantine regulations. Since the early stages of the foundation of the Republic of Turkey, relevant public health and public safety laws and regulations have been consistently updated, improved, and published on public health and communicable diseases. Because of its historical emphasis and experience and capacity building of its physicians and other health workforce, Turkey has been successful in keeping many global and/or regional outbreaks out of its borders and territories. Generations of Turkish citizens have also inherited/embraced a culture of civic responsibility and embracing rules, regulations, and expert guidance from the State, citizenry attributes that have only enhanced the efficiency and effectiveness of the prevention and containment measures instituted against pandemics at national levels.

The foundation of the current policies of Turkey on outbreaks and pandemics emanates from the notification system established in 2004.<sup>3</sup> This was followed by the creation of the early warning and response system (EWRS) in 2007 for the surveillance and control of communicable diseases.<sup>4</sup> In addition, pandemic preparedness plans have also been regularly updated and published.

Turkey's years' long and incremental experience with the prevention of outbreaks accumulated over the years, EWRS system, and continuous learning with updated pandemic preparedness plans have helped prevent and control influenza pandemics and other outbreaks on its territory. Turkey's past experiences with swine flu (H1N1), avian influenza (H5N1), and SARS outbreaks only attest to the effectiveness and efficiency of Turkey's policies (9).

## Health Security: an Intersectoral, All-Hazards Approach

In a globally interconnected world coupled by Turkey's geopolitical importance in the region, the country has increasingly recognized the critical need to comply with its global (IHR, 2005) (10) and regional (EC 1082/2006) obligations (11), showing how national and global health security are intertwined and interdependent. For the past 15 years, a series of projects on strengthening surveillance and control of communicable diseases, strengthening and expansion of EWRS, laboratory sector and linking lab surveillance with disease surveillance, and building field epidemiology training have been

implemented in collaboration with the WHO and the European Union (EU). These projects have cemented and expanded the health security capacities of Turkey and helped prioritize health threats including those due to emerging and re-emerging diseases and refined and improved EWRS. The country has also updated technical guidelines in alignment with global and regional standards, and best practices of EU and WHO, on a regular basis.

Under these projects, coordination mechanisms have been strengthened for EWRS between the MoH and other line ministries across relevant sectors, and protocols prepared and signed to cement this interministerial collaboration between and across sectors.

Establishment of a national reference laboratory was also a key component of these projects. Within the scope of the currently ongoing Health Security Project, 4th in the series, a laboratory assessment tool was updated, and a capacity assessment study was completed in 2019 that included on-site evaluations of selected laboratories to monitor and evaluate the application of national standards and compliance therewith at the provincial levels. This strengthened and expanded EWRS and the laboratory sector, but more importantly, strengthened linkages between the two have been instrumental in combating this pandemic.

## READINESS STEPS OF TURKEY: ONSET OF THE SARS-COV-2 OUTBREAK IN THE WORLD

On December 31, 2019, the People's Republic of China notified the WHO on atypical pneumonia cases of unknown origin in Wuhan. The WHO published its first report on the outbreak on 5 January 2020. Following the decisions of its IHR Emergency Committee, the WHO declared "public health emergency of international concern" (PHEIC) on 30 January 2020 regarding the outbreak of novel coronavirus. The disease was later named as COVID-19 in February. Due to the rapid increase in the number of cases and affected countries, the WHO declared COVID-19 outbreak a global pandemic on 11 March 2020 (12).

## Activation of EWRS—Emergency Operations Center

Turkey activated its preparedness/contingency plans and began its readiness activities soon after the news of the outbreak of this atypical pneumonia in China. As early as January 6, 2020, the EWRS Emergency Operations Center (EOC) in Ankara, Turkey, was activated and situational monitoring of the outbreak from this novel coronavirus in China started with updates from China and through WHO resources. Starting from early February, with cases increasing, this EOC started to work on a 7/24 basis with technical staff manning key/priority technical areas, namely surveillance, logistics, IHR focal point, and official focal points of other relevant line ministries and stakeholders. This operations center continues to remain operational with a similar configuration as of date.

<sup>3</sup>Communiqué on Notification and Reporting System of Communicable Diseases (& November 2004). Official Gazette no: 25635 (in Turkish).

<sup>4</sup>Regulation on Surveillance and Control of Communicable Diseases (30 May 2007). Official Gazette no: 26537. Updated on May 4th 2019. Official Gazette No: 30764 (in Turkish).



## Convening of the Coronavirus Scientific Advisory Board

On 10 January 2020, just before the announcement of the first fatality by China, the Ministry of Health convened the Coronavirus Scientific Advisory Board (CSAB), bringing together experts from different medical disciplines. CSAB is composed of 26 members, all senior and high-level specialists and academicians in various relevant fields, e.g., public health and epidemiology, pulmonology, infectious diseases, and clinical microbiology, among others. The CSAB has been a critical technical support body since then and has guided not only MoH leadership and staff but also those from other relevant line ministries and other stakeholders. Though formally convening twice a week, in practice, board members spent most of their times at MoH discussing emerging pandemic-related issues thoroughly in detail and in real time, generating discussions and garnering consensus on critical and emerging issues. One of the important and critical outputs especially at the beginning was the drafting of the National 2019-nCoV Disease Guidelines that set the stage for prevention, mitigation, and containment. CSAB meetings were later moved to a videoconference platform. Realizing the importance of communication, an online messaging platform was formed to ensure a constant communication channel. As the needs grew, additional experts/scientists were added to the board, allowing additional technical subgroups to work on emerging priority areas and concerns.

## Release of the 2019-nCoV Disease Guidelines

The first version of the 2019-nCoV Disease Guidelines was published on the MoH website on 14 January 2020 and served as a dynamic, living document (13). As new information and knowledge trickled in, these guidelines were frequently updated to incorporate new knowledge and emerging evidence. Training of healthcare workers was continually conducted at the provincial levels, in line with the national guideline and to ensure the latest global and regional knowledge trickled down and was shared and used at the provincial/municipal levels, the first line of contact between health staff and the community.

## Development of PCR Diagnostic Test for SARS-CoV-2

Laboratory diagnosis with PCR testing was initiated at the National Microbiology Reference Laboratory; however, it was a time- and resource-intensive effort initially. In particular, a research protocol was initiated to develop and produce a rapid laboratory PCR test kit for domestic use as well as for export to other countries. With the help of the WHO country office, the WHO's Emergency Use Listing was readily secured for the newly developed test which also extended to test the necessary quality cover for national use and for international marketing. At the end of May 2020, there were 115 laboratories strategically spread across the country capable of performing PCR test for SARS-CoV-2 infections.

## Initial Steps to Prevent Importation of Disease

Anticipating a high risk of imported cases, temperature screening with thermal scanners was initiated of passengers arriving on flights originating from infection-reporting countries from 24 January at all involved airports. No symptomatic passenger was admitted on Turkish Airlines' planes at points of departure, and all passengers were asked to fill a Passenger Contact Information to ensure efficient and effective contact tracing if any exposure was later suspected on board. Passengers demonstrating any symptom of disease were quarantined. These passenger screenings were later expanded to include all countries that reported a large number of confirmed cases. Later, all arriving international passengers were subjected to 14 days quarantine at designated places.

## SARS-CoV-2 Referral Hospitals

A total of 563 hospitals with the necessary infrastructure and staff were selected to serve as reference hospitals for COVID-19 cases, and all elective procedures and surgeries were put on hold indefinitely in these hospitals. Hospital admissions were minimized and allowed only through a centralized healthcare appointment system—reachable through a hotline, website, or an online app.

## Travel Restrictions

Turkey canceled all flights from China as early as 3 February, followed by Iran on 23 February. Turkey also temporarily closed its border land crossings with Iran for 4 days to mount field hospitals at eight border land crossings and then reopened land border crossings with necessary health screenings.

## Risk Communication and Infographics

On 29 January, brochures, banners, and posters prepared in Turkish, English, and Arabic were distributed to inform the public, highlighting precautions and actions to stop virus transmission. Starting from February, TV spots and social media communication campaigns were broadcasted widely on the media.

## Controlled Airlifting of Turkish Citizens From Abroad

Turkey also evacuated its citizens stranded in disease-prone areas/countries as international travel shrank. The first flight brought stranded citizens from Wuhan on 31 January and the second from Tehran on 23 February. Airlifting continued from several countries since then, and so far, over 70,000 citizens have been brought back home from across the globe under controlled and risk mitigation strategies. All arriving citizens were subjected to 14 days of quarantine at dedicated locations.

## Activation of Provincial Emergency Operations Centers and Health Protection Boards

Provincial operation centers are activated and provincial health protection boards established under the leadership of governors. They started working to manage the pandemic at the provincial level to guarantee effective management.

## Public Engagement and Risk Communication

Showing leadership from the front, Minister of Health Fahrettin Koca regularly held press conferences, especially after scientific board meetings, to inform the public about the latest developments as related to the management of the pandemic, emerging knowledge, and best practices. Risk communication meetings and events (with social distancing observed) were organized to share information and to get feedback from all relevant stakeholders and other governmental ministries and entities.

## Strategic Prepositioning of Critical Personal Protective Equipment and Therapeutic Agents

In line with recommendations made by the CSAB, the MoH ensured provision of appropriate and adequate amounts of therapeutic regimens such as hydroxychloroquine, the antiviral favipiravir, and other drugs for use in hospitals and PPE for healthcare workers in healthcare settings. Sufficient stockpiles of these critical drugs were ensured before the start of the pandemic in the country.

## Overcoming Challenges to Be Ready for the Pandemic

Turkey experienced some difficulties at the onset of the pandemic, such as ensuring PPEs for health workers and the general public, obtaining some more bedside ventilators to be ready for possible patient influx, preparing the pile of possible drugs for patients' treatment, etc. It may also be problematic to implement some of the CSAB decisions related to other ministries' roles and responsibilities.

To cover domestic needs, a transient ban on exporting PPEs and medical equipment is implemented initially. All industrial corporations are promoted to change their production lines to produce medical equipment especially ventilators. Domestic pharmaceutical companies are supported to produce meds to be used for the treatment of COVID-19 patients. However, there are more to be done to face pandemics, which is beyond the Ministry of Health's mandate.

With the strong support and commitment by the President, all line ministries worked in harmony to implement and put CSAB recommendations into practice. Border and airport controls, regulations on importing goods from risky areas, quickly initiating distance learning models for continuing education online, curfew practices, etc. are put into practice in an extraordinary manner.

## ARRIVAL OF SARS-COV-2 IN TURKEY: PUBLIC HEALTH MEASURES AND MULTISECTORAL ACTIVITIES BASED ON WHOLE-OF-GOVERNMENT APPROACH

### The First SARS-CoV-2 Case

Turkey announced the first confirmed case on 11 March, incidentally the same day that the WHO announced SARS-CoV-2 outbreak as a pandemic (14). Minister Koca later shared a graph

showing how contact tracing of the first case was performed (Figure 1).

The day after the first case was reported, President Erdoğan led a ministerial cabinet meeting to initiate implementation of the response road map of the Turkish Government.

## Mitigation Measures

### i Closure of On-Site Instruction in Education Institutions Across the Country

All primary, middle, and high schools and universities in Turkey were closed, effective the following Monday (16 March 2020), and online and TV broadcasting supported education for primary, middle, and high schools starting after a 1-week period of midterm break (15).

### ii Banning of Mass-Gathering Events

A large number of measures to prevent mass gatherings were put into practice (16). All sport games; scientific, cultural, or artistic meetings; conferences; and congresses were postponed until further notice. Mosques and all places of worship, libraries, cafes, gyms, movie theaters, etc. were closed. Public banks started delivering pensions to retirees above the age of 76 years to their homes to help them stay at home.

### iii Restrictive Measures for Public Officials

Public officials over 60 years of age and those suffering from chronic conditions (presumed to be at high risk of SARS-CoV-2 based on global evidence) were granted administrative leave (17, 18). Public institutions and organizations were ordered to allow alternating and flexible working schedules and enforce remote/tele-working if and where possible.

### iv Additional Travel Restrictions

Flight bans were later extended to include most of the European countries.

### v Curfews and Lockdowns

#### 1. *Selective Curfew for the Elderly Over 65 Years and Establishment of "Vefa (Fidelity) Social Support Groups"* (18)

Effective from 22 March, a curfew was imposed for those over 65 years of age while their daily needs were met through newly established special teams called "Vefa (fidelity) social support groups." These curfew measures for the elderly seemed to have played a major role in reducing the incidence of new cases of SARS-CoV-2 in the elderly (Figure 2).

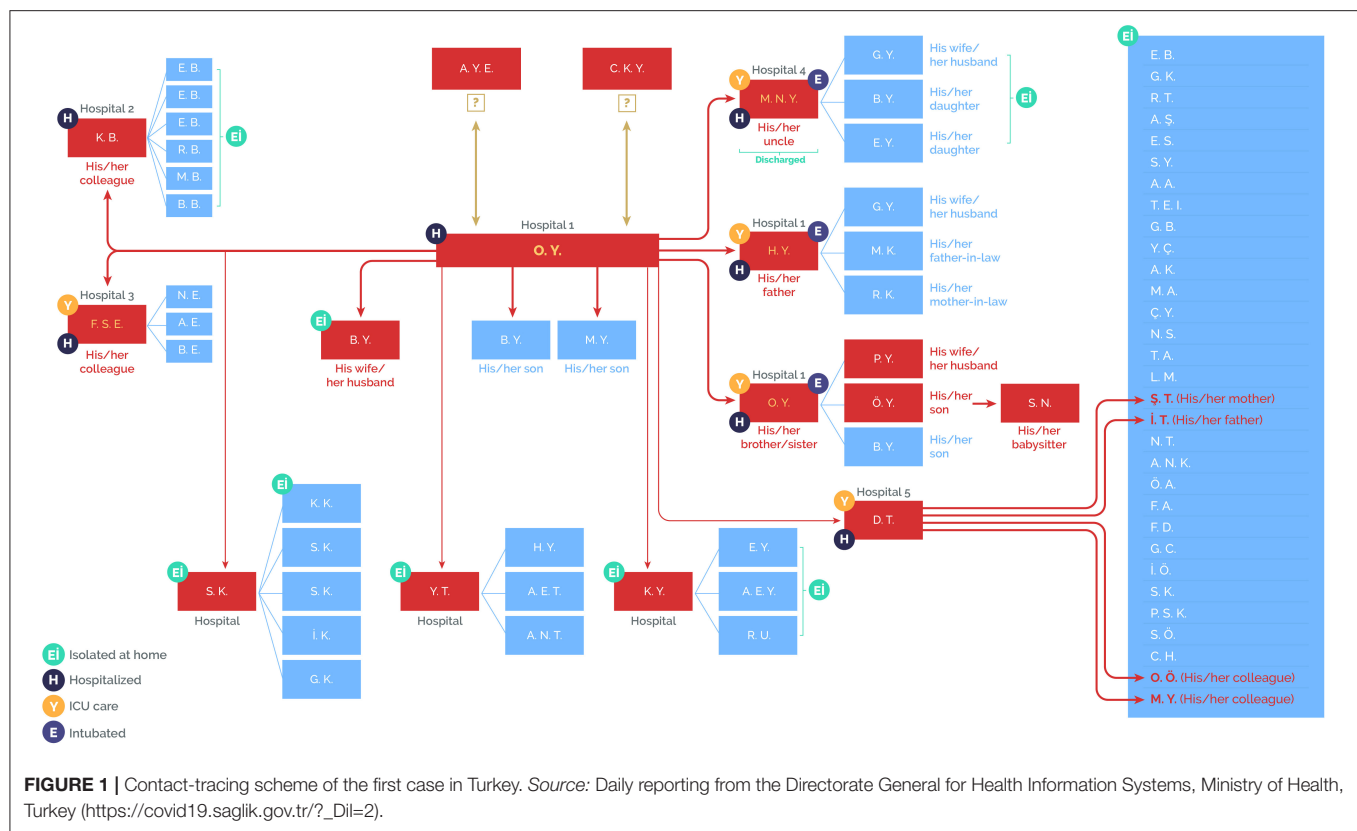
#### 2. *Curfew for Those Under 20 Years*

Ten days after imposing the curfew for the elderly over 65 years, curfew imposition was extended for those under age of 20.

### vi Weekend Total Lockdowns

The curfew for the whole population was first imposed on the weekend of 11 April and continued till June in selected cities. It was extended to cover public holidays adjoining weekends.

### vii In-Country Travel Restrictions



On 3 April, entrance ban to 30 metropolitan municipalities and provinces was announced by the President. All these measures are implemented with a whole-of-government approach, with active participation and contribution of all relevant authorities.

#### viii Economic Relief

An economic relief package of 100 billion TL (roughly 15 billion dollars) was announced by President Erdoğan on 18 March 2020 to address immediate financial woes of companies and costs in low-income households (15). With this package, the government also agreed to postpone tax liabilities, social security premium payments, and credit debts of employers in sectors worst affected by the crisis. The government also coordinated cash-raising campaigns and transferred 11.5 billion TL to families in need (2 billion TL was raised through an aid campaign called “We Are Enough For Each Other Turkey”), among other measures.

#### ix Incentives for Healthcare Workers

Special economic incentives for HCWs were provided by the government. Additional remuneration was granted to HCWs with a regulation published on 14 March 2020 (19). GSM operators in the country also provided 15 GB Internet packages for HCWs free of charge to facilitate continued contact of HCWs with their patients under isolation/quarantine and contact of HCWs with their own as well as patients’ families and loved ones. Similarly, for those HCWs who could not commute or did not

want to go home after their shifts for fear of transmitting the virus to family members/loved ones, alternate accommodations were provided free of charge.

#### x Free Health Coverage for SARS-CoV-2 for All

With a presidential decree published in the Official Gazette on 14 April 2020, all costs related to diagnosis and provision of medical treatment of persons with SARS-CoV-2 were made free of charge for all citizens and residents of Turkey (20).

#### xi Mental and Psychosocial Health

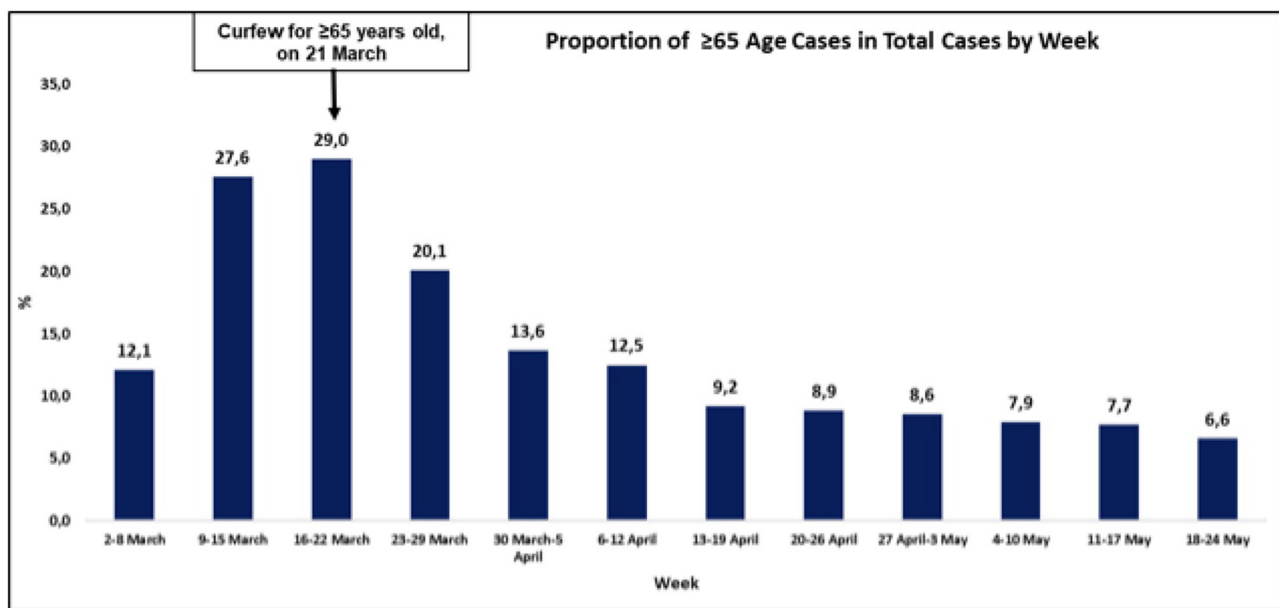
Some professionals working in healthy living centers and in some hospitals were trained and organized to provide psychosocial and mental health support to the community by placing such staff in at least one healthcare facility in each province.

#### xii Smartphone Apps/IT Usage

A specific software module for COVID-19 was added to the Public Health Management System software to ease surveillance of the disease and contact tracing.

A mobile application called Mental Health Support System was developed by the MoH to provide a direct channel between mental health professionals and HCWs, to protect the mental health and support the well-being of HCWs providing health care under challenging circumstances.

Another mobile application called “Hayat Eve Siğar” (Life Fits in Home) was also developed by the MoH, to inform, guide, and



**FIGURE 2 |** The incidence of new cases of SARS-CoV-2 in the elderly. *Source:* Daily reporting from the Directorate General for Health Information Systems, Ministry of Health, Turkey ([https://covid19.saglik.gov.tr/?\\_Dil=2](https://covid19.saglik.gov.tr/?_Dil=2)).

protect the public about areas with high exposure risk and by alerting them about high-risk behaviors. Residents could obtain a code through this application if that individual's travel between provinces was not restricted (not during the isolation period or recovery phase). Ten million residents have downloaded this application.

Special arrangements were also made to reduce the need for visits to healthcare facilities for purposes other than medical consultation, to reduce potential exposure risks for visitors as well as HCWs. Such measures included prescription refills for chronic diseases directly from pharmacies without a fresh prescription from a clinician.

#### xiii Role of Family Physicians

Family physicians have played a critical role in this response. They shouldered the provision of medical care in hospitals on the one hand and provided follow-up for vulnerable groups, such as the elderly, pregnant women and children, and refugees, on the other hand. They provided daily health checks of such vulnerable members of the community who were confined/isolated in their respective homes because of known close contact with confirmed SARS-CoV-2 patients but were asymptomatic and thus not hospitalized.

#### xiv Research and Development

##### 1. Clinical Trials for Vaccine Development

The MoH has organized a committee to synchronize and coordinate all clinical trials related to SARS-CoV-2. Data from multicentric scientific trials are intended to be submitted for peer review and publication in various journals. Multiple institutions

initiated research on vaccine development, therapeutics, and plasma convalescent therapy.

##### 2. Transfer and Sharing of Global/Regional Knowledge

MoH officials organized several videoconferences with many countries and with three levels of WHO and other international organizations to acquire/share/transfer knowledge, emerging best practices, and experience gained.

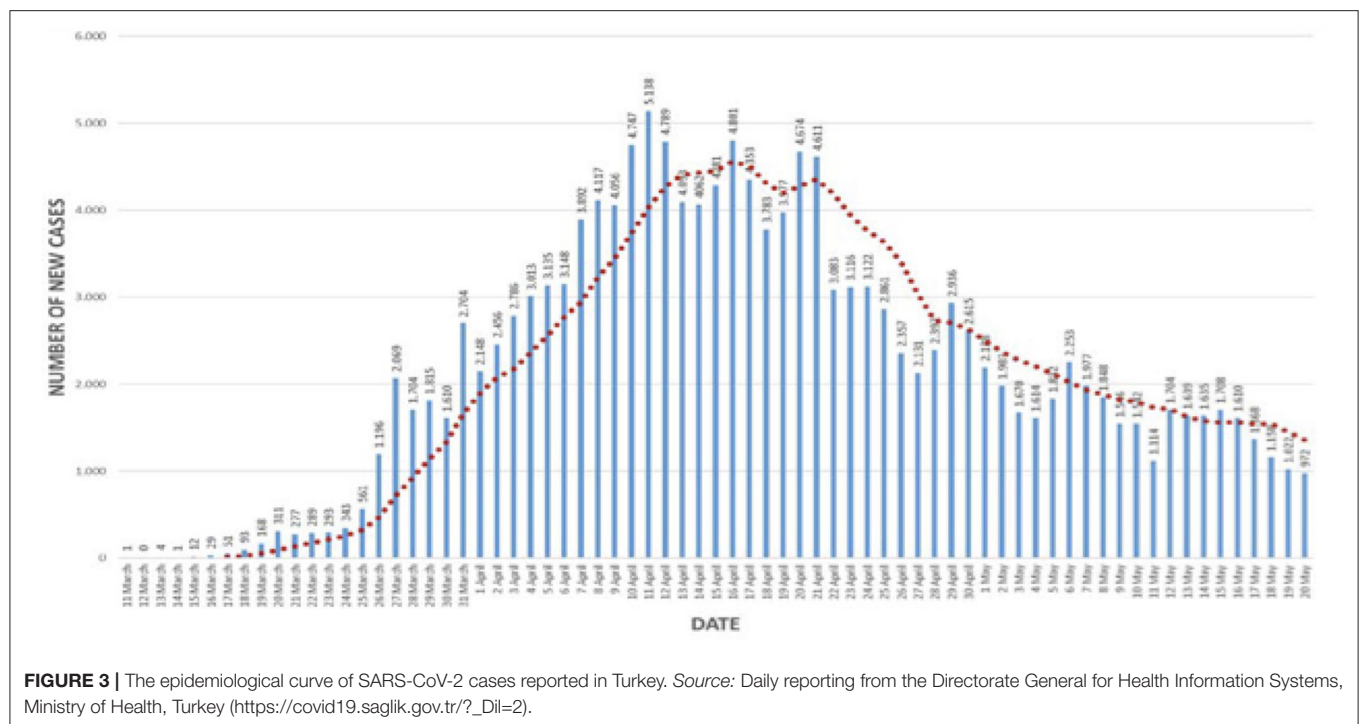
## PANDEMIC COURSE IN TURKEY AND CONTAINMENT MEASURES

### The Course of the Pandemic in Turkey

Containment measures in Turkey basically comprised four essential strategies: testing, (contact) tracing, treatment, and quarantine/isolation. The epidemiological curve of cases with SARS-CoV-2 reported in Turkey is displayed in **Figure 3**.

The highest number of daily new cases was reported on 11 April with 5,138 cases, the peak of the pandemic in the current wave. The peak tapered to a daily new case of less than a thousand by 20 May 2020 (**Figure 3**). Another key attribute responsible for Turkey's successful course is its strong testing capacity; Turkey rapidly increased its daily testing capacity up to 40,000–50,000/day, one of the best in the region, while many other developed economies continued to face the testing glut. With its high testing capacity, Turkey was able to test for cases and rapidly trace and test close contacts early. It was also able to isolate/quarantine and/or treat cases and thus interrupt the transmission chains early and effectively, preventing the spread of the virus to new susceptible individuals (**Figure 4**).





All confirmed cases can access case management and treatment easily and free of charge. Treatment recommendations are given in the COVID-19 Guidelines developed by the CSAB and are updated regularly in line with new evidence and information.

### Testing, Contact Tracing, and Case Finding

Turkey has implemented a comprehensive contact-tracing strategy. More than 6,000 field teams, composed of three staff each, were organized all around the country for contact tracing and epidemiological investigation of cases that had interactions with confirmed cases. A special software called FITAS (Filiation, Isolation and Tracing System) has been prepared and used to monitor all tracking activities and to reach all contacts, family relatives, colleagues at work, and others. This application is used also for monitoring individuals isolated at their homes. Family physicians regularly check their health status and refer them to hospitals at the earliest stage if any symptom arises. Through this process, Turkey has been able to reach 99.6% of all contacts, that is, approximately 792,000 people (more than five persons per one confirmed case), and each contact was detected within a timeframe of <32 h (21).

While the testing capacity has averaged on or around 25,000/day or so, the yield rate of positive tests has gradually lowered from a high of 15% in mid-April to single digits (5–6%) by mid-May. This sustained lower yield despite the high number of tests underscores the fact that the country is now ready to implement cascading, controlled relaxation of lockdowns. Both the numbers of patients in need of ICU care and those in need to be intubated have decreased over time (Figure 5).

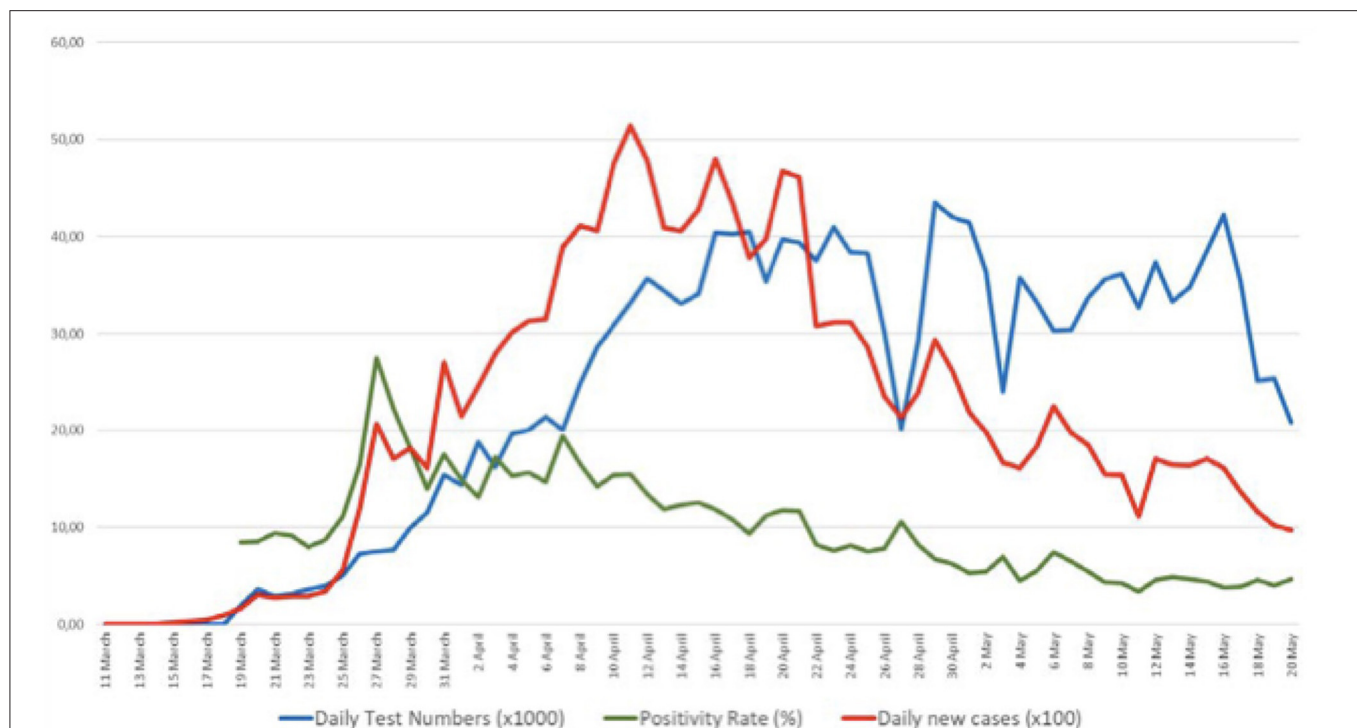
This could be attributed to the introduction of specific successful treatment protocols, as recommended by the

CSAB. The Ministry of Health had recommended starting hydroxychloroquine and/or azithromycin treatment if the likelihood of pneumonia was high. The large number of cases with only mild pneumonia in hospital admissions also lowered the need for intensive care and intubation. The full efficacy and safety of such treatment regimens still remain to be ascertained after compilation and analysis of observational data supplanted with retrospective chart reviews of patients. Initial therapy regimen with hydroxychloroquine was elaborated recently by the CSAB, and they advised to give the drug only to hospitalized patients.

It may also be useful to compile additional evidence to document the benefits of early treatment with favipiravir. Additionally, the accumulated clinical evidence on what is beneficial ranges from high-flow oxygenation, nursing in the prone position, late intubation, and the use of immunomodulators (such as anakinra and tocilizumab) and anticoagulants as supportive therapies for case management, with improved health outcomes in severe cases. Early diagnosis, contact tracing, and case management have helped greatly by lowering new infections, improving prognosis, and reducing the strain on the healthcare system. The proportion of intubated patients compared with those in intensive care has remained stable (~50%) over time, also a proxy validation of effective case management practices (Figure 5).

### LEAVING NO ONE BEHIND

Turkey hosts 3.6 million Syrians and additional nearly one and a half million regular and irregular migrants within its borders. Only 60,000 Syrians are living in the camps, while the rest live within host communities scattered across various provinces.



**FIGURE 4 |** Testing capacity, positivity rate, and case numbers per 1,000 population starting from 11 March to 20 May. *Source:* Daily reporting from the Directorate General for Health Information Systems, Ministry of Health, Turkey ([https://covid19.saglik.gov.tr/?\\_Dil=2](https://covid19.saglik.gov.tr/?_Dil=2)).

Although it would be relatively easier to provide health services to displaced populations living in camp settings, since >97% of Syrians in Turkey reside in host communities, Turkey established a network of migrant health centers for provision of health services and built these centers especially in provinces heavily inhabited by Syrians. In 2019, more than 17 million visits were recorded to these health facilities. Relevant health education and communication materials, including those for the pandemic, were developed in Arabic and English to facilitate linguistic and cultural acceptability by the refugee/migrant community. These migrant health centers helped to educate and train populations about the disease and the health protection measures they should take, and facilitated contact-tracing activities, especially for migrants. All related diagnostics and treatment procedures for SARS-CoV-2 during the pandemic are considered as emergencies, and accordingly, under this emergency approach, all services related to pandemic prevention and treatment were provided free of charge for both regular and irregular migrants as is the case with citizens (4).

Special arrangements were made to protect virus transmission in prisons and care homes for the elderly. Fixed staff teams, prescreened and determined to be non-infected, were arranged to work for longer hours in these facilities. Cases in prisons and care homes were isolated immediately in hospitals, and contacts of these cases were also screened and quarantined/isolated as needed. Meetings, visits, and transfers of prisoners were also postponed, minimizing exposures.

## TURKEY'S CONTRIBUTION TO INTERNATIONAL SOLIDARITY

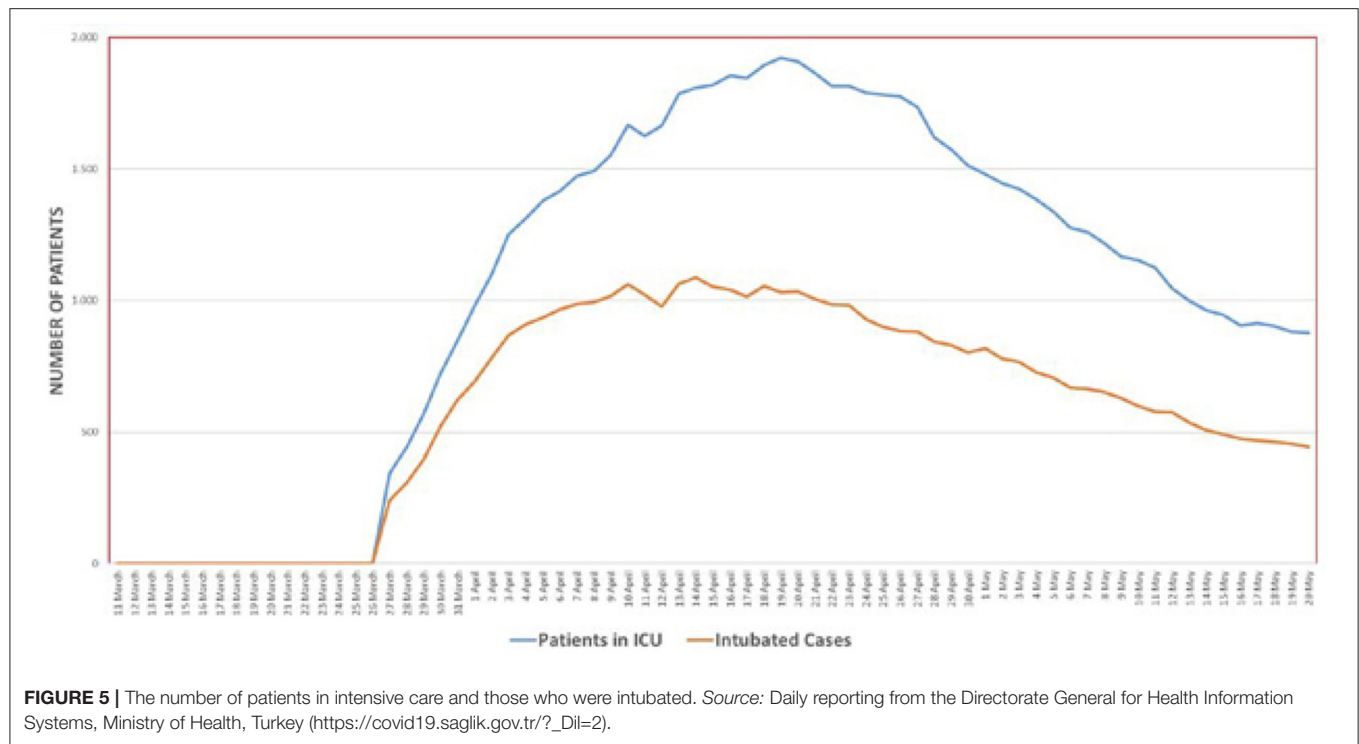
As an eminent and dutiful country as part of the international community, Turkey has been determined to fight an effective battle against COVID-19 at the national, regional, and global levels. Turkey's holistic approach, its deep-rooted state traditions, strong organizational structure, solidarity between the strong state and the nation, and effective leadership with political will—all such elements came to the fore, arming the nation in this fight.

Since the beginning of the outbreak, 136 countries and 8 international organizations have requested to cooperate with Turkey as part of their COVID-19 response efforts.

These cooperation requests were about:

- Sharing scientific and technical knowledge and experiences
- Donation of medication, medical supplies, and medical devices
- Provision of sales and export licenses for medication, medical supplies, and medical devices.

Under the coordination of the Presidency, the Ministry of Health, Ministry of National Defense, Ministry of Foreign Affairs, Turkish Red Crescent, Turkish Coordination and Cooperation Agency (TIKA), and Disaster and Emergency Management Presidency of Turkey (AFAD), as well as many professional organizations, civil society organizations, and international foundations and associations, took part in these aid efforts.



Turkey has supported more than 80 countries with personal protective equipment, diagnostic kits, medical devices, and medication and issued exceptional export licenses for 65 different countries and international organizations allowing the export of medication, personal protective equipment, and medical devices from Turkey to these end-beneficiaries.

In terms of scientific and technical knowledge and exchange of experiences, the Minister of Health, Dr. Fahrettin Koca, has conducted bilateral meetings with the Director-General of WHO, Regional Director of WHO European Region, and the ministers of health of the USA, Azerbaijan, the UK, Spain, Bulgaria, Libya, Pakistan, Romania, Tunisia, Kazakhstan, Russia, and Iran, as well as multilateral meetings at the Turkic Council. In addition, the CSAB members have taken part in meetings with the scientific committees of other countries.

Turkey has also tried to fulfill requests for personal protective equipment and ventilators from outside as much as possible while taking into consideration priority domestic needs. Turkey has continued to support cross-border healthcare services at the border with northern Syria during this period.

For Turkey, global cooperation and solidarity are part and parcel of COVID-19 response efforts. Accordingly, Dr. Fahrettin Koca's recommendations on the establishment of a "Supply Chain Group," "Health Scientific Board," and "Health Business Forum" were unanimously accepted by Member States of the Turkic Council, again setting an example among international platforms.

The words of Mevlana Celaleddin-i Rumi (famous Anatolian mystic philosopher), displayed on the boxes of supplies sent to other countries, constitute the essence of Turkey's efforts:

*"There is hope after despair and many suns after darkness."*

Through the act of global solidarity exhibited in COVID-19 response efforts, Turkey has once again demonstrated that it may not be the wealthiest, but it is one of the most generous of countries.

## TOWARD THE NEW NORMAL; CONTROLLED SOCIAL LIFE

President Erdoğan announced a road map for normalization on 3 May. It is called "a new normal," meaning some public health measures will be implemented permanently even after all facilities reopened. The CSAB provides advice on this normalization plan and prepares guidelines for various sectors. A research study is planned to determine the immunity level of the community at the provincial level; 150,000 samples will be collected for testing during that study.

Turkey's normalization is a dynamic process. Depending on up-to-date developments, some measures may be loosened earlier or later. The future of normalization will be decided not only by the impact of measures but also by public behavior. Therefore, public engagement plays a vital role. That is why the public is informed on a daily basis and communities are engaged efficiently throughout the process with a whole-of-society approach.

As also echoed by the WHO, countries need to ensure that they have capacities in place to detect and manage any upsurge in the number of cases once the transition period to a new normal is initiated. Despite low levels of intensive care and hospital bed occupancy ratios, construction of some additional pandemic hospitals and development of health system capacity is ongoing in Turkey.

## CONCLUSIONS

Turkey has successfully turned the corner in the current wave of the pandemic and stands among the countries with lower mortality rates generally but remarkably low mortality rates in the elderly. A multitude of factors seem to have worked in tandem and may hold the answers to these results:

1. Political commitment and leadership, multisectorial engagement, and whole-of-government approaches are all pillars of any public health struggle, as emphasized by the WHO and demonstrated by Turkey's experience.
2. The proportion of elderly (>65 years) in the overall population of Turkey is smaller as compared with countries with higher deaths rates (e.g., 6.5% as compared with >14% in Italy). Specific preventive and testing measures were instituted early to protect the elderly and prevent the spread of infection.
3. Early imposition of selective curfew for the elderly and people with chronic conditions protected them from being exposed to the circulating virus.
4. Turkey was an avid observer and a quick learner to adopt selective containment and mitigation measures closely observing the experiences of other countries and applying these nationally. Turkey adapted its national guidelines several times according to the latest knowledge and best practices—*Think globally and apply locally*.
5. Turkish SARS-CoV-2 guidelines were prepared with clear evidence-based recommendations, providing standardized therapeutic algorithms to all stakeholders around the country.
6. Strategic stockpiles, local production, and prepositioning allowed Turkey to avoid any critical shortages of personal protective equipment, drugs, and medical equipment.
7. Pre-pandemic high ICU bed/population ratios allowed the dilution of the strain on critical care systems even at the peak of the pandemic, and the highest occupancy for ICU beds did not exceed 60%.
8. Turkey has been active and flexible to extend the use of all possible treatment options to clinicians, ranging from antivirals to even some of the regimens from traditional Chinese medicine, and updated its guidelines according to clinical experiences.
9. Hydroxychloroquine is given to all positive and suspected cases as soon as diagnosis of SARS-CoV-2 is made. Early medication particularly with antivirals and high-flow oxygen seems to play some protective role, precluding the need for use of mechanical ventilators in the ICU.
10. Late intubation and prone position seem to have contributed to improved health outcomes in patients in the ICU.

Turkey is not among the richest of the countries. In fact, Turkey is the 17th country by virtue of population size and the 19th largest economy. Its gross domestic product (GDP)/capita scale [as measured by the purchasing power parity (PPP)] is around 75th in the world. The total expenditure on health is not more

than 5% of GDP and that means a little more than \$1,000 is spent on health per capita (on a PPP scale). Despite this, Turkey has been the most generous country as measured by its GDP. Turkey continued to support global solidarity and unity by sending lifesaving personal protective equipment and other supplies to countries in need without creating any shortages of these much-needed products at home.

Turkey's experience with its therapeutic algorithms, political and policy decisions, and public health measures have kept mortality rates from COVID-19 low particularly among the elderly. With technical backstopping from the WHO and other stakeholders, Turkey offers lessons and best practices that could be useful in contributing to the global health arsenal against the pandemic.

## THE WAY FORWARD

With all critical indicators of the severity of the pandemic tapering consistently and continually for over 4 weeks, since mid-April, Turkey is preparing for a measured exit into a socially controlled life starting from June 2020. Nonetheless, it will be extremely critical for communities to ensure compliance with social distancing, personal hygiene, and personal responsibilities to keep the infection rates low and the spread of the disease in check to ensure that there is no second peak in the initial wave that the country has successfully tamed. A critical marker is the looming autumn (fall) season, which is the flu season. Social distancing and personal hygiene coupled with compliance with flu vaccination are the interventions that can see Turkey safely through the fall.

Turkey will also continue to work with the WHO to ensure the containment, mitigation, and therapeutic and case management measures that have worked to its unique advantage in turning the corner, and best practices are shared and applied in a timely manner for the ultimate benefit of humanity (22).

## DATA AVAILABILITY STATEMENT

The data analyzed in this study is subject to the following licenses/restrictions: **Datasets belong to Ministry of Health.** Requests to access these datasets should be directed to Emine Alp Mese, eminealpmese@gmail.com.

## AUTHOR CONTRIBUTIONS

BK wrote the manuscript. IS, AT, PU, AM, and EM read and edited the manuscript. All authors contributed to the article and approved the submitted version.

## ACKNOWLEDGMENTS

A similar version of this manuscript by the same authors has been published at the WHO: <https://apps.who.int/iris/bitstream/handle/10665/335803/WHO-EURO-2020-1168-40914-55408-eng.pdf> (authors: BK, IS, AT, PU, and EM).



## REFERENCES

1. *Turkey Health System Performance Assessment 2011*. Copenhagen: WHO Regional Office for Europe (2012). Available online at: <https://www.euro.who.int/en/countries/turkey/publications/turkey-health-system-performance-assessment-2011> (accessed September 26, 2020).
2. *OECD Reviews of Health Care Quality: Turkey 2014 – raising standards*. France: Organization for Economic Co-operation and Development (2014). Available online at: <https://www.oecd.org/publications/oecd-reviews-of-health-care-quality-turkey-2013-9789264202054-en.htm> (accessed September 26, 2020).
3. *Health Statistics Yearbook 2018*. Republic of Turkey: Ministry of Health (2019). Available online at: <https://www.saglik.gov.tr/TR,62400/saglik-istatistikleri-yilligi-2018-yayinlanmistir.html> (accessed September 26, 2020).
4. *Temporary Protection Law (22 October 2014)*. Official Gazette No: 29153. Available online at: <https://www.resmigazete.gov.tr/eskiler/2014/10/20141022-15.htm> (accessed September 26, 2020).
5. *Assessment of Health Systems Crisis Preparedness – Turkey, 2010*. Copenhagen: WHO Regional Office for Europe (2011). Available online at: <https://www.euro.who.int/en/countries/turkey/publications/assessment-of-health-systems-crisis-preparedness-turkey> (accessed September 26, 2020).
6. EUR/RC54/9. Strategy of the WHO Regional Office for Europe with regard to geographically dispersed offices. In: *Fifty-fourth sessions of the WHO Regional Committee for Europe; Copenhagen, 6–9 September 2004*. Copenhagen: WHO Regional Office for Europe (2004). Available online at: [https://www.euro.who.int/\\_data/assets/pdf\\_file/0005/88205/RC54\\_edoc09.pdf](https://www.euro.who.int/_data/assets/pdf_file/0005/88205/RC54_edoc09.pdf) (accessed September 26, 2020).
7. *Presidential Decree on National Pandemic Influenza Preparedness Plan (13 April 2019)*. Official Gazette No: 30744. Available online at: <https://www.resmigazete.gov.tr/fihrist? tarih=2019-04-13> (accessed September 26, 2020).
8. Resolution A69/30. Reform of WHO's work in health emergency management: WHO Health Emergencies Programme. In: *Sixty-ninth World Health Assembly*. Geneva: WHO (2016). Available online at: [https://apps.who.int/gb/ebwha/pdf\\_files/WHA69/A69\\_30-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA69/A69_30-en.pdf) (accessed September 30, 2020).
9. *Making Preparation Count: Lessons From the Avian Influenza Outbreak in Turkey*. Copenhagen: WHO Regional Office for Europe (2006). Available online at: <https://www.euro.who.int/en/publications/abstracts/making-preparation-count-lessons-from-the-avian-influenza-outbreak-in-turkey> (accessed September 26, 2020).
10. *Strengthening Health Security by Implementing the International Health Regulations (2005)*, 2nd ed. Geneva: WHO (2018). Available online at: <https://www.who.int/ihr/publications/9789241596664/en/> (accessed September 26, 2020).
11. *Regulation (EC) No. 1082/2006 of the European Parliament and of the Council of 5 July 2006 on a European Grouping of Territorial Cooperation (EGTC)*. Legislation.gov.uk. Available online at: <https://www.legislation.gov.uk/eur/2006/1082/contents> (accessed September 26, 2020).
12. *Report of the Regional Director: the work of WHO/Europe in 2019–2020*. Copenhagen: WHO (2020). Available online at: <https://www.euro.who.int/en/about-us/governance/regional-committee-for-europe/70th-session/multimedia/report-of-the-regional-director-the-work-of-who-europe-in-20192020> (accessed September 26, 2020).
13. *COVID-19 Guides*. Republic of Turkey Ministry of Health: General Directorate of Public Health. Available online at: <https://hsgm.saglik.gov.tr/en/covid-19-i-ngilizce-dokumanlar/rehberler.html> (accessed June 27, 2020).
14. *WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 – 11 March 2020*. World Health Organization. Available online at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020> (accessed September 26, 2020).
15. *Remarks by President Recep Tayyip Erdogan in Address to the Nation Following the Meeting on Coordination of Fight Against Coronavirus*. (2020). Available online at: <https://www.tccb.gov.tr/konusmalar/353/118038/koronavirusle-mucadele-esgudum-toplantisi-sonrasi-yaptiklari-konusma> (accessed September 26, 2020).
16. *An additional circular on coronavirus measures sent to 81 provincial governorships*. 16 March 2020. Ministry of Interior. Available online at: <https://www.icisleri.gov.tr/81-il-valiligine-koronavirus-tedbirleri-konulu-ek-genelge-gonderildi> (accessed September 26, 2020).
17. *Presidential Decree on Additional Measures Against Coronavirus for Public Officials (22 March 2020)*. Official Gazette No: 31076. Available online at: <https://www.mevzuat.gov.tr/MevzuatMetin/CumhurbaskanligiGenelgeleri/20200322-4.pdf> (accessed September 26, 2020).
18. *Presidential Circular with E.12362 Reference Number on Administrative Leave of Public Servants*. (2020). Available online at: <https://iidb.adalet.gov.tr/Home/SayfaDetay/cumhurbaskanliginin-kamu-kurum-ve-kuruluslarinda-calisanlara-yonelik-idari-izin-konulu-duyurusu18032020022519> (accessed September 26, 2020).
19. *Regulation on Additional Remuneration for Healthcare Workers Serving at Healthcare Facilities of the Ministry of Health*. 4 March 2020. Official Gazette No: 31058. Available online at: <https://www.resmigazete.gov.tr/eskiler/2020/03/20200304-4.htm> (accessed September 26, 2020).
20. *Presidential Decree Addition to the Presidential Decree of 13 April 2020 No: 2399*. (2020). Available online at: <https://www.resmigazete.gov.tr/eskiler/2020/04/20200414-16.pdf> (accessed September 26, 2020).
21. *COVID-19 Information Page*. Republic of Turkey Ministry. Available online at: <https://covid19bilgi.saglik.gov.tr/tr/> (accessed September 26, 2020).
22. *Turkey's Response to Covid-19: First Impressions*. Ankara: WHO Regional Office for Europe (2020). Available online at: <https://apps.who.int/iris/bitstream/handle/10665/335803/WHO-EURO-2020-1168-40914-55408-eng.pdf> (accessed November 5, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Keskinkiliç, Shaikh, Tekin, Ursu, Mardinoglu and Mese. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Study on the Knowledge, Attitude, and Practice (KAP) of Nursing Staff and Influencing Factors on COVID-19

Xin Wen<sup>1†</sup>, Fan Wang<sup>2,3†</sup>, Xiuyang Li<sup>2,3\*</sup> and Hua Gu<sup>1\*</sup>

<sup>1</sup> Zhejiang Provincial Center for Medical Science and Education Development, Hangzhou, China, <sup>2</sup> Clinical Big Data and Statistics Center, Second Affiliated Hospital, Zhejiang University College of Medicine, Hangzhou, China, <sup>3</sup> Department of Epidemiology and Biostatistics, Zhejiang University, Hangzhou, China

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Rosnah Sutan,  
National University of  
Malaysia, Malaysia  
Aida Mujkić,  
University of Zagreb, Croatia

### \*Correspondence:

Xiuyang Li  
lixuyang@zju.edu.cn  
Hua Gu  
kjzxhgu@163.com

<sup>†</sup> These authors have contributed  
equally to this work and share first  
authorship

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 19 June 2020

**Accepted:** 30 November 2020

**Published:** 18 January 2021

### Citation:

Wen X, Wang F, Li X and Gu H (2021)  
Study on the Knowledge, Attitude,  
and Practice (KAP) of Nursing Staff  
and Influencing Factors on COVID-19.  
Front. Public Health 8:560606.  
doi: 10.3389/fpubh.2020.560606

The aim of this study is to investigate the knowledge, attitude, and practice (KAP) on Coronavirus Disease 2019 (COVID-19) care among nursing staff and analyze its influencing factors. The survey was conducted on February 18, 2020, among 7,716 voluntary participants from 143 medical institutions in Zhejiang, China. The findings indicated that KAP of nursing staff scored well. However, the accuracy of psychological nursing knowledge was much lower, 14.3% only. Nursing staff working in isolation wards have higher knowledge (OR = 1.776, 95% CI: 1.491–2.116), attitude (OR = 1.542, 95% CI: 1.298–1.832), and practice (OR = 1.902, 95% CI: 1.590–2.274) scores than those in general wards. In terms of KAP, nursing staff with working experience  $\leq 10$  years scored lower than those with working experience  $\geq 20$  years, with OR values of 0.490 (95% CI: 0.412–0.583), 0.654 (95% CI: 0.551–0.775), and 0.747 (95% CI: 0.629–0.886), respectively. It is necessary to take measures to enhance the training on COVID-19, especially for KAP of junior nurses in general wards.

**Keywords:** COVID-19, knowledge, attitude, practice, nursing staff, influencing factors

## INTRODUCTION

At the end of December 2019, a novel coronavirus pneumonia case appeared in Wuhan, China (1). The World Health Organization (WHO) named it Coronavirus Disease 2019 (COVID-19) and declared it a pandemic (2). As of April 29, 2020, there were nearly 3 million confirmed cases of COVID-19, including 202,733 deaths according to the WHO, reported by 213 countries around the world (3).

Zhejiang province locates on the east coast of China, which was one of the regions hit hardest when COVID-19 broke out in China. It is located between 118°01'–123°10' E and 27°02'–31°11' N, is economically developed, with an area of 105,500 km<sup>2</sup> and a population of about 50 million, and consists of 11 municipalities. The first case of COVID-19 reported by the Health Commission of Zhejiang Province was on January 21, 2020. As of February 18, 2020, when we conducted the survey, a total of 1,173 confirmed cases were reported in Zhejiang province and 544 were discharged from hospitals (4).

The model of KAP is divided into three continuous processes that help to explain human behavior. As a new respiratory infectious disease, COVID-19-related nursing care involves new knowledge and contents. Attitude and practice of nursing staff also affect the progression and prognosis of the disease. The purpose of the study is to understand the nursing staffs' knowledge, attitude, and practice (KAP) on COVID-19 and its influencing factors, which can provide a basis for further targeted improvement measures, and provide references for subsequent relevant training or policy-making to improve the quality of clinical nursing.

## MATERIALS AND METHODS

### Participants

We organized an anonymous and online survey on COVID-19 nursing for all nursing staff in our province through the questionnaire star, a mobile app, which greatly improved the efficiency of survey. A total of 7,716 nursing staff from 143 medical institutions volunteered to participate in the survey, which includes 11 medical institutions at the provincial level, 53 institutions at the municipal level, and 79 institutions at the county level. The survey was conducted on February 18, 2020, 68 days after the report of the first case in China (December 12, 2019).

### Survey Instrument

The self-designed questionnaire includes basic information, nursing knowledge, nursing attitude, and nursing practice on COVID-19 care. The questions were designed based on "COVID-19 diagnosis and treatment scheme (seventh edition)," "COVID-19 prevention and control program (sixth edition)," "COVID-19 laboratory testing technology guide (fifth edition)" and "COVID-19 psychological counseling work plan," which were issued by the National Health Commission of China and were revised and verified by five frontline medical experts from a designated hospital of COVID-19.

The questionnaire is composed of two parts. The first part is general information including age, educational background, work experience, hospital rank, and workplace (outpatient clinics and emergency departments, fever clinics, isolation wards, and general wards). The second part assessed the KAP of nursing staff. The knowledge section includes suspected patient care, confirmed patient care, specimen collection, psychological care, and discharge guidance. There are 10 knowledge-related questions, 1 point for each correct answer, with a total score of 10 points. The attitude section includes a self-assessment of knowledge mastery, the desire to learn more knowledge, the influence of emotional state on nursing quality, and the ability and confidence to nursing care for COVID-19. Each question is scored on five levels, ranging from 1 point to 5 points. The total score is 20 points. The practice section includes implementing nursing in accordance with the nursing requirements of infectious diseases, preventing cross-infection consciously, changing daily manner of work to meet the needs during COVID-19, and adapting to psychological changes of patients actively. There are four nursing practice questions. Each

question is scored on four levels, ranging from 1 point to 4 points. The total score is 16 points.

## Statistical Methods

Categorical data were described by numbers and percentages. The average scores of KAP were presented as median and interquartile range. Spearman rank correlation analysis or Kruskal–Wallis test was performed to analyze the relation between KAP scores and its factors. Ordered classification logistics regression analysis was performed to identify the risk factors affecting, and outcomes were presented as odds ratio and 95% confidence interval (CI). Data were analyzed using SPSS statistical software version 19.0. Two-tailed  $P$  value  $\leq 0.05$  was considered as statistically significant.

## RESULTS

### Demographic Characteristics

In the study, a total of 7,716 nursing staff volunteered to participate in the survey; 7,716 valid questionnaires were returned. Of the participants, 47.8% were under 30 years old and 50.2% were aged from 31 to 49; 76.6% have an undergraduate education background; 58.9% have a working experience of <10 years; 60.7% are from municipal hospitals; 74.8% worked in general wards, 16.9% in outpatient clinics and emergency departments, 6.1% in isolation wards, and 2.2% in fever clinics (Table 1).

### The KAP on COVID-19

The median and interquartile range of nursing knowledge, attitude, and practice on COVID-19 were 8 (2), 16 (3), and 14 (2), respectively.

The study shows that there is a high awareness rate among the respondents as to "patients' specimen collection," "requirement of patients' temperature measuring before discharge," "principles of placement in wards for suspected cases," and "nursing procedure requirements for suspected cases," with a correct answer rate of 99.0, 98.4, 95.8, and 95.8%, respectively. The correct rate of "frequency and duration of ventilation in wards," "discharge standards for patients," and "de-quarantine standards for suspected cases" was 73.4, 72.0, and 68.1%, respectively. The correct rate of "patients' psychological status" was only 14.3%.

Of the respondents, 65.3% believed that they had a good command of the COVID-19 nursing knowledge. The proportion of respondents with a strong desire to learn more nursing knowledge on COVID-19 was 74.3%. Facing the infectious disease, 17.5% of participants thought it had no impact on their nursing care quality; 66.4% thought they were neither panicked nor imprudent, and would try to ensure the nursing care quality; 9.3% indicated they had some anxiety and depression, which may affect their nursing quality and efficiency; 36.3% thought they were fully competent and confident to do a good job, while 47.6% thought they were competent and confident enough.

Of the respondents, 35.6% said they were fully able to care for COVID-19 patients according to the standards, 55.8% of them were basically able to handle in accordance with standards, and 8.5% said they were not yet good enough. In terms of consciously

**TABLE 1 |** The relation between demographic characteristics of responders and KAP scores.

Characteristics	Demographic variables	Number	Percentage	Knowledge		Attitude		Practice	
				Statistics	P	Statistics	P	Statistics	P
Age				0.143	<0.001	0.140	<0.001	0.096	<0.001
	≤30 years	3,689	47.81						
	31–49 years	3,870	50.16						
	≥50 years	157	2.03						
Educational level				0.114	<0.001	0.045	<0.001	0.013	0.240
	College degree or below	1,781	23.08						
	Undergraduate	5,908	76.57						
	Postgraduate	27	0.35						
Working experience				0.161	<0.001	0.145	<0.001	0.102	<0.001
	≤10 years	4,546	58.91						
	11–19 years	2,188	28.36						
	≥20 years	982	12.73						
Hospital rank				0.029	0.010	0.015	0.177	0.340	0.003
	County level	1,954	25.32						
	Municipal level	4,680	60.65						
	Provincial level	1,082	14.02						
Field of work				52.421*	<0.001	32.699*	<0.001	64.503*	<0.001
	Outpatient clinics and emergency departments	1,307	16.94						
	Fever clinics	169	2.19						
	Isolation wards	472	6.12						
	General wards	5,768	74.75						

\*is  $\chi^2$ , others are  $r_s$ .

preventing cross-infection, 37.6% thought they did quite well and 53.8% thought they did good enough (Table 2).

## Access to COVID-19 Nursing Knowledge

According to the survey, the main ways to acquire COVID-19 nursing knowledge were online video, training organized by hospitals, and website information. The proportion of respondents who acquired knowledge through the above three ways was 92.6, 88.6, and 74.9% respectively. Communication among colleagues, TV, and radio closely followed, with proportions of 64.9, 56.4, and 30.9%, respectively. The percentage of respondents who acquired knowledge through other means, such as newspapers, was lower (<20.0%).

## Single-Factor Correlation Analysis of the Factors Affecting KAP Scores

We analyze the relationship between knowledge, attitude, and behavior. The results showed that knowledge was related to attitude ( $r_s = 0.083$ ,  $P < 0.001$ ) and behavior ( $r_s = 0.044$ ,  $P < 0.001$ ). Attitude was positively related to behavior ( $r_s = 0.553$ ,  $P < 0.001$ ).

In order to study the relationship between different factors and KAP scores, we conducted a single-factor rank correlation analysis. We found that age had a positive correlation with the scores of KAP, so did working experience. The correlation between workplace and the scores of KAP was also statistically

significant. Educational background was not related to practice scores, but to knowledge and attitude scores. There was a positive correlation between hospital rank and knowledge score or practice score (Table 1).

## Ordered Classification Logistics Regression Analysis to Identify the Influencing Factors of KAP Scores

Using quartile as cutoff point, the scores of KAP were divided into four grades and set as the dependent variable, respectively. All factors were included into independent variables.

Ordered classification logistics regression analysis showed that knowledge score of respondents aged under 30 or 11–49 is lower than that of respondents aged over 50 years; the OR value was 0.565 (95% CI: 0.397–0.803) and 0.625 (95% CI: 0.450–0.870). The result of work experience was consistent with age. The knowledge score of nursing staff in provincial hospitals was higher than both the scores in county level hospitals (OR = 0.729, 95% CI: 0.635–0.837) and in municipal level hospitals (OR = 0.754, 95% CI: 0.667–0.853). Nurses working in fever clinics and isolation wards scored higher than those in general wards, and the OR values were 1.657 (95% CI: 1.248–2.201) and 1.776 (95% CI: 1.491–2.116), respectively.

In terms of attitude, respondents aged ≥50 years scored higher than those aged ≤30 (OR = 0.630, 95% CI: 0.449–0.883). Respondents with working experience ≤10 years scored lower than those ≥20 years (OR = 0.654, 95% CI: 0.551–0.775).



**TABLE 2 |** The score of every item in KAP.

Variable	Item	scores	1		2		3		4		5	
			<i>n</i>	Constituent ratio (%)	<i>n</i>	Constituent ratio (%)	<i>n</i>	Constituent ratio (%)	<i>n</i>	Constituent ratio (%)	<i>n</i>	Constituent ratio (%)
Knowledge		Total scores = 10										
	Specimen collection	0–1	7,639	99.00								
	Psychological care	0–1	1,100	14.26								
	Discharge guidance	0–2	1,474	19.10	6,218	80.59						
	Suspected patient care	0–3	267	3.46	2,564	33.23	4,880	63.25				
	Confirmed patient care	0–3	983	12.74	2,922	37.87	3,709	48.07				
Attitude		Total scores = 20										
	Knowledge mastery	1–5	0	0	25	0.32	2,653	34.38	4,586	59.43	452	5.86
	Learn more knowledge	1–5	5	0.06	4	0.05	207	2.68	1,929	25.00	5,571	72.20
	Emotional state	1–5	20	0.26	715	9.27	507	6.57	5121	66.37	1,353	17.53
	Confidence in nursing	1–5	6	0.08	71	0.92	1,163	15.07	3,674	47.62	2,802	36.31
Practice		Total scores = 16										
	Standardized care	1–4	7	0.09	657	8.51	4,302	55.75	2,750	35.64		
	Prevent cross infection	1–4	8	0.10	658	8.53	4,148	53.76	2,902	37.61		
	Change manner of work	1–4	1	0.01	69	0.89	1,891	24.51	5,755	74.59		
	Adapt to patient's psychological changes	1–4	6	0.08	211	2.73	2,078	26.93	5,421	70.26		

**TABLE 3 |** Ordered classification logistics regression analysis of the risk factors about KAP scores.

Dependent variable	Characteristics		Reference	$\beta$	S.E.	Wald Chisq	P	OR	95% CI
Knowledge	Age	≤30	≥50	−0.572	0.180	10.137	0.001	0.565	0.397–0.803
		31–49	≥50	−0.469	0.169	7.766	0.005	0.625	0.450–0.870
	Working time	≤10	≥20	−0.713	0.088	64.985	<0.001	0.490	0.412–0.583
		11–19	≥20	−0.488	0.076	40.751	<0.001	0.614	0.529–0.713
	Hospital rank	County	Province	−0.316	0.071	20.095	<0.001	0.729	0.635–0.837
		City	Province	−0.282	0.063	20.078	<0.001	0.754	0.667–0.853
	Field of work	Fever clinic	General ward	0.505	0.145	12.175	<0.001	1.657	1.248–2.201
		Isolation ward	General ward	0.575	0.089	41.447	<0.001	1.776	1.491–2.116
Attitude	Age	≤30	≥50	−0.462	0.172	7.188	0.007	0.630	0.449–0.883
	Working time	≤10	≥20	−0.425	0.087	23.968	<0.001	0.654	0.551–0.775
	Field of work	Isolation ward	General ward	0.433	0.088	24.329	<0.001	1.542	1.298–1.832
Practice	Working time	≤10	≥20	−0.292	0.087	11.188	0.001	0.747	0.629–0.886
	Hospital rank	County	Province	−0.205	0.070	8.575	0.003	0.815	0.710–0.935
	Field of work	Fever clinic	General ward	0.312	0.144	4.701	0.030	1.367	1.030–1.812
		Isolation ward	General ward	0.643	0.091	49.584	<0.001	1.902	1.590–2.274

Respondents in isolation wards scored higher than those in general wards (OR = 1.542 95% CI: 1.298–1.832).

Respondents with work experience ≥20 years scored higher than those ≤10 years in practice scores (OR = 0.747, 95% CI: 0.629–0.886). Respondents working in provincial hospitals scored higher than those in county hospitals (OR = 0.815, 95% CI: 0.710–0.935). Workers from fever clinics and isolation wards have higher scores than those in general wards. The OR values were 1.367 (95% CI: 1.030–1.812) and 1.902 (95% CI: 1.590–2.274), respectively (Table 3).

## DISCUSSION

The number of people diagnosed with COVID-19 was increasing continuously. The appearance of COVID-19 was listed by WHO as a “Public Health Emergency of International Concern” (PHEIC) (5), which is the highest level of infectious disease emergency response within the WHO system. It is important to staff enough nurses to care for the infected and ensure the quality of care in major public health emergencies (6). Our research was conducted during the new coronary pneumonia epidemic and the sample size was large, which is representative of the KAP of nursing staff regarding COVID-19.

The results of our study showed that nurses working in isolation wards have higher KAP scores than those in general wards. The KAP scores in outpatient and emergency departments were not so different from those in general wards. For sudden infectious diseases, the workload of nursing staff is large, and they face the risk of infection and bear greater psychological pressure than doctors (7). A study showed that non-frontline workers had lower confidence in defeating the virus compared to frontline HCWs (8). Acquiring knowledge, generating beliefs, and forming behavior are three consecutive processes (9).

Higher scores of KAP help avoid occupational exposure and prevent nosocomial infections among nursing staff. Of the infected health care workers who were presumed to have been infected in hospital, 31 (77.5%) were from general wards, 7 (17.5%) were from the emergency department, and 2 (5%) were from the ICU (10). This may be related to a lack of knowledge or awareness of protection among nursing staff in general wards.

Another important influencing factor we found was working experience, which was significantly associated with the KAP scores. Nurses who worked more than 20 years have a significantly higher score than those who worked <10 years. Our result is similar to other studies (11, 12). The richer his/her work experience, the more confident is the nurse to face and deal with public health emergencies.

We found that the knowledge and behavior scores of respondents from provincial units were higher than those from county units. The difference may be partly because of necessary equipment and protective measures against infection in provincial-level health institutions, as well as the higher accessibility of relevant information and training on COVID-19.

The theory model of KAP is widely used in nursing work. Knowledge is the basis of behavior change, which is also the decisive factor. This study found that the scoring rate of psychological nursing was only 14.3%. In terms of knowledge on COVID-19, 59.4% of the nursing staff showed that they had a better grasp of relevant knowledge, only 5.9% showed that they had fully mastered it, and 72.2% of the nursing staff said they hoped to continue to learn more about the new coronary pneumonia. Knowledge is a prerequisite for establishing prevention beliefs. Compared with health problems, nursing staff are more likely to ignore the psychological needs of patients. When facing an unknown disease without

any specific medicine to treat, patients especially the elderly may have negative emotions such as anxiety and depression. Nurses who have the necessary psychological knowledge and consciously perform psychological nursing work can help patients recover better.

For goodness of fit of the predictor model on practice, the  $R^2 = 0.021$  (Cox and Snell) is rather low to describe determinant factors; other factors need to be explored in future research.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## REFERENCES

- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med.* (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
- World Health Organization. *Coronavirus Disease (COVID-19) Pandemic.* Available online at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (accessed March 10, 2020).
- World Health Organization. *Coronavirus (COVID-19).* Available online at: <https://covid19.who.int/> (accessed April 29, 2020).
- The People's Government of Zhejiang Province. *Update on Epidemic Situation of Novel Coronavirus-Infected Pneumonia on Feb 19, 2020.* Available online at: [http://www.zj.gov.cn/art/2020/2/19/art\\_1228996608\\_41943073.html](http://www.zj.gov.cn/art/2020/2/19/art_1228996608_41943073.html) (accessed February 19, 2020).
- World Health Organization. *WHO Director-General's statement on IHR Emergency Committee on Novel Coronavirus (2019-nCoV).* Available online at: [https://www.who.int/zh/dg/speeches/detail/who-director-general-s-statement-on-ihr-emergency-committee-on-novel-coronavirus-\(2019-ncov\)](https://www.who.int/zh/dg/speeches/detail/who-director-general-s-statement-on-ihr-emergency-committee-on-novel-coronavirus-(2019-ncov)) (accessed January 30, 2020).
- Catton H. Global challenges in health and health care for nurses and midwives everywhere. *Int Nurs Rev.* (2020) 67:4–6. doi: 10.1111/inr.12578
- Huang JZ, Han MF, Luo TD, Ren AK, Zhou XP. Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi.* (2020) 38:E001. doi: 10.3760/cma.j.cn121094-20200219-00063
- Zhou M, Tang F, Wang Y, Nie H, Zhang L, You G, et al. Knowledge, attitude and practice regarding COVID-19 among health care workers in Henan, China. *J Hosp Infect.* (2020) 105:183–7. doi: 10.1016/j.jhin.2020.04.012
- McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Meta-Analysis of the reasoned action approach (RAA) to understanding health behaviors. *Ann Behav Med.* (2016) 50:592–612. doi: 10.1007/s12160-016-9798-4
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA.* (2020) 323:1061–9. doi: 10.1001/jama.2020.1585
- Khan MU, Shah S, Ahmad A, Fatokun o. Knowledge and attitude of healthcare workers about middle east respiratory syndrome in multispecialty hospitals of Qassim, Saudi Arabia. *BMC Public Health.* (2014) 14:1281. doi: 10.1186/1471-2458-14-1281
- Hou W, Wang HY, Geng Y, Hao JJ, Jin QY, Zhang Y, et al. Investigation and analysis on knowledge attitude practice among pediatric healthcare staff of prevention and control and influencing factors of the corona virus disease 2019. *Chin J Woman Child Health Res.* (2020) 31:161–5. doi: 10.3969/j.jssn.1673-5293.2020.02.006

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Medical Ethic Committee, School of Public Health, Zhejiang University.

## AUTHOR CONTRIBUTIONS

XW, FW, XL, and HG: each author has been sufficiently involved in this submission to take public responsibility for the work, meaning that each author has made substantial contributions to the conception and design of the study. HG and XW: acquisition of data. FW and XL: analysis and interpretation of the data. XW, FW, XL, and HG: drafting the article and revising it critically for important intellectual content. All authors contributed to the article and approved the submitted version.

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Wen, Wang, Li and Gu. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# War Metaphors in Political Communication on Covid-19

Eunice Castro Seixas\*

Research Centre in Economic and Organizational Sociology (SOCIUS), Research in Social Sciences and Management (CSG), Lisbon School of Economics and Management (ISEG), University of Lisbon, Lisbon, Portugal

Although militaristic metaphors have been pervasive during health crisis in political and science communication, few works have examined how these linguistic devices may influence crisis communication. Drawing on critical discourse analysis (CDA) and on crisis communication literature, I show how political representatives have used the war metaphor for very different purposes in terms of crisis communication and management of the current Covid-19 pandemic. I suggest that these findings challenge previous criticisms of the war metaphor as inherently negative and damaging. Finally, I discuss possibilities of using CDA, and specifically, metaphor analysis to inform and expand crisis communication.

**Keywords:** war metaphors, crisis communication, political communication, COVID-19, critical discourse analysis

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Ann Elizabeth Reisner,  
University of Illinois at  
Urbana-Champaign, United States  
Stephen Harper,  
University of Portsmouth,  
United Kingdom

### \*Correspondence:

Eunice Castro Seixas  
euniceseixas@gmail.com;  
euniceseixas@socius.iseg.ulisboa.pt

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Sociology

**Received:** 15 July 2020

**Accepted:** 19 November 2020

**Published:** 25 January 2021

### Citation:

Castro Seixas E (2021) War  
Metaphors in Political Communication  
on Covid-19. *Front. Sociol.* 5:583680.  
doi: 10.3389/fsoc.2020.583680

## INTRODUCTION

Militaristic metaphors have long been used in health crisis in political and media communicative practices, namely in relation to former epidemics, like the Severe Acute Respiratory Syndrome—SARS (Chiang and Duann, 2007, p. 587–597; Joye, 2010, p. 594; Koteyko et al., 2008, p. 247–259) and the Avian flu (de la Rosa, 2007, p. 18–26; de la Rosa, 2008, p. 91–94), but also regarding cancer and AIDS. This metaphorical use has been widely criticized, specifically: for being “inherently masculine, power-based, paternalistic and violent” (Reisfield and Wilson, 2004, p. 4025); contributing to the passivization of the patient; adding to further anxiety and stigmatization by blaming the victims when these are not able to win the battle, promising a victory that may be illusory and paving the way for the acceptance of the violence of the treatment and potential “collateral damages” (Hodgkin, 1985, p. 1820; Ross, 1989, p. 55; Stibbe, 1997, p. 68, 69; Sontag, 1979, p. 64–66; Sontag, 1989, p. 94).

In spite of the relevance of these criticisms, it is important to note that, as language is embedded in societal, political, and ideological structures and processes, the meaning of the signifiers depends on the specific relations between text and context. On the other hand, the recurrent use of militaristic metaphors during health crises may be actually a proof of its effectiveness as a rhetorical tool, which is something that in itself deserves further critical scrutiny. In this respect, although many discourse analysts have shown the importance of metaphors in political communication, few works have examined how these linguistic devices may actually aid or conversely, hinder, crisis communication, and management. Such an endeavor could be important in promoting a more critical approach to crisis communication, as well as in widening the application of critical discourse analysis (CDA) and specifically, metaphor analysis, to the understanding of crisis situations.

It is against this backdrop that I analyze the use of militaristic metaphors by political representatives during the current Covid-19 pandemic. From the beginning of the emergence of the Covid-19 virus in Europe we have seen the proliferation of militaristic metaphors of war and battle, with the current situation being frequently described as a “war,” health professionals being



compared to front line soldiers, and the need for making sacrifices in these difficult and exceptional times being emphasized by several spokespersons. These and similar metaphorical use are contributing to “doing” different things, in terms of crisis communication and management, with implications in terms of biosecurity and biopolitics, but also in geopolitics. Indeed, the findings of this study show how, within the context of Covid-19, war metaphors were important in: preparing the population for hard times; showing compassion, concern and empathy; persuading the citizens to change their behavior, ensuring their acceptance of extraordinary rules, sacrifices; boosting national sentiments and resilience, and also in constructing enemies and shifting responsibility. By revealing the different uses of such militaristic metaphors, I also show how the context is itself construed and controlled differently by the political representatives.

I start by presenting some introductory reflections on the literature on crisis communication and its limitations to reflect subsequently on the challenges of communication and management of Covid-19 crisis. Next, I outline the methodological approach used in this paper drawing from both CDA and crisis communication studies. Then, I present the findings of the analysis, showing how militaristic metaphors are used by spokespersons for managing this health crisis in very specific and differentiated ways. Finally, I discuss the main findings and the implications of the prevalence of militaristic metaphors in crisis situations, and argue for the development of a line of research linking crisis communication with CDA and metaphor analysis.

## COVID-19 AND CRISIS COMMUNICATION

Much of the literature on crisis communication emphasizes organizations’ practices of reputational management for the effectiveness of their response to the crisis (Benoit, 1995, p. 13–62; Benoit, 1997, p. 182–185; Coombs, 2007, p. 37; Coombs and Holladay, 2009, p. 2–5; Kim and Sung, 2014, p. 62, 63; Lyon and Cameron, 2004, p. 217–219; Ma and Zhan, 2016, p. 102–105; Payne, 2006, p. 165, 166; Zheng et al., 2018, p. 58). Nevertheless, crisis communication has a variety of goals, which are not restricted to limiting reputation damage, some of the most important being: reducing harm, reestablishing public order and protecting the public. Some of these goals may at times conflict and the different actors involved, such as governmental agencies, corporations, the media, or the public, may prioritize different goals (Seeger, 2006, p. 234). Furthermore, although Situational Crisis Communication Theory (SCCT) considers crisis as reputation threats, Coombs (2007, p. 165) suggests a consideration of the ethical aspects in managing a crisis “To be ethical, crisis managers must begin their efforts by using communication to address the physical and psychological concerns of the victims. It is only after this foundation is established that crisis managers should turn their attentions to reputational assets.”

Taking a different research perspective, some authors (for example, Covello, 2003; Seeger, 2006, p. 232–234) have sought to study and describe best practices in crisis communication, that is practices thought to improve the effectiveness of crisis communication, especially within the context of large publicly-managed crises. These include: process approaches that combine both crisis and risk communication and whereby “communication strategies are fully integrated into the decision-making process” (Seeger, 2006, p. 236); pre-event planning; partnerships with the public; listening to the public’s concerns and understanding the audience; honesty, candor and openness; collaboration and coordination with credible sources; meeting the needs of the media; communicating with compassion, concern and empathy; accepting uncertainty and ambiguity and providing self-efficacy messages (Seeger, 2006). This work is relevant to show how strategic communication during crisis situations goes beyond mere reputation management. Additionally, although most of the scholars working on crisis communication have been focusing on various types of organizations, an effective crisis communication and management is key in different types of crisis, including the Covid-19 pandemic, which can be considered as a large publicly-managed crisis.

In terms of crisis communication and management, Covid-19 pandemic has been quite challenging for several reasons, some of these related with previously mentioned factors affecting the effectiveness of communication in crisis situations, but also because of political, economic, and sociocultural factors that are not usually considered in crisis communication literature.

Firstly, although crisis are inherently dynamic and unpredictable (Seeger, 2006, p. 234), some, like this one, are more unpredictable than other. Indeed, although we know that this is a virus from the family of the coronavirus, we are in fact dealing with a new and therefore unknown and unpredictable virus that presents itself through a wide array of symptoms, but remains asymptomatic and thus invisible in a percentage of the population. In spite of the enormous effort that is being made by the global scientific community to study Covid-19 in real time and come up as fast as possible with an effective treatment, the amount of uncertainty regarding this virus and its consequences is indeed tremendous. As there is no vaccine and therefore no official effective treatment for the virus it is also difficult to predict the end of the pandemic and fears of a second wave of the virus constraint the process of decision-making regarding the removal of the exceptional measures taken to contain the spreading of the disease and the reopening of the society and economy.

Secondly, the sudden outburst of cases of persons infected with Covid-19 that required hospitalization has highlighted the deficiencies of many national health systems and their unpreparedness and lack of capacity to deal with such a pandemic. This happened more harshly in some European countries, like in Italy and Spain, but also in UK whose health-systems had been suffered badly from austerity measures. But the fact that these countries were very late in their response to the crisis also contributed to this problem. Other European countries that were similarly hit by austerity measures and also had an

aging population (like Portugal and Greece<sup>1</sup>) appeared to have learned from these experiences and attempted to delay the peak of the pandemic as they gained time to prepare their health systems, as well as the population to deal with the pandemic. An awareness that their national health systems wouldn't survive the peak of the pandemic was probably chief in their early response to the crisis. Nonetheless, the type of measures and the timing of these responses have varied greatly from country to country and their adequacy is yet to be determined.

Thirdly, this health crisis highlighted the importance of taking into consideration sociocultural factors impacting specifically, in this case, on the level of compliance of the population regarding social distancing, a key measure to avoid the spreading of the virus. Indeed, in Europe, for example, southern and Mediterranean cultures had to make an extra effort to change their habits and automatic gestures regarding greetings and body contacts compared to Northern countries. Besides these differences in customs and habits, citizens tendency to trust and comply or, conversely, to be suspicious of and resist governmental demands may also vary greatly from country to country depending on historical, political and cultural factors. The cultural importance of health, particularly in the Greek culture, was also considered a motivation for the acceptance of lock-down measures, as health was prioritized over the economy (Perrigo and Hincks, 2020). Unfortunately, these factors have seldom been taken into consideration in crisis communication literature.

Fourthly, Covid-19, like other crisis, has brought to the surface the fragility of many societies and economies and particularly, the social inequalities that make some social groups more vulnerable to the health crisis and/or to the subsequent economic crisis. This has been more salient regarding access to health care, housing conditions, and the impact of lock-down on the poorer and the workers of gray economy.

Fifth, governmental agencies in charge of managing the crisis had to deal with an intensified media scrutiny and also with the proliferation of fake news in social media. Acknowledging the key role of the media in crisis communication required thus an emphasis on remaining accessible and fostering a dialogic communication with the public, accepting it as a legitimate and equal partner as Seeger (2006, p. 238) suggests. Moreover, it became crucial also to deconstruct the growing disinformation on Covid-19 that emerged in the social media in order to protect the public.

And finally, this pandemic has also highlighted the lack of coordination at the global and regional levels to deal with the pandemic. Instead of solidarity and the development of a common strategy for "fighting" the virus, we have too often witnessed the rise of geopolitics and competition for health resources between the powers. At the EU level the lack of a timely response due to disagreement between the powers has been once again evident. So much that many European countries had to

count on China and also Russia, for donations of protection material, ventilators, as well as, in most severe cases, like in Italy, teams of health care professionals and experts in pandemics.

As all crisis can be thought of as opportunities, Covid-19 pandemic can also be considered an opportunity to rethink and expand crisis communication theories. In the following section, I suggest doing so by using critical discourse analysis and specifically critical metaphor analysis, to inform and expand crisis communication studies.

## METHODOLOGY: USING CDA WITH CRISIS COMMUNICATION STUDIES

"Discourse analysis can shed light on the texts that lead to, surface during, collide and become refined after a crisis" (Heath, 2010 p. 3).

CDA is a qualitative orientation to discourse analysis associated to the study of power dynamics in society and its main goal is to analyze how power is enacted, reproduced and resisted, through text or speech (Fairclough, 2001, p. 43). Methodologically, this paper is inspired by recent work suggesting that CDA can be used to inform crisis communication. Specifically, CDA has been used to promote a critical political-economic evaluation of the communicative practices during crisis situations (Alexander, 2013, p. 1), and to giving voice to silenced/alternative narratives (Dunn, 2010, p. 1–4; Dunn and Eble, 2015, p. 732, 733). Other relevant work on the "rhetorical arena" has sought to advance a multi-vocal approach to crisis communication, which postulates that crisis publics (receivers) can also become crisis communicators (Frandsen and Johansen, 2010, p. 428; Coombs and Holladay, 2014 p. 41).

The main objective of the analysis presented here is to explore how political representatives use militaristic metaphors during the present Covid-19 epidemic, in order to manage the crisis. As my focus is on the goals and strategic dimensions of communicative practices of spokespersons in the context of the Covid-19 pandemic, I draw heavily from CDA interest in the strategic dimension of discourse. The latter understands language as "a goal oriented activity taking place amid a set of contextual constraints" (Ihnen and Richardson, 2011, p. 235). Building from such perspective, less attention will be given in this analysis to aspects of textual coherence and cohesion and more attention will be paid to the social conditions of the production and interpretation of the text, namely: the intertextual and interdiscursive relationships between utterances, texts and discourses; the specific context of the situation in social and institutional terms and the broader socio-political and historical context. The latter aspects correspond respectively, to the second, third and fourth levels of context as proposed by the DHA of CDA (Reisigl and Wodak, 2001, p. 93).

I draw also from various work within CDA that has focused on the use of metaphors in political and media discourse. Metaphors are crucial for expressing attitudes and beliefs and making sense of complex events (Lakoff and Johnson, 1980, p. 156–160). They are especially important in political discourse as interpersonal devices that facilitate the creation of a relationship with the

<sup>1</sup> Although in a first phase of the pandemic, Portugal and Greece seemed to be effective in managing the health crisis, in subsequent moments of the sanitary crisis, the situation has changed, at least for Portugal, that was not anymore portrayed as a successful case.

public, being often used with a persuasive function (Charteris-Black, 2004, p. 7–13; Charteris-Black, 2009, p. 103; Ferrari, 2007, p. 621; Kitis and Milapides, 1997, p. 562, 563). Metaphors are thus key linguistic devices for constructing social relations and creating, contesting or legitimating specific social, cultural or political and ideological representations of the world (Charteris-Black, 2004, p. 8; Fairclough, 2001, p. 120; Musolff, 2012, p. 303, 304; Zinken, 2003, p. 519, 520).

Metaphors are also crucial cultural and linguistic tools for conceptualizing disease. Some of this work has focused on Severe Acute Respiratory Syndrome (SARS) revealing the persistence of sub-war metaphors (Larson et al., 2005, p. 263), and the importance of the social and political context for SARS metaphorical framing (Wallis and Nerlich, 2005, p. 2638; Chiang and Duann, 2007, p. 589–595). Other relevant work on Avian flu has highlighted the use of metaphors as rhetorical and persuasive devices (de la Rosa, 2008, p. 28, 29), and shown how the war metaphor could be used for portraying a global fight against this disease (de la Rosa, 2007, p. 16, 17).

In this paper, and in line with a focus on a strategic dimension of discourse, I approach metaphors “as actions that are embedded in larger discursive activities” (Zinken and Musolff, 2009, p. 2), and also as “matters of speaker choice” (Charteris-Black, 2004, p. 10). For this analysis, I selected a sample of speeches given by key political representatives during the Covid-19 epidemic, focusing on the month of March 2020, when most of the countries have put forward more restrictive measures to deal with pandemic. These speeches were selected on the basis of their (predominant) use of militaristic metaphors, and include speeches of Marcelo Rebelo de Sousa, the President of Portugal, Emmanuel Macron, the President of France, Boris Johnson, the Prime-Minister of UK, Pedro Sánchez, the Prime-Minister of Spain, Ursula von der Leyen, the President of the European Commission, Donald Trump, the President of the US and António Guterres, the Secretary-General of the United Nations. The full speeches were accessed from official websites in its original language. They were read repeatedly and coded according to their use of militaristic metaphors and/in relation to crisis communication and management. The analysis evidenced seven different ways of managing the crisis through the use of militaristic metaphors, which are presented in the next section. Extracts (presented here in the original language and its translation to the English language) were selected for their relevance to evidence these different associations with crisis communication and management.

## FINDINGS: MANAGING THE CRISIS THROUGH MILITARISTIC METAPHORS

The analysis reveals that the war metaphor not only appears in the analyzed speeches, it also tends to be the main organizing theme of the text, forming the backbone of its argumentative and rhetorical strategies. Moreover, this metaphor aids in the managing of the health crisis through the pursuit of specific goals such as: preparing the public for hard times; persuading citizens to change their behavior; fostering national unity, mobilization

and resilience; showing compassion, concern and empathy; avoiding responsibility and mitigating blame and constructing enemies and shifting blame and responsibility. Additionally, the example of speeches made by António Guterres, the Secretary-General of the UN is presented here because it shows how the war metaphor can also be used to promote peace and justice.

## Preparing the Public for Hard Times

Most of the political representatives that used militaristic metaphor to talk about Covid-19 were doing so as part of preparing the public for hard times, by asserting the seriousness of the situation and also in order to legitimate exceptional measures such as the declaration of state of alarm, state of emergency, or lock-down of the country or some of its regions. The war metaphor facilitates the public understanding that the situation is grave and hence public acceptance of exceptional measures and sacrifices. Moreover, as measures like the declaration of the state of emergency are usually linked to wartime memories, the use of militaristic metaphors gains further coherence within such statements. Often, the war metaphor appears at the beginning of the speech as a way of framing the situation and also repeatedly throughout this. Below I present some examples of this type of use of the war metaphor.

Marcelo Rebelo de Sousa, the President of Portugal, declares the state of emergency at 18 March 2020 and starts its speech by describing the situation as a war:

*Esta guerra – porque de uma verdadeira guerra se trata – dura há um mês, começou depois dos vizinhos europeus, e, também por isso, pôde demorar mais tempo a atingir os picos da sua expressão.*

*/This war - because it is a real war - has been going on for a month, it started after European neighbors, and for this reason, it could take longer to reach the peak of its expression.*

*He continues to use militaristic terms such as “combat” as in the following statement:*

*E os portugueses, com a experiência de quem já viveu tudo numa história de quase nove séculos, disciplinaram-se, entenderam que o combate era muito duro e muito longo e foram e têm sido exemplares.*

*/And the Portuguese, with the experience of those who have lived everything in a history of almost nine centuries, disciplined themselves, understood that the combat was very hard and very long and were and have been exemplary.*

Subsequently in this speech, the state of emergency is even re-signified to be depicted as a sign of democracy:

*É também um sinal democrático.*

*Democrático, pela convergência dos vários poderes do Estado.*

*Democrático, porque é a democracia a usar os meios excepcionais que ela própria prevê para tempos de gravidade excepcional.*

*Não é uma interrupção da democracia. É a democracia a tentar impedir uma interrupção irreparável na vida das pessoas.*

*/It is also a democratic signal.*

*Democratic, by the convergence of the various powers of the state.*

*Democratic, because it is democracy using the exceptional means that it itself envisages for times of exceptional gravity.*



*It is not an interruption of democracy. It is democracy trying to prevent an irreparable interruption in people's lives.*

Thus, by using militaristic metaphors, the President of Portugal is effectively preparing the Portuguese for exceptional times (“a real war”; a “very hard and very long combat”) and hence, for the acceptance of exceptional measures such as the state of emergency. At the same time, Marcelo Rebelo de Sousa evokes the long history of Portugal to praise the resilience and expected compliance of the Portuguese with these exceptional measures. And finally, the speaker even re-signifies the meaning of the state of emergency in order to delink it from any idea of chaos or totalitarianism and link it with democracy itself. This discourse was praised by the newspaper “Observador” as “the best speech of Marcelo’s life” and in general, the Portuguese citizens did show compliance for the state of emergency measures.

The French President, Emmanuel Macron, has uttered the word “war” seven times in his televised speech on the 16th of March, 2020. His use of the war metaphor also precedes the announcement of specific measures to fight the pandemic such as: the suspension of all undergoing reforms; “a new bill allowing the government to respond to emergencies and, where necessary, to legislate by ordinance,” and the decision taken to close the border with the EU and the Schengen area.

*Nous sommes en guerre. Toute l'action du gouvernement et du Parlement doit être désormais tournée vers le combat contre l'épidémie, de jour comme de nuit. Rien ne doit nous en divertir. C'est pourquoi j'ai décidé que toutes les réformes en cours seraient suspendues, à commencer par la réforme des retraites.*

*Dès mercredi, en conseil des ministres, sera présenté un projet de loi permettant au gouvernement de répondre à l'urgence et, lorsque nécessaire, de légiférer par ordonnance dans les domaines relevant strictement de la gestion de crise. Ce projet sera soumis au Parlement dès jeudi. J'ai vu tout à l'heure les présidents de l'Assemblée nationale et du Sénat afin que ces textes soient votés le plus finement possible, afin aussi que la vie démocratique et le contrôle du Parlement continuent dans cette période. Je les en remercie et je remercie tous nos parlementaires en cet instant.*

...  
*Nous sommes en guerre. Aussi, comme je vous l'ai dit jeudi, pour nous protéger et contenir la dissémination du virus, mais aussi préserver nos systèmes de soins, nous avons pris ce matin, entre Européens, une décision commune. Dès demain midi, les frontières à l'entrée de l'Union européenne et de l'espace Schengen seront fermées. Concrètement, tous les voyages entre les pays non européens et l'Union européenne seront suspendus pendant trente jours.*

*/We are at war. All the action of the government and of Parliament must now be turned toward the fight against the epidemic, day and night. Nothing can divert us. That is why I decided that all the ongoing reforms would be suspended, starting with the pension reform.*

On Wednesday, in council of ministers, a bill will be introduced allowing the government to respond to emergencies and, where necessary, to legislate by ordinance in areas strictly related to crisis management. The draft will be submitted to Parliament on Thursday. I saw the Speakers of the National Assembly and the

*Senate earlier so that these texts could be voted on as finely as possible, so that democratic life and the control of Parliament would continue in this period. I thank them for that, and I thank all our parliamentarians at this time.*

...

*We are at war. So, as I told you on Thursday, to protect us and to contain the spread of the virus, but also to preserve our health care systems, we made a joint decision this morning among Europeans. From tomorrow noon, the borders at the entrance of the European Union and the Schengen area will be closed. In concrete terms, all travel between non-European countries and the European Union will be suspended for 30 days.*

The repeated statement “We are at war” frames the announcement of these decisions, contributing to legitimating the exceptional measures taken. Such framing is reinforced in the first paragraph by the statement: “All the action of the government and of Parliament must now be turned toward the fight against the epidemic, day and night. Nothing can divert us.”

## Persuading Citizens to Change Their Behavior

Linked with the previous goal, the use of militaristic metaphors by political representatives not only serves for preparing the public to accept exceptional measures, but it is also very important to persuade citizens to change their behavior in accordance to these measures. Ensuring compliance is promoted discursively through the combine use of what can be characterized as soft and hard power devices, as when spokespersons ask the public to behave in a certain way (*soft power*), and at the same time, declare that there will be legal consequences if citizens fail to comply (*hard power*).

For an example of such a metaphorical use, one can look at the way that Boris Johnson, the UK's Prime-Minister, presents the virus as an “invisible killer” and explains what British people can do to help in fighting the disease. The speaker gives the British people “an instruction” to stay at home. His use of deontic modalities (“I must give;” “we must do;” “people will only be allowed”) assists in defining what is necessary or possible under this fight and to the speaker's goal of persuading citizens to change their behavior.

*Good Evening,*

*The coronavirus is the biggest threat this country has faced for decades – and this country is not alone.*

*All over the world we are seeing the devastating impact of this invisible killer.*

*And so tonight I want to update you on the latest steps we are taking to fight the disease and what you can do to help.*

...

*From this evening I must give the British people a very simple instruction - you must stay at home.*

*Because the critical thing we must do is stop the disease spreading between households.*

*That is why people will only be allowed to leave their home for the following very limited purposes.*



## Fostering National Unity, Mobilization, and Resilience

In crisis communication, it is important to insure the unity and resilience of the community in order to maintain morale and mobilize people to assist in the management of the crisis. The metaphor of war also helps promote a “general mobilization” of the citizens in order to fight the progress of this “invisible enemy.” In the Covid-19 pandemic, several political leaders have used this metaphor to appeal to unity and call for a mobilization of the population.

Emmanuel Macron has characterized the virus as an invisible and elusive enemy, presenting it in this way as a hefty threat that requires “our general mobilization.” The use of the possessive “Notre/Our,” as well as the repeated use of the pronoun “Nous/We” strengthens this appeal for unity among the French citizens against this common enemy.

*Nous sommes en guerre, en guerre sanitaire certes. Nous ne luttons ni contre une armée ni contre une autre nation, mais l'ennemi est là, invisible, insaisissable, et qui progresse. Et cela requiert notre mobilization générale.*

*We are at war, certainly in a health war. We are not fighting against one army or another nation, but the enemy is there, invisible, elusive, and progressing. And that requires our general mobilization.*

It is important, however, to analyze these statements in terms of what is silenced by these (the relation of the text with the context). In this regard, Macron’s suggestion of a shared identity with the audience (the French citizens) and of a national sense of unity stands in sharp contrast with the magnitude of the protests of Yellow Vests (Gilets Jaunes) that emerged in 2018, triggered by fuel tax rises, and expanded into a revolt against Macron’s government.

Marcelo Rebelo de Sousa, the President of Portugal, also mentions an invisible and insidious enemy, but he is not referring to the virus. Instead, he characterizes this enemy as one that is present in every war and that has several names: “discouragement, tiredness and time fatigue that never ends.” This is a call for resilience in times of “war,” a call for “resistance, solidarity and courage” that resembles another speech, the one of Franklin D. Roosevelt, the 32nd President of the U.S. in his first inaugural address, at 4 March, 1933. In this speech, Roosevelt uttered a statement that would become famous: “The only thing we have to fear is fear itself.”

*Termino com um pedido.*

*Nesta guerra, como em todas as guerras, só há um efetivo inimigo, invisível, insidioso e, por isso, perigoso.*

*Que tem vários nomes.*

*Desânimo. Cansaço. Fadiga do tempo que nunca mais chega ao fim.*

*Temos de lutar, todos os dias, contra ele.*

*Contra o desânimo pelo que corre mal ou menos bem.*

*Contra o cansaço de as batalhas serem ainda muitas e parecerem difíceis de ganhar.*

*Contra a fadiga que tolhe a vontade, aumenta as dúvidas, alimenta indignações e revoltas.*

*Tudo o que nos enfraquecer nesta guerra alongará a luta e torná-la-á mais custosa e dolorosa.*

*Resistência, solidariedade e coragem são as palavras de ordem.*

*I'll end with a request.*

*In this war, as in all wars, there is only one real enemy, invisible, insidious and therefore dangerous.*

*It has many names.*

*Discouragement. Tiredness. Fatigue of time that never comes to an end.*

*We have to fight him every day.*

*Against discouragement for what goes wrong or less well.*

*Against the fatigue of the battles still being many and seem hard to win.*

*Against the fatigue that kills the will, increases doubts, feeds indignations and revolts.*

*Whatever weakens us in this war will lengthen the fight and make it more costly and painful.*

*Resistance, solidarity and courage are the watchwords.*

Ursula von der Leyen, the president of the European Commission, also uses the war metaphor to send a message of self-efficacy to the EU, by explaining what “every single one of us” can do to fight the virus and call for a general mobilization in this fight. Interesting in this speech is the use of an economic metaphor of “debt” that here is used in moral terms to express the debt of gratitude toward the health professionals.

*But what is unique about this fight is that every single one of us has a role to play. Every single one of us can help repay that debt. By keeping our distance we can slow down the spread of the virus. The numbers in the last few days have shown that we can bend the trend – but only if we all do our share.*

## Showing Compassion, Concern, and Empathy

In crisis situations, communicating with “appropriate levels” of compassion, concern and empathy is known to increase the credibility of the message and enhancing the perceived legitimacy of the messenger (Coombs, 2007, p. 172; Seeger, 2006, p. 241). Spokespersons have often shown compassion for the victims of the Covid-19 and their families, and acknowledgment of the resilience required to endure lock-down measures.

Ursula von der Leyen, for example, has expressed compassion for the victims of the pandemic “currently fighting for their lives,” as well as their “loved ones.” In this speech, the metaphor of “fight” is used to express the harshness of a patient’s individual struggle with the disease, and directed at the persons infected by the virus.

*My heart goes out to all of the victims and their loved ones.*

*And all of our thoughts and best wishes are with those currently fighting for their lives or sick at home.*

Emmanuel Macron has also expressed empathy, but in this case, regarding the impact of the exceptional measures on the lives of the French citizens, and the difficulty of changing one’s habits.

*Mes chers compatriotes, je mesure l'impact de toutes ces décisions sur vos vies. Renoncer à voir ses proches, c'est un déchirement. Stopper ses activités quotidiennes, ses habitudes, c'est*

*très difficile. Cela ne doit pas nous empêcher de garder le lien, d'appeler nos proches, de donner des nouvelles, d'organiser aussi les choses avec nos voisins. D'inventer de nouvelles solidarités entre générations. De rester, comme je vous l'ai dit jeudi dernier, profondément solidaires et d'innover là aussi sur ce point. Je sais que je vous demande de rester chez vous.*

*My fellow countrymen, I see the impact of all these decisions on your lives. Giving up seeing your loved ones is heartbreaking. It's very difficult to stop your daily activities and habits. This should not prevent us from keeping the link, calling our relatives, giving news, also organizing things with our neighbors. From inventing new solidarity between generations. From remaining, as I told you last Thursday, deeply in solidarity and to innovate there too on this point. I know I'm asking you to stay home.*

By first recognizing the sacrifices requested from the French citizens, and putting himself in this same group—by using the pronoun “nous”/we—the speaker can then present the situation as an opportunity: for “inventing” and “innovating” in issues of solidarity.

The idea of exceptional measures and the need to make sacrifices evokes wartime. Although this specific extract does not include any militaristic metaphor, it has to be understood in the context of the entire speech. All Macron's speech is organized around this idea of being in a war, the pandemic being compared to a war situation (see section Preparing the Public for Hard times). And this is foregrounded in the beginning of the speech:

*Jamais la France n'avait dû prendre de telles décisions, évidemment exceptionnelles, évidemment temporaires en temps de paix.*

*/France has never had to make such decisions, obviously exceptional, obviously temporary in peacetime.*

Thus, the need to make sacrifices, just like in wartime, had already been put forward by Macron earlier in his speech, allowing at this moment for the speaker to show empathy regarding the impact of the exceptional measures on the lives of citizens.

## Avoiding Responsibility and Mitigating Blame

In a long speech of 195 min, which was widely criticized by the Spanish media, Pedro Sanchez, the prime-minister of Spain, presents the virus as an unknown enemy, “un enemigo al que aún estamos conociendo”/“an enemy we are still getting acquainted with” (Pedro Sanchez, 21 March 2021). Besides “enemigo” (enemy), Sanchez uses several other words conveying a militaristic metaphor such as: “resistencia” (resistance), “lucha” (fight), and “batalla” (battle).

In terms of crisis communication, the goal of such message is clearly that of avoiding responsibility and mitigating blame for the lack of control of the pandemic. While it is true that Covid-19 is in fact a new virus and therefore unknown, the focus on the idea of lack of control masks the failure of the Spanish government to provide a timely and effective response to contain the damage and protect the population. In terms of crisis communication, failure in acknowledging the government's responsibility corresponds to a lack of candor on the part of the

speaker, understanding this as “communicating the entire truth as it is known, even when the truth may reflect negatively on the agency or organization” (Seeger, 2006, p. 239). Indeed, although to acknowledge the uncertainty of the situation can be considered a best practice in crisis communication (Seeger, 2006, p. 241, 242), that cannot serve as an excuse for not communicating the entire truth.

Increasingly weakened politically, Pedro Sanchez will later apologize (on 20 May) for his mistakes in managing the pandemic, although he further justifies these by the “urgency of times, scarcity of resources and exceptional nature and absence of precedents.”

## Constructing Enemies and Shifting Blame and Responsibility

Following weeks of downplaying the seriousness of the pandemic, and as the virus spread in the country, Donald Trump, the President of the US, also engaged in wartime rhetoric and even called himself “a wartime President.” “I view it as a, in a sense, a wartime President. I mean, that's what we're fighting” (18 March 2020). In this statement, Trump emphasizes the sacrifices necessary in such times, such as the one of closing part of the economy: “One that you have to close it down in order to defeat this enemy. But we are doing it. And we are doing it well.”

Such militaristic metaphors were followed on the following day (19 March 2020) by a naming of the Covid-19 as the “Chinese virus” as Trump made his speech in the Virus Task Force Hold Briefing: “We continue our relentless effort to defeat the Chinese virus.” Such an association of diseases with a foreign place and other has a long tradition and “reveals a link between imagining disease and imagining foreignness” (Sontag, 1989, p. 47–55).

What this rhetoric suggests, is an attempt by Donald Trump to shift blame and responsibility for the pandemic by focusing the attention on China. Moreover, Trump has also blamed the WHO for allegedly aligning uncritically with China's narrative regarding the origin of the Covid-19.

These attempts to shift responsibility can be understood as scapegoating, a primary crisis response strategy predicted by SCCT, through which “the crisis manager blames some person or group outside of the organization for the crisis” (Coombs, 2007, p. 170). Shifting the focus of the attention and controlling the discourse is also a way of avoiding the journalists' distressing questions regarding the seriousness of the situation in the US, which the president has repeatedly sought to deny. In addition to denial—of both of the seriousness of the crisis and his responsibility in failing to provide an adequate response to it, Trump has recurrently used another reputation management strategy: the one of emphasizing his current good deeds, what Kim and Liu (2012, p. 82) have called “enhancing.” This discursive device differs from “bolstering”—emphasizing the corporation past good deeds that has been suggested by SCCT (Coombs, 2007, p. 172).

Thus, in his communicative practices regarding Covid-19 Donald Trump has predominantly used reputation management strategies rather than strategies focused on helping the public deal physically and psychologically with the pandemic. The focus on

reputation management evokes crisis communication strategies adopted by US corporations during the 2009 flu pandemic, which were in contrast to government organizations' response that emphasized providing instructing information to the public, such as guidelines about how to respond to the crisis (Kim and Liu, 2012).

## A Call for Peace

Finally, on a positive note, António Guterres, the ninth Secretary-General of the United Nations has also used the metaphor of war, referring to the virus as "a common enemy," which in this context seems to imply a global enemy, that attacks all people in the world. However, somewhat paradoxically, the war metaphor is used here by the speaker to call for a global ceasefire:

*Our world faces a common enemy: COVID-19.*

*The virus does not care about ethnicity or nationality, faction or faith. It attacks all, relentlessly.*

*Meanwhile, armed conflict rages on around the world.*

*The most vulnerable — women and children, people with disabilities, the marginalized and the displaced — pay the highest price.*

*They are also at the highest risk of suffering devastating losses from COVID-19.*

*Let's not forget that in war-ravaged countries, health systems have collapsed.*

*Health professionals, already few in number, have often been targeted.*

*Refugees and others displaced by violent conflict are doubly vulnerable.*

*The fury of the virus illustrates the folly of war.*

*End the sickness of war and fight the disease that is ravaging our world.*

*That is why today, I am calling for an immediate global ceasefire in all corners of the world.*

*It is time to put armed conflict on lockdown and focus together on the true fight of our lives.*

(António Guterres, 23 March 2020).

In this speech, Guterres argues that the war has made people, health-systems and countries more vulnerable, and hence more defenseless also to the attack of the virus. Thus, he effectively shifts the attention away from the virus and its victims to the war and its systemic impacts in creating vulnerable groups (women and children, people with disabilities, the marginalized and the displaced) that are also the ones at the highest risk of Covid-19. The speaker goes on framing the audience perspective on both war and the virus. This is made by comparing "the fury of the virus" with "the folly of war" and using the metaphor of disease to describe the war "End the sickness of war and fight the disease that is ravaging our world." Finally, Guterres uses the lock-down as a metaphor for closing down the war.

Subsequently, on the 26 March 2020, the Secretary-General of the United Nations warns that we are not winning this war against Covid-19 and presents the numbers to support his argument.

*We are at war with a virus – and not winning it.*

*It took the world 3 months to reach 100,000 confirmed cases of infection.*

*The next 100,000 happened in just 12 days.*

*The third took 4 days.*

*The fourth, just one and a half.*

*This is exponential growth and only the tip of the iceberg.*

*This war needs a war-time plan to fight it.*

*Solidarity is essential. Among the G-20 – and with the developing world, including countries in conflict.*

*That is why I appealed for a global ceasefire.*

(António Guterres, 26 March 2020).

The metaphor of the war against the virus is invoked here to suggest that the solution must also be a solution tailored to the situation, that is, a "war-time plan," which Guterres sees as founded on solidarity among the most powerful and peace.

## CONCLUDING REMARKS: MILITARISTIC METAPHORS, POLITICAL COMMUNICATION, AND CRISIS MANAGEMENT

The use of militaristic metaphors in health crisis is not new and with the emergence of the Covid-19 pandemic we have again witnessed its recurrent use by political representatives and by the media, particularly in television. In this paper I sought to explore the use of the war metaphor by political actors in its intersection with the practices of crisis communication and management. Drawing from the approach of CDA, and particularly the studies on the use of metaphors in political discourse and crisis communication, I suggest that such an approach can serve both to inform crisis communication literature and to develop CDA. This is in line with Chiapello and Fairclough's understanding of a transdisciplinary approach, which asks "how a dialogue between two disciplines or frameworks may lead to a development of both through a process of each internally appropriating the logic of the other as a resource for its own development" (Chiapello and Fairclough, 2002 cited in Fairclough, 2005, p. 53).

The findings show that first, the war metaphor was used often in the context of the recent pandemic of Covid-19, but also that it was used in very different ways in terms of crisis communication and management. Some political representatives have at times, used the war metaphor for purposes such as showing compassion, concern and empathy with the public and promoting self-efficacy and resilience in coping with the pandemic, which can be linked with recognized best practices in crisis communication. And the war metaphor is used by the Secretary-General of the United Nations, António Guterres to paradoxically, call for a global ceasefire and highlight the systemic impacts of war. Nonetheless, as my goal was just to explore and show the different uses of the war metaphor, rather than analyzing in detail the political communication and crisis management strategies of these representatives, from these good examples, it is not possible to conclude that these representatives were always ethical and followed best practices in the way they communicated and managed the Covid-19 crisis.

Furthermore, the findings of this study also suggest that the war metaphor is often used for the pursuit of specific goals of crisis communication and management such as: preparing

the public for hard times, persuading the population to change their behavior and bolstering resilience and self-efficacy. These are messages that, while using the war metaphor, place the emphasis on adaptation to hard times, rather than on fighting an “invisible enemy.” Subsequent studies should try to go deeper in order to enable a comprehensive and critical analysis of the communication and crisis management strategies of each country or organization.

In general, these findings seem to caution against previous generalized criticisms of the war metaphor as inherently dangerous and damaging. Instead, they highlight the role played by the dialectics between text and context in discourse. Political discourse, which is the focus of this paper, is targeted to social groups. Hence, political use of the war metaphor raises the questions of what kind of categorizations are used by the spokespersons, who is included in this fight against the virus, and whose voices or alternative narratives are silenced. Constructions of self and other are also linked to differing ideological uses of the DISEASE IS WAR metaphor, as Chiang and Duann (2007, p. 581) have shown regarding SARS.

Addressing the issue of the strategic use of the war metaphor requires an understanding of the pragmatics of discourse, or, to put it simply, of what that speaker is doing in terms of political and crisis communication, while using the war metaphor. Is he/she, for example, trying to help citizens to cope physically and psychologically with the pandemics or is he/she attempting to engage in reputation management actions like avoiding or shifting responsibility for failures in the crisis management? Are some social groups being systematically neglected in terms of crisis management? These discursive actions only make sense if one understands the historical, social and political context of their occurrence. This means we need to analyze, as Fairclough (2001, p. 8) has argued, not only what people are doing with language and how language is linked to power, but also how and why they are doing it: “why are the facts as they are?; how - in terms of development of social relationships of power—was the existing sociolinguistic order brought into being?; how is it sustained?; and how it might be changed to the advantage of those who are dominated by it?”

In this case, it means also to situate the discursive act in the context of the global health crisis in order to analyze the way it has impacted and unfolded in that specific social context, nation or organization. In this regard, although Covid-19 was considered a pandemic, there has been a flagrant lack of coordination between nations even within the European Union. Further studies are needed to understand why this happened, why each nation followed its own strategy of crisis management and communication, but many have converged nonetheless on some measures of lock-down, social-distancing and protective use of masks.

It is useful here to look at the exceptions, at the cases where different crisis communication and crisis management strategies were used. Regarding the use of militaristic metaphors during the Covid-19 pandemic, it is worth noting Germany's discursive use of negation—denying that the Covid pandemic was a war. Following Macron speech of 16 March and against it, the president of Germany, Frank-Walter Steinmeier, declared: “It

is not a war, it's a test to our humanity!” Such resistance in using militaristic metaphors may be linked to Germany's history, its participation in the WWII and responsibility for the inhumanity of holocaust. However, Germany's strategy for crisis management did not differ much from France's, in spite of this difference in framing the crisis. Sweden, on the other hand, in stark contrast with other European nations, has managed the epidemic by appealing to citizens' individual responsibility and accountability and relying on their trust in the state and expertise knowledge (Nygren and Olofsson, 2020, p. 3). In his address to the nation on 22 March, 2020, the Swedish Prime-Minister, Stefan Löfven, never once used the militaristic metaphor to refer to Covid-19. He was nonetheless engaging in crisis communicative practices with the goals of preparing the public for hard times, appealing to individual responsibility, bolstering resilience and self-efficacy and showing compassion and empathy with the public. These differences point to cultural and historical differences in the use of political language and specifically, militaristic metaphors.

Further studies should focus on the reception of these discourses in order to examine the effectiveness of the war metaphor in the various discursive actions associated with crisis management. Although some authors have sought to challenge crisis communication strong sender orientation (Frandsen and Johansen, 2010, p. 428; Coombs and Holladay, 2014, p. 41), more studies on this line are needed. Additionally, it can be important to examine situations when the use of militaristic metaphors may “backfire,” for example, when it becomes clear that the war against the virus is not being won, or that “collateral damages” of this war (be it the number of deaths or the number of unemployed and poor) becomes too great to be accepted by the public.

Finally, although this paper focuses on militaristic metaphors, these are often used by political representatives in conjunction with other discursive and rhetorical devices, inclusive other types of metaphors. Further studies should analyze how, in the context of Covid-19, other metaphors are being used alternatively to or in conjunction to the war metaphor, for example, the virus as a Killer metaphor, economic metaphors, patriarchal or religious metaphors. Such alternative metaphors, like the killer metaphor may be as problematic in their framing of the issue as militaristic ones (Wallis and Nerlich, 2005, p. 2634).

An interesting case is how Jair Messias Bolsonaro, the president of Brazil, has consistently denied the seriousness of the pandemic and positioned himself against any lock-down, confinement or social distancing measures by using androcentric and religious metaphors. In this regard, Bolsonaro has suggested that one should “face the virus like a man rather than a kid” in order to repudiate lock-down and social distancing measures. By doing so, he was criticizing anyone who attempted to protect themselves against the pandemic, blaming them for lack of courage and for behaving irresponsibly like “kids.” In fact, Bolsonaro's discourse has tended to equate responsibility with going to work as usual and irresponsibility with complying with lock-down, social distancing, and other protecting measures. Furthermore, when confronted by journalists with the rising numbers of the infected and dead in Brazil, he just replied, making a joke about his



own name: “I am Messias but I do not perform miracles.” With such discursive act, the speaker was successfully evading the issue and at the same time, trivializing the impact of Covid-19, which is something he has also done in other occasions. The religious aspect is not a joke though as Bolsonaro has publicly appeared supporting the evangelical church in religious celebrations.

In this case, the populist facet of Bolsonaro’s discourse drew heavily on religious, patriarchal and masculinity discourses. However, Bolsonaro also used the war metaphor in the context of Covid-19, but not for promoting measures of social distancing and protection against the virus. Instead, the war metaphor was used as a justification for the use of hydroxychloroquine and chloroquine, a highly controversial treatment. This discursive combination of militaristic and patriarchal metaphors is not new, but it is one that seems to be particularly invoked by populist leaders (Steinert, 2003, p. 267). However, unlike Steinert, who reinforces the view of the war metaphor as inherently negative and dominant, incorporating in itself elements of patriarchy and masculinity, the findings of these paper

suggest taking a more critical look at the rhetorical and pragmatic elements of discourse and metaphorical use in political communication.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/**Supplementary Materials**, further inquiries can be directed to the corresponding author/s.

## AUTHOR CONTRIBUTIONS

EC, as the sole author, collected and analyzed all the data, and was the sole responsible for the conceptualization and writing-up of this manuscript.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsoc.2020.583680/full#supplementary-material>

## REFERENCES

- Alexander, R. J. (2013). Shaping and misrepresenting public perceptions of ecological catastrophes: the BP gulf oil spill. *Crit. Approach. Disc. Anal. Across Discipl.* 7, 1–18.
- Benoit, W. L. (1995). *Accounts, Excuses and Apologies*. Albany, NY: State University of New York Press.
- Benoit, W. L. (1997). Image repair discourse and crisis communication. *Publ. Relat. Rev.* 23, 177–186.
- Charteris-Black, J. (2004). *Corpus Approaches to Critical Metaphor Analysis*. New York, NY: Palgrave Macmillan.
- Charteris-Black, J. (2009). “Metaphor and political communication,” in *Metaphor and Discourse*, eds A. Musolff and J. Zinken (London: Palgrave Macmillan), 97–115.
- Chiang, W.-Y., and Duann, R.-F. (2007). Conceptual metaphors for SARS: “war” between whom? *Disc. Soc.* 18, 579–602. doi: 10.1177/0957926507079631
- Coombs, W. T. (2007). Protecting organization reputations during a crisis: the development and application of situational crisis communication theory. *Corporate Reput. Rev.* 10, 163–176. doi: 10.1057/palgrave.crr.1550049
- Coombs, W. T., and Holladay, S. J. (2009). Further explorations of post-crisis communication: effects of media and response strategies on perceptions and intentions. *Publ. Relat. Rev.* 35, 1–6. doi: 10.1016/j.pubrev.2008.09.011
- Coombs, W. T., and Holladay, S. J. (2014). How publics react to crisis communication efforts. *J. Commun. Manag.* 18, 40–57. doi: 10.1108/JCOM-03-2013-0015
- Covello, V. T. (2003). Best practices in public health risk and crisis communication. *J. Health Commun.* 8(suppl.1), 5–8. doi: 10.1080/713851971
- de la Rosa, M. V. M. (2007). A global war against avian influenza. *RAEL* 6, 16–30.
- de la Rosa, M. V. M. (2008). The persuasive use of rhetorical devices in the reporting of “Avian Flu.” *Vigo Int. J. Appl. Linguist.* 5, 87–106.
- Dunn, C. K. (2010). *Power and Place: A Case Study Approach to Rethinking Crisis Communication*. (Doctoral Dissertation). East Carolina University, Greenville, NC, United States.
- Dunn, C. K., and Eble, M. (2015). Giving voice to the silenced: using critical discourse analysis to inform crisis communication theory. *J. Business Ethics* 132, 717–735. doi: 10.1007/s10551-014-2315-4
- Fairclough, N. (2001). *Language and Power*. 2nd ed. Harlow: Longman.
- Fairclough, N. (2005). “Critical discourse analysis in transdisciplinary research,” in *A New Agenda in (Critical) Discourse Analysis. Theory, Methodology and Interdisciplinarity*, eds R. Wodak and P. Chilton (Amsterdam: John Benjamins), 53–70.
- Ferrari, F. (2007). Metaphor at work in the analysis of political discourse: investigating a “preventive war” persuasion strategy. *Disc. Soc.* 18, 603–625. doi: 10.1177/0957926507079737
- Frandsen, F., and Johansen, W. (2010). “Crisis communication, complexity, and the cartoon affair: a case study,” in *The Handbook of Crisis Communication*, eds W. T. Coombs and S. J. Holladay (Malden, MA: Wiley-Blackwell), 425–448.
- Heath, R. L. (2010). “Introduction,” in *The Handbook of Crisis Communication*, eds W. T. Coombs and S. J. Holladay (Malden, MA: Wiley-Blackwell), 1–13.
- Hodgkin, P. (1985). Medicine is war: and other medical metaphors. *Br. Med. J.* 291, 1820–1821.
- Ihnen, C., and Richardson, J. E. (2011). “On combining pragma-dialectics with critical discourse analysis,” in *Keeping in Touch With Pragma-Dialectics: in Honor of Frans H. Van Eemeren*, eds E. T. Feteris, B. Garssen, and F. S. Henkemans (Amsterdam: John Benjamins), 231–244.
- Joye, S. (2010). News discourses on distant suffering: a critical discourse analysis of the 2003 SARS outbreak. *Disc. Soc.* 21, 586–601. doi: 10.1177/0957926510373988
- Kim, S., and Liu, B. F. (2012). Are all crises opportunities? a comparison of how corporate and government organizations responded to the 2009 flu pandemic. *J. Publ. Relat. Res.* 24, 69–85. doi: 10.1080/1062726X.2012.626136
- Kim, S., and Sung, K. H. (2014). Revisiting the effectiveness of base crisis response strategies in comparison of reputation management crisis responses. *J. Publ. Relat. Res.* 26, 62–78. doi: 10.1080/1062726X.2013.795867
- Kitis, E., and Milapides, M. (1997). Read it and believe it: how metaphor constructs ideology in news discourse. A case study. *J. Pragmat.* 28, 557–590. doi: 10.1016/S0378-216600075-1
- Koteyko, N., Brown, B., and Crawford, P. (2008). The dead parrot and the dying swan: the role of metaphor scenarios in UK press coverage of avian flu in the UK in 2005–2006. *Metaphor. Symbol* 23, 242–261. doi: 10.1080/10926480802426787
- Lakoff, G., and Johnson, M. (1980). *Metaphors We Live By*. Chicago, IL: University of Chicago Press.
- Larson, B. M. H., Nerlich, N., and Wallis, P. (2005). Metaphors and biorisks: the war on infectious diseases and invasive species. *Sci. Commun.* 26, 243–268. doi: 10.1177/1075547004273019
- Lyon, L., and Cameron, G. T. (2004). A relational approach examining the interplay of prior reputation and immediate response to a crisis.

- J. Publ. Relat. Res.* 16, 213–241. doi: 10.1080/1532-754X.2004.11925128
- Ma, L., and Zhan, M. (2016). Effects of attributed responsibility and response strategies on organizational reputation: a meta-analysis of situational crisis communication theory research. *J. Publ. Relat. Res.* 28, 102–119. doi: 10.1080/1062726X.2016.1166367
- Musolff, A. (2012). The study of metaphor as part of critical discourse analysis. *Crit. Disc. Stud.* 9, 301–310. doi: 10.1080/17405904.2012.688300
- Nygren, K. G., and Olofsson, A. (2020). Managing the Covid-19 pandemic through individual responsibility: the consequences of a world risk society and enhanced ethopolitics. *J. Risk Res.* 23, 1031–1035. doi: 10.1080/13669877.2020.1756382
- Payne, L. L. (2006). Synthesizing crisis communication and reputation management. *J. Promotion Manag.* 12, 161–187. doi: 10.1300/J057v12n03\_10
- Perrigo, B., and Hincks, J. (2020). *Greece Has an Elderly Population and a Fragile Economy. How Has It Escaped the Worst of the Coronavirus So Far?* Time. Available online at: <https://time.com/5824836/greece-coronavirus/> (accessed July 2, 2020).
- Reisfield, G. M., and Wilson, G. R. (2004). Use of metaphor in the discourse on cancer. *J. Clin. Oncol.* 22, 4024–4027. doi: 10.1200/jco.2004.03.136
- Reisigl, M., and Wodak, R. (2001). “The discourse-historical approach (DHA),” in *Methods of Critical Discourse Analysis*, eds R. Wodak and M. Meyer (London: Thousand Oaks), 87–121.
- Ross, J. W. (1989). The militarisation of disease: do we really want a war on AIDS? *Soundings* 72, 39–58.
- Seeger, M. W. (2006). Best practices in crisis communication: an expert panel process. *J. Appl. Commun. Res.* 34, 232–244. doi: 10.1080/00909880600769944
- Sontag, S. (1979). *Illness as Metaphor*. New York, NY: Farrar, Straus and Giroux.
- Sontag, S. (1989). *AIDS and its Metaphors*. New York, NY: Farrar, Straus and Giroux.
- Steinert, H. (2003). The indispensable metaphor of war: on populist politics and the contradictions of the state’s monopoly of force. *Theoret. Criminol.* 7, 265–291. doi: 10.1177/13624806030073002
- Stibbe, A. (1997). Fighting, warfare and the discourse of cancer. *South African J. Linguist.* 15, 65–70. doi: 10.1080/10118063.1997.9724108
- Wallis, P., and Nerlich, B. (2005). Disease metaphors in new epidemics: the UK media framing of the 2003 SARS epidemic. *Soc. Sci. Med.* 60, 2629–2639. doi: 10.1016/j.socscimed.2004.11.031
- Zheng, B., Liu, H., and Davison, R. M. (2018). Exploring the relationship between corporate reputation and the public’s crisis communication on social media. *Publ. Relat. Rev.* 44, 56–64. doi: 10.1016/j.pubrev.2017.12.006
- Zinken, J. (2003). Ideological imagination: intertextual and correlational metaphors in political discourse. *Disc. Soc.* 14, 507–523. doi: 10.1177/0957926503014004005
- Zinken, J., and Musolff, A. (2009). “A discourse-centred perspective on metaphorical meaning and understanding,” in *Metaphor and Discourse*, eds A. Musolff and J. Zinken (London: Palgrave Macmillan), 1–8.

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Castro Seixas. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Prospects of COVID-19 Vaccination in Romania: Challenges and Potential Solutions

Stefan Dascalu<sup>1,2\*</sup>, Oana Geambasu<sup>3,4†</sup>, Ovidiu Covaciu<sup>5†</sup>, Razvan Mircea Chereches<sup>6</sup>, Gabriel Diaconu<sup>7</sup>, Gindrovel Gheorghe Dumitra<sup>8</sup>, Valeriu Gheorghita<sup>9,10</sup> and Emilian Damian Popovici<sup>11</sup>

<sup>1</sup> Department of Zoology, University of Oxford, Oxford, United Kingdom, <sup>2</sup> Avian Influenza Group, The Pirbright Institute, Pirbright, United Kingdom, <sup>3</sup> Harvard T.H. Chan School of Public Health, Harvard University, Cambridge, MA, United States, <sup>4</sup> Division of Infectious Diseases and Tropical Medicine, University Hospital, Ludwig Maximilian University of Munich, Munich, Germany, <sup>5</sup> Healthy Romanian Coalition, Bucharest, Romania, <sup>6</sup> Department of Public Health, Babes-Bolyai University, Cluj-Napoca, Romania, <sup>7</sup> Mindcare Centre for Excellency in Psychiatry and Psychotherapy, Bucharest, Romania, <sup>8</sup> Romanian National Society of Family Medicine, Bucharest, Romania, <sup>9</sup> Romanian COVID-19 Vaccine Strategy Committee, Bucharest, Romania, <sup>10</sup> Central Military Emergency Hospital, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania, <sup>11</sup> Department of Epidemiology, Victor Babes University of Medicine and Pharmacy, Timisoara, Romania

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies  
University, China

### Reviewed by:

Adrian Saftoiu,  
University of Medicine and Pharmacy  
of Craiova, Romania  
Farid Rahimi,  
Australian National University, Australia

### \*Correspondence:

Stefan Dascalu  
stefan.dascalu@univ.ox.ac.uk

<sup>†</sup>These authors have contributed  
equally to this work

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 21 December 2020

**Accepted:** 22 January 2021

**Published:** 10 February 2021

### Citation:

Dascalu S, Geambasu O, Covaciu O,  
Chereches RM, Diaconu G,  
Dumitra GG, Gheorghita V and  
Popovici ED (2021) Prospects of  
COVID-19 Vaccination in Romania:  
Challenges and Potential Solutions.  
Front. Public Health 9:644538.  
doi: 10.3389/fpubh.2021.644538

The rapid advancement in vaccine development represents a critical milestone that will help humanity tackle the COVID-19 pandemic. However, the success of these efforts is not guaranteed, as it relies on the outcomes of national and international vaccination strategies. In this article, we highlight some of the challenges that Romania will face and propose a set of solutions to overcome them. With this in mind, we discuss issues such as the infrastructure of vaccine storage and delivery, the deployment and administration of immunisations, and the public acceptance of vaccines. The ways in which Romanian society will respond to a national COVID-19 vaccination campaign will be contingent on appropriate and timely actions. As many of the problems encountered in Romania are not unique, the proposed recommendations could be adapted and implemented in other countries that face similar issues, thereby informing better practices in the management of the COVID-19 pandemic.

**Keywords:** COVID-19, Romania, vaccination, communication, public health

## INTRODUCTION

The COVID-19 pandemic has generated unprecedented efforts in the development of potential vaccines against its causative agent, SARS-CoV-2 (1, 2). As the entire world welcomes the approval of various COVID-19 vaccines that have successfully completed clinical trials, it is paramount to acknowledge that their implementation will pose major challenges not only on a global scale, but also at the regional and local levels. In the European Union (EU), considerable efforts have been concentrated on ensuring the financial and logistic resources necessary for the production, acquisition, and distribution of COVID-19 vaccines as they become available. As the outcomes of national vaccination campaigns are often variable both among and within EU member states, potential issues will only be fully solved by considering their specific manifestations in each country and region.

Moreover, this needs to be done in a timely manner, thereby ensuring that as COVID-19 vaccines become available, their implementation follows as smoothly and efficiently as possible. In this article, we highlight the urgent need for an evidence-based vaccination campaign in Romania. We begin by identifying how some of the main issues concerning vaccination may manifest themselves within the country. We then propose actions which need to be taken during the national COVID-19 immunization campaign in order to maximize its chances of success.

## CHALLENGES CONCERNING VACCINATION IN ROMANIA

According to the latest EU evaluation, the Romanian healthcare system has the lowest GDP expenditure toward healthcare, the highest percentage of treatable causes of mortality, and one of the lowest vaccination coverages among member states (3, 4). Indeed, the effects of the underfunded healthcare system were felt immediately during the acute stages of the pandemic. These included, but were not limited to, shortages of appropriate equipment, the understaffing of healthcare units, an inadequate capacity for contact tracing and isolation/quarantine, and a partial public mistrust of the authorities' ability to meet the needs of the population (5). By contrast, the problems concerning COVID-19 vaccination became apparent as the national immunization campaign unfolded. Indeed, in Romania, major challenges had been expected regarding the deployment, distribution, and administration of COVID-19 vaccines (1, 2, 5).

## DISTRIBUTION CHAINS AND THE DELIVERY OF IMMUNIZATION

The adequate transport and storage of COVID-19 vaccines will be crucial for the success of any national vaccination campaign. However, considering past experiences with other vaccine-preventable infectious diseases, these logistic aspects remain a major impediment in Romania. For example, in 2009, the insufficient supply of MMR vaccine led to only 53 and 43% of children being immunized in November and December, respectively (6). Similarly, in the 2019–2020 flu season, the stock of the influenza vaccine was not enough to meet national demands (7). Hence, an important challenge that Romania has been facing is how to use an infrastructure which is already stretched to its limits. Furthermore, some of the COVID-19 vaccines impose additional logistic difficulties, as they have very stringent requirements in terms of storage and transport (e.g., cold chains of  $-80^{\circ}\text{C}$ ) (2). However, the transfer of vaccination logistics to the Romanian Ministry of National Defense was able to overcome some of these issues (8). Moreover, as opinion polls indicate that as many as 70% of Romanians place a high degree of trust in the military, we suggest this coordination may heighten the acceptance of a national vaccination campaign (9).

Similarly, for an efficient delivery of any vaccine, an accurate and up-to-date electronic health record is required. In Romania, the database co-opted for the immunisations against COVID-19 was the National Electronic Registry for Vaccinations (RENV).

Prior to the COVID-19 pandemic, RENV required all childhood immunisations to be recorded by medical personnel, thus having the prerequisite attributes to serve as a useful tool in any national vaccination campaign (6). Indeed, this system was adapted and extended to include adult COVID-19 vaccinations, thereby acting as a centralized electronic database for monitoring vaccine stocks, the vaccination coverage rate, and adverse reactions post-immunization.

## PRIORITIZATION OF VACCINE RECIPIENTS

One of the recurrent topics worldwide concerned the question of who will be the first beneficiaries of COVID-19 immunizations (1). In Romania, while the prioritization of first responders was understandable due to their significant exposure, authorities needed to employ efficient communication concerning the subsequent priority groups that were to receive the vaccine. As a degree of mistrust was already present with regards to the provision of healthcare services, the authorities had to reassure the public and explain that the prioritization of COVID-19 vaccination was made based on objective and ethically justified criteria (5).

Uncontrolled distribution and reports of individuals "jumping the queue" have the potential to generate mistrust and cause public unrest. Indeed, there are numerous instances of this phenomenon occurring throughout the Romanian healthcare system, as waiting lists are vulnerable to corruption (10). As such, the concern that some individuals can accrue health benefits to the detriment of those less fortunate needs to be addressed with complete transparency. Resolving this issue remains paramount for the COVID-19 vaccination programme to succeed in Romania, as it is often invoked by supporters of various conspiracy theories or the anti-vaccination movement (6). Indeed, transparency and clear communication will also serve as the main pillars of educational campaigns aimed at improving public trust in vaccines.

## RAISING AWARENESS AND ACCEPTANCE OF VACCINES

Public outreach concerning immunization is critical for the success of a national COVID-19 vaccination campaign due to several issues (1, 2). For example, the development of current vaccine candidates was much more accelerated in comparison to that of other vaccines in use. Therefore, communication efforts will be continuously required to emphasize that no compromises were made in terms of safety or efficacy. Similarly, as some vaccines use novel technologies (e.g., mRNA), thorough and accessible information needs to be made available to the public. These issues will also allow for anti-vaccine sentiments to develop, and thus appropriate communication strategies will need to be devised to address this problem.

In Romania, traditional media channels such as television or radio were initially used to broadcast material about COVID-19 vaccination. Moreover, the early stages of the



campaign included the creation of an official online platform ([www.vaccinare-covid.gov.ro](http://www.vaccinare-covid.gov.ro)) which provided accessible information, including other verified national and international resources (11). However, the results of these communication efforts would be greatly enhanced if information were delivered in a manner more targeted toward specific population subgroups (6). Indeed, any vaccination campaign in Romania will have to overcome the challenges posed by the cultural, socioeconomic, and historical factors specific to the country.

An elaborate, evidence-based educational campaign for raising vaccine acceptance is urgently required. These actions will also need to consider the social desirability factor (the “silent factor”), in the sense that some people may wish to be immunized, but would not disclose that in polls or surveys (12). This phenomenon may be especially relevant if any survey is carried out to assess the vaccine acceptance of a particular population subgroup or in a specific region. Additionally, funds will be needed to address the issues of vaccine hesitancy and refusal in a systematic way, ranging from educating the public to having open debates and providing relevant information about COVID-19 vaccines and the act of immunization itself. Recent national and international surveys (13, 14) troublingly suggest that at least 1 in 3 Romanians would refuse any form of vaccination against COVID-19. By contrast, fewer than the same number of individuals have the intention to immunize themselves if a vaccine becomes available. As many Romanians place safety concerns among the primary reasons for refusing a potential COVID-19 vaccine, strong and transparent communication on the known safety profile of the COVID-19 vaccines will be needed. Therefore, public repositories regarding potential side-effects and clear mechanisms to report such issues are essential for a national vaccination campaign to succeed.

## COMBATING THE SPREAD OF MISINFORMATION

Throughout the COVID-19 pandemic, containing the spread of misinformation was perhaps at least as difficult as controlling new infections. Indeed, Romania is no exception to this phenomenon, and there are numerous instances where public health efforts were hindered by false information. For example, during the early stages of the pandemic, returning members of the Romanian diaspora were vilified on various social media platforms (5). Similarly, in September 2020, parents from a small village rushed to protest at their local school after a child allegedly told their parents about the “forced vaccination” of pupils against COVID-19 (15). One video showing the parental concerns and the scolding of school staff quickly gained millions of views on social media and was used extensively to justify opposition to vaccines.

Social media need not be detrimental to the prevention and control of infectious diseases. Indeed, if its potential can be harnessed efficiently, public health interventions may gain significant advantages. Fortunately, such is the case with vaccination in Romania, where social media platforms have become an important vector for the delivery of accurate scientific

information. For example, Romania has the largest Facebook group in the world that provides parents with vaccination advice directly from primary-care physicians (16, 17). With this in mind, the use of such social media platforms will prove beneficial in addressing vaccine hesitancy in Romania, thereby aiding the implementation of any potential anti-COVID-19 immunization strategy.

Lastly, the success of any immunization campaign depends on the sociocultural and historical factors that characterize the region(s) of the concerned populations. Important contributions to national public health campaigns can be offered by non-governmental entities, as was demonstrated in the course of the COVID-19 pandemic. One of the most illustrative examples in Romania concerns the Romanian Orthodox Church, which contributed both by providing significant human and material resources and by reinforcing the messages that were communicated by public health authorities (5). This was not always the case, as was observed during important religious holidays, when mass gatherings and protests against social distancing were recorded (18). However, in early January 2021, the Patriarch of the Romanian Orthodox Church issued a statement addressed to clerical staff in which he officially endorsed vaccination whilst stressing the importance of an accurate and transparent provision of information. Furthermore, this message included an official brochure which was elaborated by public health officials in order to provide accessible details concerning COVID-19 immunizations (19). This illustrates the importance of establishing clear channels of communication that go beyond classical methods and informing society from different angles to guide collective actions toward the betterment of public health.

## FUTURE DIRECTIONS AND PROPOSED RECOMMENDATIONS

In Romania, by the end of December 2020, there have been more than half a million documented SARS-CoV-2 infections, with the real numbers likely far exceeding this figure due to insufficient testing (20). Despite the restrictions that were imposed by the authorities, hospitals are likely to become overwhelmed by COVID-19 patients and their capacity to provide intensive care will likely reach its limits. This situation is extremely alarming and other, perhaps more restrictive, interventions will be required to prevent a potential sanitary disaster. However, in the long term, equally worrying problems need to be addressed concerning the employment of a COVID-19 immunization campaign. Indeed, many of the previous Romanian *ad-hoc* vaccination campaigns which were not based on a solid framework did not achieve their desired goals. Such is the case with the 2008–2009 HPV vaccination campaign, which had a staggeringly low success rate (2.57%) without facing the many difficulties associated with the COVID-19 pandemic (21).

As the Romanian healthcare system is under immense pressure, an evidence-based strategy drawing on implementation science is the most effective means of delivering such a task (22). A successful campaign needs to be based on

methods that were validated in other countries, and this is indeed what the EU general recommendations are relying on (1, 23). Subsequently, such methods need to be adapted to the unique profile of Romania, thereby directly addressing any country-specific challenges. With this in mind, we argue that the following criteria need to be met to guarantee the success of a national COVID-19 immunization strategy:

- Public health actions in Romania must be taken based on the lessons learned from successful vaccination campaigns in other countries of the EU and around the world. The available scientific knowledge concerning the implementation of good practices should serve as a basis for thorough planning and informed choices with regards to country-specific issues.
- COVID-19 testing must continue, and the national testing capacity must be increased for accurate data to inform the vaccination campaign. Currently, Romania's testing strategy offers a limited insight into the number of daily infections. A better understanding of the incidence rate coupled with cross-sectional studies of seroprevalence will inform strategies which could be tailored to specific regions of the country.
- Potential issues concerning the logistics of transport and storage need to be addressed in a centralized approach, and current impediments to the delivery infrastructure need to be identified and tackled. The involvement of military personnel in this process may overcome most of these challenges.
- The present infrastructure and information network concerning immunizations needs to be continuously developed to meet the demands of COVID-19 vaccination. Some of the resources available presently have the potential to be adapted for future requirements, and the feasibility of such actions will need to be carefully evaluated.
- The locations and stakeholders involved in immunization need to be clearly defined. Moreover, the Romanian public needs to be informed about the responsibilities of each concerned party throughout the vaccine implementation process.
- The identification and immunization of the priority groups should be explained and done appropriately. At the same time, equitable access to vaccination must be guaranteed, and constant communication concerning this aspect will be required during the COVID-19 immunization campaign in Romania.
- The transparency of both decision-making and implementation coupled with efficient communication will be crucial for a national vaccination strategy to succeed and for people to accept immunizations.
- Mechanisms to report potential side-effects or other issues concerning immunization need to be carefully defined and communicated in a clear and transparent manner.
- An elaborate and evidence-based vaccine awareness campaign must be carried out as soon as possible to tackle both general vaccine hesitancy and any potential mistrust concerning the provisioning of healthcare services. Moreover, classical awareness and educational campaigns will be insufficient if not brought together through an optimally devised delivery

strategy that can be tailored to different at-risk categories of the population.

- Raising awareness and managing misinformation must be carried out on all channels of communication in Romania, with social media being of particular importance. With this in mind, the involvement of various influencers on these platforms will be key. At the same time, communication experts, psychologists, and sociologists should be approached to tailor the messaging strategy to various age and risk groups, according to national or local behavioral patterns.
- The support of influential figures and non-governmental institutions and organizations is required to facilitate an increase in the public understanding and acceptance of vaccines.
- A unifying legislative framework about vaccination is necessary to define the duties and responsibilities of all stakeholders involved in immunization. This will not only provide a basis for any national vaccination strategy, but will also ensure that all potential concerns are addressed in a clear and transparent manner.

Together, these recommendations will create an efficient and sustainable vaccine implementation framework which will serve as a basis for tackling the current challenges posed by the COVID-19 pandemic in Romania.

## CONCLUSION

In this article, we have described some of the main issues concerning the COVID-19 vaccination campaign in Romania. We also highlighted mechanisms through which many of these difficulties can be overcome, provided certain criteria are satisfied and actions are taken in a timely manner. Although most of the challenges that we presented in this article are country-specific, the proposed solutions could be adapted in order to inform similar public health policy development in other EU member states and beyond.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article and further inquiries can be directed to the corresponding author.

## AUTHOR CONTRIBUTIONS

SD, OC, and OG wrote the main text of the manuscript. SD coordinated the academic initiative which resulted in the drafting of this article. OC and OG contributed equally to the work. RC, GDi, GDu, VG, and EP provided very insightful suggestions and assistance throughout the drafting of the manuscript. All authors contributed to the article and approved the submitted version.

## FUNDING

SD was funded by the Biotechnology and Biological Sciences Research Council (BBSRC), Grant Number BB/M011224/1.

EP was funded by Unitatea Executiva pentru Finantarea Invatamantului Superior, a Cercetarii, Dezvoltarii si Inovarii, Grant Number PN-III-P2-2.1-SOL-2020-2-0324. RC receives funding from the Fogarty International Center (RC111566A), the European Commission Erasmus+ programme (597977 and 586291), and the Romanian Ministry of European Funds – Competitiveness Operational Program (ID108473).

## REFERENCES

- European Centre for Disease Prevention and Control. *Key Aspects Regarding the Introduction and Prioritisation of COVID-19 Vaccination in the EU/EEA and the UK*. (2020). Available online at: <https://www.ecdc.europa.eu/sites/default/files/documents/Key-aspects-regarding-introduction-and-prioritisation-of-COVID-19-vaccination.pdf> (accessed November 21, 2020).
- Preparedness for COVID-19 Vaccination Strategies and Vaccine Deployment*. Communication from the Commission to the European Parliament and the Council (2020). Available online at: [https://ec.europa.eu/health/sites/health/files/vaccination/docs/2020\\_strategies\\_deployment\\_en.pdf](https://ec.europa.eu/health/sites/health/files/vaccination/docs/2020_strategies_deployment_en.pdf) (accessed November 21, 2020).
- OECD/European Observatory on Health Systems and Policies. *Romania: Country Health Profile* (2019).
- WHO. *Routine immunization profile WHO European Region*. (2019). Available online at: [https://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0010/420967/WHO-Regional-profile.pdf](https://www.euro.who.int/__data/assets/pdf_file/0010/420967/WHO-Regional-profile.pdf) (accessed November 21, 2020).
- Dascalu S. The successes and failures of the initial COVID-19 pandemic response in Romania. *Front Public Heal.* (2020) 8:344. doi: 10.3389/fpubh.2020.00344
- Dascalu S. Measles epidemics in Romania: lessons for public health and future policy. *Front Public Heal.* (2019) 7:98. doi: 10.3389/fpubh.2019.00098
- Neagu A. *Ministry of Health: The Third Tranche of Influenza Vaccine has Arrived in the Country and can be Distributed to Doctors. The Number of Doses Can be Supplemented if it is Insufficient*. Hotnews (2019). Available online at: <https://www.hotnews.ro/stiri-sanatate-23494006-ministerul-sanatatii-anunta-treia-transa-vaccin-gripal-ajuns-tara-poate-distribuita-medicilor-iar-daca-numarul-dozelor-este-insuficient-poate-suplimentat.htm> (accessed November 23, 2020).
- Hera M. *Coordinator of the Anti-COVID Vaccination Campaign in Romania: Vaccination will be Free. Army and MIA Structures Will be Involved in Vaccine Distribution and Transport*. Hotnews (2020). Available online at: <https://www.hotnews.ro/stiri-coronavirus-24430720-interviu-coordonatorul-campaniei-vaccinare-anti-covid-romania-vaccinarea-gratuita-armata-structuri-din-mai-vor-implicata-distribuirea-transportul-vaccinului-cand-putea-incepe-vaccinarea-populatiei.htm> (accessed November 28, 2020).
- INSCOP Research. *The Direction of the Country and the EU, the Sources of Concern of Romanians, and the Trust in Domestic and International Institutions*. (2019). Available online at: <https://www.inscop.ro/16-mai-2019-directia-tarii-si-a-ue-sursele-de-ingrijorare-ale-romanilor-si-increderea-in-institutii-interne-si-internationale/> (accessed November 28, 2020).
- Ungureanu MI, Gheorghe A, Voinea SA. Patients are denied care because of corruption in Romania. *Lancet.* (2017) 390:2139. doi: 10.1016/S0140-6736(17)32811-8
- National information platform on vaccination against COVID-19*. (2020). Available online at: <https://vaccinare-covid.gov.ro/> (accessed January 18, 2021).
- Krumpal I. Determinants of social desirability bias in sensitive surveys: a literature review. *Qual Quant.* (2013) 47:2025–47. doi: 10.1007/s11135-011-9640-9
- Romanians, on the Last Places in the World Regarding the Intention to Vaccinate Against COVID-19, if the Vaccine were Available*. IPSOS (2020). Available online at: <https://www.ipsos.com/ro-ro/romanii-pe-ultimele-locuri-lume-acea-ce-priveste-intentia-de-vaccinare-anti-covid-19-daca-vaccinul> (accessed November 22, 2020).
- Survey: 38.6% of Romanians Say They Would Not Get Vaccinated Against COVID-19*. AGERPRES (2020). Available online at: <https://www.agerpres.ro/english/2020/11/12/survey-38-6-of-romanians-say-they-would-not-get-vaccinated-against-covid-19--608276> (accessed November 22, 2020).
- Mironescu V. *Parents Stormed a School in Murgeni, Believing Their Children Were Being Tested and Vaccinated*. Digi24 (2020). Available online at: <https://www.digi24.ro/stiri/actualitate/parintii-au-dat-navala-la-o-scoala-din-murgeni-crezand-ca-le-sunt-testati-si-vaccinati-copiii-uitati-in-direct-a-facut-anti-covid-1376178> (accessed November 22, 2020).
- Vaccines and Vaccination - Clarifications and Support for Parents*. Facebook (2020). Available online at: <https://www.facebook.com/groups/vaccinuri> (accessed November 22, 2020).
- Neagu A. *The Story of the Romanian Who Founded the Largest Pro-vaccination Group on the Internet: We All Have a Responsibility for Those Around Us*. HotnewsRo (2019). Available online at: <https://www.hotnews.ro/stiri-sanatate-23191049-video-interviu-povestea-romanului-care-fondat-cel-mai-mare-grup-pro-vaccinare-internet-toti-avem-responsabilitate-pentru-cei-din-jur-vazut-vanzator-ulei-sarpe-pseudo-tratament-care-are-propria-emisiun.htm> (accessed January 18, 2021).
- Pavaluca L. *Scandal in Iasi, at the Relics of Saint Parascheva. Angry, Masked Believers Quarrel With the Gendarmes*. Digi24 (2020). Available online at: <https://www.digi24.ro/stiri/actualitate/evenimente/video-scandal-la-iasi-la-moastele-sfintei-parascheva-dumneavoastra-trebuie-sa-fiti-informat-ca-dumnezeu-e-deasupra-dumneavoastra-1384138> (accessed November 22, 2020).
- The Dioceses of the Romanian Orthodox Church Have Received Official Information About the SARS-CoV-2 Vaccination Campaign*. BasilicaRo (2021). Available online at: <https://basilica.ro/eparhiile-bisericii-ortodoxe-romane-au-primit-informatiile-oficiale-despre-campania-de-vaccinare-sars-cov-2-document/> (accessed January 18, 2021).
- Alwan NA. Surveillance is underestimating the burden of the COVID-19 pandemic. *Lancet.* (2020) 396:e24. doi: 10.1016/S0140-6736(20)31823-7
- Penta MA, Baban A. Mass media coverage of HPV vaccination in Romania: a content analysis. *Health Educ Res.* (2014) 29:977–92. doi: 10.1093/her/cyu027
- Bauer MS, Damschroder L, Hagedorn H, Smith J, Kilbourne AM. An introduction to implementation science for the non-specialist. *BMC Psychol.* (2015) 3:32. doi: 10.1186/s40359-015-0089-9
- WHO regional office for Europe. *Strategic Considerations in Preparing for Deployment of COVID-19 Vaccine and Vaccination in the WHO European Region*. (2020). Available online at: <https://apps.who.int/iris/bitstream/handle/10665/335940/WHO-EURO2020-1148-40894-55356-eng.pdf?sequence=1&isAllowed=y> (accessed November 29, 2020).

## ACKNOWLEDGMENTS

The authors would like to acknowledge Mihai Craiu for providing valuable advice and supporting the current project. The authors are also very grateful to Andreea Itu for proofreading the paper at various stages of its development.

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Dascalu, Geambasu, Covaciu, Chereches, Diaconu, Dumitra, Gheorghita and Popovici. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Presenting or Spinning Facts? Deconstructing the U.S. Centers for Disease Control Statement on the Importance of Reopening Schools Under COVID-19

**Habib Benzian<sup>1,2,3\*</sup>, Marilyn Johnston<sup>4</sup>, Nicole Stauf<sup>2</sup> and Richard Niederman<sup>3</sup>**

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Robert Otto Valdez,  
University of New Mexico,  
United States  
Margo Bergman,  
University of Washington Tacoma,  
United States

### \*Correspondence:

Habib Benzian  
habib.benzian@nyu.edu

### Specialty section:

This article was submitted to  
Public Health Education and  
Promotion,  
a section of the journal  
Frontiers in Public Health

**Received:** 22 December 2020

**Accepted:** 15 February 2021

**Published:** 09 March 2021

### Citation:

Benzian H, Johnston M, Stauf N and  
Niederman R (2021) Presenting or  
Spinning Facts? Deconstructing the  
U.S. Centers for Disease Control  
Statement on the Importance of  
Reopening Schools Under COVID-19.  
*Front. Public Health* 9:645229.  
doi: 10.3389/fpubh.2021.645229

<sup>1</sup> Department of Epidemiology & Health Promotion, World Health Organization Collaborating Center, College of Dentistry, New York University, New York, NY, United States, <sup>2</sup> The Health Bureau Ltd Consultants for Global Health, Buckingham, United Kingdom, <sup>3</sup> Department of Epidemiology & Health Promotion, College of Dentistry, New York University, New York, NY, United States, <sup>4</sup> Independent Researcher, Berlin, Germany

Credible, reliable and consistent information to the public, as well as health professionals and decision makers, is crucial to help navigate uncertainty and risk in times of crisis and concern. Traditionally, information and health communications issued by respected and established government agencies have been regarded as factual, unbiased and credible. The U.S. Centers for Disease Control and Prevention (CDC) is such an agency that addresses all aspects of health and public health on behalf of the U.S. Government for the benefit of its citizens. In July 2020, the CDC issued guidelines on reopening schools which resulted in open criticism by the U.S. President and others, prompting a review and publication of revised guidelines together with a special “Statement on the Importance of Reopening Schools under COVID-19.” We hypothesize that this statement introduced bias with the intention to shift the public perception and media narrative in favor of reopening of schools. Using a mixed methods approach, including an online text analysis tool, we demonstrate that document title and structure, word frequencies, word choice, and website presentation did not provide a balanced account of the complexity and uncertainty surrounding school reopening during the COVID-19 pandemic. Despite available scientific guidance and practical evidence-based advice on how to manage infection risks when reopening schools, the CDC Statement was intentionally overriding possible parent and public health concerns. The CDC Statement provides an example of how political influence is exercised over the presentation of science in the context of a major pandemic. It was withdrawn by the CDC in November 2020.

**Keywords:** COVID-19, disaster communication, public health guidance, school safety, reopening, political bias, pandemic mitigation



## CREDIBLE HEALTH COMMUNICATION IN THE TIME OF COVID-19

Credible, reliable and consistent information to the public, as well as health professionals and decision makers, is crucial to help navigate uncertainty and risk in times of crisis and concern. The COVID-19 pandemic has generated an information surge, based on an unprecedented amount of rapidly evolving and accessible data, amplified by modern mass communication channels, oftentimes unvetted in terms of quality, truthfulness or scientific evidence. The individual's ability to distinguish real from fake or important from hyped is tested to the maximum in what the World Health Organization calls an "infodemic" (1). Decisions on whom to trust are all too often made on the basis of who shouts the loudest or gets the most social media attention, rather than on the basis of rational assessment, transparency and credibility of the source (2, 3).

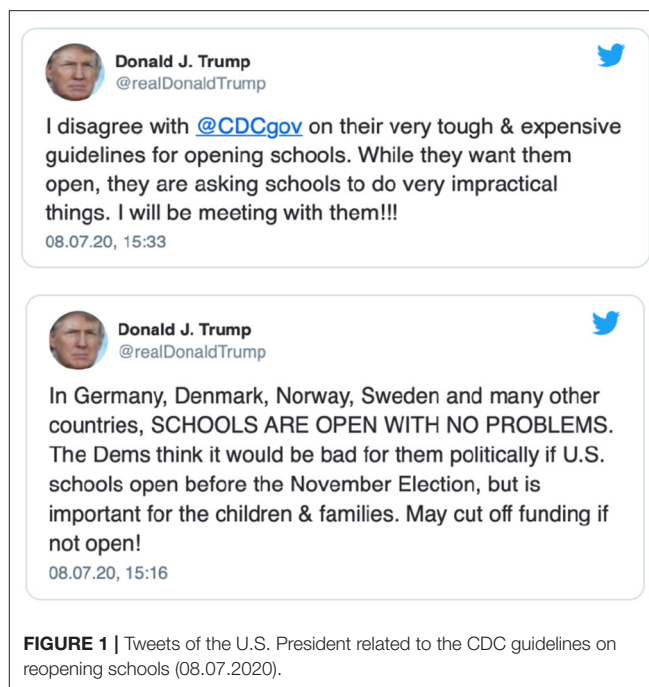
Traditionally, information and health communication items issued by respected and established government agencies have been regarded as factual, unbiased and credible. The U.S. Centers for Disease Control and Prevention (CDC) is an agency that addresses all aspects of health and public health on behalf of the U.S. Government for the benefit of its citizens. The CDC's pledge is to "base all public health decisions on the highest quality scientific data that is derived openly and objectively," which sets a high bar of scientific integrity for information and guidance that is provided for health professionals, political decision makers, media and the public at large (4).

The COVID-19 pandemic has exacerbated pre-existing tensions between science and politics in the U.S. (and elsewhere), challenging the role and credibility of science and the translation of scientific advice into effective public health policy and action. Such conflicts have recently resulted in a situation where the CDC was requested to reconsider its draft guidance on reopening of schools during the COVID-19 pandemic (5). According to media reports, as well as President Donald Trump's own tweets from July 8, 2020 (**Figure 1**), the White House felt the original draft guidelines placed too much emphasis on the infection risks related to school reopening and threatened federal defunding of public schools unless the guidelines were reworked.

Reacting to the criticism, Vice President Mike Pence and CDC Director Robert Redfield announced that revised guidelines would be released the following week. According to the New York Times, the Department of Health and Human Services took control of the revisions with minimal input from the CDC (6). When the CDC eventually released its revised guidelines on July 23, 2020, it introduced them with a separate statement entitled "The Importance of Reopening America's Schools this Fall" (we use the term "Statement" in this paper) (7).

## HYPOTHESIS—THE CDC STATEMENT INTRODUCES BIAS

It is our hypothesis that the introductory Statement of the revised guidance introduced politically motivated bias into a scientific discussion. To test this hypothesis we analyzed the



CDC Statement, using language and contextual analysis tools to determine whether the information is presented objectively, in accordance with CDC's pledge. In this paper we do not enter into details of the politics of the relationship between the CDC and the U.S. Government. Neither do we assess the scientific evidence of the arguments put forward against or in favor of a return to regular school attendance.

## ANALYSIS METHODOLOGY

We used a mixed-methods approach to analyze the text and online presentation context of the CDC Statement. With support of an open-source free online text analysis tool (8) (<http://www.voyant-tools.org>, University of Alberta, Canada, and McGill University, Canada), we undertook simple automated analyses of the Statement's main body, excluding footnote text. We analyzed word frequencies to compile a ranking of words according to frequencies; a predetermined set of stopwords was excluded, based on a standard list of English stopwords available from Voyant-tool.org). We tabulated the first five most common terms and three additional selected words related to the pandemic ("Covid-19," "risk/risks," "safety"). In addition, the authors manually analyzed the document structure and performed a word-by-word content, contextual and emotional connotation analysis (9). This analysis was first conducted independently by each co-author, then in a second step jointly reviewed to achieve consensus. Lastly, we analyzed the presentation of the Statement in the context of the overall COVID-19 guidance for schools on the CDC's website, specifically looking at the placement of elements, integration in the website style and format and the relation to

**TABLE 1** | Document sections and respective word count/ranking and frequency of selected words in the CDC statement (excluding footnotes).

Section	Word count
Introduction	238
Covid-19 and Children	307
Educational Instruction	455
Social and emotional development	640
Safety	186
Nutrition	118
Physical Activity	166
Conclusion	178
Total word count (including subheadings)	2,315

Rank	Word/s	Frequency
1	School/schools	74
2	Children	54
3	Students	18
4	Learning	17
5	Covid	16
...		
116/117	Risk/Risks	3/3
...		
195	Safety	2

website navigation elements. The analysis was undertaken in September 2020.

## FINDINGS

### Choice of Document Title

The title of the CDC Statement (“The Importance of Reopening America’s Schools this Fall”) is declarative, identifying the document’s view, rather than an evaluation of risks and benefits.

### Document Organization and Selectivity of Topics

The Statement is structured into eight broad sections, starting with an introduction. Only the second section with the heading “COVID-19 and Children” briefly discusses the health risks of COVID-19 and the particular situation of children. From the total word count of 2,315 words only 307 are dedicated to this topic (see **Table 1**). The other sections expound on the value of school attendance for education, social and emotional development, safety, nutrition and physical activity. The section on safety does not deal with safety from infection risks, but with the role of the school in the context of safety from abuse and violence. Text related to serious disease complications is shifted to a footnote rather than explaining the complications in the main body of text.

### Word Count and Frequency

**Table 1** also shows selected words and their respective frequency of use in the Statement. The terms “school/schools,” “children,”

“students,” and “learning” occupied the ranks one to four. The term “COVID” ranked 5th most frequent. The words “risk/risks” ranked 116/117th with three mentions each and the word “safety” ranked 195th with only two mentions in the entire document.

### Word Choice

The choice of words and phrasing of the Statement demonstrate vagueness and bias, as illustrated in this annotated version (annotations in square brackets) of the second paragraph of the section with the heading, “COVID-19 and Children:”

*Scientific studies suggest [indicates that studies are not yet certain; no references] that COVID-19 transmission among children in schools may [indicates uncertainty] be low. International studies [no references] that have assessed how readily COVID-19 spreads in schools also reveal [the other studies do not reveal but suggest, however here it is implied that the information provided is certain] low rates of transmission when community transmission is low. [This is an important qualifier, but its relevance to decision making about reopening is not discussed.] Based on current data, [references missing] the rate of infection among younger [the age cohort is not mentioned, which would be important for making this statement more relevant] school children, and from students to teachers, has been low, especially if proper precautions are followed. [This is an important “if,” but its importance is not discussed and the details of the precautions are not provided.] There have also been few reports [vague, references missing] of children being the primary source of COVID-19 transmission among family members. [Were these children attending school?] This is consistent with data from both virus and antibody testing, suggesting [“suggesting” is not proving.] that children are not the primary drivers of COVID-19 spread in schools or in the community. No studies are conclusive, but the available evidence provides reason to believe [vague] that in-person schooling is in the best interest of students, particularly in the context of appropriate mitigation measures similar to those implemented at essential workplaces. [The appropriate mitigation measures are not discussed in this statement. This blanket assertion is not helpful to those seeking advice on how to safely reopen schools.]*

### Website Presentation

The Statement is presented on a webpage separate from the technical guidance documents. The latter are accessible via a left-hand menu of searchable tabs, requiring additional clicks to unfold sub-menus in order to find and select guidance related to school reopening. Users reaching the website through a search engine may have difficulty finding the technical content or mistake the statement as the main guidance (see the website screenshot in **Figure 2** or <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/reopening-schools.html>).

## DISCUSSION

The CDC Statement provides an example of how political influence is exercised over the presentation of science in the context of a major pandemic. The fact that the original draft of the CDC’s guidelines on school reopening was publicly questioned by the U.S. President; that an additional statement

The screenshot shows the CDC website's 'Coronavirus Disease 2019 (COVID-19)' section. The header includes the CDC logo, the text 'Centers for Disease Control and Prevention', and the tagline 'CDC 24/7: Saving Lives. Protecting People™'. A search bar and a 'Coronavirus' dropdown menu are visible. Below the header, a teal banner reads 'Coronavirus Disease 2019 (COVID-19)'. A navigation bar lists categories: 'Your Health', 'Community, Work & School', 'Healthcare Workers & Labs', 'Health Depts', 'Cases & Data', and 'More'. The 'Community, Work & School' category is selected, showing a sidebar with sub-topics like 'Health Equity', 'Community Mitigation Framework', 'Cleaning & Disinfecting', 'Businesses & Workplaces', 'Worker Safety & Support', 'Schools & Child Care' (highlighted), 'Colleges & Universities', 'Parks, Sports & Recreation', 'Gatherings & Community Events', 'Community & Faith-Based Organizations', 'First Responders, Law Enforcement & Public Services', and 'Shared & Congregate Housing'. The main content area is titled 'COMMUNITY, WORK & SCHOOL' and features the article 'The Importance of Reopening America's Schools this Fall'. The article is dated 'Updated July 23, 2020' and includes social media sharing icons. The text of the article discusses the importance of considering the full spectrum of benefits and risks of both in-person and virtual learning options, noting that the best available evidence indicates that if children become infected, they are far less likely to suffer severe symptoms. It also mentions that death rates among school-aged children are much lower than among adults. The article further states that the harms attributed to closed schools on the social, emotional, and behavioral health, economic well-being, and academic achievement of children, in both the short- and long-term, are well-known and significant. It also notes that the lack of in-person educational options disproportionately harms low-income and minority children and those living with disabilities. These students are far less likely to have access to private instruction and care and far more likely to rely on key school-supported resources like food programs, special education services, counseling, and after-school programs to meet basic developmental needs. The article also states that aside from a child's home, no other setting has more influence on a child's health and well-being than their school. The in-person school environment does the following:

- provides educational instruction;
- supports the development of social and emotional skills;
- creates a safe environment for learning;
- addresses nutritional needs; and
- facilitates physical activity.

The article concludes by stating that this paper discusses each of these critical functions, following a brief summary of current studies regarding COVID-19 and children.

**FIGURE 2 |** Screenshot of the CDC website featuring the Statement on *The Importance of Reopening America's Schools this Fall*.

was crafted to precede and pre-empt the revised guidelines without actually incorporating them; and that the title of the Statement itself contains no reference to “safety,” all combined suggest that there was a deliberate intent to spin the CDC’s scientific guidance toward reopening of schools. Our analysis confirms this initial hypothesis and provides evidence of biased and selective presentation of science, intended to downplay the COVID-19 infection risks for children, teachers and staff returning to school. However, we acknowledge a potential and virtually unavoidable analysis bias. The extent of White House interference in CDC matters was the subject of multiple media reports and became the origin of our interest in undertaking the presented analysis (10).

Unlike an earlier CDC communication on school reopening from May 19, 2020, the new CDC Statement neither addresses the risks of reopening in detail nor discusses how to manage

them safely. Instead, it elaborates at great length on the benefits of reopening and the missed benefits of not doing so. In seven of the eight sections the Statement speaks about the educational needs of children, the benefits of attending school and, in particular, the detriments of not attending, none of which is questioned by anyone. It is interesting to note that the Statement boasts about school-related benefits that have been under pressure, limited, or otherwise challenged by the Trump administration’s policies aimed at weakening the public school system (11, 12).

Building on extensive evidence, several practical health communication tools have been developed for the context of pandemics and the COVID-19 pandemic in particular (13–15). Among the recognized principles of effective health communication in times of crisis is the need to transparently acknowledge concerns of the reader, as well as existing

uncertainties and evolving scientific evidence (16, 17). However, the challenges and difficulties of balancing competing interests and the hard choices facing decision-makers - in short, how and when do you open schools safely during a pandemic - are left unsaid in the CDC Statement. Nowhere in the text can the reader find recommendations on when to reopen or how to reopen safely. Readers are left on their own to discover those recommendations, as they are not immediately visible and are accessible only via an interactive list of topics on the left-hand side of the CDC's web page. Navigating such a page arrangement may be familiar to someone who reads scientific publications regularly or professionally, but it may not be familiar to the parent who googles "CDC school reopening guidelines."

Even though the CDC's technical guidelines and tool tabs on the website provide a more balanced risk-benefit analysis of reopening and offer recommendations on how to keep children, teachers and staff safe at school, they remained hidden by separating them from the Statement in an obvious effort to strengthen the case for re-opening (see **Figure 2**). It would have been appropriate to provide a more nuanced and less biased text by simply incorporating the word "safely reopen schools" in the title, by adding more detail on the disease risk and by highlighting existing evidence on school-based mitigation measures. As this was not done, it may imply that the CDC Statement was politically motivated and biased to present information favoring reopening of schools. However, by overly emphasizing this message and practically ignoring parent, teacher, staff and family concerns about COVID-19 transmission, the Statement's authors do not provide a balanced perspective but a rather one-sided view.

Critical in the broader frame of transparency and accountability is the fact that the Statement was published under the CDC's name and brand, as part of a set of technical guidelines. The fact that the Statement was conceptualized and largely drafted by people not within the CDC, and that CDC was given limited opportunity to provide input is not communicated openly (6). Readers unfamiliar with this important political context will read and understand the Statement as part of the CDC's scientific products. Worse, this lack of context and transparency may make the reader more likely to read and understand the detailed technical guidance through the lens of prioritizing reopening, rather than through the lens of minimizing risks of infection for children, teachers, staff and families.

The Statement was withdrawn by the CDC on November 17, 2020, 2 months after our analysis presented here (18). The deletion resulted from a critical inquiry of the House of Representatives Select Subcommittee on the Coronavirus Crisis initiated in September 2020. The complete erasure of the Statement from the CDC's website without replacement (it is not even available through the site's search function) is the ultimate confirmation that the Statement was not in line with the CDC's usual standards of quality and scientific rigor.

## CONCLUSION

The U.S. and many other countries witnessed heated and politicized public discussions about the risks and benefits of open or closed schools amidst an ongoing pandemic with continued high rates of disease transmission. The importance of reopening school is widely recognized and acknowledged, but it is only safe if available scientific guidance and practical evidence-based advice on how to manage infection risks when reopening schools are duly observed. The additional Statement simply overrides all public health concerns by pushing technical details and balanced risk assessments into the background. The fact that the Trump administration felt the need to add an interpretative layer to the CDC's science-based guidance is an expression of its general disregard for science and its preference that favors economic returns over potential harm to children, teachers, school staff and families (19). Political interference by the White House undermines the CDC's credibility as a leading public health agency, making it difficult for the agency to be viewed as a credible provider of equipoised guidance (20).

In the context of effective health communication in a pandemic, "wise politicians realize the limits to their knowledge and their ability to spin things in the real world. This is a disease, it doesn't care what we think and say, it only cares about what we do. If politicians have a short-term agenda and cherry pick the data, or find a scientist who happens to agree with them, they might win in the short run, but they leave themselves vulnerable in the long run. Wise policy advisers encourage policy-makers to respect the science, and, of course to communicate evidence-based messages as effectively as possible." (21) We wholeheartedly agree with this criticism by Fleck & Fishhoff.

It is hoped that vigilant science, media and civil society will defend the CDC's independent science-based work and urge political leaders to respect science and act accordingly, in the best interest of the people they serve. The eventual deletion of the Statement from the CDC's website is testimony to the critical need and power of such public vigilance.

## DATA AVAILABILITY STATEMENT

The original contributions generated for this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

## AUTHOR CONTRIBUTIONS

All authors contributed equally to the concept, analysis and interpretations presented in the manuscript.



## REFERENCES

1. Tangcharoensathien V, Calleja N, Nguyen T, Purnat T, D'Agostino M, Garcia-Saiso S, et al. Framework for managing the COVID-19 infodemic: Methods and results of an online, crowdsourced WHO technical consultation. *J Med Internet Res.* (2020) 22:e19659. doi: 10.2196/19659
2. Dash S, Parry AA, De Freitas L, Mithu MIH, Rahman MM, Ramasamy A, et al. Combating the COVID-19 infodemic: a three-level approach for low and middle-income countries. *BMJ Glob Health.* (2021) 6:e004671. doi: 10.1136/bmjgh-2020-004671
3. Islam MS, Sarkar T, Khan SH, Mostofa Kamal AH, Hasan SMM, Kabir A, et al. COVID-19-related infodemic and its impact on public health: A global social media analysis. *Am J Trop Med Hyg.* (2020) 103:1621–9. doi: 10.4269/ajtmh.20-0812
4. Centers for Disease Control and Prevention (CDC). *Pledge to the American People (version 6 April 2018)*. Available online at: <https://www.cdc.gov/about/organization/pledge.html> (accessed February 5, 2021).
5. Sprunt B, Turner C. *White House Stumbles Over How to Best to Reopen Schools, as Trump Blasts CDC Guidance*. National Public Radio (NPR) (2020). Available online at: <https://www.npr.org/2020/07/08/888898194/trump-blasts-expensive-cdc-guidelines-for-reopening-schools> (accessed July 30, 2020).
6. Goodnough A. *C.D.C. Calls on Schools to Reopen, Downplaying Health Risks*. New York Times. (2020). Available online at: <https://www.nytimes.com/2020/07/24/health/cdc-schools-coronavirus.html> (accessed July 31, 2020).
7. Centers for Disease Control and Prevention (CDC). *The Importance of Reopening America's Schools This Fall*. (2020). Available online at: <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/reopening-schools.html> (accessed July 30, 2020).
8. Sampsel LJ. Voyant tools. *Music Ref Serv Q.* (2018) 21:153–7. doi: 10.1080/10588167.2018.1496754
9. Hawkins J. Textual analysis. In: Allen M, editor. *The SAGE Encyclopedia of Communication Research Methods*. Thousand Oaks, CA: SAGE Publications (2018). p. 1745–56.
10. Mazzetti M, Weiland N, LaFraniere S. *Behind the White House Effort to Pressure the C.D.C. on School Openings*. New York Times (2020). Available online at: <https://www.nytimes.com/2020/09/28/us/politics/white-house-cdc-coronavirus-schools.html> (accessed December 5, 2020).
11. Duret D. *School Lunch Programs are Losing Millions Feeding Hungry Kids; They Could be Broke by Fall*. USA Today, (2020). Available online at: <https://www.usatoday.com/story/news/education/2020/05/31/coronavirus-school-lunch-programs-going-broke-because-kids-hunger/3101507001/> (accessed August 4, 2020).
12. Crisp E. *Trump Battles With CDC Over School Lunches as He Urges Schools to Reopen*. Newsweek (2020). Available online at: <https://www.newsweek.com/trump-battles-cdc-over-school-lunches-he-urges-schools-reopen-1516429> (accessed August 4, 2020).
13. COVID-19: lessons in risk communication and public trust. *Public Health Res Pract.* (2020) 30:3022006. doi: 10.17061/phrp3022006
14. Pan American Health Organization (PAHO). *COVID-19: Guidelines for Communicating About Coronavirus Disease 2019. A Guide for Leaders*. Washington DC: PAHO (2020).
15. World Health Organisation (WHO). *Communicating Risk in Public Health Emergencies: A WHO Guideline for Emergency Risk Communication (ERC) Policy and Practice*. Geneva: WHO (2017)
16. Leask J, Hooker C. How risk communication could have reduced controversy about school closures in Australia during the COVID-19 pandemic. *Public Health Res Pract.* (2020) 30:3022007. doi: 10.17061/phrp3022007
17. Ratzan SC, Sommariva S, Rauh L. Enhancing global health communication during a crisis: lessons from the COVID-19 pandemic. *Public Health Res Pract.* (2020) 30:3022010. doi: 10.17061/phrp3022010
18. 116th Congress of the United States House of Representatives Select Subcommittee on the Coronavirus Crisis. *CDC Removes Misleading School Guidance Following Select Subcommittee Inquiry*. Press Release 17 Nov 2020. Available online at: <https://coronavirus.house.gov/news/press-releases/cdc-removes-misleading-school-guidance-following-select-subcommittee-inquiry> (accessed December 5, 2020).
19. Valant J. *School Reopening Plans Linked to Politics Rather Than Public Health*. Brookings Brown Center Chalkboard. (2020). Available online at: <https://www.brookings.edu/blog/brown-center-chalkboard/2020/07/29/school-reopening-plans-linked-to-politics-rather-than-public-health/> (accessed December 5, 2020).
20. Rasmussen SA, Jamieson DJ. Public health decision making during Covid-19 - Fulfilling the CDC pledge to the American people. *N Engl J Med.* (2020) 383:901–3. doi: 10.1056/NEJMp2026045
21. Fleck F, Fischhoff, B: the importance of testing messages. *Bull World Health Organ.* (2020) 98:516–7. doi: 10.2471/BLT.20.030820

**Conflict of Interest:** NS was employed by company The Health Bureau Ltd.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Benzian, Johnston, Stauf and Niederman. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# To What Extent Have Conspiracy Theories Undermined COVID-19: Strategic Narratives?

**Kenneth Graham Drinkwater\*, Neil Dagnall, Andrew Denovan and R. Stephen Walsh**

*Department of Psychology, Manchester Metropolitan University, Manchester, United Kingdom*

**Keywords: COVID-19, conspiracy theories, misinformation, inoculation methods, vaccination, preventative strategies**

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Stephen Harper,  
University of Portsmouth,  
United Kingdom  
Nora Abdul-Aziz,  
University of Toledo, United States

### \*Correspondence:

Kenneth Graham Drinkwater  
k.drinkwater@mmu.ac.uk

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 25 June 2020

**Accepted:** 24 February 2021

**Published:** 15 March 2021

### Citation:

Drinkwater KG, Dagnall N, Denovan A  
and Walsh RS (2021) To What Extent  
Have Conspiracy Theories  
Undermined COVID-19: Strategic  
Narratives?  
Front. Commun. 6:576198.  
doi: 10.3389/fcomm.2021.576198

## INTRODUCTION

Noting the emergence of COVID-19 conspiracy theories and acknowledging the role that official messages play in countering the spread of the virus, this article considers the extent to which conspiracies have undermined strategic narratives during the pandemic. Globally, coronavirus infection has produced widespread concern about attendant physical and psychological welfare (World Health Organization, 2020). The emergence of multiple conspiracy theories accompanied attempts to comprehend the implications of the ensuing epidemic (Georgiou et al., 2020). These, consistent with archetypal conspiratorial thinking (e.g., Denovan et al., 2020), explain COVID-19 in terms of clandestine plots, enacted by powerful actors, to achieve malevolent goals (Sibley et al., 2020). Prominent examples include claims that COVID-19 was engineered in a laboratory as a bioweapon (Lewis, 2020), and that vaccination is a pretext to implant tracking microchips into populations (Huddleston, 2021, January 12).

Endorsement of conspiracy theories occurs when individuals perceive official narratives as deficient, or an event has no conclusive explanation (Dagnall et al., 2017). A further key feature of conspiracy theories is that despite lacking a robust empirical basis, they typically cite supporting scientific evidence (Drinkwater et al., 2018). This provides an “illusion” of credibility, and in part, explains why people often wrongly perceive conspiracies as valid alternatives to mainstream explanations (Drinkwater et al., 2020). This was demonstrated in the United States by the QAnon meta-conspiracy theory (Amarasingam and Argentino, 2020). QAnon encapsulates a range of smaller conspiracies that thematically represent the notion that during his presidency there was a deep state, series of secret/unauthorized networks operating in pursuit of their own agenda and goals, which actively undermined Donald Trump. Pertinent to the COVID-19 pandemic, QAnon encouraged resistance to public health messages (Hannah, 2021; Sturgill, 2021).

## Communication and Conspiracy

From a communications perspective, COVID-19 conspiracies are problematic because their content refutes official messages and distorts societal perceptions of the pandemic. Moreover, the assertion of spurious counterarguments reduces narrative impact and potentially weakens source credibility. Illustratively, research into the effects of conspiracy on immunization has demonstrated that mere exposure to confutation reduces the likelihood of vaccination (Jolley and Douglas, 2014). This shows that conspiracy theories can adversely influence attitudes, decision-making, and behavior related to real-world situations.

Specifically, in the United Kingdom (UK) the burning of 5G masts was a reaction to false social media claims that the new technology spread the Coronavirus (Child, 2020, April 13). During the pandemic, misinformation has also directly contradicted the efficacy of key public health advice (i.e., limiting social contacts and interactions). Recently, this has extended to vaccination

effectiveness and purpose. Explicitly, the notions that pharmaceutical companies cover up the danger of vaccines, have fabricated data, and have exaggerated the potency of immunization (Freeman et al., 2020). Conspiracies are thus most influential when they index canonical themes such as distrust of authority, alienation, and personal insecurity; directly oppose official accounts; and reference ideological beliefs and/or political affiliations (Bessi et al., 2015). For instance, anti-maskers refusing to wear face coverings because they regard them as an assault on personal freedom (Duncan, 2020, July 2020).

These instances suggest that conspiracy theories have reduced the effectiveness of key COVID-19 UK strategic narratives (e.g., *Conservatives.com*, 2020b), and “Stay alert, control the virus, save lives” (*Conservatives.com*, 2020a). These are key public messages that seek to reduce risk and enhance well-being by encouraging maximum engagement with health directives (Dagnall et al., 2020). Explicitly, strategic narratives advance public health by focusing on “scientific development, strategic dissemination, and critical evaluation of relevant, accurate, accessible, and understandable health information” (Bernhardt, 2004, p. 2051). Consistent with this classification, UK politicians and scientists have used communications as a tool to construct common understanding, and to promote and shape behaviors that reduce the spread of COVID-19 (Dagnall et al., 2020).

## DISCUSSION

The impact of conspiracy theories stems from the fact that they are often wrongly perceived as legitimate information sources. This occurs within modern technological societies because there exist multiple outlets, which rapidly transmit vast volumes of new and evolving data. In this context, it is easy for boundaries between official guidance, informed social commentary, conjecture and misinformation to become blurred. The internet plays a central role in this obfuscation, since paradoxically it is the main provider of authentic news and fact, and the primary source of conspiracy theories and misinformation. Although in some instances the distinction is evident (i.e., conspiracy websites), in others (e.g., social media platforms) it is more difficult to discern (Gretter et al., 2017). This problem is exacerbated by the existence of fake news websites that intentionally publish disinformation to drive social media traffic (e.g., *Infowars*). Hence, speculation and rumors are frequently circulated, shared, and cross-posted without reference to validity [see Knight (2000)]. For these reasons, the internet is a fertile breeding ground for conspiracy and misinformation (Del Vicario et al., 2016).

Another variable associated with the formation and endorsement of conspiracy theories is uncertainty. With reference to COVID-19, there are myriad factors that combine to heighten uncertainty (the rapidly changing nature of the pandemic, alterations to working practices, disruption to social life, etc.). Doubt creates anxiety and motivates the desire to establish personal meaning (van Prooijen, 2016). This process draws frequently on conspiracy theories because

people demonstrate a corresponding preference for external data that validates their internal beliefs and motivations (Zonis and Joseph, 1994). Hence, conspiracies are intuitively appealing since they provide congruent knowledge about the world. Explicitly, the epistemic content of conspiratorial narratives supplies details, addresses gaps in official accounts, and affords novel insights (Douglas et al., 2017). Noting these points, researchers have conceptualized conspiracies as the consequence of the sense-making process initiated to resolve ambiguity (Hofstadter, 1966; Shermer, 2012). This explicates why conspiracies are widely endorsed and habitually accompany social crises, such as infectious outbreaks (e.g., Severe Acute Respiratory Syndrome, SARS, 2002–2004; and Zika virus, 2015–2016) (Mitchell, 2019), and times of political instability (the attack on the Capitol as part of the 2020–21 United States election protests, *ABC News*, 2021). In the case of the Capitol Hill Attack, the riot and storming of Congress was also linked to the QAnon movement, which has consistently undermined COVID-19 strategic narratives.

In addition to alleviating uncertainty, conspiracies relatedly fulfill the existential need to feel safe and in control (Douglas et al., 2017). This notion concurs with the observation that people draw on conspiracy theories when they experience feelings of powerlessness, low self-esteem, political cynicism, and social alienation (Irwin et al., 2015). Collectively psychological factors such as these reflect a sense of anomie (normlessness) and societal estrangement. These characteristics are found in marginalized groups who, incidentally, are more influenced by conspiracy theories and less convinced by officialdom (Zonis and Joseph, 1994). Within disaffected sectors of society, conspiracies can enhance intra-group belonging and reinforce inter-group separation. Thus, conspiracies not only provide information and reassurance, but serve also to preserve sub-cultural identity and individual beliefs. This is consistent with authors who view conspiracies as minority theory (Moscovici, 1987; Drinkwater et al., 2012).

Accordingly, social identity is important because group membership helps to maintain positive self-image. Consistent with this supposition, individuals tend to share opinions with likeminded others, who embrace similar ideologies. This conceptualization depicts the emergence, reinforcement, and perpetuation of conspiracies as an active consequence of the assertion of self and group identity (Swire et al., 2017). In the case of COVID-19, perception of mutual sub-group beliefs provides a rationale for and validation of behaving in particular ways. At the individual level, this provides a justification for both selective adherence to (i.e., attending social gatherings with friends, whilst adhering to two meter distancing in public), and defiance of government guidelines (i.e., refusing to wear face masks).

To understand why conspiratorial beliefs facilitate social movements and anti-democratic behavior, it is necessary to acknowledge the importance of social identity and personal motivations (Sternisko et al., 2020). Sternisko et al. (2020) locates these in an overarching framework that explains associations between motivational processes, conspiracy theories, related social identities, and collective action. Two motivational allures

are central to this conceptualization (i.e., content and qualities). Social identity persuades via content, whereas uniqueness influences via qualities. This distinction is important because it elucidates the relationship between different motives and conspiracy theory beliefs. Content denotes the importance of narrative features. Thus, although conspiracies possess the same underlying structure, premises within individual theories vary as a function of group, goal, and consequence. Qualities refers to the common structural properties of conspiracies. For instance, theories are typically epistemic (i.e., explain most events), reveal secret information, and challenge agreed knowledge and beliefs (Goertzel, 1994). Depending on situation and motivational states, different contents or qualities prove more alluring. Consequently, the appeal of COVID-19 conspiracies differs because of these factors. For example, notions of government cover-ups appeal to individuals who distrust authority, and to those who draw on ideas of secrecy, intrigue, and abuse of power (Knight, 2000).

In addition to motivational factors, worldview (thinking style) is likely to influence proclivity to COVID-19 conspiracies. Generally, worldview refers to the central, overarching belief system that encompasses a set of interrelated assumptions about the nature of the world (Overton, 1991; Dagnall et al., 2015). The conspiratorial worldview is characterized by high-order beliefs (i.e., mistrust of authority, cynicism, and suspicion) that facilitate conspiratorial thinking (Goertzel, 1994). This from the viewpoint of the individual is internally coherent, but externally is rationally bounded and flawed. The cognitive style resembles the productive, positive facets of schizotypy (i.e., odd beliefs, paranoid ideation, ideas of reference, and magical thinking). Jointly, these cognitions and perceptions serve as an interpretative framework for structuring reality (Koltko-Rivera, 2004). Correspondingly, the conspiracist worldview focuses on rejection of official accounts and is less concerned with the validity and particulars of conspiracy theories (Dagnall et al., 2015). The notion of a generalized tendency to endorse conspiracies aligns with the concept of conspiracy mentality (Swami et al., 2010; Imhoff and Bruder, 2014), which expresses as a general political attitude comprising disapproval of authority and the behavioral intention to challenge the existing situation (Bessi et al., 2015).

Previous research suggests that conspiracy theories during epidemics are widespread and enduring. Moreover, exposure to misinformation can affect the reception of subsequent material. For example, Carey et al. (2020) reported that conspiracy theories about the Zika epidemic in Brazil were widely endorsed. Furthermore, corrective information was unsuccessful, and it also generally reduced the perceived accuracy of other Zika-related beliefs. Following meta-analysis of studies investigating the effectiveness of messages countering misinformation, Chan et al. (2017) concluded that the persistence of false information was stronger, and the debunking effect (i.e., presenting a corrective message) was weaker, when audiences generated reasons to support initial misinformation. Collectively, these findings indicate that although people can be inoculated against the potentially harmful effects of conspiracy

theories, misinformation is difficult to correct once established (Jolley and Douglas, 2014).

To be successful during the continuously evolving COVID-19 pandemic, strategic narratives need to focus on providing accurate data via trusted information channels. Correspondingly, information needs to adapt to changing scenarios, be supported by reputable empirical evidence, and deliver clear messages (Dagnall et al., 2015). Preceding work on conspiracies also suggests that impartial, consensually agreed communications (i.e., cross party endorsed) are most likely to successfully influence people. These recommendations are consistent with Uscinski et al. (2020), who found that the strongest predictors of COVID-19 related conspiracies in the United States were denialism (i.e., the inclination to reject expert information and explanations), tendency to endorse conspiracy theories generally, and partisan and ideological motivations (i.e., strength of affiliation). Partisanship is important because when high profile figures (e.g., prominent party members) promote conspiracy theories their rhetoric is likely to encourage likeminded individuals to adopt the same ideas (Swire et al., 2017). This is particularly important with regards to fostering conspiracy theories (Uscinski et al., 2020). Concomitantly, enhanced trust of political systems (e.g., government) and institutions (e.g., health agencies) inspires greater public faith in subsequent strategic narrative (Goertzel, 2010).

## CONCLUSION

To maximize impact and reduce the potential negative effects of conspiracy theories, strategic narratives should be accompanied by social media campaigns to correct global health misinformation (Bode and Vraga, 2018). These should encourage users to repudiate conspiracies and false information and provide appropriate supporting evidence. To diminish the potential negative consequences of emerging conspiracies, strategic narratives could also be used alongside “prebunking” (Uscinski et al., 2020). This involves warning receivers about the dangers and consequences of conspiracy theories. Roozenbeek et al. (2020) assert that this strategy cultivates “mental antibodies” against fake news. This metaphor draws on related work using inoculating messages or vaccination against misinformation [e.g., Roozenbeek and van der Linden (2019)]. Cook et al. (2017) state that two elements are required for an inoculation, an explicit warning and refutation. These measures weaken the theory and increase the likelihood that the conspiracy will be dismissed when presented alongside counterargument(s).

Accordingly, subsequent research should investigate whether communicational inoculation in the form of pre-emptive (forewarning) messages increases awareness of the dangers of conspiracy theories and protects against misinformation (inaccuracy) and disinformation (deliberately misleading Compton and Pfau, 2005). This should also determine whether this process encourages advocacy of public health messages over a sustained period. Although, previous research has demonstrated attitudinal vaccination treatments can protect individuals



from/or help them to resist negative persuasive messages, this work has focused generally on the immediate effects of immunization. Clearly, during prolonged public health crises such as the COVID-19 pandemic, it is important to establish that interventions have positive influences that endure and result in health guideline adherence and behavioral adaptation.

## REFERENCES

- ABC News (2021). *Capitol Siege Highlights Powerful Pull of Conspiracy Theories, Experts Say*. ABC News. Available online at: <https://abcnews.go.com/Health/capitol-siege-highlights-powerful-pull-conspiracy-theories-experts/story?id=75180483> (accessed February 16, 2021).
- Amarasingam, A., and Argentino, M. A. (2020). The QAnon conspiracy theory: a security threat in the making. *CTC Sentinel*. 13, 37–44.
- Bernhardt, J. M. (2004). Communication at the core of effective public health. *Am. J. Publ. Health* 94, 2051–2053. doi: 10.2105/AJPH.94.12.2051
- Bessi, A., Coletto, M., Davidescu, G. A., Scala, A., Caldarelli, G., and Quattrociocchi, W. (2015). Science vs conspiracy: collective narratives in the age of misinformation. *PLoS ONE* 10:e0118093. doi: 10.1371/journal.pone.0118093
- Bode, L., and Vraga, E. K. (2018). See something, say something: correction of global health misinformation on social media. *Health Commun.* 33, 1131–1140. doi: 10.1080/10410236.2017.1331312
- Carey, J. M., Chi, V., Flynn, D. J., Nyhan, B., and Zeitoff, T. (2020). The effects of corrective information about disease epidemics and outbreaks: evidence from Zika and yellow fever in Brazil. *Sci. Adv.* 6:eaa7449. doi: 10.1126/sciadv.aaw7449
- Chan, M. P. S., Jones, C. R., Hall Jamieson, K., and Albarracín, D. (2017). Debunking: a meta-analysis of the psychological efficacy of messages countering misinformation. *Psychol. Sci.* 28, 1531–1546. doi: 10.1177/0956797617714579
- Child, D. (2020). *Fighting Fake News: The New Front in the Coronavirus Battle*. Breaking News, World News and Video from Al Jazeera. Available online at: <https://www.aljazeera.com/news/2020/04/fighting-fake-news-front-coronavirus-battle-200413164832300.html> (accessed January 12, 2021).
- Compton, J. A., and Pfau, M. (2005). Inoculation theory of resistance to influence at maturity: recent progress in theory development and application and suggestions for future research. *Ann. Int. Commun. Assoc.* 29, 97–146. doi: 10.1080/23808985.2005.11679045
- Conservatives.com (2020a). *Stay Alert, Control the Virus, Save Lives: The Prime Minister's Update*. Available online at: <https://www.conservatives.com/news/stay-alert-control-the-virus-save-lives> (accessed June 1, 2020).
- Conservatives.com (2020b). *Stay at Home, Protect the NHS, Save Lives*. Available online at: <https://www.conservatives.com/news/stay-at-home-protect-the-nhs-save-lives> (accessed June 1, 2020).
- Cook, J., Lewandowsky, S., and Ecker, U. K. (2017). Neutralizing misinformation through inoculation: exposing misleading argumentation techniques reduces their influence. *PLoS ONE* 12:e0175799. doi: 10.1371/journal.pone.0175799
- Dagnall, N., Denovan, A., Drinkwater, K., Parker, A., and Clough, P. (2017). Statistical bias and endorsement of conspiracy theories. *Appl. Cogn. Psychol.* 31, 368–378. doi: 10.1002/acp.3331
- Dagnall, N., Drinkwater, K., Denovan, A., and Walsh, R. S. (2020). Bridging the gap between UK government strategic narratives and public opinion/behavior: lessons from COVID-19. *Front. Commun.* 5:71. doi: 10.3389/fcomm.2020.00071
- Dagnall, N., Drinkwater, K., Parker, A., Denovan, A., and Parton, M. (2015). Conspiracy theory and cognitive style: a worldview. *Front. Psychol.* 6:206. doi: 10.3389/fpsyg.2015.00206
- Del Vicario, M., Bessi, A., Zollo, F., Petroni, F., Scala, A., Caldarelli, G., et al. (2016). The spreading of misinformation online. *Proc. Natl. Acad. Sci. U.S.A.* 113, 554–559. doi: 10.1073/pnas.1517441113
- Denovan, A., Dagnall, N., Drinkwater, K., Parker, A., and Neave, N. (2020). Conspiracist beliefs, intuitive thinking, and schizotypal facets: a further evaluation. *Appl. Cogn. Psychol.* 34, 1394–1405. doi: 10.1002/acp.3716
- Douglas, K. M., Sutton, R. M., and Cichocka, A. (2017). The psychology of conspiracy theories. *Curr. Dir. Psychol. Sci.* 26, 538–542. doi: 10.1177/0963721417718261
- Drinkwater, K., Dagnall, N., Denovan, A., and Neave, N. (2020). Psychometric assessment of the generic conspiracist beliefs scale. *PLoS ONE* 15:e230365. doi: 10.1371/journal.pone.0230365
- Drinkwater, K., Dagnall, N., Denovan, A., Parker, A., and Clough, P. (2018). Predictors and associates of problem–reaction–solution: statistical bias, emotion-based reasoning, and belief in the paranormal. *SAGE Open* 8:2158244018762999. doi: 10.1177/2158244018762999
- Drinkwater, K., Dagnall, N., and Parker, A. (2012). Reality testing, conspiracy theories, and paranormal beliefs. *J. Parapsychol.* 76, 57–77.
- Duncan, C. (2020). *Anti-mask Demonstrators Protest Mandatory Face Coverings in Shops*. Available online at: <https://www.independent.co.uk/news/uk/home-news/face-masks-coverings-mandatory-protest-keep-britain-free-hyde-park-a9627446.html> (accessed January 12, 2021).
- Freeman, D., Loe, B. S., Chadwick, A., Vaccari, C., Waite, F., Rosebrock, L., et al. (2020). COVID-19 vaccine hesitancy in the UK: the Oxford coronavirus explanations, attitudes, and narratives survey (Oceans) II. *Psychol. Med.* 1–15. doi: 10.1017/S0033291720005188
- Georgiou, N., Delfabbro, P., and Balzan, R. (2020). COVID-19-related conspiracy beliefs and their relationship with perceived stress and pre-existing conspiracy beliefs. *Pers. Individ. Diff.* 166:110201. doi: 10.1016/j.paid.2020.110201
- Goertzel, T. (1994). Belief in conspiracy theories. *Polit. Psychol.* 15, 731–742. doi: 10.2307/3791630
- Goertzel, T. (2010). Conspiracy theories in science: conspiracy theories that target specific research can have serious consequences for public health and environmental policies. *EMBO Rep.* 11, 493–499. doi: 10.1038/embor.2010.84
- Gretter, S., Yadav, A., and Gleason, B. W. (2017). Walking the line between reality and fiction in online spaces: understanding the effects of narrative transportation. *J. Media Lit. Educ.* 9, 1–21. doi: 10.23860/JMLE-2017-9-1-2
- Hannah, M. (2021). *QAnon and the Information Dark Age*. First Monday. doi: 10.5210/fm.v26i2.10868
- Hofstadter, R. (1966). “The paranoid style in American politics,” in *The Paranoid Style in American Politics and Other Essays*, ed R. Hofstadter (New York, NY: Knopf), 3–40.
- Huddleston, T. (2021). *Here's What Bill Gates Has to Say About Those Covid-19 Vaccine Conspiracy Theories He's Pegged to*. CNBC. Available online at: <https://www.cnbc.com/2020/06/05/bill-gates-responds-to-bizarre-covid-19-vaccine-conspiracy-theories.html> (accessed January 12, 2021).
- Imhoff, R., and Bruder, M. (2014). Speaking (un-) truth to power: conspiracy mentality as a generalised political attitude. *Eur. J. Pers.* 28, 25–43. doi: 10.1002/per.1930
- Irwin, H. J., Dagnall, N., and Drinkwater, K. (2015). Belief inconsistency in conspiracy theorists. *Compr. Psychol.* 4:19. doi: 10.2466/17.CP.4.19
- Jolley, D., and Douglas, K. M. (2014). The effects of anti-vaccine conspiracy theories on vaccination intentions. *PLoS ONE* 9:e89177. doi: 10.1371/journal.pone.0089177
- Knight, P. (2000). *Conspiracy Culture: From the Kennedy assassination to the X-Files*. London: Routledge.
- Koltko-Rivera, M. E. (2004). The psychology of worldviews. *Rev. General Psychol.* 8, 3–58. doi: 10.1037/1089-2680.8.1.3
- Lewis, T. (2020). *Nine COVID-19 Myths that Just Won't Go Away*. Scientific American. Available online at: <https://www.scientificamerican.com/article/nine-covid-19-myths-that-just-wont-go-away/> (accessed January 12, 2021).
- Mitchell, S. S. (2019). Population control, deadly vaccines, and mutant mosquitoes: the construction and circulation of Zika virus conspiracy theories online. *Can. J. Commun.* 44, 211–237. doi: 10.22230/cjc.2019v44n2a3329

## AUTHOR CONTRIBUTIONS

KD: The overall article development and composition, draft review, and creative oversight. ND and AD: draft review and creative oversight. All authors contributed to the article and approved the submitted version.

- Moscovici, S. (1987). "The conspiracy mentality," in *Changing Conceptions of Conspiracy*, eds C. F. Graumann, and S. Moscovici (New York, NY: Springer), 151–169. doi: 10.1007/978-1-4612-4618-3\_9
- Overton, W. F. (1991). "Historical and contemporary perspectives on developmental theory and research strategies," in *Visions of Aesthetics, the Environment and Development*, eds R. M. Downs, L. S. Liben, and D. S. Palermo (Hillsdale, NJ: Erlbaum), 263–311.
- Roozenbeek, J., and van der Linden, S. (2019). The fake news game: actively inoculating against the risk of misinformation. *J. Risk Res.* 22, 570–580. doi: 10.1080/13669877.2018.1443491
- Roozenbeek, J., van der Linden, S., and Nygren, T. (2020). Prebunking interventions based on "inoculation" theory can reduce susceptibility to misinformation across cultures. *Harvard Kennedy Sch. Misinformation Rev.* 1, 1–23. doi: 10.37016/mr-2020-008
- Shermer, M. (2012). *The Believing Brain: From Spiritual Faiths to Political Convictions—How We Construct Beliefs and Reinforce Them As Truths*. London: Robinson.
- Sibley, C. G., Greaves, L. M., Satherley, N., Wilson, M. S., Overall, N. C., Lee, C. H., et al. (2020). Effects of the COVID-19 pandemic and nationwide lockdown on trust, attitudes toward government, and well-being. *Am. Psychol.* 75, 618–630. doi: 10.1037/amp0000662
- Sternisko, A., Cichocka, A., and Van Bavel, J. J. (2020). The dark side of social movements: social identity, non-conformity, and the lure of conspiracy theories. *Curr. Opin. Psychol.* 35, 1–6. doi: 10.1016/j.copsyc.2020.02.007
- Sturgill, A. (2021). Health care providers can help combat harmful misinformation about the pandemic. *N. C. Med. J.* 82, 68–70. doi: 10.18043/ncm.82.1.68
- Swami, V., Chamorro-Premuzic, T., and Furnham, A. (2010). Unanswered questions: a preliminary investigation of personality and individual difference predictors of 9/11 conspiracist beliefs. *Appl. Cogn. Psychol.* 24, 749–761. doi: 10.1002/acp.1583
- Swire, B., Berinsky, A. J., Lewandowsky, S., and Ecker, U. K. (2017). Processing political misinformation: comprehending the Trump phenomenon. *Royal Soc. Open Sci.* 4:160802. doi: 10.1098/rsos.160802
- Uscinski, J. E., Enders, A. M., Klostad, C., Seelig, M., Funchion, J., Everett, C., et al. (2020). Why do people believe COVID-19 conspiracy theories? *Harvard Kennedy Sch. Misinf. Rev.* 1, 1–12. doi: 10.37016/mr-2020-015
- van Prooijen, J. W. (2016). Sometimes inclusion breeds suspicion: self-uncertainty and belongingness predict belief in conspiracy theories. *Eur. J. Soc. Psychol.* 46, 267–279. doi: 10.1002/ejsp.2157
- World Health Organization (2020). *Mental Health And Psychosocial Considerations During the COVID-19 Outbreak*, 18 March 2020 (No. WHO/2019-nCoV/MentalHealth/2020.1).
- Zonis, M., and Joseph, C. M. (1994). Conspiracy thinking in the Middle East. *Polit. Psychol.* 15, 443–459. doi: 10.2307/3791566

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Drinkwater, Dagnall, Denovan and Walsh. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# SWOT Analysis and Preliminary Study on Prevention and Control Management of Temporary Integrated Isolation Ward During COVID-19 Outbreak

Ye Zhou<sup>1</sup>, Lixiang Bai<sup>1</sup>, Hao Guo<sup>1</sup>, Shaowei Guo<sup>1</sup>, Xiaowen Han<sup>2</sup>, Ning J. Yue<sup>3</sup> and Qingxia Li<sup>1\*</sup>

<sup>1</sup> The Fourth Department of Oncology, Hebei General Hospital, Shijiazhuang, China, <sup>2</sup> The Department of Respiratory, Hebei General Hospital, Shijiazhuang, China, <sup>3</sup> Department of Radiation Oncology, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ, United States

## OPEN ACCESS

### Edited by:

Amelia Kekeletso Ranotsi,  
Maluti Adventist College, Lesotho

### Reviewed by:

Thang Van Vo,  
Hue University, Vietnam  
Bipin Adhikari,  
University of Oxford, United Kingdom

### \*Correspondence:

Qingxia Li  
lqx73@163.com; email@uni.edu

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 03 May 2020

**Accepted:** 21 January 2021

**Published:** 15 March 2021

### Citation:

Zhou Y, Bai L, Guo H, Guo S, Han X,  
Yue NJ and Li Q (2021) SWOT  
Analysis and Preliminary Study on  
Prevention and Control Management  
of Temporary Integrated Isolation  
Ward During COVID-19 Outbreak.  
Front. Public Health 9:558565.  
doi: 10.3389/fpubh.2021.558565

**Background:** The world faced crises of prevention and control and shortage of medical resources during the COVID-19 (Corona Virus Disease 2019) outbreak. The establishment of temporary integrated isolation wards in hospitals, which is universal and representative in China, is one of the most-effective strategies in solving these problems according to China's experiences.

**Aim:** To conduct a preliminary study on the establishment of a temporary integrated isolation ward during the outbreak of COVID-19 and to evaluate related impact.

**Methods:** SWOT analysis was used to analyze the advantages, disadvantages, opportunities, and risks in the establishment of the temporary integrated isolation ward, and corresponding corrective measures were made according to the analysis results.

**Findings:** The ward has formulated more than 10 related work procedures and prevention and control measures. A total of 93 patients with 18 critically ill patients were admitted for treatment and isolation. They were all evaluated based on established procedures and protocols. Twenty-four supplementary nucleic acid tests were ordered and conducted. One new patient with COVID-19 was confirmed and was successfully transferred to the designated COVID-19 infectious control hospital. There were no missed diagnosis or misdiagnosis, no cross-infection of patients, no cluster outbreak, and no infection of medical workers during the entire process.

**Conclusion:** SWOT analysis is helpful in guiding the establishment of a temporary integrated isolation ward and the formulation of prevention and control measures in Hebei General Hospital during the COVID-19 outbreak. It provides the guidance and reference of significance for the establishment of similar types of wards in the future.

**Keywords:** COVID-19, SWOT analysis, temporary integrated isolation ward, prevention and control management, hospital management

## INTRODUCTION

COVID-19 is an acute respiratory b infectious disease mainly caused by a novel coronavirus (SARS-cov-2) and is characterized mostly by pulmonary inflammatory lesions (1, 2). According to the data released by the Chinese national health commission, there were 15,152 confirmed cases and 2,807 suspected cases by February 12, 2020 in China (3), hitting a new high for the COVID-19 infected patients in China. Hebei General Hospital is a Level 1 first-class comprehensive hospital directly directed by the Department of Health of Hebei Province of China and undertakes important epidemic prevention and control work in Hebei Province. To respond to the COVID-19 outbreak and the potential impact to the care of febrile patients and health-care workers, on February 13, 2020, Hebei General Hospital decided to transform the original Fourth Department of Oncology, which is a comprehensive department managing cancer patients with radiotherapy and chemotherapy, into a temporary integrated isolation ward. The focus of the newly established department is to manage various patients under observation with fever and conduct the screening and isolation of suspected COVID-19 infected patients, as well as other related work. Because the hospital had no previous experiences of temporary integrated isolation wards, it is particularly important to explore the establishment of plans for temporary integrated isolation wards and subsequent management issues in order to complete epidemic prevention work with high quality (4).

SWOT analysis refers to the assessment and evaluation of various strengths (S), weaknesses (W), opportunities (O), threats (T), and other factors that influence a specific topic. It comprehensively, systematically, and accurately describes the scenario in which the topic is located. This method can be used to identify favorable and unfavorable factors and conditions, solve current problems in a targeted manner, recognize the challenges and obstacles faced, and formulate strategic plans to guide scientific decisions. It can be useful in a scientific field and in the medical management field (4–10). This methodology was adopted in the establishment of the temporary integrated isolation wards in our hospital. This paper presents the SWOT analysis in our hospital that analyzed the current situation of establishing temporary integrated isolation wards and formulated corresponding rectification and prevention and control measures according to the results.

## METHODS AND ANALYSIS

### Methods

The qualitative study was conducted according to the Consolidated Criteria for Reporting Qualitative Studies guidelines (11). The semi-structured focus groups were conducted by the Epidemic Prevention and Control Team of Hebei General Hospital from February 1, 2020 to February 12, 2020. It aimed to explore respondents' experiences and insights on the establishment of the temporary integrated isolation ward in our hospital. Twelve respondents of this study were selected purposively based on their profession in the hospital, inclusive of the staff of administrative departments of the hospital (Group

A), members of the infection prevention and control group (Group B), staff of the Fourth Department of Oncology (Group C), and other clinical technical departments (Group D). Based on the guideline, these members were purposely selected as the sampling in this study because of their important positions in their respective professional fields.

Some questions and prompts were applied to data collection by the Epidemic Prevention and Control Team during their interview to encourage respondents to openly convey their viewpoints, such as What is the significance of converting the Fourth Department of Oncology into temporary isolation wards? How do you avoid the risk of cross-infection? How does the mental state of medical personnel adjust? How is the patient managed after entering the isolation ward? What support should the hospital supply? What unknown risks will the hospital and temporary isolation wards face and how to avoid them? The semi-structured focus groups were conducted by face-to-face interviews and lasted about 90 min every time. Interviews were repeated twice.

The members' opinions were collected during the interviews. A coding procedure was done by Dr. Han, Dr. Li, and a member of the Epidemic Prevention and Control Team. The same code was given to the similar opinions. They achieved an agreement on a set of codes that would be used for the analysis through a discussion among them. Then, the Epidemic Prevention and Control Team discussed the codes and generated the themes for each code according to the interrelation of similar opinions and the subcodes' counts of each code. The themes were compiled according to the strategic planning analysis of strength, weakness, opportunity, and threats (SWOT). Rank the importance of codes by counts. Recode from 1 in order of importance. The themes were entered separately in each factor of SWOT according to the new encoding. The data was summarized using a framework matrix. Strategic planning was specified according to the relationship between the data in the framework (11, 12) (Table 1).

## SWOT Analysis

### Strength Analysis

(1) Internal advantages of the hospital: Hebei General Hospital has a sound hospital infection management system and related streamlined policies and procedures, strong routine emphasis in the importance of epidemic prevention, and strong leadership supports and leads to the establishment and operation of temporary integrated isolation wards. (2) Internal advantages of the original department: the department is located near the west gate of the hospital, which is an independent three-story building. It is far from the main ward area and close to the open streets. It has good ventilation system, and its geographical advantages are conducive to the prevention and control of cluster-infection and the realization of secondary isolation. (3) Advantages of professional skill and knowledge training: the whole hospital has excellent communication and training networks, such as hospital internal information network, "good doctor" network, and WeChat group; daily morning session has been set up to conduct knowledge and skills training and assessment of COVID-19 cases. Before receiving the task of integration, our



**TABLE 1 |** Stakeholders' view of the establishment of the temporary integrated isolation wards in our hospital: SWOT Analysis.

Factor	Content			
Strengths	1. The hospital has the capacity and support to establish isolation wards	2. The location of the department is independent	3. Medical staff have been trained in professional skills	
Weakness	1. The ward facilities do not meet infection control standards	2. It is difficult for The Fourth Department of Oncology to develop work procedures for isolation wards	3. The number of medical staff is insufficient and the professionals are not suitable	4. Patients and families are under great psychological pressure
Opportunity	1. The establishment of temporary isolation wards contributed to the epidemic prevention and control in Hebei province and the whole country	2. The comprehensive strength of The fourth Department of Oncology will be improved after they undergo rectification	3. Ensure the safety of febrile patients and relieve the pressure of other departments	4. Improve information construction of the hospital
Threat	1. Inadequate conditions in isolation wards pose a risk of cross-infection	2. The exploratory isolation ward has less experience but more difficulties	3. Complex conditions in admitted Patients can lead to medical care errors	

S, strengths; W, weaknesses; O, opportunities; T, threats.

department staff members acquired sufficient relevant knowledge and passed the training examination proctored by the hospital and Department of Health.

### Weakness Analysis

In terms of ward facilities, the building in our section was built many years ago and is not in accordance with the current requirements of the professional isolation ward. There was no access control system, no perfect “three areas and two passages” structure, and no adequate air conditioning and professional ventilation system, so there was risk of cross-infection and cluster-infection.

Two aspects of weakness in workflows include: (1) The department was originally a general oncology department, but the internal workflow had to be changed according to the isolation ward standards after rectification. Due to lack of relevant experiences, the ability to formulate and implement the isolation ward work process was relatively weak. (2) In order to minimize the contacts between patients and their families with the outside world, medical staff would take the place of or lead the work of handling the hospitalization procedures, patients going out for inspection, taking medicine, sending samples, sending meals, registering and paying fees, etc., for patients. These extra loads of work on the health-care workers of the department are huge and complex and require careful planning.

Two aspects of weakness in human resources are: (1) The department was originally staffed with 22 doctors and nurses, all of whom were engaged and specialized in cancer management and care. They were not specially trained for taking care of COVID-19-infected patients. And after the rectification, the department needed to be divided into three layers of support,

with a sharp increase in workload, high practicing pressure, and insufficient manpower. (2) Most of the department staff members are young medical care professionals, with relatively few experiences in handling public health emergencies, disaster rescue, etc., and a weaker ability in risk management and first aid than the dedicated infectious control and ER health-care workers.

Patients and companions: most of the patients admitted and treated in the department have complicated and severe diseases. The immune function of the patients is normally lower than that of ordinary patients, and their ability of self-protection and isolation protection is lower, leading to possible increased risk of cross-infection, and the psychological pressure on the patients and their companions is also likely greater.

### Opportunity Analysis

(1) For the prevention and control of COVID-19, it was the first attempt of such kind in the history of the entire hospital and the department. The established temporary integrated isolation ward will contribute to the prevention and control of the epidemic in Hebei Province and even the whole country. It will provide valuable experiences for the establishment of similar departments in the future. (2) The department rectification is fully supported by the hospital. Its successful completion will significantly improve the department management ability, the ability to deal with major emergencies, and the professional ability of medical staff, laying a solid foundation for the rapid development of the department in the future. (3) The establishment of a temporary integrated isolation ward will help the diversion of patients with fever and greatly reduce the pressure of infection and emergency departments. It can better guarantee the personal safety of patients with fever and reduce the risk of infection

of other departments in the hospital. (4) During the epidemic outbreak period, most offline continuing education programs were canceled, and various forms of online education activities have been developed for the completion of the project. This provides great opportunities for the construction of online network information-based telemedicine in our hospital.

## Risk/Threat Analysis

(1) The department will be a post-rectification ward, and the prevention and control conditions of the ward environment and equipment are still relatively poor compared to those of the professional department of infectious diseases, and there are hidden risks such as potentially increased nosocomial infection and spreading infection. (2) After the rectification of the department, the department mainly accepts and treats the febrile patients for observation and the critically ill patients. Patients' conditions and illnesses vary and can be very complicated. The department will be faced with many challenges, such as the exploratory ward reformation, the development of new workflows, isolation and protection, professional skills training, and other peripheral works. The fact that the original Fourth Department of Oncology lacked the professional skills, experiences, and human resources required for the special isolation ward may lead to some medical care errors, redundant work, and psychological pressure on the medical staff (Table 2).

## THE PREVENTION AND CONTROL STRATEGIES OF THE TEMPORARY INTEGRATED ISOLATION WARD

According to the strategies of SWOT analysis about the temporary integrated isolation ward of in Hebei General Hospital, some specific measures are as follows.

### Ward Reformation and Transformation, Strict Zoning, and Reasonable Layout

The original ward areas were divided according to the rule of "three areas, two passages," that is, clean area, semi-polluted area, polluted area (three areas), and the medical staff channel, the patient channel (two passages). The south area of the first floor is the clean area with a duty room. The south area of the second and third floors are the semi-polluted areas, including the doctor's office, nursing station, treatment room, and warehouse. The north area of the second and third floors are the polluted areas. Clearly visible signs and marks are placed on the doors and walls of each of the areas for their roles and functions. The cleaning and pollution routes of people flow and logistics, which are mutually exclusive (13), are strictly regulated. There are 11 single-room isolation wards in the entire ward area, each of which is equipped with, oxygen, suction, and other bedside treatment facilities, as well as calling and intercom systems. Adequate space is allocated at the bedside for bedside X-ray machines, breathing machines, etc. All the wards are equipped with private toilets, showers, and handwashing facilities, as well as electric heating and ultraviolet disinfection lamp. Every effort is made to ensure that the wards, medical offices, and duty rooms are well-ventilated.

The department is well-stuffed with protective clothing, goggles, respirator, latex gloves, alcohol, chlorine-containing disinfectant, and other disinfection and protection materials.

## Workflows and Management Protocols

According to the prevention and control strategies of COVID-19 and the specific situation of the department, specific workflows and protocols are established for the temporary integrated isolation ward. The protocols and workflows include "Patient Admission Workflow," "Procedures of Receiving and Observing Patients with Fever," "Notes for Medical Personnel," "Precautions for Admission and Treatment of Patients," "Graded Protection Requirements for Medical Personnel," "Procedures of Peripheral Works," "Detailed Division of Duties of Doctors on Duty," "Disinfection Measures of COVID-19," "Observed Patient Notification," "Flow Chart of Entrance Personnel Check," etc. All medical staff members, patients, and other supporting personnel were organized to study together and strictly supervised (14, 15).

Strengthen medical personnel support and human management. The hospital has reassigned 19 medical doctors and nurses to support our department, including the experts from respiratory department, department of cardiology, emergency department, and department of surgery. After the integration, there were 41 medical staff members in the department, including 18 medical doctors with eight from the oncology department, four from the respiratory department, four from the emergency department, one each from departments of cardiology and nephrology, and 23 nurses. Based on the staffing level, our department has formulated the detailed rules of division of workload and responsibilities and implemented a "group shift" scheduling system, with each shift working for 4 days, so as to ensure that each shift group includes one respiratory physician, one physician in the isolation ward, one physician in the cleaning ward, two nurses in the isolation ward, and two nurses in the semi-contaminated ward. The doctors in each shift group have worked seamlessly according to the division of workload and responsibilities. Every effort is made to ensure that there is no vacant post in each shift or no discontinuity of clinical coverage, to optimize the shift positions to avoid unnecessary congestion and to minimize the likelihood of cross-infection and to avoid work related fatigue. At the same time, efforts are made to the staff idle time to conduct emergency isolation and protection training, COVID-19-related knowledge teaching, and clinical diagnosis and treatment skills training for all staff members in the department (16).

Strengthen patient management: (1) Check the potential COVID-19 infection indications at patient admission. For patients with fever and respiratory symptoms who have had negative nucleic acid test for the first two times, they will be quarantined to the isolation room, waiting for further nucleic acid tests and lung CT tests. An investigation will be conducted for the causes of the symptoms. Consultation will be made with the members of the hospital's infectious disease prevention and control expert group if necessary. For critically ill patients requiring emergency admission, a nucleic acid and pulmonary CT examination shall be performed immediately. Patients with fever and pulmonary lesions shall be admitted to

**TABLE 2 |** SWOT matrix (2 × 2) of the temporary integrated isolation ward of in Hebei General Hospital.

Strategic analysis External factors	Internal capabilities	Strength	Weakness
<b>Strategic analysis</b> <b>External factors</b> Opportunity 1) The establishment of temporary isolation wards contributed to the epidemic prevention and control in Hebei province and the whole country. 2) The rectification about the ward can improve the “soft power” of the department. 3) Ensure the safety of febrile patients and relieve the pressure of other departments. 4) Improve information construction of the hospital. Risk/threat 1) Inadequate conditions in isolation wards pose a risk of cross-infection. 2) The exploratory isolation ward has less experience but more difficulties. 3) Complex conditions in admitted patients can lead to medical care errors.		1) The hospital has the capacity and support to establish isolation wards 2) The location of the department is independent 3) Medical staff have been trained in professional skills	1) The ward facilities do not meet infection control standards 2) It is difficult for The fourth Department of Oncology to develop work procedures for isolation wards 3) The number of medical staff is insufficient and the professionals are not suitable 4) Patients and families are under great psychological pressure
		SO strategies 1) Make good use of the advantages of hospital policies to carry out the reform of ward areas. 2) Seize opportunities to carry out online and offline learning. ST strategies 1) Apply for more human resources and equipment. 2) Improve the professional prevention and control skills of medical staff, strengthen the psychological construction, and monitor the physical condition.	WO strategies 1) Apply for the assistance of relevant departments in the hospital. 2) Draw lessons from the experience of other hospitals. 3) Summarize the appropriate rectification methods. 4) Formulate the process system. WT strategies 1) Strictly implement the new system and workflows. 2) Strengthen the prevention and control of hospital disinfection and natural ventilation of the ward to make up for the lack of conditions. 3) Strengthen the management of patients and family in all aspects.

the isolation ward, and the admission can be made according to the corresponding prevention and control protocols. (2) The wards are divided into three different levels, and patients are “managed by division” according to high, medium, and low risk. Efforts are made so that one room accommodates one patient. The patients suspected of contracting COVID-19 and critically ill patients are mainly monitored (14, 15, 17). (3) Follow-up of patients discharged from the hospital is made. It is recommended that patients with fever continue to be self-quarantined at home after discharge. In the first 3 days after discharge, the on-duty doctor calls the patient for the body temperature and records the temperature in patient chart. If the patients’ temperature was normal, it would be recorded every other day during the next 14 days. (4) Carefully examine and check the epidemiological exposure history of patients with COVID-19. When a patient is suspected or confirmed to be infected with COVID-19, a report is immediately filed to the relevant departments of the medical institution, and if necessary, arrangement is proactively made to transfer the patient to a designated COVID-19 control and management hospital. (5) Provide the psychological consultation and comfort to patients and their families to minimize related burdens during treatment.

Simplify peripheral workflows. Apply to the hospital to allow the department to directly process patient registration, prescription, billing, and other works in order to reduce the contacts of the medical staff, patients, and their families with the environment outside the ward and the department, thus the risk of infection. At the same time, medical workers are encouraged to work from home if possible.

### Strengthen Disinfection, Isolation, and Protection to Make Up for the Lack of Certain Needed Conditions in the Ward

(1) Disinfection of the ward shall be carried out strictly in accordance with Disinfection Measures of COVID-19 (18). In addition, the department has strengthened the prevention and control of contact and air transmission after the rectification of the environment and promptly disinfected the surfaces of objects, prescriptions, and other potential polluted objects in the department. Ensure that all staff members wear the isolation clothing correctly, enforce hand hygiene, and ensure that disinfection supplies are safe and effective. Procedures are set up to register the usage of disinfection drugs and disinfection consumables, report the information to the hospital,

and apply for the personal protective equipment in a timely fashion (18, 19). When doctors are on duty, they should strictly follow personal protection in accordance with Graded Protection Requirements for Medical Personnel (20). (2) Register and record the body temperature of patients, staff members, and visitors at the entrance of hospital and department. The epidemiological investigation is conducted to the medical staff. A related questionnaire is distributed to and completed by the medical staff. To enhance the awareness, the relevant informed notice and fliers on the knowledge of prevention and control of COVID-19 are posted on the ward corridor, publicity board, and social media.

## Pay Attention to the Physical and Mental Health of All Staff

The hospital administrative team regularly visits the department staff, provides daily medical supplies, and ensures that nutritious diet is readily available. A special psychological consultation clinic is opened, and free psychological consultation is provided to medical staff. Based on the nature of job responsibilities, the daily temperature and respiratory symptoms of medical personnel are monitored and registered. When necessary, free CT and blood monitoring examinations are provided for medical personnel to ensure that medical personnel can provide medical services to patients in a healthy body and mind (21, 22).

## PRELIMINARY RESULTS OF PREVENTION AND CONTROL STRATEGIES

With the support of the hospital, the comprehensive ward of The Fourth Department of Oncology, namely the temporary integrated isolation ward, has been transformed and put into use, with reasonable and sufficient personnel professional structure and supporting and functioning capacity. The supply of protective substances and equipment is abundant. It can not only ensure the medical needs of febrile patients with different diseases but also ensure the smooth development of the prevention and control workflows of COVID-19 patient management and care. Since the temporary integrated isolation ward was set up on February 13, 2020, more than 10 related work procedures and prevention and control strategies/protocols have been preliminarily formulated and developed. A total of 93 patients with 18 cases of critically ill patients were admitted for treatment and were isolated if needed based on their symptoms. Twenty-four additional nucleic acid detection tests were ordered and completed. One patient was confirmed to be COVID-19 positive. There were no missed diagnosis and misdiagnosis, no cross infection in

the ward patients, no mass outbreak, and no infection among medical workers.

The department has conducted and participated in online and offline COVID-19 prevention and control knowledge training, training and assessment of hospital and department rules and regulations, and patient and family education training and assessment. Forty such trainings and assessments were conducted, with a training participation rate and assessment passing rate of 100%. A high level of morale and spirit was observed and maintained among the medical staff.

## CONCLUSION

In this study, SWOT analysis is presented on the establishment of a temporary integrated isolation ward in Hebei General Hospital, and corresponding measures and protocols based on the analysis results are also presented for its operation during the COVID-19 outbreak. The study may be useful in providing guidance and reference for the similar types of wards in other hospitals and regions. At present, the COVID-19 pandemic is not over and a lot still needs to be learned. The analysis and strategies presented in this study could serve as a stepping-stone for more comprehensive management measures of pandemic infectious disease control and patient care.

## DATA AVAILABILITY STATEMENT

All datasets presented in this study are included in the article/supplementary material.

## AUTHOR CONTRIBUTIONS

YZ: methodology, formal analysis, and drafting the article. LB and HG: analysis and interpretation of data. SG: acquisition of data. XH: supervision and project administration. NY: revising it critically for important intellectual content. QL: the conception, design of the study, and final approval of the version to be submitted. All authors contributed to the article and approved the submitted version.

## FUNDING

This article was supported by Youth Talent Training Project Funding in Hebei General Hospital.

## ACKNOWLEDGMENTS

Thanks to all the authors for their contributions to the article. Thanks for the support of Hebei General Hospital and Youth Talent Training Project Funding.

## REFERENCES

1. National Health Commission of the People's Republic of China. *Prevention and Control of COVID-19*. (2020). Available online at: <http://www.nhc.gov.cn/yzygj/s7653p/202003/46c9294a7dfe4cef80dc7f5912eb1989/files/ce3e6945832a438eaae415350a8ce964.pdf> (accessed March 18, 2020).
2. World Health Organization. *Infection Prevention and Control During Health Care When Novel Coronavirus (2019-nCoV) Infection is*



- Suspected: Interim guidance* [EB/OL]. (2020). Available online at: <https://apps.who.int/iris/handle/10665/330674> (accessed March 06, 2020).
3. National Health Commission of the People's Republic of China. *As of 24 Hours on 18 March, The Latest Situation of COVID-19* [EB/OL]. (2020).
  4. Wang J, Lei C, Tan J, et al. SWOT analysis of improvised ward organization and management, the prevention and control strategies during an epidemic of COVID-19. *Western J Tradition*. (2020).
  5. Wang J, Wang L. Application of SWOT analysis model to determine the practice and exploration of hospital strategic planning. *China Health Indu*. (2019) 16:15–8. doi: 10.16659/j.cnki.1672-5654.2019.26.01
  6. Bhat KRS, Moschovas MC, Rogers T, Onol FF, Corder C, Roof S, et al. COVID-19 model-based practice changes in managing a large prostate cancer practice: following the trends during a month-long ordeal. *J Robot Surg*. (2020). doi: 10.1007/s11701-020-01100-8. [Epub ahead of print].
  7. Wang J, Wang Z. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of China's prevention and control strategy for the COVID-19 epidemic. *Int J Environ Res Public Health*. (2020) 17:2235. doi: 10.3390/ijerph17072235
  8. Tinga AM, de Back TT, Louwerse MM. Non-invasive neurophysiology in learning and training: mechanisms and a SWOT analysis. *Front Neurosci*. (2020) 14:589. doi: 10.3389/fnins.2020.00589
  9. Jasiulewicz-Kaczmarek M. SWOT analysis for planned maintenance strategy—a case study. *IFAC PapersOnLine*. (2016) 49:674–9. doi: 10.1016/j.ifacol.2016.07.788
  10. Rizzo A, Kim GJ. A SWOT analysis of the field of virtual reality rehabilitation and therapy. *Pres Teleoper Virt Environ*. (2005) 14:119–46. doi: 10.1162/1054746053967094
  11. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research: A 32-item checklist for interviews and focus groups. *Int J Qual Health C*. (2018) 19:349–57. doi: 10.1093/intqhc/mzm042
  12. Sufiza Ahmad N, Makmor-Bakry M, Hatah E. Multi stakeholders of health and industries perspectives on medicine price transparency initiative in private health care settings in Malaysia. *Saudi Pharm J*. (2020) 28:850–8. doi: 10.1016/j.jsps.2020.06.003
  13. Wang QQ, Wang R, Liu H. Design and test of infectious isolation ward. *Chin Hospital Equip Architect*. (2003) 4:4–7. doi: 10.3969/j.issn.1671-9174.2003.06.001
  14. Peking University Third hospital. *Emergency Plan for the Management of Pharmacy Department of COVID-19*. (2020). Available online at: <https://www.puh3.net.cn/ztbd/gzbd/fy/sjjj/144936.shtml>. (accessed March 18, 2020).
  15. National Health Commission of the People's Republic of China. *Notification of the Issuance of Technical Guidelines on the Prevention and Control of COVID-19 (first edition) in Medical Institutions*. (2020). Available online at: <http://www.nhc.gov.cn/xcs/yqfkdt/202001/b91fdab7c304431eb082d67847d27e14.shtml> (accessed March 18, 2020).
  16. Chinese Medical Association. *Notification of the Issuance of Technical Guidelines on the Prevention and Control of COVID-19 (first edition) in Medical Institutions* [EB/OL]. (2020). Available online at: <http://subject.med.wanfangdata.com.cn/Upload/Files/202002/753dbddb0a5f4e2e99f954afc6c3d4c6.pdf> (accessed March 18, 2020).
  17. World Health Organization. *Clinical Management of Severe Acute Respiratory Infection When Novel Coronavirus (2019-nCoV) Infection is Suspected (Interim guidance)*. (2020). Available online at: <https://apps.who.int/iris/handle/10665/330893>
  18. The former National Health Ministry. *Regulation of Disinfection Technique in Healthcare Setting (WS/T 367-2012)*. (2020). Available online at: <http://www.nhc.gov.cn/wjw/s9496/201204/54510/files/2c7560199b9d42d7b4fce28eed1b7be0.PDF> (accessed August 01, 2012).
  19. Beijing Municipal Health Commission. *Technical Guidelines for Isolation and Protection Against Infectious Diseases for Medical Personnel* [EB/OL]. (2018). Available online at: [http://wjw.beijing.gov.cn/zwgk\\_20040/fgwj/bz/201912/t20191216\\_1239865.html](http://wjw.beijing.gov.cn/zwgk_20040/fgwj/bz/201912/t20191216_1239865.html) (accessed March 18, 2020).
  20. National Health Commission of the People's Republic of China. *Guidelines on the Scope of Use of Common Medical Protective Equipment in the Prevention and Control of COVID-19 (trial)* [EB/OL]. (2020). Available online at: <http://www.nhc.gov.cn/xcs/zhengcwj/202001/e71c5de925a64eafbe1ce790deba5c6.shtml> (accessed March 18, 2020).
  21. Chinese Association for Mental Health. *COVID-19 Guidelines for Public Psychological Self-Help and Counseling*. Beijing: People's medical publishing house (2020).
  22. National Health Commission Disease Control Bureau of the People's Republic of China. *Guidelines for Emergency Psychological Crisis Intervention in COVID-19 Outbreak* [EB/OL]. (2020). Available online at: <http://www.nhc.gov.cn/jkj/s3577/202001/6adc08b966594253b2b791be5c3b9467.shtml> (accessed March 18, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Zhou, Bai, Guo, Guo, Han, Yue and Li. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# The Traffic Light Approach: Indicators and Algorithms to Identify Covid-19 Epidemic Risk Across Italian Regions

Luca Paroni<sup>1,2</sup>, Clelia D'Apice<sup>1,3</sup>, Silvia Ussai<sup>4\*</sup>, Benedetta Armocida<sup>1</sup>, Beatrice Formenti<sup>1,5</sup>, Lorenzo De Min<sup>1</sup> and Eduardo Missoni<sup>1,6</sup>

<sup>1</sup> Saluteglobale.It Associazione di Promozione Sociale, Brescia, Italy, <sup>2</sup> Istituto di Ricerche Farmacologiche Mario Negri Istituti di Ricovero e Cura a Carattere Scientifico, Milan, Italy, <sup>3</sup> Department of Medicine and Surgery, University of Parma, Parma, Italy, <sup>4</sup> Directorate General for Food and Health, European Commission, Brussels, Belgium, <sup>5</sup> Division of Infectious Diseases, Aziende Socio Sanitarie Territoriali Spedali Civili di Brescia, Brescia, Italy, <sup>6</sup> Center for Research on Health and Social Care Management (CERGAS), Bocconi University, Milan, Italy

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Penrose Jackson,  
Vermont Public Health Institute,  
United States  
Alessandro Rovetta,  
Mensana srls, Italy

### \*Correspondence:

Silvia Ussai  
ussai.silvia@gmail.com

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 06 January 2021

**Accepted:** 18 February 2021

**Published:** 16 March 2021

### Citation:

Paroni L, D'Apice C, Ussai S, Armocida B, Formenti B, Min LD and Missoni E (2021) The Traffic Light Approach: Indicators and Algorithms to Identify Covid-19 Epidemic Risk Across Italian Regions.  
Front. Public Health 9:650243.  
doi: 10.3389/fpubh.2021.650243

With the beginning of the autumn-winter season, Italy experienced an increase of SARS-CoV-2 cases, requiring the Government to adopt new restrictive measures. The national surveillance system in place defines 21 key process and performance indicators addressing for each Region/Autonomous Province: (i) the monitoring capacity, (ii) the degree of diagnostic capability, investigation and contact tracing, and (iii) the characteristics of the transmission dynamics as well as the resilience of health services. Overall, the traffic light approach shows a collective effort by the Italian Government to define strategies to both contain the spread of COVID-19 and to minimize the economic and social impact of the epidemic. Nonetheless, on what principles color-labeled risk levels are assigned on a regional level, it remains rather unclear or difficult to track.

**Keywords:** COVID-19, Italy, guideline, indicators, traffic light algorithms

With the beginning of the autumn-winter season, Italy experienced an increase of SARS-CoV-2 cases, requiring the Government to adopt new restrictive measures (1). The national surveillance system has been implemented according to the Prime Ministerial Decree (DPCM) of November 3, 2020 (2), the previous strategic documents for monitoring for the second wave (3, 4) and the DPCM of April 26, 2020 (5). The latter document defines 21 key process and performance indicators addressing for each Region/Autonomous Province: (i) the monitoring capacity, (ii) the degree of diagnostic capability, investigation and contact tracing, and (iii) the characteristics of the transmission dynamics as well as the resilience of health services (Table 1) (5). Based on a weekly assessment, each region is assigned to different levels of risk (high, medium, and low), which are mapped using a “traffic light” color code (red, orange, and yellow). The criteria are compliant with the European Commission’s decision to adopt a common color code to provide strategy to restrict free movement across the European Union (6) and with the WHO frameworks (7).

The complete algorithm is presented in Figure 1. The overall risk assessment is based on 21 key process and performance indicators (Table 1). Either thresholds or comparative evaluation are defined and monitored on a weekly basis by each region as part of the national integrated surveillance system.

Indicators 1.1–1.6 are used for an initial assessment of the quality of the information collected. If a region has those indicators above threshold, it is automatically labeled as a high-risk region.

**TABLE 1** | List of the 21 Indicators as described in the DPCM of April 26.

Section	N	Indicator	Threshold	Alert	Data source
Monitoring capacity (quality indicators of surveillance systems with data collection at national level)	1.1	Number of symptomatic cases notified per month with known symptoms start date/Total of symptomatic cases notified to the national surveillance system in the same period	$\geq 60\%$ with a growing trend; a value $\geq 50\%$ with a growing trend will be considered acceptable in the first 3 weeks from 4 May 2020	$< 50\%$ in the first 3 weeks from 4 May 2020, then $< 60\%$	Integrated national surveillance system
	1.2	Number of cases notified per month with a history of hospital admission (in wards other than ICU) indicating the date of admission/Total cases with a history of hospital admission (in wards other than ICU) notified to the national surveillance system in the same period			
	1.3	Number of cases notified per month with history of transfer/ICU admission indicating the date of transfer or ICU admission/Total of cases with history of transfer/ICU admission reported to the national surveillance system in the same period			
	1.4	Number of cases notified per month in which the municipality of domicile and residence is reported/Total of cases notified to the surveillance system in the same period			
	1.5 (optional)	Number of checklists provided weekly to residential healthcare facilities	$\geq 50\%$ of the residential healthcare facilities in the Region/Autonomous Province with an improving trend	$< 50\%$ of the residential healthcare facilities in the Region/Autonomous Province	Periodic weekly evaluation by the Regions and Autonomous Provinces—Complementary surveillance to be carried out if feasible
	1.6 (optional)	Number of residential healthcare facilities responding to the checklist weekly with at least one criticality observed	$\leq 30\%$ with an improving trend	$> 30\%$	
Ability to promptly test all suspected cases	2.1	% of positive swabs per month excluding, where possible, all screening activities and “re-testing” of the same subject, total and by macro-setting (territory, ER/Hospital, other)	Decreasing trend in hospital settings/ER; Stable or decreasing Positive predictive value (PPV)	Increasing trend in hospital settings/ER; PPV increasing	Periodic weekly evaluation
	2.2	Time between symptoms onset and diagnosis	Weekly median $\leq 5$ days	Weekly median $> 5$ days	ISS; COVID-19 Integrated Surveillance System
	2.3 (optional)	Time between symptoms onset and start of isolation	Weekly median $\leq 3$ days	Weekly median $> 3$ days	ISS; COVID-19 Integrated Surveillance System with the integration of this variable
Ability to guarantee adequate resources for contact-tracing, isolation and quarantine	2.4	Number, types of professional figures and time per person dedicated in each territory to contact-tracing	Number and types of dedicated professionals dedicated to each activity at local level progressively aligned to recommended European standards	Number and types of dedicated professionals at local level reported as inadequate on the basis of recommending standards at European level	Periodic report (monthly)

(Continued)

TABLE 1 | Continued

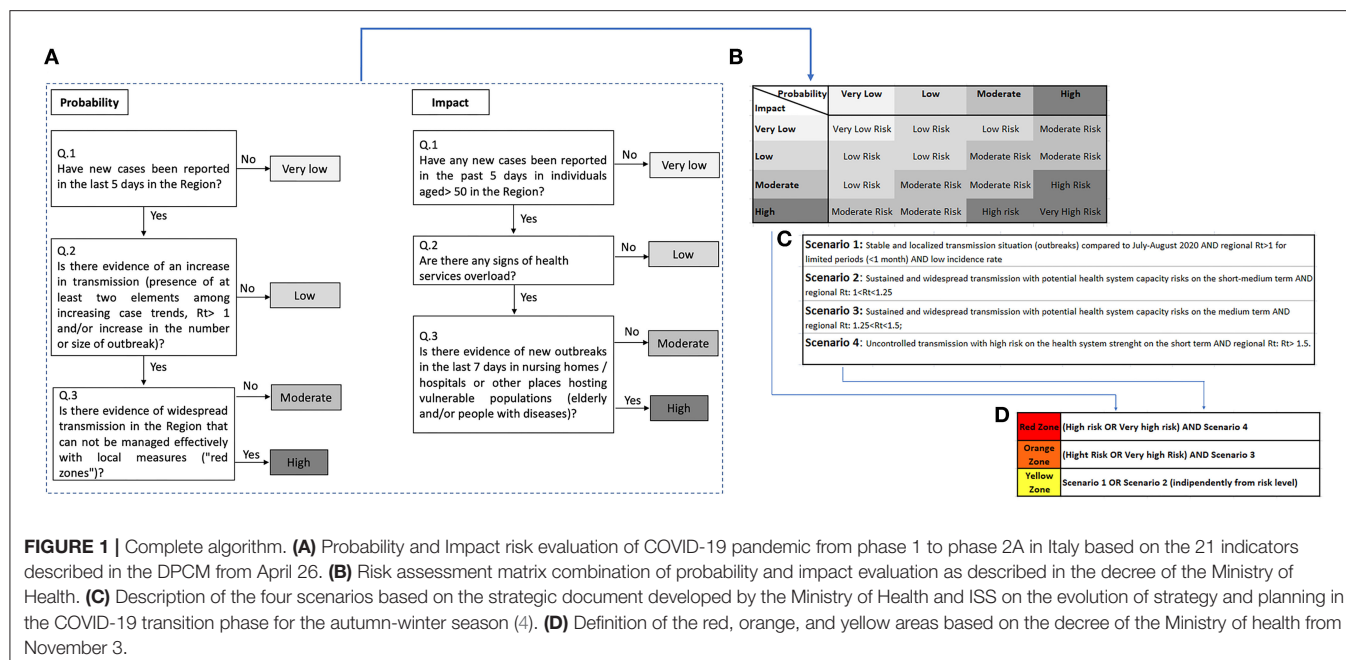
Section	N	Indicator	Threshold	Alert	Data source
Transmission stability	2.5	Number, types of professional figures and time per person dedicated in each territorial service to the activities of sampling/sending to the reference laboratories and monitoring of close contacts and cases placed, respectively in quarantine and isolation			
	2.6	Number of confirmed cases in the Region for which an appropriate epidemiological investigation has been carried out with investigation of close contacts/total of new confirmed cases of infection	Improving trend with final target to 100%		
	3.1	Number of cases notified to civil protection system in the last 14 days	Number of cases with decreasing or stable weekly trend	Cases increasing in the last 5 days (% of weekly increase with standard thresholds to be used as an "information dashboard"). An increase in the number of cases is expected in the first 15–20 days after reopening. In this phase, the warnings from this indicator will be evaluated together with indicators 3.1 and 3.5 at the regional level	Ministry of Health
	3.2	Rt calculated on the basis of integrated ISS surveillance (two indicators will be used. One based on date of onset of symptoms and the other based hospitalization date)	Rt calculated on regional level and $\leq 1$ in all Regions/Autonomous Province in phase 2A	Rt > 1 or not measurable	ISS database/Rt measured by Foundation Bruno Kessler
	3.3 (optional)	Number of weekly cases notified to sentinel COVID-net surveillance	Number of cases with decreasing or stable trend	Cases increasing in the last 5 days (% of weekly increase with standard thresholds to be used as an "information dashboard"). An increase in the number of cases is expected in the first 15–20 days after reopening. In this phase, the warnings from this indicator will be evaluated together with indicators 3.1 and 3.5 at the regional level	ISS; Sentinel COVID-net surveillance
	3.4	Number of cases by diagnosis date and symptom onset date reported to COVID-19 integrated surveillance per day	Decreasing or stable weekly trend	Cases increased in the last week. An increase in the number of cases is expected in the first 15–20 days after reopening. In this alert, this indicator will be evaluated jointly with indicators 3.1 and 3.5 at the regional level (% of weekly increase with standard thresholds to be used as "information dashboard")	ISS-COVID-19 integrated surveillance system

(Continued)



TABLE 1 | Continued

Section	N	Indicator	Threshold	Alert	Data source
Non-overloaded health care services	3.5	Number of new transmission outbreaks (2 or more epidemiologically linked cases or an unexpected increase in the number of cases in a defined time and place)	Non-increase the number of active transmission outbreaks in the Region; Absence of transmission outbreaks on the regional territory for which a risk assessment was not quickly carried out and the opportunity to establish a sub-regional “red zone” evaluated	Evidence of new outbreaks in the last 7 days, particularly in nursing homes, retirement homes, hospitals or other places hosting vulnerable populations. Presence of new local outbreaks in the region requires an <i>ad-hoc</i> risk evaluation in order to evaluate if in the regional area there is a substantial and spread transmission which would require to return on phase 1	ISS-Monitoring of outbreaks and red zones with survey cards OR ISS-Integrated Surveillance (using as a variable the point of exposure and defying a local outbreak ID)
			≥90% of responding facilities report the absence of subjects with a confirmed diagnosis of COVID-19 (optional)	<90% of responding facilities report the absence of subjects with a confirmed diagnosis of COVID-19 (optional)	Surveillance via checklist of residential facilities (optional)/ Complementary surveillance to be carried out based on feasibility
			Non-increase the number of active transmission outbreaks in the Region	Evidence of new outbreaks in the last 7 days especially in nursing homes, retirement homes, hospitals or other places hosting vulnerable populations	ISS—Activation of the Italian Epidemic Intelligence Network
	3.6	Number of regional new cases of confirmed SARS-CoV-2 infection not associated with a known chain of transmission	If there are new outbreaks declared, the indicator can monitor the quality of the contact-tracing. If there are no outbreaks of transmission, the presence of cases not connected to transmission chains could be compatible with a scenario of low transmission in which only sporadic cases are observed (considering a circulation rate not measurable in paucisymptomatic subjects)	In presence of outbreaks, the presence of new cases of infection not traced to non-contagion chains requires an <i>ad hoc</i> risk assessment that defines whether there is a sustained and widespread transmission in the region, such as to require a return to phase 1	Periodic weekly evaluation
	3.7 (optional)	Number of accesses to the ER with ICD-9 classification compatible with syndromic frameworks attributable to COVID-19	For at least 80% of the ER part of the surveillance network in the Region/Autonomous Province, number of ER accesses with syndromes compatible with COVID-19 decreasing or stable	In 50% of ER part of the surveillance network in the Region/Autonomous Province, number of ER accesses with syndromes compatible with COVID-19 increasing	ER Syndromic supervision coordination to be defined
Non-overloaded health care services	3.8	Total Intensive Care beds (code 49) occupancy rate of COVID-19 patients	≤30%	>30%	Ministry of Health—Platform for daily detection of beds/Civil Protection system admissions data
	3.9	Total medical area beds occupancy rate of COVID-19 patients	≤40%	>40%	



**FIGURE 1 |** Complete algorithm. **(A)** Probability and Impact risk evaluation of COVID-19 pandemic from phase 1 to phase 2A in Italy based on the 21 indicators described in the DPCM from April 26. **(B)** Risk assessment matrix combination of probability and impact evaluation as described in the decree of the Ministry of Health. **(C)** Description of the four scenarios based on the strategic document developed by the Ministry of Health and ISS on the evolution of strategy and planning in the COVID-19 transition phase for the autumn-winter season (4). **(D)** Definition of the red, orange, and yellow areas based on the decree of the Ministry of health from November 3.

If a region complies with the threshold, two algorithms are used in order to evaluate the epidemic probability risk and epidemic impact risk (**Figure 1A**). Indicators used to evaluate the probability risk range from 3.1 to 3.7, while indicators used to evaluate the impact risk range from 3.1 to 3.9 (5). A risk assessment matrix (RAM) based on the probability and impact risk defines the risk level as: very low, low, moderate, high, and very high (**Figure 1B**). An additional classification of the level of risk has been defined assuming four possible scenarios based on the reproductive number ( $R_t$ ) (**Table 1**—indicator 3.2) as described in **Figure 1C** (3).

For each region, the combination of RAM and the four possible scenarios defines the overall high, medium and low risk, which is color coded as red, orange, and yellow (2) (**Figure 1D**). A region is considered red when the RAM is equal to very high risk or high risk and complies with Scenario 4; orange when the RAM is equal to very high risk or high risk and complies with Scenario 3; and yellow when it is in Scenario 1 or Scenario 2, independently from the RAM results. From December 6 until December 12, the overall distribution of the Regions and Autonomous Provinces was as follows: 12 color-coded as yellow areas, eight color-coded as orange areas, and one as red area.

The risk assessment method outlined by the Italian Government is in line with the WHO and European Commission frameworks (6, 7). Although detailed indicators and the risk assessment process were defined, we draw attention to the following critical issues: (1) some indicators are not clearly

outlined either in their meaning or in the proposed threshold (indicators 2.1, 2.4, 2.5, 2.6, 3.1–3.6); (2) the two algorithms of probability and impact risk assessment do not report which specific indicators are used to assess the four questions (**Figure 1A**); (3) overall, the information needed to define the entire algorithm is fragmented in different documents (2–5); (4) although the 21 indicators have been defined in the DPCM of April 26 (5), the related weekly reports started being described on a regional basis only from October 26 (8); (5) potential enforcement of the risk assessment algorithm by local regional regulation. As an example, the administration of the Abruzzo Region, which was on a Red risk level until December 5, decided to unilaterally self-declare on an orange risk level despite the Italian central Government did not allow the shift until December 12 (9).

The traffic light approach shows a collective effort by the Italian Government to define strategies to both contain the spread of COVID-19 and to minimize the economic and social impact of the epidemic. Nonetheless, on what principles color-labeled risk levels are assigned on a regional level, it remains rather unclear or difficult to track.

## AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

## REFERENCES

- Decreto del Presidente del Consiglio dei ministri. *Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19»*, e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19». (2020). Available online at: <https://www.gazzettaufficiale.it/eli/gu/2020/10/25/265/sg/pdf> (accessed December 8, 2020).
- Decreto del Presidente del Consiglio dei ministri. *Ulteriori disposizioni attuative del decreto-legge 25 marzo 2020, n. 19, convertito, con modificazioni, dalla legge 25 maggio 2020, n. 35, recante «Misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19»*, e del decreto-legge 16 maggio 2020, n. 33, convertito, con modificazioni, dalla legge 14 luglio 2020, n. 74, recante «Ulteriori misure urgenti per fronteggiare l'emergenza epidemiologica da COVID-19». (2020). Available online at: <https://www.gazzettaufficiale.it/eli/gu/2020/11/04/275/so/41/sg/pdf> (accessed December 8, 2020).
- Prevenzione e risposta a COVID-19: evoluzione della strategia e pianificazione nella fase di transizione per il periodo autunno-invernale. Roma: Ministero della Salute, Istituto Superiore di Sanità (2020). Available online at: <https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=76597&parte=1%20&serie=null> (accessed December 8, 2020).
- Principi di monitoraggio del rischio sanitario. Available online at: [https://www.lavoripubblici.it/documenti2020/lvpb2/Allegato\\_10\\_dpcm\\_26\\_04\\_2020.pdf](https://www.lavoripubblici.it/documenti2020/lvpb2/Allegato_10_dpcm_26_04_2020.pdf) (accessed December 8, 2020).
- Emergenza COVID-19: attività di monitoraggio del rischio sanitario connesse al passaggio dalla fase 1 alla fase 2A di cui all'allegato 10 del DPCM. (2020). Available online at: <https://www.trovanorme.salute.gov.it/norme/renderNormsanPdf?anno=2020&codLeg=77099&parte=1%20&serie=null> (accessed December 8, 2020).
- European Commission Statement on the Coordination of Measures Restricting Free Movement in the European Union Related to the Coronavirus Pandemic. Available online at: [https://ec.europa.eu/commission/presscorner/detail/en/statement\\_20\\_1871](https://ec.europa.eu/commission/presscorner/detail/en/statement_20_1871) (accessed December 11, 2020).
- World Health Organization. *COVID-19 Strategic Preparedness and Response Plan. Country Preparedness and Response Status for COVID-19*. (2020). Available online at: <https://www.who.int/publications/i/item/strategic-preparedness-and-response-plan-for-the-new-coronavirus> (accessed December 8, 2020).
- Ministry of Health of Italy. *Nuovo Coronavirus. Notizie-Report settimanale Covid-19*. Available online at: [http://www.salute.gov.it/portale/nuovocoronavirus/archivioNotizieNuovoCoronavirus.jsp?lingua=italiano&tipo=Report\\$pm\\$settimanale\\$pm\\$Covid-19&btnCerca=cerca](http://www.salute.gov.it/portale/nuovocoronavirus/archivioNotizieNuovoCoronavirus.jsp?lingua=italiano&tipo=Report$pm$settimanale$pm$Covid-19&btnCerca=cerca) (accessed December 8, 2020).
- Regione Abruzzo. *Ordinanza del presidente della giunta regionale N.106 del 6 Dicembre 2020. Ulteriori misure urgenti per la prevenzione e gestione dell'emergenza epidemiologica da COVID-2019*. Available online at: <https://www.regione.abruzzo.it/system/files/atti-presidenziali/ordinanze/2020/opgr-106-2020.pdf> (accessed December 8, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Paroni, D'Apice, Ussai, Armocida, Formenti, Min and Missoni. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Organizational Level Responses to the COVID-19 Outbreak: Challenges, Strategies and Framework for Academic Institutions

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
Bowling Green, OH, United States

### Reviewed by:

Ganiu Oladega Okunnu,  
Crescent University, Abeokuta, Nigeria  
Kuldeep Dhama,  
Indian Veterinary Research Institute  
(IVRI), India  
Peter Vikesland,  
Virginia Tech, Blacksburg, VA,  
United States

### \*Correspondence:

Jagannath Biswakarma  
jagannath.biswakarma@eawag.ch  
Kyounglim Kang  
kyounglim.kang@univie.ac.at  
Deep Jyoti Bhuyan  
D.Bhuyan@westernsydney.edu.au

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 17 June 2020

**Accepted:** 03 February 2021

**Published:** 17 March 2021

### Citation:

Biswakarma J, Rushworth D,  
Srivastava G, Singh G, Kang K, Das S,  
Anantharaman SB, Aeppli M, Popp AL  
and Bhuyan DJ (2021) Organizational  
Level Responses to the COVID-19  
Outbreak: Challenges, Strategies and  
Framework for Academic Institutions.  
Front. Commun. 6:573585.  
doi: 10.3389/fcomm.2021.573585

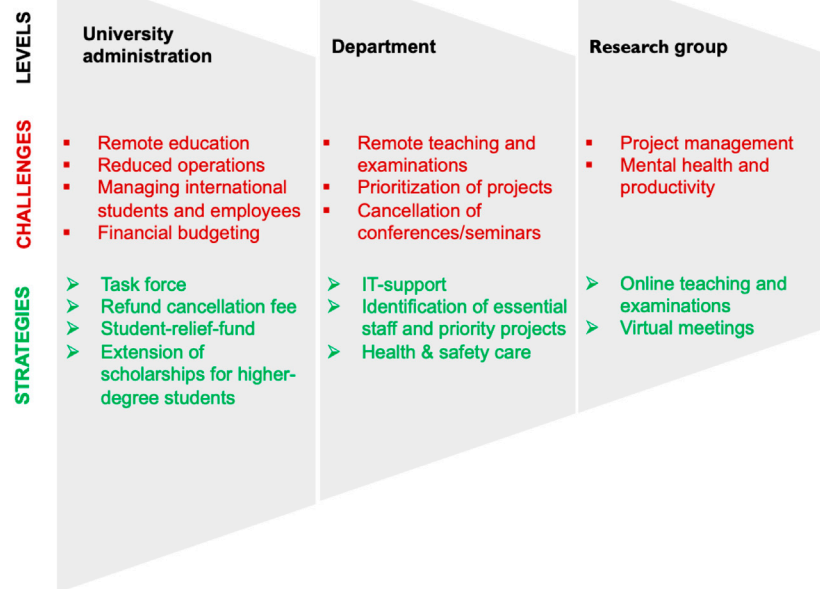
**Jagannath Biswakarma<sup>1,2\*</sup>, Danielle Rushworth<sup>3,4</sup>, Gitika Srivastava<sup>5,6</sup>, Gagandeep Singh<sup>7</sup>, Kyounglim Kang<sup>3,8\*</sup>, Subhasish Das<sup>9</sup>, Surendra Babu Anantharaman<sup>10</sup>, Meret Aeppli<sup>11</sup>, Andrea L. Popp<sup>12</sup> and Deep Jyoti Bhuyan<sup>13\*</sup>**

<sup>1</sup>Eawag, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland, <sup>2</sup>Department of Environmental Sciences, University of Basel, Basel, Switzerland, <sup>3</sup>Department of Environmental Geosciences, University of Vienna, Vienna, Austria, <sup>4</sup>Copernicus Institute of Sustainable Development, Faculty of Geosciences, Utrecht University, Utrecht, Netherlands, <sup>5</sup>Empa, Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland, <sup>6</sup>Department of Chemistry, University of Zurich, Zurich, Switzerland, <sup>7</sup>Department of Computer Science, ETH Zurich, Zurich, Switzerland, <sup>8</sup>Department of Civil and Environmental Engineering, University of California, Davis, CA, United States, <sup>9</sup>Department of Environmental Science, Mizoram University (Pachhunga University College), Aizawl, India, <sup>10</sup>Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA, United States, <sup>11</sup>Department of Earth System Science, Stanford University, Stanford, CA, United States, <sup>12</sup>Department of Geosciences, University of Oslo, Oslo, Norway, <sup>13</sup>NICM Health Research Institute, Western Sydney University, Penrith, NSW, Australia

The outbreak of the novel coronavirus, severe acute respiratory syndrome (SARS)-CoV-2, has gained unprecedented global attention. SARS-CoV-2, which causes the newly described coronavirus disease 2019 (COVID-19), has affected millions of people and led to over 1.9 million deaths worldwide by the beginning of January 2021. Several governments have opted for lockdown as one of the measures to combat the rapidly increasing number of COVID-19 cases. Academic institutions (i.e., universities, colleges, research centers and national laboratories), which are home to thousands of students, researchers, technicians, and administrative staff, have strictly followed government regulations. Due to the lockdown, the majority of academics have been facing various challenges, especially in transitioning from classroom to remote teaching and conducting research activities from a home office. This article from an early-career researchers' perspective addresses the common challenges that academic institutions have encountered and possible strategies they have adopted to mitigate those challenges at the individual organizational level. Furthermore, we propose a framework to facilitate the handling of such crisis in any near future at the organizational level. We hope academics, policymakers and (non) government organizations across the globe will find this perspective a call to better improve the overall infrastructure of academic institutions.

**Keywords:** education, electronic learning, research, challenges, developing countries, corona virus, policy





**FIGURE 1 |** List of key challenges academic organizations have faced, and strategies adapted due to the COVID-19 pandemic at different levels within an organization. For more information, read the Challenges and Strategies sections the paper.

## INTRODUCTION

The ongoing COVID-19 pandemic caused by the coronavirus SARS-CoV-2 has been reported to infect more than 90 million people worldwide resulting in over 1.9 million fatalities thus far (as of the beginning of January 2021) (World Health Organisation, 2020; Worldometer, 2020). In addition to its tremendous impact on human lives and healthcare systems, this pandemic has considerably challenged the education and research sectors worldwide. Although some measures on public health management were made available by the WHO following the previous SARS outbreak in 2003, the challenges faced by academics were not addressed (World Health Organisation, 2003). This article summarizes a) the challenges faced by academic organizations and their members (i.e., staff and students) due to COVID-19 and b) the strategies implemented by the organizations to tackle those challenges. Furthermore, this article recommends a framework that helps to tackle these challenges during such global pandemics.

The following sections are based on the perspectives of the authors—ten early career researchers from seven different countries namely Australia, Austria, India, the Netherlands, Norway, Switzerland and the United States. Individual experiences during the crisis are not explicitly cited but we focus instead on the main points that are applicable to most academic institutions around the world. We synthesized publicly available information on universities' webpages (ETH Zurich, 2020; Stanford, 2020; University of Zurich, 2020; University of Vienna, 2020; Utrecht University, 2020; Western Sydney University, 2020; University of Pennsylvania, 2020; University of Oslo, 2020), and survey questionnaires. We are aware that as

the pandemic continues, strategies and frameworks may require continuous monitoring and feasibility checks. Nevertheless, the aim of this perspective article is to highlight the possible ways academic institutions can tackle a global pandemic in order to assist such institutions in handling future crises and to inform policymakers to support the academic and research workforce.

## CHALLENGES

Due to the COVID-19 pandemic, academic organizations, including universities, colleges, research centers and national laboratories, have faced a number of challenges, as shown in **Figure 1**. Most academic institutions across the globe have closely followed the government regulations of their respective country, state and territory to maintain the safety and wellbeing of their employees and students. These regulations are formulated based on the recommendations of the WHO (World Health Organization, 2020). As the pivotal goal of academic organizations is to provide education and foster research and development, the current challenges faced by different academic organizations located across the globe might have many similarities and can be categorized as follows:

### Providing Education Remotely

In response to COVID-19, most countries imposed mandatory emergency lockdown procedures to control the spread of the virus. With that, academic organizations deemed it necessary for their employees to work from home and that provisions should be made to deliver education remotely. The greatest challenge was to move face-to-face classes, lectures, tutorials and other teaching

and learning activities online in a short duration of time. This imposed a huge workload especially on the information technology (IT) departments of the universities. Technical difficulties such as poor internet connectivity, overloaded university servers and frequent crashing of software, and privacy issues of online apps are just some of the hurdles that universities have faced during the process of providing education remotely.

In addition to delivering live lectures through online services (e.g., using Zoom, Google Classroom and Microsoft Teams), academics have been asked to record their lectures and make them available online for students. Tutorials were also moved online, and teaching assistants (TA) had to quickly learn new software and acquire new IT skills. Many courses, for instance, medicine, physics, chemistry and biology involve one-on-one interactions, group activities and laboratory classes which are highly challenging to conduct on a virtual platform.

Defining regulations and policies to conduct online assessments and examinations effectively is another predicament during this crisis as many universities are in a nascent stage in handling online tools to conduct examinations remotely.

### Reduced University Operations

In addition to transitioning to online teaching and learning systems, universities had to decide which essential administrative departments (human resources and finance) and academic services (e.g., libraries, sports centers, career and student services, and cafeterias) would continue to operate, and, subsequently, to implement measures to disinfect these facilities regularly.

### Temporary Suspension of Research Activities

As the pandemic progressed, academic organizations had to temporarily suspend most of their clinical trials as well as laboratory and field-based research activities. They also had to prioritize which research projects (including higher research degree projects, grant projects with fixed deadlines and commercial projects with industry) should be considered essential and could be conducted with minimal staff and resources. As periodic maintenance is crucial for various laboratory equipment, suspending laboratory operations can have detrimental effects on the resources and research outputs of academic institutions over time.

### Managing International Students and Employees

Increasing border restrictions and decreasing travel options meant that many international students and employees faced the difficult decision of returning to their home countries. With no certainty as to how the pandemic would unfold, many academic organizations were challenged with the question of how these abrupt changes would impact international students with respect to their studies. International students mostly rely on

either scholarships or jobs that provide them with wages to survive. During this pandemic, many international students lost their jobs and endure difficulties.

### Cancellation of Seminars, Workshops and Conferences

Many seminars, career fairs, graduation ceremonies, workshops and conferences involving a large number of participants organized by the universities or societies have either been canceled or transitioned to an online platform. Such measures restrict academics from the well-valued networking opportunities and limit the number of one-to-one interactions they can have with peers.

### Financial Challenges

Several universities worldwide are experiencing significant financial strains due to the COVID-19 pandemic (ETH Zurich, 2020; University of Zurich, 2020; University of Vienna, 2020; Utrecht University, 2020; Western Sydney University, 2020; Stanford, 2020; University of Pennsylvania, 2020; University of Oslo, 2020). These financial shortfalls are due to the shrinking world economy and the fact that the universities had to cancel and/or defer many courses and redirect funds to other areas of operations, for example, IT infrastructure (to enhance bandwidth for online teaching and learning) and supporting staff (to minimize job losses) and students (to provide financial help). In addition, many universities may have also lost potential international students due to the COVID-19 pandemic and associated travel and border restrictions. It is highly uncertain how this health and economic crisis will influence governmental, industrial and philanthropic funding that are crucial for the growth of universities, in the near future (Díez Gutiérrez and Gajardo, 2020; Ding and Kalashnyk, 2020).

### Mental Health and Productivity

Sudden shifts in the culture and environment for work and teaching and the loss of structure and social contact have perplexed many staff and students in finding a balance between productivity and family responsibilities. Employees with young children requiring care and homeschooling face additional challenges and time-restrictions. Both the lockdown and the uncertainty surrounding the end of this pandemic have affected the productivity and mental health of many early career researchers (who are often on fixed-term contracts) working on time-bound projects and grant deadlines (Bostan et al., 2020; Marcio and Carneiro, 2020). Social isolation is also expected to impact mental health significantly (Cornwell and Waite, 2009) particularly of students (both domestic and international) and staff living alone away from family and friends.

## STRATEGIES

We acknowledge that it is difficult to prepare strategies or policies in a rapidly changing and uncertain scenario. Since this global pandemic is new to our times and little is known about the virus,

most academic organizations devised their strategies (examples shown in **Figure 1**) in accordance with governmental guidance. Taskforces were formed quickly at the university and department level to monitor the progression of the pandemic, address the immediate consequences and maintain essential operations safely. While several approaches have been used worldwide, we have identified the following as important strategies that have been, and can be, implemented by academic organizations to manage the COVID-19 crisis (ETH Zurich, 2020; Stanford, 2020; University of Zurich, 2020; University of Vienna, 2020; Utrecht University, 2020; Western Sydney University, 2020; University of Pennsylvania, 2020; University of Oslo, 2020; Wigginton et al., 2020).

## Online Classes

The rapid transition from the classroom to online teaching was implemented using various web applications such as Zoom, Microsoft Teams (within Office 365 licensing), Google Classroom and Skype. With a multitude of online formats, academics have become creative in their educational output, from creating podcasts to making videos. One method accessible to most people is to provide students with lecture materials to read ahead of class (not necessarily a new concept). This facilitates active virtual interactions and engagement of students during the lecture.

IT infrastructure and services are identified as a key resource within a university, which require adequate funding and a skilled workforce (Favale et al., 2020). The services provided by the IT department are crucial for the smooth functioning of working from home. Universities are required to increase their network server capacity so that more software can be downloaded off-campus. Electronic or online library (e-library), where access to journals, books or any other information can be obtained using the internet, is an easy way to provide learning materials to students; the demand for e-libraries was magnified during this crisis especially in countries that rely on physical library facilities. Some academic publishers have relaxed the paywall or provided alternative ways to remotely access institutional subscriptions (Springer Nature, 2020). The COVID-19 pandemic underlines the importance of increased access to scientific findings quickly and freely either through pre-prints or open-access publishers. Transformative journal frameworks such as Plan S launched in 2018 by cOAlition S (an international consortium of research funding and performing organizations) is a great example of open access publishing initiative (Plan S, 2020; Rabesandratana, 2019; Noorden, 2020). Under this initiative, from 2021, research funded by public or private funding bodies, must be published in 1) open access journals, or 2) on open access platforms, or 3) made immediately available through open access repositories without embargo (Plan S, 2020).

Many parts of the world lack stable internet connections, which cause significant challenges to classes (and research) conducted online. In cases where access to e-libraries is difficult, physical copies of books, journals, study materials and assignments might be sent, *if possible*, at a nominal cost to students. Alternatively, the learning materials can be downloaded in flash drives and sent to the students via postal/

courier services. To further minimise the cost of posting the learning materials to students, academic institutions can collaborate with postal and/or courier services. Approaches such as centralised locations with drive-in and walk-up access, providing students with low-cost loan computers/tablets with learning materials already downloaded on them and pop-up libraries (also known as street libraries) to engage with students and other active readers (with appropriate physical-distancing measures) could also be considered. Contact-less pick-up of learning materials should be implemented in the case of physical libraries. Alternatively, academic institutions can partner with satellite internet providers, *where available*, to provide students especially from rural areas where conventional internet facilities are not available with low-cost satellite internet plans to access e-libraries.

## Online Examinations

Examinations (written and oral) have been conducted online, where possible. Through regular online meetings, teaching assistants for the courses and the relevant faculty members discuss the course content and exercises. Online examinations might be conducted with different sets of questions given out in different groups within the same class. Doctoral examinations have been conducted remotely in many universities. It is essential to conduct such examinations in the presence of an IT specialist to address urgent IT/network related issues. Professors and the chair of a PhD defense must monitor the attendees to avoid unwanted guests/hackers. Extra cautions such as stronger firewall and password-protected apps and virtual meetings have been used to prevent hackers. Many universities have started to offer cybersecurity courses online to their staff and students to raise awareness of possible cyber-attacks and their prevention (Naidoo, 2020). In addition, universities have been exploring the possibility of using monitoring software such as Proctorio and ProctorU to prevent cheating in examinations, however, concerns have been raised regarding the privacy issues related to these apps (The Guardian Australia, 2020).

Overall, online classes, seminars, conferences, and meetings are appreciated worldwide (Liguori and Winkler, 2020; Dhawan, 2020; Gamage et al., 2020; Murphy, 2020; Di Pietro et al., 2020; Mishra et al., 2020; Gonzalez et al., 2020), as these solutions decrease the planning and execution of travels and accommodation, thus saving time and carbon footprints of individuals. Online solutions have also stimulated entrepreneurial activities in the education sector, leading to the development of user-friendly web applications (Liguori and Winkler, 2020).

## Identification of Essential Employees

Essential staff have been defined for minimal yet smooth operations of the institutions and laboratories. At some institutions, prior authorization from the institution director or university vice-chancellor is mandatory for employees who are required to be physically present on the campus for research or maintenance. Security, finance, IT, human resources, building management and library are some departments that may require the physical presence of essential employees. A list of essential

employees should be submitted to the security staff of the building/institute. Online calendars should be set up for employees to pre-book their schedule in the laboratory/institute. These calendars should be accessible by all staff and students and only allow a certain number of people in each laboratory/institute in order to maintain a safe physical distance at all times. Additional personal protective equipment such as face masks/face shields, gloves and lab coats and rigorous hygiene practices must be implemented during these operations.

## Prioritization of Research

The lockdown measures forced universities to identify their priority research projects, which can be conducted under the state of emergency with minimal staff and limited resources. Universities needed to come up with some assessment criteria before identifying the “priority” projects. Research related to the pandemic is commonly considered a high priority (Layne et al., 2020). Other research projects, which are related to government and industrial grants with strict deadlines as well as student research projects were prioritized based on urgency and nature of the research. Extensions of research and employment contracts, higher degree research student candidature and scholarships have been evaluated by universities on a case-by-case basis.

## Managing the Wellbeing of Students and Employees

International students residing in hostels and shared accommodations are one of the most vulnerable groups in this crisis. Sudden lockdown and reduced operations of universities have led to confusion, anxiety and stress among students. Many research groups have increased the frequency of group meetings, coffee breaks and lunches through online apps. Faculty mentorship is a possible initiative whereby a professor/group leader/teacher is assigned a group of students to monitor the progress of each student. The students would be responsible for reporting any problems they have to their mentor during the crisis and online discussions could be held to resolve these issues. Many universities have created support registers where their employees can register their interest in providing support such as short-term accommodation, mentoring, guest lecturing and marking to students in need.

Employees with children/aged relatives/caring responsibilities at home also require support from universities and departments to maintain a work-life balance. Implementing flexible working hours will be of enormous help to employees with children. Providing online psychological counseling by mental health professionals is another important aspect that academic organisations can consider for their employees. Many academic organisations have started providing online fitness, yoga and meditation sessions free of cost which are beneficial to the physical and mental health of their employees.

## Relief Funds

Student hardship funds for both domestic and international students were established in some universities to provide students with grocery vouchers, loan laptops and limited

financial support (Western Sydney University, 2020). These funds usually support full-, and part-time graduate and professional students who have incurred unexpected expenses directly related to the pandemic. This includes disruption of their semester for which tuition fees are paid, moving expenses, travel, insurance, covering multiple rents and urgent requirements. Conference/seminar registration fees, travel and accommodation costs are also reimbursed in some cases.

Many universities have made several changes such as freezing new recruitment, using savings across all strategic initiative projects, workload adjustment for academic and professional staff, reducing leave balances, fractional appointments, voluntary retirement program, deferring of the estate and capital works programs to bear the financial downfall and accommodate the relief funds. In addition, senior staff from some universities donated up to 20% of their salaries to the student relief funds (Western Sydney University, 2020). This indicates that the universities and departments should start creating separate emergency funds especially toward future potential outbreaks like COVID-19. Governments and funding bodies should work together with universities and academic institutions on how to create crisis management funds.

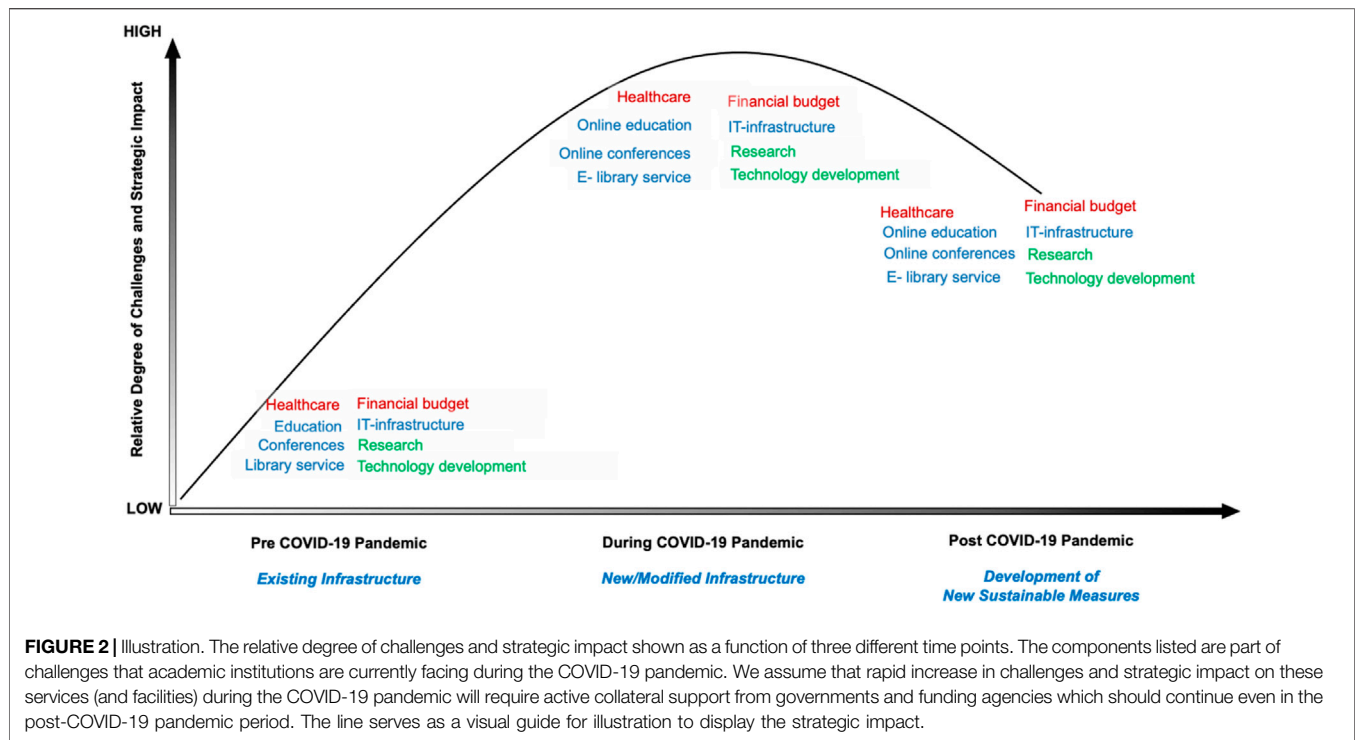
## FRAMEWORK

The challenges faced by academic organizations that host thousands of students and employees and strategies adapted to overcome those challenges during the pandemic are still uncharted territory for most organizations. We recognize that under given circumstances, many new sustainable measures have to be implemented and the academic sector can change considerably in the post-COVID-19 times compared to the pre-COVID-19 pandemic. As the degree of challenges and the strategic impact can vary across academic organizations (Figure 2), there is a need to have a common framework that academic institutions can trigger in times of global crisis. Below, we provide some key points for strategies that can help academic institutions to mitigate the effects of a global crisis.

### University Level

1. Securing the universities financially so that students and employees are not affected due to pandemic and related crisis.
2. Setting up a task force to determine the feasibility of working normally while maintaining social distancing in the future without going into complete lockdown.
3. A pandemic management committee can be established involving healthcare professionals, scientific researchers, academics and policymakers to formulate guidelines and evidence-based preventative measures in line with their respective government during a pandemic phase.
4. The universities can design custom courses on dealing with future outbreaks and suggest standard protocols based on scientific evidence. These can be made accessible to the public free of cost.
5. Provide better funding opportunities for research on designing vaccines for viruses [as several previous outbreaks were caused





by viruses (World Health Organization (2021)), epidemiology and other potentially infectious diseases. In general, academic institutions should work together with federal governments to allocate more funds to health and medical research from the total yearly health expenditure.

- For students based in remote areas with limited or no internet connectivity, the universities can look into establishing a robust learning framework based on correspondence delivering the required course material via physical mail or pop-up/drive-in/walk-up libraries or satellite internet services.

## Department Level

- Provide better training to non-technical staff on how to operate online tools in order to facilitate work from home.
- Monitoring how transitioning to online teaching affects overall teaching quality and provide strategies to improve virtual teaching and learning experience.
- While online teaching works, online exams are problematic as it is difficult to ensure that the students are not cheating with the current setup. Develop strategies to build trust and examination-monitoring software that does not violate privacy. In addition, open-book examinations can be considered in course that need to evaluate the critical thinking and problem-solving abilities of the students.
- Where home office is imposed, employees on fixed-term contracts, PhD students, early career researchers and tenure track academics should be given priority to return to the workplace.
- Plan/establish networks that support the mental health and emotional needs of employees and students. It is common in

academia that researchers are at institutes in foreign countries away from their home. Allowing academics to work from their home country could be an option.

## Research Group Level

- Ensure that members of the group do not experience social isolation by organizing regular online group meetings and one-to-one check-ins with supervisors.
- Support each other through kindness and empathy. Establish an online format/tool for social interactions between groups.
- Design courses in such a way that they can be efficiently delivered even when physical teaching is not feasible. Use of high-quality multimedia (e.g., animation, video and audio) can be quite helpful in delivering online courses effectively.
- Flexible work environment
  - Providing laptops/tablets instead of desktops
  - Removing the strict rule of working in the office
  - Adaptation of time-shift work environment
- Offline services to online services
  - More use of e-signature
  - Decreasing paperwork (online application/submission/approval)
  - Virtual meetings for regular updates

A significant amount of teaching, learning and research-related work can be done remotely especially in developed countries due to the strong internet connectivity and availability of several online apps and platforms (König et al., 2020; Favale et al., 2020; Noorden, 2020; Murphy, 2020). This opens up several exciting avenues for people with disabilities who

can work from home. Continuing use of online meetings could have a large impact on the mobility of researchers (less travel to meetings and conferences) and would grant more flexibility to scientists who can and want to work remotely.

It is fundamental that universities regularly update and maintain their IT infrastructure for hassle-free operations of online services. This also emphasizes the urgency to improve network connectivity in remote places where there are no internet services. Governments and international agencies should prioritize building infrastructures to support online teaching and learning operations, facilitate research and technology development and improved healthcare systems to better prepare the world for the current and any future global pandemics.

## SUMMARY

The COVID-19 crisis has shaken every industry and organization worldwide, including the education and research sector. This article highlights the common challenges that universities face and the strategies that have been implemented. It also proposes a framework to facilitate better handling of such a crisis in the future at the academic organizational level. The measures we suggested here are based on our own experiences during the initial hit of COVID19. As the crisis is very dynamic and ongoing, we are aware that strategies will need to be adapted over time and systematic research is required to further investigate the feasibility of these measures and frameworks. Nevertheless, the

proposed strategies will enable academic institutions, especially in developing and underdeveloped countries, to build a fast system, which would potentially support the operation and maintenance of the institutions during the current and a future emergency. Suggestions provided through the framework can potentially facilitate engagements and collaborations of institutions with governments, funding bodies and other organizations associated with education and research sector. We hope that the outcome and the proposed framework of this study will be beneficial to academic institutions, without compromising their time and resources during an emergency such as the COVID-19 pandemic.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## AUTHOR CONTRIBUTIONS

JB conceptualized, visualized, wrote the original draft, created the figures and finalized the manuscript for publication. DR, GiS, SD, SA, MA and AP wrote and edited the manuscript. GaS and KK wrote and edited the manuscript and contributed to the figures. DB visualized, wrote the original draft, contributed to the figures and finalized the manuscript for publication.

## REFERENCES

- Bostan, S., Akbolat, M., Kaya, A., Ozata, M., and Gunes, D. (2020). Assessments of anxiety levels and working conditions of health employees working in COVID-19 pandemic hospitals. *Electron. J. Gen. Med.* 17 (5), em246. doi:10.29333/ejgm/8228
- Cornwell, E. Y., and Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *J. Health Soc. Behav.* 50, 31–48. doi:10.1177/002214650905000103
- Dhawan, S. (2020). Online learning: a panacea in the time of COVID-19 crisis. *J. Educ. Tech. Syst.* 49 (1), 5–22. doi:10.1177/0047239520934018
- Di Pietro, G., Biagi, F., Costa, P., Karpiński, Z., and Mazza, J. (2020). *The likely impact of COVID-19 on education: reflections based on the existing literature and international datasets*. EUR 30275 EN, Luxembourg: Publications Office of the European Union. doi:10.2760/126686/JRC121071
- Diez Gutiérrez, E., and Gajardo, K. (2020). Educating and evaluating in times of coronavirus: the situation in Spain. 10, 102–134. doi:10.17583/remie.2020.5604
- Ding, S., and Kalashnyk, L. (2020). Resocial-ization and readaptation as a social need of post-corona period. *Postmodern Openings* 11 (1 Suppl. 2), 12–19. doi:10.18662/po/11.1sup2/135
- ETH Zurich (2020). Coronavirus COVID-19. Available at: <https://ethz.ch/services/en/news-and-events/coronavirus.html>.
- Favale, T., Soro, F., Trevisan, M., Drago, I., and Mellia, M. (2020). Campus traffic and e-Learning during COVID-19 pandemic. *Comput. Networks* 176, 107290. doi:10.1016/j.comnet.2020.107290
- Gamage, K. A. A., Wijesuriya, D. I., Ekanayake, S. Y., Rennie, A. E. W., Lambert, C. G., and Gunawardhana, N. (2020). Online delivery of teaching and laboratory practices: continuity of university programmes during COVID-19 pandemic. *Educ. Sci.* 10, 291. doi:10.3390/educsci10100291
- Gonzalez, T., de la Rubia, M. A., Hincz, K. P., Comas-Lopez, M., Subirats, L., Fort, S., et al. (2020). Influence of COVID-19 confinement on students' performance in higher education. *PLoS One* 15 (10), e0239490. doi:10.1371/journal.pone.0239490
- König, J., Jäger-Biela, D. J., and Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *Eur. J. Teach. Educ.* 43, 608–622. doi:10.1080/02619768.2020.1809650
- Layne, S. P., Hyman, J. M., Morens, D. M., and Taubenberger, J. K. (2020). New coronavirus outbreak: framing questions for pandemic prevention. *Sci. Transl. Med.* 12, eabb1469. doi:10.1126/scitranslmed.abb1469
- Liguori, E., and Winkler, C. (2020). From offline to online: challenges and opportunities for entrepreneurship education following the COVID-19 pandemic. *Entrepreneurship Educ. Pedagogy* 3 (4), 346–351. doi:10.1177/2515127420916738
- Marcio, M. H., and Carneiro, M. (2020). Peri and postmenopausal women in times of coronavirus pandemic. *Women Health* 60, 1079–1082. doi:10.1080/03630242.2020.1784370
- Mishra, L., Gupta, T., and Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *Int. J. Educ. Res. Open* 1, 100012. doi:10.1016/j.ijedro.2020.100012
- Murphy, M. P. A. (2020). COVID-19 and emergency eLearning: consequences of the securitization of higher education for post-pandemic pedagogy. *Contemp. Secur. Policy* 41 (3), 492–505. doi:10.1080/13523260.2020.1761749
- Naidoo, R. (2020). A multi-level influence model of COVID-19 themed cybercrime. *Eur. J. Inf. Syst.* 29 (3), 306–321. doi:10.1080/0960085X.2020.1771222
- Noorden, R. V. (2020). Open-access Plan S to allow publishing in any journal. *Nature* doi:10.1038/d41586-020-02134-6
- Plan S (2020). Making full and immediate open access a reality. Available at: <https://www.coalition-s.org/>.

- Rabesandratana, T. (2019). Will the world embrace Plan S, the radical proposal to mandate open access to science papers? *Science* doi:10.1126/science.aaw5306
- Springer Nature (2020). SARS-CoV-2 and COVID-19, Available at: <https://www.springernature.com/gp/researchers/campaigns/coronavirus>.
- Stanford (2020). COVID-19 health alerts. Available at: <https://healthalerts.stanford.edu/covid-19>.
- The Guardian Australia (2020). Students alarmed at Australian universities' plan to use exam-monitoring software. Available at: <https://www.theguardian.com/australia-news/2020/apr/20/concerns-raised-australian-universities-plan-use-proctorio-proctoru-exam-monitoring-software>.
- University of Oslo (2020). Available at: <https://www.uio.no/english/about/hse/corona/index.html>.
- University of Pennsylvania (2020). Coronavirus information. Available at: <https://coronavirus.upenn.edu>.
- University of Vienna (2020). Coronavirus. Available at: <https://www.univie.ac.at/en/about-us/further-information/coronavirus/>.
- University of Zurich (2020). Coronavirus COVID-19. Available at: <https://www.uzh.ch/cmsssl/en/about/coronavirus.html>.
- Utrecht University (2020). Information coronavirus. Available at: <https://www.uu.nl/en/information-coronavirus>.
- Western Sydney University (2020). Information on coronavirus (COVID-19). Available at: <https://www.westernsydney.edu.au/coronavirus-information.html>.
- Wigginton, N. S., Cunningham, R. M., Katz, R. H., Lidstrom, M. E., Moler, K. A., Wirtz, D., et al. (2020). Moving academic research forward during COVID-19. *Science* 368 (6496), 1190–1192. doi:10.1126/science.abc5599
- Worldometer (2020). COVID-19 coronavirus pandemic. Available at: <https://www.worldometers.info/coronavirus/>.
- World Health Organisation (2003). Emergencies preparedness, response. Available at: <https://www.who.int/csr/sars/postoutbreak/en/>.
- World Health Organization (2020). Coronavirus disease (COVID-2019) situation reports. Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>.
- World Health Organization (2021). Emergencies: disease outbreaks. Available at: <https://www.who.int/emergencies/diseases/en/>.

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Biswakarma, Rushworth, Srivastava, Singh, Kang, Das, Anantharaman, Aeppli, Popp and Bhuyan. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Theory(ies) of Culture and Compassion: Indian Writers Call out Local and Global Politics Under the Pall of Covid-19

Priya Kapoor\*

*Department of International and Global Studies, Portland State University, Portland, OR, United States*

**Keywords:** authoritarianism, south Asia, Indian essayists, discourse analysis, international and political communication, communalism, migration

“This economic slowdown is caused by a humanitarian crisis. It is important to view this from the prism of sentiments in our society than mere economic numbers and methods,” he said.

(Manmohan Singh, former Prime Minister and architect of economic liberalization in India in an interview with Biswas, 2020)

Of all the people I spoke to that day, including a group of Muslim tailors who had only weeks ago survived the anti-Muslim attacks, one man’s words especially troubled me. He was a carpenter called Ramjeet, who planned to walk all the way to Gorakhpur near the Nepal border.

“Maybe when Modiji decided to do this, nobody told him about us. Maybe he doesn’t know about us,” he said. “Us means approximately 460m people.” (Roy, 2020c; np)

## OPEN ACCESS

### Edited by:

Birzescu Anca,  
*Xi'an International Studies University,  
China*

### Reviewed by:

Chambers Claire,  
*University of York, United Kingdom*

### \*Correspondence:

Priya Kapoor  
kapoorp@pdx.edu

### Specialty section:

This article was submitted to  
*Political Communication and Society*,  
a section of the journal  
*Frontiers in Communication*

**Received:** 02 October 2020

**Accepted:** 01 February 2021

**Published:** 18 March 2021

### Citation:

Kapoor P (2021) Theory(ies) of Culture and Compassion: Indian Writers Call out Local and Global Politics Under the Pall of Covid-19.  
*Front. Commun.* 6:613622.  
doi: 10.3389/fcomm.2021.613622

## INTRODUCTION: FROM THE CRISIS OF A LOCKDOWN TOWARD A THEORY OF COMPASSION

An excerpt from Roy’s essay “The pandemic is a portal” (2020), cited above, uniquely captures the shock of the migrant worker-citizen who, in a moment of vulnerability, is struck by the attitude of unconcern by the ruling cadre of politicians, unable to empathize with them at the time that the pandemic struck. “Maybe he [Indian Prime Minister Narendra Modi] doesn’t know about us” is a poignant realization, laden with disbelief when spoken by the traveling carpenter featured in Roy’s essay. This statement is far more direct than the ruminative “maybe when Modiji decided to do this, nobody told him about us.” To this Arundhati Roy adds, “Us [emphasis mine] means approximately 460 million people.” In a recent interview with Manmohan Singh, an economist and former Prime Minister of India from 2004 to 2014, Biswas (2020) surmises that the lockdown was “hastily executed.” Singh seems to tacitly condone Modi’s shock-and-awe governance style during pandemic uncertainty saying, “perhaps the lockdown was an inevitable choice.” Singh attributes the economic slowdown in India (see Gettleman, 2020) to Modi’s March 24, 2020 decision. Manmohan Singh calls the decision out as a *humanitarian crisis* in no uncertain terms (Biswas, 2020; Dave, 2020). Statements culled from both the blue-collar worker and an eminent economist steer us into thinking about the health of our democracy. The power wielded by elected representatives almost define their [lack of] empathy in people-centered decisions and how those twin tropes (of democracy and elected representatives) are no longer descriptive of our current stock of callow global and local leadership.



Once the Lockdown was announced at 8<sup>pm</sup> on Indian television, the police got their orders to assert their authority to prevent citizens from movement within towns and cities. Several images of exercise in brute police authority circulated virally on social media and the press (Express News Service, 2020). Young men being beaten just because they were walking on the street going about their business, persons being jumped while traveling on their scooters and slapped without an explanation, became common sights on WhatsApp, Facebook and YouTube (Sharma, 2020). Vast numbers of migrant laboring persons found trains cancelled to their hometowns and when trains resumed several weeks later, they were overcrowded, either crushing them or excluding them (Gupta, 2020; Sen, 2020). Santosh Gangwar, the Minister of State for Labor and Employment, when asked in Parliament about documentation of migrant labor problems during the pandemic had barely any response to give as “data was not available on assistance provided to migrant workers” (The Wire Staff, 2020, np). Press reports that seven Members of Parliament asked if there was a count of migrant workers who had lost their lives. Gangwar, again, replied that no data was available. The Government floated several ration and employment schemes later to offset some of the damage done (The Wire Staff, 2020). The lives and the confidence lost, in Government goodwill, among migrant workers and their families is irreparable.

Many a philosopher or social thinker remarks that compassion is a desirable trait to harbor during a pandemic. Roy (2020b) alerts us to the exigency of caste intolerance that has led to the brutal, and fatal rape of a young Dalit woman at the hands of upper caste men. Mishra (2020), Sen (2020), and Appadurai (2020a) scrutinize the neocolonial and neoliberal structures adopted as economic policies that make our leaders indifferent to hunger, poverty, and dereliction among migrants from rural areas and in the global South (as in the United States and Europe), looking for work in the city. Given the urgency of the situation, is it possible to have a working theory of compassion during the months that Covid-19 takes up the major part of our consciousness while we field or tame the virus through our resources and everyday tactics. Protective gear, remote methods of paid work and a disruption in routine tasks such as dental visits, doctor’s check-ups, grocery shopping, meeting friends, conducting religious rituals, and dropping off kids for socially distant interactions are some tactics used to circumvent the Covid-19 virus. In these times of distress what are the emotional reserves we possess for allowing our hearts to melt with a smile from a stranger, be moved by a gesture of kindness, be caressed as a street cat sidles by our ankle emerging between our feet. Moreover, how do we instill concern into our political and social life by creating policy that is compassionate to mothers, to single men, to travelers, to immigrants, to “illegal” border-crossers, to criminals, to pets, to wildlife? For us, as citizens, the personal is political and the political is deeply personal.

## Foregrounding Political Analysis by Roy, Mishra, Ghosh, Sen, Appadurai and Other Writers of Indian Origin During Covid-19

As an ode to compassionate politics, this paper is a reading of essays by Indian writers who are writing in the backdrop of the Covid-19 pandemic marked by the first phase of the Lockdown initiated by Prime Minister Modi toward the end of March 2020

and then its subsequent lifting. The lifting of the lockdown occurred under deep political duress to jumpstart the economy, and the socio-political decisions that have followed are tantamount to political faux pas that, not just PM Modi but other global heads of State, namely President Trump in the United States and PM Boris Johnson in the United Kingdom, have performed. This convergence of poor governing behaviors is not happenstance as patterns of colonialism, imperialism, post-colonialism, liberalism and (post-1990s) neo-liberal thought have aligned the US and the United Kingdom with India (Ghosh, 2016; Goodman, 2020; Mishra, 2020; Roy, 2020c). I assume, for this essay that India’s position as a powerful geopolitical and socio-economic-cultural entity establishes its presence as a global thought leader. I have curated and presented the beginnings of an analysis of recent essays, interviews, response to essays, and commentaries by Arundhati Roy, Pankaj Mishra, Amitav Ghosh, Amartya Sen, and Arjun Appadurai whose essays and interviews are an important read as Covid-19 and other human-created tragedies continue to rage in India, Russia, Brazil, Sweden, United States and parts of Africa; and protests against state policies and historical injustices are widespread (Levantesi, 2020). These five social thinkers and essayists move easily between borders yet their research is grounded in India and social justice. Also, Indian writers command a sizeable global readership and the critique of present times (with regards economics, governance and democracy) is made richer by adding their voice to popular public debate. Their voices as political commentators are unique as they challenge the ideals of democracy (as practiced in India, mirroring policies in Europe/United States) and adherence of the modern nation-state to neoliberal economy, both held as sacred doctrine by the strong economies of the West. It is absolutely essential that these debates are brought into the public sphere when Covid-19 is victimizing steeply rising numbers of people in India and most other parts of the world. And also, ideals of good governance are shattered by elected leaders who seem to be floundering to find stable strategies to check mortality and infection among their people. Even though India is diligently pursuing Covid-19 vaccine research for the common good, research by the Indian Council of Medical Research (ICMR) has been found to contain certain inaccuracies motivated by political partisanship (Lancet, 2020). Underreporting of burgeoning infections on the one hand and the relaxation of restrictions on businesses on the other, has led to a dangerous climate of optimism among the average Indian citizen, that the Lancet has termed “false optimism” (Lancet, 2020).

Democracy and neoliberalism have worked hand-in-glove, serving each other well, creating a cadre of elite in every culture and nation whether their geographical identification begs the designation: global North or South. The attention of these ruling elite has completely divested from the common good, from people’s hardship, from death and disease, indeed compassion, when most needed (Appadurai, 2020). At the same time the essayists reviewed sharply critique the direction that Indian leadership is taking with regards Covid-19, public healthcare, protest, social inequity and justice (Appadurai, 2020a; Ghosh, 2016; Goodman, 2020; Mishra, 2020; Roy, 2020c). Modi has made it abundantly clear that despite the ferocity of advance

of the Covid-19 infection among its citizens, the Hindutva ideology will triumph, compelling him to continue with building the Ram Janmabhoomi temple over the formerly decimated Babri Masjid by Kar Sevak (mostly Hindu-identified) enthusiasts. Other recently enacted Acts and Laws shaking the foundation of the constitution and the judicial system are: the passing of the Kashmir domicile law to promote what amounts to settler colonialism in Kashmir. There is also the previous blight of Article 370, that revokes the self-governance and legislative powers that Kashmir, a Muslim majority state has held since India's independence. Following the Shaheen Bagh protests and social mobilization against racist, anti-Muslim pogroms (Covid-19 struck and Trump visited India before the Lockdown), several acts of incarceration and intimidation of innocent citizens became commonplace as an ode to asserting authoritarian rule (The Wire Staff, 2020a; The Wire Staff, 2020).

Amitav Ghosh, 2018 Jnanpith literary Award winner, is the only writer who has not written a post-Covid essay that I know of but has been interviewed by many news-based and literary quarters for discussions presaging the modalities of climate change and political leadership as applicable to the Covid outbreak. His pre-Covid epic "The Great Derangement: Climate change and the unthinkable" in 2016 has given us considerable grist for the mill. The title of the book is formulated as an imperative. Our footprint on earth has caused extreme distress to the environment. Ghosh cites the Paris Agreement, "climate change is a common concern for human kind" (2016, p. 206). The extent to which we have created this distress, we are sure to come across as deranged to generations that inhabit the earth after us. In an interview with Sardesai (2020) on *India Today TV*, Ghosh while mulling the intertextuality between his latest climate inspired novel *Gun Island* and Cyclone Amphan, underscores that migration, displacement and climate change have internecine links. Ghosh argues that the political elite completely ignore climate disasters thereby dismissing the science of climate change and subsequent action, quite easily. To belabor the argument Ghosh gives the example of Cyclone Amphan, and the vast destruction to human and animal life in the ecologically fragile region of the Sundarbans in West Bengal. Although cataclysmic, the event does not warrant more than one mention during national parliamentary debates for the season. Ghosh's writing and interviews help us re-evaluate crises of pro-environment leadership in a Post-Paris Agreement era.

## The Rule of the Elite

PM Modi's government asserts executive power in a number of ways. The passing of the Citizen Amendment Act, CAA, makes religion a necessary foundation for citizenship. The NRC, National Register of Citizens requires a mountain of documentation ranging from land ownership documents, ration cards and birth certificates that most citizens do not possess. This exercise has yielded approximately 1.9–4.0 million people in Assam stateless (BBC, 2019). The NPR or the National Population Register is one of the largest data-gathering attempts that purports to consolidate the biometric project started with the foundation of the Aadhar card. The Registry project was to begin in April 2020 before Covid-19 struck. Modi, like other authoritarian leaders in Hungary (PM

Viktor Orban), Turkey (President Recep Tayyip Erdogan), Poland (Jaroslaw Kaczynski, leader of the Law and Justice Party) has sought to increase his executive powers (Khosla, 2020) over every governmental institution that has decision making legislative powers. A recent OP-ED piece in the New York Times by Indian constitutional scholar Madhav Khosla cites Princeton constitutional law professor Kim Lane Scheppele in contrasting the record of human rights violations among national leaders in recent history. Autocrats of today when compared with 20th century autocrats, level the same damaging impact as tanks and bullets of yore (Khosla, 2020).

The "new autocracies"<sup>1</sup> of Narendra Modi, Donald Trump, Recep Tayyip Erdogan, Jair Bolsonaro, Boris Johnson, Viktor Orban, Putin, Rodrigo Duterte signal what Appadurai (2020, np) terms "populism from above"—where the people are electoral tools for a mass exit from democracy." Appadurai believes that 20th century thinker José Ortega y Gasset's average "mass man" bound by similar "tastes, dispositions, and values" was yielding to a new breed of elites whose protest is primarily against liberty, equality and fraternity, the ideals of liberal democracy. These protesting or "revolting" elite avoid any regulatory, deliberative, or procedural checks against their version of capitalism and if someone [most likely an elite of a different kind—perhaps highly educated] questions them, they call foul (Appadurai, 2020a). Appadurai inverts the notion of protest and revolt (usually an action against dispossession of rights) in the wake of this emerging elitism, to turn his gaze on those power elite who protest to avoid abiding by the rules of democracy. Continuing in this dead serious mock-heroic vein, Appadurai points out that the power bearing elite worldwide and in India unite in their "hatred of intellectuals, academics, artists, activists, socialists, feminists, admiration for capitalism so long as it is regulated only in their favour, and a hatred of democracy matched by their cultish pursuit of the voter (rather than the people)" (2020, n.p.). In Appadurai's account, global leadership as he has described it, has wrested control of the state machinery to change the reality of its voting public so as to suit their pecuniary ends undermining established structures of governance, judiciary, and secularism.

If one were to string the headlines of press articles reporting on Covid-19, we would be able to weave a shocking tale of the economic, religious, judicial inequalities that the Covid-19 period has created and brings to light on a daily basis. Here are some iniquitous scenarios that have unfolded before us: 39 billionaires were added to the US economy in the first 3 months of the pandemic; while more astute than previous years, the US Congress and legislators, were unable to bring-to-book the four Tech Giants (Amazon, Google, Facebook, and Apple) for their anti-trust practices (Noble, 2020). In more humbler contexts, many a daily-wage laborer died, dehydrated and hungry, walking to reach their villages in India as the

<sup>1</sup>Appadurai (2020) calls the current administrations of world leaders namely Narendra Modi, Donald Trump, Recep Tayyip Erdogan, Jair Bolsonaro, Boris Johnson, Viktor Orban (and many others) as "new autocracies" because they are not acting in Democratic ways and there are plenty of elite who seem to follow their policies.

lockdown was announced by PM Modi. Many will face chronic hunger in weeks, months to come (Staff, 2020). Their families are succumbing to food shortages (Dave, 2020; Menon, 2020). Several hapless laborers returning home were reportedly crushed while sleeping over train tracks believing them to be unmoving and un-operational during the lockdown (Gupta, 2020).

## Globalization and its (Dis)contents

Statistical reports about our differential lives are too many to tell. Unemployment, hunger, domestic violence, these figures stagger those of us who have studied Globalization with cautious optimism. Globalization promised to bring in the best wares, services, and job opportunities of the world to our doorstep. Our constantly peripatetic lives initially brought the glad consumption of rare gifts, the awareness of varied global customs via media or travel, circulating wealth, but also invisible pathogens that clung on to the new environs first, to take root and then, to thrive upon our bodies. The story of globalization gradually unfolds and unravels in this Covid-19 era. For instance, the strong economic partnership between Wuhan, China, and Italy also sealed their fate in terms of disease and mortality. Furthermore, as a globalized humanity, we allowed the creation of rules of trade and commerce so benefits were heaped onto select (read: elite) populations and industries in disproportionate ways. The occurrence of Covid-19 surprisingly further skewed the manner in which money and commerce thrived. Safety protocols of Covid-19, namely remote functioning and remote work, has given an unfair advantage to technological businesses. Billionaires have emerged overnight. Tech companies raked it in (Noble, 2020). On the flip side, minority and marginalized populations have become more vulnerable to high rates of infection than ever before (Sen, 2020).

Much has been seen and made of United States President Trump's unconcern, lack of heart and understanding, to lead the country toward health sustainability and equal public health accessibility. PM Modi, on the other hand has made a moral virtue of imposing strictures of physical movement, especially when managing dissent, upon populations in India, in the name of bringing back the health of the nation during the Covid-19 pandemic. The Shaheen Bagh mobilization that fought against Islamophobia, the muzzling of freedom of speech and people's protests was at its height right before the national lockdown in March. Modi needed a recovery to glory. He invited Trump all the way from the United States so that this staged event would divert the attention of the public and bring recognition and fame to each of the leaders', for its own sake. Amidst talk of hospitality, gauging from offerings of gold-leaf covered fruit for the Trump team visiting India, we lost the ability to have a public discussion of the arms and ammunition deals that India would broker with the US. When the lockdown was imposed it was without concern for migrant workers away from their villages that were already dried of resources, farming opportunities back home, and other paid work in Urban areas. The lockdown did not care to account for the bolt of food scarcity, hunger or the need for shelter that millions are currently facing in the absence of family or social monetary reserves. The urban landlords who rely on income from migrant workers feel their monetary and kindness reserves pinched and constrained by the slim profit margins they are making.

Pankaj Mishra begins his essay "Flailing States" with the forthright quote by Paul Valery from 1919 in the context of Europe's rout, "the abyss of history is deep enough to hold us all." A reminder of the excess of Empire, a departure from Grecian classical notions of statesmanship and Government, and a nudge to England and the US to abandon its illusion of grandeur and supremacy are the essay's key upshot. "The early winners of modern history now seem to be its biggest losers with their delegitimized political systems, grotesquely distorted economies and shattered contracts," claims Mishra. He calls out Trump and Johnson's narcissism about their notions of governance and capitalism, their moral superiority over China, Iran, Russia, and the big exposé regarding a poorly run public health system that favors only those with means. Timely and frequent testing for early detection of Covid-19 has become a pipe dream, holding back checking the skyrocketing virus infection rates. Mishra exhorts India to embrace, once more, the value of social, political and economic equality embodied by its early founders. Mishra warns India against running with the bulls of democracy and state-building à la United Kingdom and the United States as it has only led to racial, ethnic divisions. Even education did not prove to be a great leveler of difference as the upper castes received top education and the top jobs. India's adherence to the economic and political growth patterns of Anglo-America has succeeded in putting us behind most East Asian countries.

Sen begins his essay (2020) by recalling a song by Vera Lynn about meeting again and in the song recall from 1939, he ruminates what scenario awaits us beyond the pandemic. Will the world be any different just because of our shared crisis? The world did come together and the United Nations, IMF and the World Bank were founded in 1944–1945, Britain reduced undernourishment among its population, life expectancy increased and the first National Health Service hospital was founded in Manchester in 1948. Several inequities were bridged by these post World War II measures. Yet 3 million Indians died in the Great Bengal Famine in 1943 and the British Raj did nothing to prevent the famine nor death. Similarly, we find inequities during the Covid era—minority, underrepresented populations are dying at a faster rate than majority populations (Sen, 2020). Alas, our sense of social justice and equality (in healthcare access nor in combatting malnutrition, houselessness, etc.) has not evolved despite our common struggle against the virus.

Roy's latest essay in August 2020, "India's Day of Shame" is on Kashmir, a land disputed with Pakistan and now China (Aksai Chin), with a majority Muslim population. Roy focuses on the governmental push toward decimating the will of the land and its people by robbing them of a basic 21<sup>st</sup> century right: that of telephony, connectivity, the internet, and the state's sovereign status via the passing of Article 370, in December, 2019. Writing a year past Article 370 and the Citizenship Amendment Act (CAA), on August 05, 2020, just as the domicile law becomes viable, Roy awakens us to the displacement this law will cause for bona fide Muslim Kashmiris. The domicile law passed in the union territory of Jammu and Kashmir by the Bharatiya Janata Party-led Central Government faces a legal challenge posed by petitioners in the state (Maqbool, 2020). The law was enacted by the Ministry of Home Affairs through an executive order in March 2020, during Covid-19, promising "domiciles" jobs. The new domiciles would include all those who choose to relocate to J&K without the

traditional ties of culture and family. Reporter Umar Maqbool of the *Wire* writes, “before the reorganization of J&K, non-locals were not eligible for jobs in the erstwhile state due to special constitutional safeguards incorporated in the constitution of India through a presidential order of 1954” (2020, np). It is estimated that 25,000 persons had already been granted domicile under the new rule enabling them to apply for jobs, own property and to vote (Connah, 2020).

This holding pattern of suspension of fundamental rights and the continuing house arrest of formerly elected pro-India state government officials and protesters has not changed in 1 year. The new domicile law of August 2020 leads to speculation on who will buy property in Kashmir. Purchase of land will displace Kashmiri citizens in a formerly constitutionally, legally independent state into a play ground of the rich and famous who will move there for profit and Himalayan cool air. Kashmir is often known as India’s Switzerland and Bollywood song sequences are shot in its vales and lotus studded lakes. This law does not empathize with the myriad atrocities faced by the Muslim population who have deep generational roots in Kashmir and are the majority population living in the state. The Kashmiri Pandits, largely Hindu comprise approximately 2.5% of the total original residents of Kashmir and also stand displaced. The Kashmiri Pandits are dispossessed of ancestral land as well but have not been targeted by police and army authorities accused by human rights record keepers, of rape and torture, nor recruited by border terrorist organizations in the same way that the Muslim youth have.

The media often plays a polemical role with regards Kashmir reportage. In creating binary opposition, the media usually present two stark polarities comprising people on one side and the governmental bodies on the other signifying different purposes and intentions. Well-known Qatari news outlet, *Al* (2020) inadvertently stoked a controversy regards domicile when it initiated a Tweet asking its listeners the question: “Are you in India and planning to move to Jammu and Kashmir under the recently introduced domicile laws? What’s behind your decision? Send your thoughts for Sundays @ AJ STREAM” (Live on YouTube) (*Al*, 2020). With this question, Kashmiris were moved to call out *Al Jazeera* for promoting settler colonialism. Having created a stir, and wanting to initiate a serious debate on the issue, they invited Mona Bhan from Syracuse University, Mirza Saif Beg, a Kashmiri lawyer and Safwat Zargar, a Kashmiri journalist, all of whom comment on the downside of using incentivizing language in the tweeted question asked by the *Al Jazeera* tweet regards domicile law, initiating a general move to reside in Kashmir. The *Al Jazeera* call in tandem with the new domicile legislation against Kashmir seeks to “invisibilize” Muslims, says Mirza Beg (*Al*, 2020). This incident provides insight into how emotionally and physically destabilizing unchecked media intervention can be, especially this call for public “opinion” by *Al-Jazeera* that doesn’t allow Kashmiris to weigh in about their existential condition prior to going live.

## On Compassion: Syncretism and Cultural Praxis

The Kashmiris have lost their position of autonomy in the constitution despite protest of all hue, and in the North-East, Bengali-speaking immigrants have lost their locus standi in

Assam. The National Registry of Citizens has made almost 3 million Muslim immigrants who have lived for generations in Assam, lose their legal status (Roy, 2020a). The poignancy of their dilemma is hard to understand in standard prose and so writers who call themselves the Miyah poets of Assam have begun to pen down poetry that describes the othering process and injustice felt deep inside by Bengali-speaking Muslims in Assam. Miyah is the tongue-in-cheek reference to a gentleman in Urdu. Miyah, in Assam, transformed into a term referring derogatorily to Bengali-speaking Muslims (Kumar and Andre, 2016; *The Wire Staff*, 2019). Reclaiming the term Miyah, poets and protesters now use the term to express their thoughts on citizenship. Some credit the origin of this form of poetry to the 1983 Nellie massacre when 2,000 Bengali-speaking Muslims were brutally killed within a few hours. Quoted here is one verse known to be the first extant Miyah poem titled “*Write Down I am a Miyah*” by Hafiz Ahmed, the president of the Char<sup>2</sup> Sapor Sahitya Parishad (Daniyal, 2019). This poem was composed after the Modi Government began a National Registry in 2019, accounting for citizens in Assam while knowing fully well of its checkered history of immigration related to the formation of modern Bangladesh and the division of Bengal (see endnote). Noteworthy is the brutality with which local and national forces have excluded the most disenfranchised members of Assamese society from governance and economic opportunity, hindering them to succeed in the state policies of modernity. Ahmed’s verse goes thus:

“Write down.  
I am a Miya.  
My serial number in the NRC is 200543.

I have two children.  
Another is coming.  
Next summer.  
Will you **hate** [emphasis mine] him.  
As you hate me?”

Hafiz Ahmed adapts the powerful verse of Palestinian Mahmoud Darwish who reclaims his pride, love of land, and identity with his poem *ID Card*<sup>3</sup> (Hilmy, 2017). Taking the cue from such a widely recognized and powerful resistance poet is evocative of the injustice of the National Registry that disenfranchises Assamese Muslims erroneously known as Bangladeshi, casting doubt on their nationality and loyalty to

<sup>2</sup>Chars is a reference to the sandbars formed in the middle of the major regional river Brahmaputra, home to labor brought in during the British Raj when Bengal was undivided. The majority of the migrant laboring class came from the Mymensingh region of northeast Bengal, now in Bangladesh. The residents of the Mymensingh area are one of the poorest and least educated of any population in Assam as also the target of the National register of citizens (Daniyal, 2019).

<sup>3</sup>Palestinian resistance poet Mahmoud Darwish’s ‘ID Card’:

“Write down!  
I am an  
Arab And my identity card number is fifty thousand  
I have eight children  
And the ninth will come after a summer  
Will you be angry?”



the nation. It is no wonder that writer Daniyal (2019) believes that this style of protest poetry has shaken life and politics in Assam. By othering indigenous communities, the BJP's policies are exposed as anti-immigrant and anti-Muslim. One finds resonance of these dark sentiments in contemporary U.S. politics, in Trump's tactics of separating families and lodging immigrant children in cages in border states of the United States. "Hate," Hafiz Ahmed reminds us in his final verse, is a powerful word and can make those on the right side of the border become all powerful.

Another verse by emergent poet-of-dissent Grover captures protest, sorrow and anger at the formalization of the NRC in his poetry. Varun Grover declares in his verse, "*Kagaz nahi dikhayenge*" (we will not present our papers). Grover, a Hindu, expresses solidarity with Muslim immigrant populations who will be subject to registry once NRC is implemented nation-wide. Genres of poetry have emerged or have been revived strategically in the wake of draconian citizenship laws in the country. When the usual institutions of politics (for instance: is voting adequate?) are not able to assert adequate counterpoint, the pregnant verses of poetry have expressed youth outrage and horror at the state of the nation. Echoing Grover's sentiments is senior activist Harsh Mander who threatened to convert to Islam in protest of NRC, and well-known film maker Mahesh Bhatt who also declared non-cooperation with NRC protocols.

## Portals of Hope: A Creative Passage

Roy's April 2020 essay "The Pandemic is a portal" and Sen's "A better society can emerge from the Lockdowns" (2020) take us from hopelessness to hope. A portal is an opening, a way forward. Roy writes "Historically, pandemics have forced humans to break with the past and imagine their world anew. This one is no different. It is a portal, a gateway between one world and the next." A portal can signify passage, transition, transnationalism, migration and immigration all of which are highly politicized tropes with state policies associated with them.

Sen opens the essay in question with synesthetic memories of song but his ray of hope for humanity comes with: "The need to act together can certainly generate an appreciation of the constructive role of public action. The second world war, for example, made people better realise the importance of international co-operation" (Sen, 2020, np). And we are reminded of the idealism and cooperative spirit that went into the founding of the United Nations, the World Bank and the IMF in 1948.

Roy, Sen, Appadurai, Ghosh, and Mishra have woven their politico-historical tales for readers through a worldly lens. All are suitably disturbed by the trends in authoritarianism and intolerance and its seepage in state policies unfairly impacting minoritized communities. Ghosh (2016) lays faith in a culture's imaginative resources to find solutions to extreme climate change related events--Covid-19 qualifies as such. Perhaps a way out of the conundrum of Western economic and philosophical dependency lies locally through an imaginative and philosophical coming together of disparate traditions in South Asia comprising India, Pakistan, Sri Lanka, Nepal, Bangladesh,

Afghanistan, Bhutan, Maldives. South Asia is rife with rich histories of cultural unity in the arenas of socio-political philosophy guiding a path to human co-existence. Why then must we allow political leaders to turn these powerful modes of being into ways of maintaining raw power? The hopeful proposal of a conjuncture starts with a history of trade relations with the Arab world in the seventh century C.E. and political contact in 712 C.E. with the invasion of Sindh by Mohammed Bin Qasim (Haider and Phil under supervision, 1984). The fates of several religions, namely Islam and Hinduism, that came together from the 8th to the 17th century with moderate, mystical ways of thinking provided us the opportunity to plumb fertile traditions of tolerance and co-existence.

The Bhakti and Sufi philosophic traditions forged semblance through common themes of devotion, a longing for a *beloved* in the divine, beckoned by music in their doctrines. The chief concern of the Bhakti and Sufi lines of thought is anti-establishment praxis that may be coded as political in the contemporary context. The Bhakti and Sufi traditions were able to carve a way toward communal synthesis despite a dialectical relationship between Islam and Hinduism. That form of co-existence gave rise to devotional musical traditions that are inherited by contemporary world music today. Over time, Sufi and Bhakti music metamorphosed into several branches and genres of music that had its votaries in Pakistan, India and Bangladesh. The qawwals reside in Pakistan and India, and the bauls, wandering mystic minstrels reside in West Bengal in India, and in Bangladesh. Qawwals and bauls shunned institutionalized religion while adhering to their own rules of mysticism. The bauls, despite border restrictions and threats from mainstream Islam, wander singing Vaishnava inspired and Sufi inspired devotional music. The qawwals usually sing in dargahs, shrines of "pirs" (learned persons), or Sufi saints. Their geographic separation from mosques or mandirs, havens of institutionalized religion was normalized until modern, post-1947 discourses of Islamic and Hindu nationalism (exacerbated by the Trumpian Global War on Terror and Modi's Hindutva) fanned the fires of communalism. Dargahs came to be seen as *too Islamic* in an era of Hindutva politics whereas the dargah was perceived as *too secular* for an equally rapidly fundamentalizing Islam of the 21<sup>st</sup> century (Katju, 2014).

Just as the Miyah poets are perceived as shaking up Assam, the Sufi/Bhakti poets are trying to survive threat of killings, and beatings. Their resilience and syncretism are shaken but intact as an exemplar of dissent for us to admire and adopt. While physical destruction through Covid-19 pestilence will take its course, the ideological divides must not continue to erode our ability to co-exist with our neighbors nor marginalize those who are subject to economic or religious intolerance. The reality of the Citizen Amendment Act, Article 370, The Domicile Act in Kashmir, the National Register of Citizens and the National Population Register are a warning call for all who value the exhilarating cultural hybridity and transnationalism in Indian and South Asian custom. Global elite leaders in India and abroad: Brazil, Philippines, Hungary, United Kingdom., United States, and Russia are succeeding in

“undoing many democratic structures, values and traditions” (Appadurai, 2020a). In the end, we are surrounded by our collective creativity despite foreboding political (reference: strongman authoritarian politics), extreme climate events and pandemic scenarios. The Sufis, the Miyahs, and the new poets of protest show a way for us to think of problems of contemporary (derelict) rural and (dense) urban life in ways that surpass the cupidity of historical times as during colonialism, neo-liberal economic policies, formation of the nation-state and modern-day governance. These creative channels of thinking collectively, steer humanity in a direction that Roy, Ghosh, Appadurai, Sen and Mishra urge us to, for the continued existence of collective protest. This is a direction that is not meek or subtle, a mobilization of citizens, marginalized and beaten down, although moved to create social change by electing political leaders who represent

their socio-cultural and political predilections. Ghosh (2016), Appadurai, 2020a, and Mishra (2020), in their writings, unveil the political and moral failings of the Western powers who, have not devised a way to share national and global power, even in a postcolonial and globalized world. In other words, traditional colonial structures have not dismantled because the usual suspects of global power (the United Kingdom, United States, other European nation-states) have not shouldered the mantle of leadership very well.

## FUNDING

A grant from the National Research Foundation of Korea (NRF-2017S1A6A3A0209749) has supported the research for this essay.

## REFERENCES

- Al, J. (2020). The stream: what does the domicile law mean for Kashmir?. Available at: <https://www.aljazeera.com/programmes/thestream/2020/06/domicile-law-kashmir-200610143308394.html> (Accessed July 20, 2020).
- Appadurai, A. (2020). Coronavirus won't kill globalization. But it will look different after the pandemic, May 19, 2020. *Time*. Available at: <https://time.com/5838751/globalization-coronavirus/> (Accessed May 30, 2020).
- Appadurai, A. (2020a). We are witnessing the revolt of the elites, 22 April, 2020. *The Wire*. Available at: <https://thewire.in/politics/populism-elite-narendra-modi-donald-trump> (Accessed April 25, 2020).
- BBC (2019). Assam NRC: what next for 1.9 million 'stateless' Indians?. *BBC News*. Available at: <https://www.bbc.com/news/world-asia-india-49520593> (Accessed September 1, 2020).
- Biswas, S. (2020). Manmohan Singh's 'three steps' to stem India's economic crisis. Available at: <https://www.bbc.com/news/world-asia-india-53675858?fbclid=IwAR2GAnS3SfCit0M3rQ1-fG7xXeAq670w4it0qUXPxV1XIQWmADiQXIGFAQ> (Accessed August 10, 2020).
- Connah, L. (2020). Kashmir: new domicile rules spark fresh anger a year after India removed region's special status, July 29, 2020. *The Conversation*. Available at: <https://theconversation.com/kashmir-new-domicile-rules-spark-fresh-anger-a-year-after-india-removed-regions-special-status-142696> (Accessed September 25, 2020).
- Daniyal, S. (2019). 'I am Miya': why poetry by Bengal-origin Muslims in their mother tongue is shaking up Assam, July 14, 2019. *Scroll*. Available at: <https://scroll.in/article/930416/i-am-miya-why-poetry-by-bengal-origin-muslims-in-their-mother-tongue-is-shaking-up-assam> (Accessed April 1, 2020).
- Dave, D. (2020). Who will take responsibility for the human tragedy unfolding in democratic India?. 28 March 2020. *The Wire*. Available at: <https://thewire.in/rights/who-will-take-responsibility-for-the-human-tragedy-unfolding-in-democratic-india> (Accessed March 29, 2020).
- Express News Service (2020). Migrant workers caned in Guntur after rushing out of relief camp in bid to return home. *New Indian Express*. Available at: [https://www.newindianexpress.com/states/andhra-pradesh/2020/may/16/migrant-workers-caned-in-guntur-after-rushing-out-of-relief-camp-in-bid-to-return-home-2144154.html?fbclid=IwAR20RixfBFtffag-BwqfEmM5CC1sasqelfTQXrj\\_mM3c7Pu5bvCK2V8L8E](https://www.newindianexpress.com/states/andhra-pradesh/2020/may/16/migrant-workers-caned-in-guntur-after-rushing-out-of-relief-camp-in-bid-to-return-home-2144154.html?fbclid=IwAR20RixfBFtffag-BwqfEmM5CC1sasqelfTQXrj_mM3c7Pu5bvCK2V8L8E) (Accessed May 30, 2020).
- Gittleman, J. (2020). Coronavirus crisis shatters India's big dreams. Available at: <https://www.nytimes.com/2020/09/05/world/asia/india-economy-coronavirus.html> (Accessed September 5, 2020).
- Ghosh, A. (2016). *The great derangement: climate change and the unthinkable*. Chicago, UK: The University of Chicago Press.
- Goodman, A. (2020). "Chaotic Situation": India begins Lockdown of 1.3 billion residents as coronavirus pandemic spreads, March 26, 2020. *Democracy Now*. Available at: [https://www.democracynow.org/2020/3/26/amaritav\\_ghosh\\_india\\_coronavirus\\_lockdown](https://www.democracynow.org/2020/3/26/amaritav_ghosh_india_coronavirus_lockdown) (Accessed March 30, 2020).
- Gupta, S. (2020). Exhausted migrants fell asleep on tracks. 16 run over by train. Available at: <https://www.ndtv.com/india-news/15-migrant-workers-run-over-by-train-in-maharashtra-2225184>.
- Haider, S. R., and Phil under supervision, M. (1984). Relations of the Bhakti saints with Muslim sufis, 16<sup>th</sup> and 17<sup>th</sup> centuries. Aligarh, UP: Dr. Jagatvir Singh Agre, Aligarh Muslim University. Available at: <https://core.ac.uk/download/pdf/144516397.pdf> (Accessed August 1, 2020).
- Hilmy, S. (2017). "ID card" by Mahmoud darwish—a translation and commentary. Available at: <https://www.wrmea.org/017-november-december/id-card-by-mahmoud-darwish-a-translation-and-commentary.html> (Accessed January 1, 2021).
- Katju, M. (2014). Dargahs and sufis, times of India blogs. *Times of India*. Available at: <https://timesofindia.indiatimes.com/blogs/satyam-bruyat/dargahs-and-sufis/> (Accessed February 10, 2020).
- Khosla, M. (2020). With freedom at stake, courts are collapsing: in Hungary, Turkey and India, the courts have turned into silent bystanders and complicit actors. *New York Times*. Available at: <https://www.nytimes.com/2020/09/09/opinion/hungary-turkey-india-courts.html>.
- Kumar, A., and Andre, A. (2016). Protest poetry: Assam's Bengali Muslims take a stand. Available at: <https://www.aljazeera.com/features/2016/12/23/protest-poetry-assams-bengali-muslims-take-a-stand> (Accessed December 23, 2016).
- Levantesi, S. (2020). Amitav Ghosh: 'I suspect there will be a huge wave of novels about the pandemic'. *Mint*. Available at: <https://www.livemint.com/mint-lounge/features/-i-suspect-there-will-be-a-huge-wave-of-novels-about-the-pandemic-amitav-ghosh-11589638359319.html> (Accessed June 1, 2020).
- Maqbool, U. (2020). J&K's controversial new domicile law faces a legal challenge, August 8, 2020. *The Wire*. Available at: <https://thewire.in/government/jammu-and-kashmir-domicile-rules-legal-challenge> (Accessed September 26, 2020).
- Menon, A. (2020). 90% workers lost livelihood, 94% ineligible for govt relief: study, 9 April, 2020. Available at: <https://www.thequint.com/news/india/covid19-lockdown-economy-impact-construction-workers> (Accessed June 10, 2020).
- Mishra, P. (2020). Flailing states: Pankaj Mishra on Anglo America. *London Review of Books*. (London, UK): Available at: <https://www.lrb.co.uk/the-paper/v42/n14/pankaj-mishra/flailing-states> (Accessed July 16, 2020).
- Noble, S. (2020). The loss of public goods to big tech. Available at: <https://www.noemamag.com/the-loss-of-public-goods-to-big-tech/> (Accessed July 20, 2020).
- Roy, A. (2020b). Arundhati Roy: India's Hindu Right are willing to bury democracy. Available at: <https://www.jacobinmag.com/2020/10/arundhati-roy-india-bjp-modi-delhi-protests-cremation> (Accessed August 1, 2020).
- Roy, A. (2020a). India's day of Shame. Aug. 5, 2020. *The Wire*. Available at: <https://thewire.in/rights/august-5-kashmir-ayodhya-bhoomi-pujan-ram-mandir-china> (Accessed August 7, 2020).

- Roy, A. (2020c). The pandemic is a portal. *Financial Times*. (London, UK) Available at: <https://www.ft.com/content/10d8f5e8-74eb-11ea-95fe-fcd274e920ca> (Accessed April 15, 2020).
- Sardesai, R. (2020). Amitav Ghosh exclusive: cyclone in covid times. May 29, 2020. *India Today* Available at: <http://book-news.org/bengals-sundarbans-devastated-by-cyclone-amphan-author-amitav-ghosh-discusses-climate-change> (Accessed July 10, 2020).
- Sen, A. (2020). A better society can emerge from the Lockdowns. April 15, 2020. *Financial Times*. Available at: <https://www.ft.com/content/5b41ffc2-7e5e-11ea-b0fb-13524ae1056b> (Accessed April 20, 2020).
- Sharma, S. (2020). India cannot fight a pandemic with police lathis: it must ensure people have food-and dignity 13 April, 2020. *Scroll*. Available at: <https://scroll.in/article/958993/india-cannot-fight-a-pandemic-with-police-lathis-it-must-ensure-people-have-food-and-dignity> 2020 (Accessed May 1, 2020).
- Staff, S. (2020). 'I haven't eaten in two days': migrant workers unable to return home, protest in Bengaluru, May 5, 2020. *Scroll*. Available at: <https://scroll.in/video/961056/i-havent-eaten-in-two-days-migrant-workers-unable-to-return-home-protest-in-bengaluru?fbclid=IwAR0RIi5S9u03P9b29dzpdC-RxqMPq2o9qVKPrCNofmDF7ZRfM0kLI7qnGc> (Accessed May 15, 2020).
- The Lancet. (2020). COVID-19 in India: the dangers of false optimism. *Lancet*. 396 (10255), 867–867. doi:10.1016/S0140-6736(20)32001-8
- The Wire Staff. (2020a). Academics, rights activists condemn umar khalid's arrest, Accuse Delhi Police of 'Witch Hunt, 14 September, 2020. *Wire*. Available at: <https://thewire.in/rights/umar-khalid-arrest-condemned> (Accessed September 20, 2020).
- The Wire Staff. (2019). Assam: ten poets, activists booked for poem on citizenship row, July 12, 2019. *The Wire*. Available at: <https://thewire.in/rights/miyah-poetry-assam-nrc> (Accessed January 1, 2020).
- The Wire Staff (2020). Delhi violence: police raid AISA student leader's home, seize phone. Available at: <https://thewire.in/government/delhi-violence-aisa-student-leader-kawalpreet-kaur-raid> (Accessed May 3, 2020).

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Kapoor. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Reaching at-Risk Student Populations During a Pandemic: The Impacts of Covid-19 on Prison Education

Desiree Ann Montenegro\*

Palo Verde College, Blythe, CA, United States

## OPEN ACCESS

### Edited by:

Anca Birzescu,  
Xi'an International Studies University,  
China

### Reviewed by:

Ganiu Oladega Okunnu,  
Crescent University, Nigeria  
Nora Abdul-Aziz,  
University of Toledo, Toledo, OH,  
United States

### \*Correspondence:

Desiree Ann Montenegro  
desiree.montenegro@  
paloverde.edu

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 10 September 2020

**Accepted:** 05 February 2021

**Published:** 22 March 2021

### Citation:

Montenegro DA (2021) Reaching at-Risk Student Populations During a Pandemic: The Impacts of Covid-19 on Prison Education. *Front. Commun.* 6:604963. doi: 10.3389/fcomm.2021.604963

Since the onset of the COVID-19 pandemic, higher education programs in prisons have suffered due to continued overcrowding, modified schedules, limited access to facilities, 21,183 documented COVID-19 positive cases in the United States Correctional Facilities, an over 11 million documented COVID-19 positive cases in Correctional Facilities across the globe and seemingly uncontrollable outbreaks. Existing challenges for prison education programs have been substantially exacerbated by the COVID-19 pandemic, emphasizing a need to reinvigorate correspondence instruction modalities of teaching so that effective instruction in prison systems can continue. This study analyzes the current situation, strengths, weakness and opportunities available for best communication practices within the established instructional modality in prison and correspondence education during the current pandemic.

**Keywords:** correctional education, COVID-19, institutionalized persons, correspondence education, incarcerated students

## INTRODUCTION

In this time of Global Pandemic, educators working with incarcerated students are faced with additional restrictions, constraints, and limitations within an already challenging environment for education and instruction (Lukacova, et al., 2018; University and College Union, 2020a; University and College Union, 2020b; University and College Union, 2020c; University and College Union, 2020d; University and College Union, 2020e; University and College Union, 2020f; Montenegro, 2020). Across the globe, millions are currently incarcerated; for example, the United States of America has 2,094,000, China has 1,710,000, Brazil 755,274, Russian Federation has 491,650, and India has 478,600 ranking as the top five most punitive countries with the highest rate of incarceration to date, and a global total of over 11 million (World Health Organization, 2020; World Prison Brief, 2020). Institutionalized Persons all have varied educational backgrounds, knowledge, abilities, and skills associated with formal education, even in countries with a universal right of access to 10 or more years of schooling. A large minority of incarcerated persons—commonly between 25 and 40 percent—face difficulties in math, reading, and digital literacy, as well as conducting basic social transactions (ONU, 1948; Plemons et al., 2018; Añaños et al., 2019).

The benefits of higher education programs in prisons have been legitimized. Research has shown that these programs can reduce recidivism rates and provide student inmates the skills necessary to reintegrate into society and the opportunity for career advancement (Brosens et al., 2020; Hughes, 2012; Smith, 2021). Education acts as a prerequisite for reducing recidivism and reintegration into society by providing access to the means of reconstructing one's self to benefit the community, governments, and the world (ONU, 1948; Añaños et al., 2019). Research shows effectively educated



prisoners are less likely to find themselves returning to prison after release (Vacca, 2004; Ellison et al., 2017; Szifris et al., 2018; Ortiz & Jackey, 2020). Revitalizing correspondence education may be one of the best means to accomplish these goals.

Although support for Prison education has grown in recent years, development in much-needed policy and funding does not match. For example, across the nation and arguably across the globe leaders are identifying way to assist incarcerated people to rehabilitate, advance and acclimate into society upon re-entry. Some suggestions that have been made for policy change include increasing funding for postsecondary and higher education in prison, restoring inmate access to the Pell Grant and similar funding sources, and expanding laws regarding equal opportunity employment to include the formerly incarcerated (Steurer and Educational Testing Service, 2020). Furthermore, outside of the prison system, and due to the COVID-19 pandemic, distance educational modality and capacities have been expanded, except correspondence education, which is the primary modality in which instruction is facilitated to student inmates enrolled in higher education programs (COVID-19 Preparedness Information – CDCR, 2020; Burke, 2020).

In 2003 the United States Department of Justice, Office of Justice Programs reported that more than 11% of the State Prison inmates, 24% of Federal inmates and 14% of non-Federal jail inmates, and 24% of probationers all were attending some form of college (U.S. Department of Justice Office of Justice Programs, 2003). Essentially students who are incarcerated and still part of the system in some fashion may have access to higher education during their term. In 2017 more than 7,000 students from over 35 different state prisons were recorded as active in a higher education program according to the California Community Colleges Chancellor's Office Divisions of Educational Services and Support.

Education is not always considered a right but rather a privilege in society, however, education should be seen as a basic human right that all nationals are required to protect, and enforce regardless of context, breaking past the confines of literal and figurative prison walls (ONU, 1948; Añños et al., 2019). Education has transformative possibilities, particularly as education has been, or failed to be, promoted within systems of incarceration (Courtney, 2019; O'Grady & Hamilton, 2019). That lesson must be learned by administrations, institutions, and politicians, so that an essential opportunity for education reform in prison is not lost.

The United States State of California has been a leader in acknowledging the impact that education has on meaningful rehabilitation of its inmate population. One of the ways the State has been leading is as an example by creating and facilitating programs of instruction for incarcerated populations focused on the possibilities and consequences education provides as factors for effective rehabilitation. The resultant programs aim to develop incarcerated writers/scholars through education, providing them with the tools needed to succeed in contemporary society. However, there is still work that needs to be done, and the pandemic has heightened multiple ways in which California's correctional institutions have not yet met their educational rehabilitation goals.

Education in prisons worldwide, and overcrowding in prisons as a result of criminalization of social and political behavior and habits along with the tough on crime variants across the globe, now add the current pandemic and its challenges further complicating an already rigid and bureaucratic systems of education and rehabilitation (COVID-19 Preparedness Information – CDCR, 2020; Montenegro, 2020; Population COVID-19 Tracking, 2020; World Prison Brief, 2020; Lukacova, et al., 2018; Manger et al., 2019; University and College Union, 2020a; University and College Union, 2020b; University and College Union, 2020c; University and College Union, 2020d; University and College Union, 2020e; University and College Union, 2020f; Montenegro, 2020; De Maeyer, 2019; UNESCO Institute for Education, 1995; Baggio et al., 2020). Moreover, with these unpredictable environments comes a clear need for advancing instructional practices in this specialized environment.

This perspective piece aims to identify possible communication strategies that have the potential of being replicated at all Correctional Institutions across the globe, and how those strategies are impacted by the effects of the Covid-19 pandemic. This perspective piece includes qualitative observation, analysis, and review of literature and practice with the intent of collecting information that may conclude best communication practices and recommendations for growth in distance education and face-to-face education in correctional institutions. This perspective piece may serve as a starting point for educators, Colleges, Universities, Rehabilitation and Education programs, and Correctional Facilities to gain some insight into this unique environment providing valuable information to aid in meaningful education and rehabilitation.

## HISTORICAL FRAMING OF PRISON EDUCATION

For this analysis, I focus on prison education in California due to my personal experience as an instructor in that system. California's educational rehabilitation system is managed by the California Department of Rehabilitation and Education (DORE). The core mandate for DORE is to create clear pathways for inmate rehabilitation through education and enrichment programs. The origins of the modern DORE program can trace back to the late 1800s at New York State's Elmira Reformatory. Rather than managing the prison as a housing facility for criminals, Warden Zebulon Brockway designed programs at this correctional facility in Upstate New York aimed at measurable rehabilitation goals for inmates at the facility. Education served as the core goal for Brockway's system, utilizing measurable/clinical behavioral analysis to determine how education could positively impact an inmate's ability to re-enter society as a form of behavioral change. The resulting process was an early attempt at a form of total person rehabilitation where education served as a primary means of complete person restoration. However, this early DORE model was less than perfect, with multiple allegations of 'cruel, brutal, excessive, degrading, and unusual punishment of the inmates, all

of which were later confirmed by investigative reports (Cabana, 1996). Thus, this initial DORE model led to a brief acceptance of education as a tool for rehabilitation in the Correctional system; however, it also illustrated an early need for prison reform due to the highly visible negative impacts on the inmate population. Not surprisingly, interest in the model declined in popularity in the early 1900s (Cabana, 1996). However, in the first half of the 20th Century, education based rehabilitation continued, with a focus on reaching the inmate as a potential useful member of society upon release (MacCormick, 1937; Schnur, 1948; Jenkinson & Jenkinson, 1953; Allen, 1958).

In 1959, William Nardini argued that prison education aided in bringing about a type of individual rehabilitation from the inside-out. "Educational training," Nardini argues, helps "bring about within the individual inmate a sense of well-being and tranquility which eventually permeates the entire penal social structure" (p. 3).

Nardini further argues that penal education programs must be fitted to the needs of each institution's specialized population. In 1974, Martinson presented a list of general questions designed to address the concerns brought up by Nardini and others who argued that individual institutions needed to evaluate the education needs, both vocational and academic, of their unique incarcerated populations (Nardini, 1959; Ubah and Robinson, 2003; Ward, 2009; Aheisibwe and Rukundo, 2018).

In recent decades, the unique needs of the California Correctional population and the challenges associated with overcrowding have amplified the need for DORE programs and their potential impact on recidivism (Torre & Fine, 2005; Sabol et al., 2009; Hausam et al., 2018; California Department of Corrections & Rehabilitation, 2020). Since the 1980s, state and federal budgets have shifted away from education to care of prisons, focusing on incarceration instead of rehabilitation (Torre and Fine, 2005). Exasperating the situation further, in 1994, Congress passed the "Violent Crime Control and Law Enforcement Act" essentially disqualifying prisoners from any financial aid or assistance for college eliminating the Pell Grant program established in the 1970s (Ubah and Robinson, 2003; Torre and Fine, 2005; McCarty, 2006; Ward, 2009). However, these challenges have not dissuaded this at-risk student inmate population according to the "Census of State and Federal Correctional Facilities, 2005": 85% of State and Federal facilities had educational classes with over 35% of them being higher education courses (Sabol et al., 2009). Critiques of the "prison-industrial-complex" of this era often highlight the move away from education and other rehabilitation goals and ground many current calls for prison reform.

## THE PANDEMIC, PRISONS, AND PRESENT SYSTEMIC INEQUITIES

The pandemic has further challenged the already complicated and bureaucratic systems of DORE that exist, particularly in light of prison overcrowding and racial inequities that permeate the current prison-industrial-complex (Baggio et al., 2020; UNESCO Institute for Education, 1995). According to the United States

Department of Justice Office of Justice Programs, at the end of 2015, the United States had approximately 1,526,800 prisoners in state and federal correctional facilities. California represented roughly 9% of that population (U.S. Department of Justice Office of Justice Programs and Harlow, 2018). Similarly, three years later at the end of 2018, the United States had approximately 1,465,200 prisoners in state and federal correctional facilities, with California representing roughly 9% of that population (U.S. Department of Justice Office of Justice Programs and Harlow, 2018). Across the globe, millions are currently incarcerated in the United States of America at 2,094,000 ranking as the most punitive country with the highest rate of incarceration to date, taking up 18% of the total global incarceration rates (World Health Organization, 2020; World Prison Brief, 2020).

What this tells us is that California has one of the highest prison populations within the United States, consistent with its high overall population totals. This is one of the rationales regarding how California's efforts to influence education standards and related programs will have potential reliability within this at-risk student population.

A recent report from the California Department of Corrections and Rehabilitation (2020) revealed, in its title, how "Several Poor Administrative Practices Have Hindered Reductions in Recidivism and Denied Inmates Access to In-Prison Rehabilitation Programs." The report focuses on California's DORE effectiveness, explaining how the recent state's goals have focused on transition to workforce after inmate release:

Total inmate population generally has declined in the State of California; however, recidivism rates for inmates are on the upturn at around 50 percent, and oversight is needed for effective facilitation of DORE programs (California Department of Correction and Rehabilitation, 2020).

This report resonates with the unique challenges this student body faces and the unique yet straightforward opportunities there are for sufficient growth. In response to a need for advocative roles needed within this system, programs such as Project Rebound, RISE, and California College Promise Grant have developed as well their related chapter within and throughout the state of California. The analysts explain that the programs are designed to assist inmate transition from the prison environment into ongoing academic pursuits, through a community of support, both vocational and encompassing potential higher education goals (Ludlow et al., 2019). However, this support system needs additional resourcing within as well as outside of the California Correctional system itself, and with clear pathways provided by institutions of higher education.

Currently, Post-Secondary education is offered at roughly 35 California Correctional institutions. These participating programs work in collaboration with The Office of Correctional Education of the Division of Rehabilitative Programs, California Community College Chancellor's Office, and over 34 different accredited California Colleges with instruction facilitated in varied modalities (California Department of Correction and Rehabilitation, 2020). However, tuition fees, textbooks and related course instructional materials all fall on the responsibility of the student inmate, which has

proven to present an insurmountable and progressively challenging roadblock to program completion and recidivism rates. These programs are valuable because they provide dual benefit for the student inmate, Milestone Completion Credit(s) and Education Merit Credit following the California Code of Regulations Title 15, and tools that can be used to prevent recidivism (California Department of Correction and Rehabilitation, 2020).

The ongoing issues regarding access to instructional materials is compounded by the social distancing and sanitization requirements of the Covid-19 pandemic. In many cases, the education department and facilities used to run these programs have been closed down altogether (CDCR Visitor Processing Appointment Scheduling System, 2020; Davis, 2020; Kurtzman, 2020). Significantly, these are the facilities that house the majority of educational materials and related staff who function as liaisons between the colleges and correctional facilities, including proctors and administrative staff that help the programs function (James, 2005; CDCR Visitor Processing Appointment Scheduling System, 2020). The quarantining of materials also impacts the functionality of these programs, with instructors often receiving materials from inmates well after quarter and semester terms have ended. For example in California, United States a statewide order was issued beginning Nov. 26, 2020 that ordered limited movement at all Adult, Youth, Fire Camp, and other facilities, all institutions were required to implement a mandatory 14-days modified program with little to no movement of staff and incarcerated population for COVID-19 mitigation purposes (Ventiecher, 2020; COVID-19 Preparedness Information - CDCR, 2020).

Further, pandemic exposure within the prisons themselves has impacted vendor-based functions within the prison systems (Kurtzman, 2020), including educational processes through the reshuffling of inmates within the California prison system, not all of which have educational facilities and programs attached, and, in some cases, higher levels of access blocks and restrictions. And inconsistent implementation of statewide and effective prison-specific mandates has also impacted the ability for educators to effectively reach their students and enter the prison environment safely during the pandemic (Ventiecher, 2020).

State Representative Sydney Kamlager explained, "As we have seen, jails and prisons have become petri dishes for this pandemic" (Davis, 2020). Senator Kamlager goes on to explain that staff and vendors, including educators, proctors, and school administrators, are also at much higher risk due to the population and overcrowding and outdated air circulation systems in the facilities (Davis, 2020). These problems are further identified by active scholars across disciplines (Bisharyan et al., 2020; Kurtzman, 2020; Lee & Green, 2020). Further, many inmates have contracted and developed symptoms of Covid-19, and statewide funding concerns exacerbated by expenses related to the pandemic have led to the partial or complete closure of some prison facilities, including the inability of educational staff and faculty to enter and facilitate required educational processes (CDCR Visitor Processing Appointment Scheduling System, 2020). For example, in May of 2020, only 2 months into the pandemic in the United States, over 500 prisoners in California

were diagnosed with Covid-19, and there were at least five reported deaths (Davis, 2020). By early November of 2020, the total had reached over 16,000 confirmed cases and 82 deaths (Bisharyan et al., 2020; Lee & Green, 2020).

Therefore, inmates who began programs have needed to shift to completely new or altered program requirements part-way through their degree and are thus being further disenfranchised (Newsom et al., 2020; Steurer and Educational Testing Service, 2020). Upon release, former inmates, some of whom have been released early in an attempt to lessen the impacts of overcrowding during the pandemic, continue to face challenges that existed prior to the pandemic. These challenges include a lack of clear reentry plans, a lack of clear educational pathways, and issues related to housing and food security (Anderson et al., 2018; Castro, 2018; Castro & Gould, 2018; Castro & Gould, 2019; Kurtzman, 2020). Covid-19 exposure in the system prior to release compounds this as time is needed for released inmates to enroll in Medicaid, and quarantine time is required prior to entering halfway houses and other housing facilities (Kurtzman, 2020). Further, prison education systems are correspondence-based, so former inmates have not all received the training required to enter the fully online distance-based education systems most colleges and universities shifted to due to Covid-19, many of which are themselves still in flux.

## THE NEED TO REVITALIZE CORRESPONDENCE EDUCATION

These many ongoing challenges have been highlighted by the pandemic, making them visible outside of the prison education system to a broader range of social justice advocates than prior to the problems related to the spread of Covid-19. Many of the challenges faced by California Detention Center (CDC) staff, instructors, administrators, facilitators, and students result from the unpredictability of the environment, coupled with the bureaucratic confines of the institution itself (U.S. Department of Justice Office of Justice Programs, 2018; U.S. Department of Justice Office of Justice Programs, 2016; U.S. Department of Justice Office of Justice Programs, 2003; Jacobs et al., 2019). The challenges such as overpopulation/overcrowding in prisons, infectious disease control, procedural requirements such as mandatory training, counts, and potential lockdowns serve to amplify pre-existing conditions. Furthermore, these challenges are exacerbated, with all operations standing still due to Covid-19 related restrictions, liabilities, and challenges.

Additionally, these challenges reflect those of many non-traditional educational environments which maintain correspondence formats, often involving communities with limited to no access to travel, resources, funding, and instructional materials, or with limited or controlled communication channels. This includes low-income students, rural students, and students in restrictive communities where government or social controls are in place. In this way, the perils of the prison education system not only echo but draw attention

to issues for at-risk and specialized student populations in a variety of settings.

While correspondence education may no longer be seen as common practice within distance education, it remains the only type of instruction possible for many at-risk and specialized student populations. It is important to note that these kinds of environments face unique challenges, unlike other settings where education is facilitated. Therefore, it is important not to neglect the needs of correspondence instructors, students, administrators, and systems due to a belief in their antiquated nature. Student enrollment figures in correspondence distance learning education programs along with a 500% prison population increase in the last 40 years indicate that a modality of teaching is growing needs continued development (Allen, 1958; Kim & Bonk, 2006; Allen & Seaman, 2010; Lei & Gupta, 2010; Caruth & Caruth, 2013; The Sentencing Project, 2018; Smith, 2021).

Prison education is by intent and design limited to correspondence practices. The prison functions as a system separate from educational institutions and processes, and while it is required to address those institutions' accreditation-based goals and policies, these same goals and policies can directly conflict with the needs and restrictions of the prison institutions themselves. As a result, decision making power and what can and what cannot be facilitated for the inmate students in their education program is a process that flows between multiple institutional entities, and often overlooks the needs and recommendations of instructors and students themselves. For example, a prison warden, who essentially is the final determining power and authority within the prison, need not be guided by pedagogical concerns. Similarly, many educational institutions working with prisons are concerned with standardizing processes and minimizing expense, again neglecting pedagogical best practices.

These differences and variations pose challenges for facilitators and educators, such as how to create applicable education programs and material that can effectively reach incarcerated students in multiple prisons. The challenge becomes how to successfully facilitate academic courses and the educational process in such an unpredictable and varied environment. The pandemic has added to this process, by adding additional stages within the communication processes between instructor and student, between instructor and educational institution, between instructor and facilitators, and between instructor and the prisons.

In order to address these many challenges, there are several aspects of correspondence education for incarcerated populations that need to be explored. First, one of the potential areas for growth includes additional support systems in programs that help to facilitate all inmate student population needs. One example of this could be equipped facilities in every California Detention Center (CDC) that has a DORE program as an essential requirement for funding. A second would be to set and maintain predictable hours and access that students can count on that would closely emulate the services that students would receive in the traditional post-secondary educational process. Other perceived support systems should be re-coded as essential and required.

During the pandemic, these challenges are ever present, but will cost in terms of funding, manpower, and goals-shifting for both the educational and correctional institutions. These recommended changes would be, at best, a starting point to help transition students from the Correctional Facility environment to the outside world and function support of their continued educational journey. Outreach via existing reform movements would also provide benefits. In the State of California, for example, those programs could be implemented within the prison and connected to existing external programs and resources, such as Project Rebound, Corrections to College, California, and Prison Scholars already present at California colleges and Universities. These connections would create additional support systems that are independently funded, objective, and not subject to conflicts of interest. They would also mirror the support systems implemented and provided at colleges and universities for on-campus and commuter students. These positions and programs would serve a facilitating, advocative role in the education process as well as serve as checks and balances within the system (Eggleston & Gehring, 1986). These additional follow up support services are needed to ensure that academic programs and education are both significant and in the interest of the rehabilitation of student inmates.

Additionally, since the current financial obligation for purchasing required textbooks for courses is on the inmate student, this places an additional burden. The pandemic has illustrated how delays in mailing and funding challenges prevent students from accessing essential instructional materials in time to complete required coursework. Therefore, a practical solution to this problem would be state-funded support for instructors, colleges, and universities to promote the development of Open Education Resources (OER) materials in correspondence education. This financial support would encourage the development of more free OER materials while also providing free of cost instructional materials to the student inmate population, therefore facilitating equitable and inclusive educational opportunities.

Also needed is pedagogy-based policy at the state level that would hold each warden accountable in implementing best practices that would facilitate effective instruction for inmate students. Some examples of this would be delaying transfers of inmate students until each academic term is complete, allowing access to facilities, technology, and equipment to aid completion of inmate student assignments. Some level of predictability and agreed upon standards are critical (Plemons et al., 2018; Boyce, 2019; Armstrong-Mensah et al., 2020; Loose & Ryan, 2020). Some of these changes include what students have access to, where, why, and to what extent. There are exponential benefits if these changes are incorporated in correctional institutions, colleges, and universities. Furthermore, all parties stand to benefit from these communication best practices.

Many educational institutions have been forced, by the pandemic, to expand their distance-learning educational capacities (Armstrong-Mensah et al., 2020; Loose & Ryan,



2020). This shift provides an opportunity to also expand and rethink the value of correspondence education to meet the needs of new, at-risk, and specialized populations. The ongoing challenges of the pandemic further highlight how staff, instructors, administrators, and facilitators must all be supported, both in terms of funding and in resources and training opportunities to generate the best practices necessary in this newly disrupted mode of education. While a number of the logistical challenges in prison education, such as overcrowding

and high recidivism rates are best addressed through prison reform efforts, the positive impacts of quality prison education can be facilitated through a focus on education reform.

## AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

## REFERENCES

- Aheisibwe, I., and Rukundo, A. (2018). Demographic variations in achievement goal orientations among prisoners on formal and vocational training in Uganda. *J. Prison Educ. Reentry* 5 (1), 83–96. doi:10.25771/cat7-hd44
- Allen, D. W. (1958). Vocational education, job training, and work trait evaluation techniques. *J. Correctional Educ.* 10 (4), 113–117.
- Allen, I. E., and Seaman, J. (2010). *Learning on demand: online education in the United States, 2009*. Newburyport, MA: Babson Survey Research Group. Available at: <http://sloanconsortium.org/publications/survey/pdf/learningondemand.pdf>.
- Añanos, K., Añanos-Bedriñana, F., and Rodríguez, J. A. (2019). Exercising fundamental rights in punitive conditions: education in Spanish prisons. *Int. J. Hum. Rights* 23, 1206–1220. doi:10.1080/13642987.2019.1601084
- Anderson, A. Y., Nava, N. J., and Cortez, P. (2018). The conduits and barriers to reentry for formerly incarcerated individuals in San Bernardino. *J. Prison Educ. Reentry* 5 (1), 2–17. doi:10.25771/sdf0-1631
- Armstrong-Mensah, E., Ramsey-White, K., Yankey, B., and Self-Brown, S. (2020). COVID-19 and distance learning: effects on Georgia state university school of public health students. *Front. Public Health* 8, 576227. doi:10.3389/fpubh.2020.576227
- Baggio, S., Peigné, N., Heller, P., Gétaz, L., Liebrezn, M., and Wolff, H. (2020). Do overcrowding and turnover cause violence in prison? *Front. Psychiatry* 10, 1015. doi:10.3389/fpsyt.2019.01015
- Bisharyan, J., Gardner, N., Soomal, J., and Komarla, A. (2020). *CDCR Institutions are 105 percent over capacity despite efforts to reduce population—breaking down Covid-19 in CDCR*. Davis, CA: The Davis vanguard. Available at: <https://www.davisvanguard.org/2020/11/breaking-down-covid-19-in-cdcr/> (Accessed November 11).
- Boyce, A. (2019). A re-imagining of evaluation as social justice: a discussion of the education justice project. *Crit. Educ.* 10 (1), 1–19. doi:10.14288/ce.v10i1
- Brosens, D., Croux, F., Claes, B., Vandevelde, S., and De Donder, L. (2020). An organizational analysis of foreign national prisoners' participation possibilities in Flanders (Belgium). *J. Prison Educ. Reentry* 6 (2), 144–161. doi:10.25771/mh4f-0996
- Burke, L. (2020). College programs in prisons go remote. *Inside Higher Ed*. Available at: <https://www.insidehighered.com/news/2020/06/18/college-programs-prisons-adapt-covid> (Accessed June 18).
- Cabana, D. A. (1996). The development and evolution of adult correctional education in the American penitentiary. Available at: Google Scholar (U.M.I. #9718169).
- California Department of Corrections & Rehabilitation (2020). Post-secondary education. Available at: <https://www.cdcr.ca.gov/rehabilitation/psel/>.
- Caruth, G. D., and Caruth, D. L. (2013). Distance education in the United States" from correspondence courses to the internet. *Turk. Online J. Distance Educ.* 14 (2), 141–149.
- Castro, E. L. (2018). Racism, the language of reduced recidivism, higher education in prison: toward anti-racist praxis. *Crit. Educ.* 9 (17), 1–14. doi:10.14288/ce.v9i17
- Castro, E. L., and Gould, M. R. (2018). What is higher education in prison? *Crit. Educ.* 9 (10), 1–16. doi:10.14288/ce.v9i10
- Castro, E. L., and Gould, M. R. (2019). Higher education in prison. *Crit. Educ.* 10 (13), 1–15. Available at: <https://ices.library.ubc.ca/index.php/criticaled/article/view/186525>.
- CDCR Visitor Processing Appointment Scheduling System (2020). CCVI visiting status—Covid 19. Available at: <https://visitorreservations.cdcr.ca.gov/VisitingStatus.aspx>.
- Courtney, J. A. (2019). The relationship between prison education programs and misconduct. *J. Correctional Educ.* 70 (3), 43–59.
- COVID-19 Preparedness Information - CDCR (2020). COVID-19 information. Available at: <https://www.cdcr.ca.gov/covid19/> (Accessed March 4, 2021).
- Davis, C. (2020). California governor proposes closing 2 prisons in response to Covid-19. *Business Insider*. Available at: <https://www.businessinsider.com/california-governor-closing-2-prisons-in-response-to-covid-19-2020-5> (Accessed May 16, 2020).
- De Maeyer, M. (2019). L'éducation en prison à la périphérie de l'éducation pour tous. *Int. Rev. Educ.* 65 (5), 811–832. doi:10.1007/s11159-019-09800-6
- Eggleston, C., and Gehring, T. (1986). Correctional education paradigms in the United States and Canada. *J. Correctional Educ.* 37 (2), 86–92.
- Ellison, M., Szifris, K., Horan, R., and Fox, C. (2017). A rapid evidence assessment of the effectiveness of prison education in reducing recidivism and increasing employment. *Probation J.* 64 (2), 108–128. doi:10.1177/0264550517699290
- Hausam, J., Lehmann, R. J. B., and Dahle, K.-P. (2018). Predicting offenders' institutional misconduct and recidivism: the utility of behavioral ratings by prison officers. *Front. Psychiatry* 9, 679. doi:10.3389/fpsyt.2018.00679
- Hughes, E. (2012). *Education in prison studying through distance learning*. New York, NY: Routledge.
- Jacobs, A., and Weissman, M. John Jay College of Criminal Justice, P. R. I. (PRI) (2019). "Mapping the landscape of higher education in New York state prisons," in *Prisoner reentry institute* (New York, NY: Prisoner Reentry Institute).
- James, S. J. (2005). *Census of state and federal correctional facilities*. Washington D. C., United States: Bureau of Justice Statistics. NCJ 222182. Available at: <http://bjs.ojp.usdoj.gov/content/pub/pdf/csfcf05.pdf> (Accessed October 1, 2008).
- Jenkinson, C. V., and Jenkinson, C. Y. (1953). Development in prisoner employment facilities. *J. Correctional Educ.* 5 (2), 34–37.
- Kim, K. J., and Bonk, C. J. (2006). The future of online teaching and learning in higher education: the survey says. *Educuse Quarterly* 4, 22–30.
- Kurtzman, L. (2020). *For prisoners, pandemic hits with greater force*. San Francisco Campus News, CA: University of California. Available at: <https://www.ucsf.edu/news/2020/10/418876/prisoners-pandemic-hits-greater-force> (Accessed October 25, 2020).
- Lee, I., and Green, S. (2020). Tracking the coronavirus in California state prisons. *Los Angeles Times*. Available at: <https://www.latimes.com/projects/california-coronavirus-cases-tracking-outbreak/state-prisons/> (Accessed March 5).
- Lei, S. A., and Gupta, R. K. (2010). College distance education courses: evaluating benefits and costs from institutional, faculty and students' perspective. *Distance Educ.* 130, 616–631.
- Loose, C. C., and Ryan, M. G. (2020). Cultivating teachers when the school doors are shut: two teacher-educators reflect on supervision, instruction, change and opportunity during the Covid-19 pandemic. *Front. Educ.* 5, 582561. doi:10.3389/feduc.2020.582561
- Ludlow, A., Armstrong, R., and Bartels, L. (2019). Learning together: localism, collaboration and reflexivity in the development of prison and university learning communities. *J. Prison Educ. Reentry* 6 (1), 25–45. doi:10.25771/134v-gn16
- Lukacova, S., Lukac, M., Lukac, E., Pirohova, I., and Hartmannova, L. (2018). Prison education in Slovakia from the teacher's perspective. *J. Prison Educ. Reentry* 5 (1), 63–79. doi:10.25771/z8dt-cn71

- MacCormick, A. H. (1937). "Present status of penal education," in *1937 Proceedings of the annual congress of the American Prison Association* (Indianapolis: W.B. Burford), 189–191.
- Manger, T., Eikeland, O. J., and Asbjørnsen, A. (2019). Why do not more prisoners participate in adult education? an analysis of barriers to education in Norwegian prisons. *Int. Rev. Educ.* 65 (5), 711–733. doi:10.1007/s11159-018-9724-z
- McCarty, H. J. (2006). Educating felons: reflections on higher education in prison. *Radical Hist. Rev.* 96, 78–94. 10.1215/01636545-2006-005.
- Montenegro, D. (2020). *Humanizing distance education for specialized populations with limited resources. 106th annual convention of the national communication association annual convention*. Indianapolis, IN, United States: Peace and Conflict Communication Division and International and Intercultural Communication Division. Available at: <https://ww4.aievolution.com/nca2001/index.cfm?do=cnt.page&pg=1011>.
- Nardini, W. (1959). The educational program in prison. *J. Correctional Educ.* 11 (2), 3–26.
- Newsom, V., Yeung, M., Curiel, L. L., Peña, A., Montenegro, D., Birzescu, A., et al. (2020). *The impact of social polarization on public health risk perception. 106th annual convention of the National Communication Association Annual Convention*. Indianapolis, IN, United States: Health Communication Division USA. Available at: <https://ww4.aievolution.com/nca2001/index.cfm?do=cnt.page&pg=1011>.
- ONU (1948). *Declaración Universal de los Derechos Humanos. Adoptada y proclamada por la Asamblea General en su resolución 217 A (III), de 10 de diciembre de 1948*. Washington D. C., United States: Department of State, United States of America. Available at: <http://www.un.org/es/universal-declaration-human-rights/>.
- Ortiz, J. M., and Jackey, H. (2020). *Educational and skill-based programming*. New York, NY: Routledge Handbook on American Prisons, 261–270.
- O'Grady, A., and Hamilton, P. (2019). There's more that binds us together than separates us": exploring the role of prison-university partnerships in promoting democratic dialogue, transformative learning opportunities and social citizenship. *J. Prison Educ. Reentry* 6 (1), 78–95. doi:10.25771/307x-2d27
- Plemons, A., Lockard, J., and Rankins-Robertson, S. (2018). "Something other than progress: indigenous methodologies and higher education in prison," in *Prison pedagogies: learning and teaching with imprisoned writers* (Syracuse, NY: Syracuse University Press), 88–105.
- Population COVID-19 Tracking (2020). COVID-19 information Available at: <https://www.cdc.ca.gov/covid19/population-status-tracking/>.
- Sabol, W., West, H., and Cooper, M. (2009). Prisoners in 2008: bureau of justice statistics. *NJC* 228417. Available at: <http://bjs.ojp.usdoj.gov/content/pub/pdf/p08.pdf> (Accessed September 2009).
- Schnur, A. C. (1948). The educational treatment of prisoners and recidivism. *Am. J. Sociol.* 54 (2), 142–147. doi:10.1086/220293
- Smith, V. S. (2021). "Exploring the potential of digital technology to reduce recidivism: a Delphi study on the digitalization of prison education [ProQuest Information & Learning]," in *Dissertation abstracts international section A: humanities and social sciences* (Ann Arbor, MI, United States: Proquest Dissertations Publishing), Vol. 82, Issue 1–A, 178.
- Steurer, S. J. and Educational Testing Service, E. C. for R. on H. C. and E (2020). "How to unlock the power of prison education. Policy Report," in *ETS center for research on human capital and education* (Princeton, NJ, United States: ETS Center for Research on Human Capital and Education), 42.
- Szifris, K., Fox, C., and Bradbury, A. (2018). A realist model of prison education, growth, and desistance: a new theory. *J. Prison Educ. Reentry* 5 (1), 41–62. doi:10.25771/qac7-9w77
- The Sentencing Project (2018). Trends in U.S. corrections. Available at: <https://sentencingproject.org/wp-content/uploads/2016/01/Trends-in-US-Corrections.pdf> (Accessed August 25, 2020).
- Torre, M. E., and Fine, M. (2005). Bar none: extending affirmative action to higher education in prison. *J. Soc. Issues* 61 (3), 569–594. doi:10.1111/j.1540-4560.2005.00421.x
- Ubah, C. B. A., and Robinson, R. L. (2003). A grounded look at the debate over prison-based education: optimistic theory versus pessimistic worldview. *Prison J.* 83, 115–129. doi:10.1177/0032885503083002001
- UNESCO Institute for Education (1995). *Basic education in prisons*. Vienna and Hamburg: United Nations Office at Vienna, Crime Prevention and Justice Branch, UNESCO Institute for Education. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000111660>.
- University, and College Union (2020a). UCU says suspend face-to-face prison education as staff don't even have basic handwashing facilities. University and College Union (London, UK). Available at: <https://www.ucu.org.uk/article/10730/UCU-says-suspend-face-to-face-prison-education-as-staff-dont-even-have-basic-handwashing-facilities?list=10700> (Accessed March 24, 2020).
- University, and College Union (2020b). Lockdown restrictions for prison educators. University and College Union (London, UK). Available at: <https://www.ucu.org.uk/article/11105/Lockdown-restrictions-for-prison-educators?list=10700> (Accessed November 5, 2020).
- University, and College Union (2020c). Covid-19 hazards and controls: considerations for ongoing review of risk assessments in prison education. University and College Union (London, UK). Available at: [https://www.ucu.org.uk/media/11208/Covid-19-hazards-and-controls-in-prisons/pdf/ucu\\_covid19\\_prisons-hazards.pdf](https://www.ucu.org.uk/media/11208/Covid-19-hazards-and-controls-in-prisons/pdf/ucu_covid19_prisons-hazards.pdf) (Accessed November 13, 2021).
- University, and College Union (2020d). Hazards and controls in prison education. University and College Union (London, UK). Available at: <https://www.ucu.org.uk/article/11125/Hazards-and-controls-in-prison-education?list=10700> (Accessed November 13, 2020).
- University, and College Union (2020e). MP highlights health and safety fears for prison educators as prison Covid cases jump. University and College Union (London, UK). Available at: <https://www.ucu.org.uk/article/11131/MP-highlights-health-and-safety-fears-for-prison-educators-as-prison-Covid-cases-jump> (Accessed November 17, 2020).
- University, and College Union (2020f). UCU warns of Covid safety issues and lack of technology in prisons. University and College Union (London, UK). Available at: <https://www.ucu.org.uk/article/11165/UCU-warns-of-Covid-safety-issues-and-lack-of-technology-in-prisons> (Accessed November 24, 2020).
- U.S. Department of Justice Office of Justice Programs (2003). *Bureau of justice statistics special report: Education and correctional populations (NCJ 195670). January, 2003*. Washington, D. C., United States: U.S. Department of Justice. Available at: <https://www.bjs.gov/content/pub/pdf/ecp.pdf>.
- U.S. Department of Justice Office of Justice Programs (2016). *Bureau of justice statistics special report: education and correctional populations (NCJ 195670), December, 2016*. Washington, D. C., United States: U.S. Department of Justice. Available at: <https://www.bjs.gov/content/pub/pdf/p15.pdf>.
- U.S. Department of Justice Office of Justice Programs Harlow, C. W. (2018). *Bureau of justice statistics special report: Education and correctional populations (NCJ 195670), April 2018*. Washington, D. C., United States: U.S. Department of Justice. Available at: <https://www.bjs.gov/content/pub/pdf/p18.pdf>.
- Vacca, J. S. (2004). Educated prisoners are less likely to return to prison. *J. Correctional Educ.* 55 (4), 297–305.
- Ventietcher, W. (2020). California prison staff showed "indifference" to masks even after COVID-19 deaths, report says. *The Sacramento Bee*, Available at: <https://www.sacbee.com/news/politics-government/the-state-worker/article246728471.html> (Accessed October 26, 2021).
- Ward, S. A. (2009). Career and technical education in U.S. prisons: what have we learned? *J. Correctional Educ.* 60 (3), 191–200.
- World Health Organization (2020). Fact sheet —health in prisons (2020). world health organization regional office for Europe. Available at: <https://www.euro.who.int/en/health-topics/health-determinants/prisons-and-health/publications/2020/fact-sheet-health-in-prisons-2020>.
- World Prison Brief (2020). Highest to lowest—prison population total | world prison brief. Available at: [https://www.prisonstudies.org/highest-to-lowest/prison-population-total?field\\_region\\_taxonomy\\_tid=All](https://www.prisonstudies.org/highest-to-lowest/prison-population-total?field_region_taxonomy_tid=All).

**Conflict of Interest:** The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Montenegro. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# The <Three Cs> of Japan's Pandemic Response as an Ideograph

Sasha Allgayer\* and Emi Kanemoto\*

Department of Communication, State University of New York at Geneseo, Geneseo, NY, United States

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
Bowling Green, OH, United States

### Reviewed by:

David Samuel Layfield,  
University of Maryland University  
College, Adelphi, MD, United States  
Andrew Donofrio,  
Columbus State University,  
Columbus, OH, United States

### \*Correspondence:

Emi Kanemoto  
kanemoto@geneseo.edu  
Sasha Allgayer  
allgayer@geneseo.edu

### Specialty section:

This article was submitted to  
Political Communication and Society,  
a section of the journal  
Frontiers in Communication

**Received:** 16 August 2020

**Accepted:** 15 February 2021

**Published:** 26 March 2021

### Citation:

Allgayer S and Kanemoto E (2021) The  
<Three Cs> of Japan's Pandemic  
Response as an Ideograph.  
Front. Commun. 6:595429.  
doi: 10.3389/fcomm.2021.595429

While the COVID-19 pandemic soared across the world and changed the political dynamics on a global scale, Japan was viewed by some news sources as a “miracle” exception that beat the anticipated projections by experts of how the virus would affect the nation. Though there are a number of potential guesses about Japan's initial pandemic outcome, which include low numbers of testing, an existing culture of mask-wearing, sanitation, and certain degree of social distancing, the political environment and communication from the government have also been accredited to the so-called “success” of Japan's pandemic experience. By using the concept of ideograph, this study rhetorically analyzes the key slogan that emerged from Japanese political discourse surrounding the COVID-19 situation: 3つの密 - Mittsu no Mitsu (The Three Cs). Specifically, the authors conclude the ways in which < Three Cs > function as a negative ideograph in this specific rhetorical context. By doing so, the authors argue that this slogan that stems from political discourse became culture-bound and serves as a present-day ideological construction in the form of an ideograph for collective governance to (un)justify certain behaviors.

**Keywords:** ideograph, ideology, political discourse, Japan, coronavirus, three cs

## INTRODUCTION

During the COVID-19 pandemic, worldwide political and politicized discourses surrounding the health emergency shaped and modified perceptions of social and cultural norms at the local, glocal, and global scales. On January 16, 2020, the Japanese Ministry of Health, Labor and Welfare confirmed the second known case of COVID-19 outside of China, after Thailand (World Health Organization, 2020b). Since then, Japanese authorities and health institutions have been both criticized by some and praised by others related to their response and actions pertaining to the pandemic. Though experts predicted at the start of the pandemic that Japan would be hit heavily by the virus with up to 400,000 deaths (Feder, 2020), Japanese society fortunately steered clear of such a path.

Despite having been among the first three nations to identify cases of the virus, the COVID-19 growth rate in Japan had been rather low since the onset. For perspective, the daily number of new confirmed cases stayed below 100 until March 28, reached a peak of 743 on April 12, and fell to stay below 100 consistently since May 16 until the end of June (Roser et al., 2020). Multiple news agencies and health experts raised questions about why Japan was able to escape the dark fate many other nations experienced with this pandemic initially, especially given that Japan only tested 0.2% of the population and neither enforced widespread shutdowns nor utilized surveillance technologies (Feder, 2020). In the Business Insider article, Feder (2020) claimed that much of the success has been attributed to the messaging from Japan's government, where “instead of encouraging social-distancing practices like staying 6 feet away from other people at all times, the government

told people to avoid the Three C's: closed spaces, crowded places, and close-contact settings" (para. 4).

Indeed, it could be that both the political discourse and general cultural norms of Japanese society had contributed to this seemingly positive outcome compared to the alarming statistics in much of the world. As such, this research study investigates how political discourse in Japanese society framed the COVID-19 pandemic in the earlier era from February to May 2020. The project specifically examines the rhetorical use of slogans in this period of the pandemic to answer the following research question: How did the Three Cs slogan used by Japanese politicians perform as an ideograph to persuade individuals to accept certain actions and alter perceptions of a rhetorical situation? That rhetorical situation in this case being the communication surrounding the pandemic itself.

The main goal of this project is to document the ways in which the earlier framing in political discourse to avoid the Three C's justified/unjustified certain decisions by the Japanese government, as well as certain behaviors of individuals under the COVID-19 pandemic crisis. This study is guided by the communication concept of ideograph, specifically documenting how the <Three Cs><sup>1</sup> could function as an ideograph in Japanese context as it relates to the rhetorical situation of the pandemic.

This paper proceeds as follows. First, the idea of political slogan as an ideograph is expanded in the literature review. Second, a brief summary of key events in Japan regarding COVID-19 as of May 2020 is provided, where the political speeches as materials of analysis are introduced. After exploring the role of the widely circulated slogan, avoiding the Three C's, this paper offers an analysis of how the political slogan functions as an ideograph within Japanese context. The discussion then offers a brief comparison to political communication from other nations, as well as some criticisms of Japan's pandemic response.

## LITERATURE REVIEW

The literature review below begins by outlining how political slogans can function as ideographs, followed by an explanation of positive and negative ideographs. Then, ideographs through an international lens are introduced. This concept of ideograph serves as the guiding theoretical framework for the rhetorical analysis.

### Political Slogans as Ideographs

In a study about slogans in the United States, Barry (1998) defined political slogans as "a catchword or rallying motto distinctly associated with a political party or other group" (p. 161). For slogans to be memorable, they typically include stylistic devices such as alliteration, repetition, and rhyme (Blythe, 2003; Koc and Ilgun, 2010). Further, these slogans could go beyond the political party or other groups to be endorsed by the nation as a whole

(Barry, 1998). It is when the public accepts slogans that shows their effectiveness, or conversely rejects that shows their ineffectiveness. In a parallel sense, Lu (1999) described slogans as "a particular form of public discourse aiming to unify public thoughts and agitate public actions and reactions" (p. 493). Further, Lu (1999) pointed out that a slogan is an ideograph, since the examination of political discourses characterized by slogans could unpack the practice of ideology.

In fact, McGee (1980) stated that "the political language which manifests ideology seems characterized by slogans, a vocabulary of 'ideographs' easily mistaken for the technical terminology of political philosophy" (p. 5). In this manner, slogans used in the political discourse to reinforce ideology can be understood as ideographs, which McGee (1980) described as common terms used and pervaded in political discourse in order to call for "collective commitment to a particular but equivocal and ill-defended goal" (McGee, 1980, p. 15; also see; Cloud, 2004; Condit and Lucaites, 1993; McGee and Martin, 1983). As Cloud (2004) claimed, an ideograph is a "vehicle through which ideologies...become rhetorically effective" (p. 288). Here, ideographs are capable of enforcing ideological beliefs and governing public behaviors as they are inundated with cultural meanings. This means that they can justify political practice of power, as well as certain actions and beliefs. Accordingly, these actions and beliefs can be considered as easily acceptable by the individuals in a community.

Moreover, ideographs that discourage certain behaviors are called *negative ideographs*, while ideographs that promote an ideal are called *positive ideographs* (Connelly, 2012). For instance, <rule of law>, <liberty>, <freedom>, <heritage> and <national security> often function as positive ideographs in United States context to justify certain practice of power and certain behaviors (see McGee, 1980; Ewalt, 2012; Connelly, 2012; Kelly, 2014). On the other hand, <terrorism> functions as a negative ideograph in the United States as a means of discouraging certain actions and beliefs among the general population (Jackson, 2011). Though ideographs within Japanese context are largely understudied, <和><sup>2</sup> [<harmony>], according to Kanemoto (2019), acts as an ideograph because it follows the four defining characteristics of ideographs that McGee (1980) outlined:

- (1) They are commonly used terms in political discourse;
- (2) They are abstract terms signifying collective commitment;
- (3) They justify the practice of power and certain behaviors and beliefs as acceptable; and
- (4) They are culture-bound.

It is important to note that through the process of invoking culturally embedded ideology, ideographs could be used as persuasive tools to alter perception of a rhetorical situation (Connelly, 2012).

<sup>1</sup>Angle brackets (<>) are typically used by rhetorical critics to indicate ideographs (see McGee, 1980; Cloud, 2004).

<sup>2</sup>There is an alternate understanding of ideograph through the Japanese lettering system, *kanji*, which is the one-character Chinese writing system. Some scholars label kanji characters themselves as ideographs. This paper, however, utilizes McGee (1980)'s concept of ideograph, which are unrelated to *kanji*.



Within international contexts, there have been a few scholars who have rhetorically studied political slogans, such as in Australia (see Young, 2006), China (see Lu, 1999; Lu and Simons, 2006; Hartig, 2018) and Turkey (see Koc and Ilgun, 2010). In one such case, the repeated usage of political slogans in the Red Flag bi-weekly journal published by the Chinese Communist Party from the early 1960s to the late 1980s shifted and modified the dominant cultural ideologies in China (Lu, 1999). The Los Angeles Times even headlined Red Flag as China's "Maoist Theoretical Journal" (The Los Angeles Times, 1988). Though the journal ceased publication in 1988, it was, according to Lu (1999), the "most authoritative, official, and representative journal" of the Chinese Communist Party (p. 504).

After analyzing the political slogans in the journal, Lu (1999) discovered that the rhetorical strategies used were comparable to those used by Nazi Germany and the Soviet Union. Yet, studies about political slogans are limited in political communication and there is a need to expand the understanding of political slogans as ideographs (Hartig, 2018). This need is evident from the potential rhetorical power of ideographs and far reaching persuasive ability to govern general populations while justifying/unjustifying certain behaviors and actions in the community. This current project is a case study that focuses on political slogans as a mode of ideographs, which can be viewed as effective rhetorical tools of articulating political goals, inducing political awareness, and shaping certain cultural attitudes (see McGee, 1980; Lu, 1999; Jasinski, 2010).

## Brief Timeline of Key Events and Materials Analyzed

While COVID-19 has spread globally at varying degrees since it was first discovered in Wuhan in late 2019 (World Health Organization, 2020c), this section provides a brief summary of selected key events of the early 2020 pandemic within Japanese context. Details are also provided about the analyzed speeches, starting with January 6th, when the Japanese Ministry of Health, Labor and Welfare called on Japanese citizens who had been in Wuhan and have certain symptoms, such as cough and fever, to have an immediate medical examination and report their travel history (Japan Broadcasting Corporation, n.d.a). Soon after the World Health Organization declared a global health emergency on January 30th, the Diamond Princess cruise ship, with an infected passenger on board, arrived at Yokohama port, in Japan. On February 13th, the first death in Japan related to COVID-19 was confirmed (Japan Broadcasting Corporation, n.d.a).

Given the worldwide impact of the pandemic on health, tourism, and politics, the International Olympic Committee and the Tokyo 2020 organizing committee jointly announced on February 24th that the 2020 Tokyo Summer Olympic and Paralympic Games, scheduled to begin in July, would be postponed until 2021 (The International Olympic Committee, 2020). It was soon after this announcement that Japanese authorities became more direct about the serious nature and need to combat the pandemic. Precisely, on February 28th, Governor Naomichi Suzuki of Hokkaido prefecture issued his own emergency declaration. He urged all residents to try to stay home, especially on weekends, due to the virus spreading in

Hokkaido; having reached 63 confirmed cases and two deaths at the time of the declaration (Japan Broadcasting Corporation, n.d.a; Yamaguchi, 2020).

Thereafter, a Novel Coronavirus Expert Meeting (新型コロナウイルス感染症対策専門家会議 - *Shingata Korona Uirusu Kansenshō Taisaku Senmonka Kaigi*), was held by a Japanese advisory body on March 9th. They publicly expressed that people need to eschew situations where the following three conditions overlap:

- (1) Closed spaces with poor ventilation [換気の悪い密閉空間]
- (2) Many people in crowded areas [多くの人々が密集]
- (3) Short-distance conversations and short-distance utterances (close-contact) [近距離での会話や発話(密接)] (Japan Broadcasting Corporation, n.d.a).

This was the first occurrence of the Three C's before they became a slogan. The kanji 密 [*mitsu*] repeats in each of the three conditions to signify 1) "closed," 2) "crowded," and 3) "close."

Nearly one month later, on April 7th, Prime Minister Shinzo Abe declared a state of emergency in seven out of 47 prefectures; Tokyo, Kanagawa, Saitama, Chiba, Osaka, Hyogo, and Fukuoka. Finally, the state of emergency was expanded to the entire country on April 16th (Japan Broadcasting Corporation, n.d.a). After just one month and a half, on May 25th, Prime Minister Abe announced the lifting of the state of emergency declaration across the entire country (Prime Minister of Japan and His cabinet, 2020c).

Throughout this time, the authors actively observed a total of eight speeches by Prime Minister Abe and 22 speeches by Governor of Tokyo, Yuriko Koike, that were made at press conferences dating from February 24th until the end of May. Both the Prime Minister's and Tokyo Governor's speeches were delivered in Japanese. Though Prime Minister Abe's cabinet provided provisional translations for all speeches in English and Chinese, Tokyo Governor's cabinet, as of May 13, provided summarized provisional translations for three speeches delivered on March 20th, March 27th, and April 3rd in English, Chinese and Korean (Tokyo Metropolitan Government, 2020c). One of the author's is fluent in Japanese and thus was able to translate the speeches. Since Japanese is a nuanced language, the authors at times sought clarification from another fluent speaker of Japanese unrelated to the study.

Though all 30 speeches were actively analyzed for this study, the focus for the purpose of this research is only on the rhetorical construction of the Three C's rather than dissecting each speech individually. Therefore, the following section begins with a rhetorical analysis of the Three Cs that emerged out of political discourse and took over as a slogan from there. The authors specifically draw connections between the political construction of the slogan and McGee's (1980) concept of ideograph.

## < 3つの密 - MITTSU NO MITSU> [< THREE CS >]

This section presents an analysis of the slogan to "Avoid the Three Cs" [三つの密, pronounced as *mittsu no mitsu*, or 三密,

pronounced as *san mitsu*], specifically noting McGee's (1980) four defining characteristics of ideographs, which are that they 1) are commonly used terms in political discourse, 2) are abstract terms signifying collective commitment, 3) justify the practice of power and certain behaviors and beliefs as acceptable; and 4) are culture-bound. First, the emergence of the slogan is introduced, followed by an analysis of how it was commonly used in political discourse as a culturally bounded term signifying collective commitment. Afterward, examples are provided about the way political authorities (un)justified certain practices of power, as well as certain behaviors and beliefs as acceptable. Ultimately, we conclude the analysis by interpreting how the <Three Cs> function as a (negative) culture-bound ideograph in this specific rhetorical context of political communication surrounding COVID-19 in Japan.

### <Three Cs> in Political Discourse

To begin, we analyze the emergence and use of the <Three Cs> within political discourse since the initial defining characteristic of ideographs, as outlined by McGee (1980), is that they are commonly used in such discourse. In order to unpack this, it should be first noted that it was not until the February 24th announcement that the 2020 Tokyo Summer Olympics would be postponed that the Japanese government began to directly alarm the serious nature of the pandemic. After the decision was announced to postpone the Games, both Tokyo Governor Koike and Japanese Prime Minister Abe began to publicly encourage and remind everyone to "Avoid the Three Cs [三つの密]" (see Tokyo Metropolitan Government, 2020a; Prime Minister of Japan and His Cabinet, 2020a). The Three Cs slogan echoed the recommendation shared by the Japanese advisory body's initial Novel Coronavirus Expert Meeting mentioned earlier. The first C stands for "confined spaces [密閉]", the second C stands for "crowded places [密集]", and the third C stands for "close-contact setting [密接]" (Prime Minister of Japan and His Cabinet, 2020a, para. 7).

The <Three Cs> were not just limited to speeches by Japanese politicians and the advisory body for COVID-19, but also through massive campaigns of public service announcements and materials such as flyers made jointly by the Prime Minister's Office and the Ministry of Health, Labor and Welfare (2020), urging everyone to "Avoid the 3Cs": *closed spaces, crowded places, and close-contact settings*. Additionally, as Blythe (2003) and Koc and Ilgun (2014) identified, for a slogan to be memorable, it must include stylistic devices. The Japanese pronunciation of the slogan (*mitsu no mitsu*) utilizes alliteration as a rhetorical stylistic device. Alliteration, as Davison (2008) explained, occurs when the initial letter or sound repeats in order to add emphasis or make a phrase more memorable. Therefore, the use of alliteration in "*mitsu no mitsu*" paves the way for it to become a memorable phrase. As a result, it can be considered as a slogan, even though the Japanese and Tokyo governments did not officially call it as such. This demonstrates that to "Avoid the 3Cs" is a commonly and repeatedly used phrase in political discourse. Though it emerged out of a fairly simple call to action from certain government officials, it spread throughout multiple public and

private sectors in Japan and functioned as an ideograph for collective commitment.

### <Three Cs> as Collective Commitment

As McGee (1980) outlined, collective commitment is another defining characteristic of ideographs. The first example of such a commitment happened to be about the closing and reopening of schools. To provide a brief context, at the end of February, Prime Minister Abe requested elementary, junior high, and high schools all over the country to temporarily close from March 2nd until the end of the school year, which is the end of March (Prime Minister of Japan and His Cabinet, 2020a; Japan Broadcasting Corporation, n.d.a). Later, the length of this request was extended, and then lifted little by little depending on the COVID-19 situation within each prefecture.

Schools in Japan typically start their academic year in April, but 93 percent of schools (kindergarten, elementary, junior high, high school, and special needs school) remained temporarily closed when they were supposed to open (Japan Broadcasting Corporation, n.d.b; Ministry of Education, Culture, Sports, Science and Technology of Japan, n.d.). Therefore, most schools nationwide were closed except for some areas that had rare cases of COVID-19, such as Iwate Prefecture, Tottori Prefecture and Kagoshima Prefecture (Japan Broadcasting Corporation, n.d.b).

Here, the <Three Cs> discouraged the collective group from being in crowded places, close-contact settings and closed spaces, which are all characteristics of classrooms in schools. This discouragement even fostered collective commitment in regards to in-person graduation and entrance ceremonies. Specifically, Prime Minister Abe requested graduation ceremonies be held with the minimum number of attendees necessary, if any (Prime Minister of Japan and His Cabinet, 2020b). Although this was a request and did not have any enforcement capability over the school systems, 92.2 percent of universities followed the request and either canceled graduation ceremonies altogether or requested parents not to attend the ceremonies, thus only graduating students could attend (Ishiwatari, 2020). Similarly, multiple universities canceled in-person entrance ceremonies at the beginning of April. It should also be noted that these decisions were made before the April 16 nationwide state of emergency declaration, which highlights the proactive collective commitment by school authorities.

When restrictive suggestions eased, avoiding the <Three Cs> furthered collective commitment after certain guidelines to re-open schools were provided by the Ministry of Education, Culture, Sports, Science and Technology of Japan. For example, the school systems were urged to thoroughly take measures to avoid the <Three Cs> at each educational facility (see Prime Minister of Japan and His Cabinet, 2020a). One such measure came in the form of a suggestion to have staggered school attendance by dividing students into two cohorts (Japan Broadcasting Corporation, n.d.b). In Saitama Prefecture, this worked by dividing elementary and junior high school students into morning and afternoon groups to attend classes in order to manage the number of students at a given time in

school facilities (Nihon Keizai Shimbun, 2020). This would in essence reduce the number of people in confined places, crowded spaces and closed-settings. In addition, daily temperature measurements were in effect and schools were ready to maintain social distancing between students in order to eschew the Three Cs in classrooms. It is clear that the general educational system under the COVID-19 pandemic in Japan became a pivotal institution to enact the avoidance of the <Three Cs> through collective commitment across government officials, educational institutions, as well as student and parent bodies.

Beyond the general educational system under the COVID-19 pandemic, such a collective commitment to avoid the <Three Cs> was also observed at the organizational setting, public transportation, and public events. There was a joint effort between Minister Kato of Health, Labor and Welfare, Minister Kajiyama of Economy, Trade, and Industry, and Minister Akaba of Land, Infrastructure, Transport and Tourism to request Japan's Business Federation, Japan's Chamber of Commerce and Industry, Japan's Association of Corporate Executives, and Japan's Trade Union Confederation to cooperate with preventing the spread of infection (Ministry of Health, Labor, and Welfare of Japan, n.d.). One of their major requests was to adapt telework and staggered commuting (Ministry of Health, Labor, and Welfare of Japan, n.d.).

Major companies stationed in Japan, such as Sony Corp., Hitachi Ltd. and NEC Corp. then continued to hold telework arrangements even after the state of emergency was lifted out of principle in order to reduce the risk of infection (Kyodo News, 2020c). Fujitsu Ltd. continued to push remote working for more than 80,000 of their domestic employees (Kyodo News, 2020b). The employees were also allowed to use their time flexibly if they must come to the physical workplace, where the company used to have core working hours. By doing so, not only are they protecting the workplace and their workers, but these companies also reduce the overlapped <Three Cs> during daily commutes by trains, since trains are *confined*, *crowded*, and *closed-settings*. In this case, eschewing the <Three Cs> was enacted to further collective commitment at the work setting under the current COVID-19 situation.

## <Three Cs> (Un)Justifying Certain Behaviors

Next, we analyze the <Three Cs> in relation to the third defining characteristics of ideographs—ideographs justify the practice of power and certain behaviors and beliefs as acceptable. Through the analysis, it becomes clear that the slogan of avoiding the <Three Cs> has justified the government request as well as actions among the individuals in Japanese society. In this section, we present examples of how the <Three Cs> (un)justified certain practices of power and behaviors as (un)acceptable, ultimately paving the way for it to operate as a negative ideograph.

One of the first direct situations of practicing power occurred when Tokyo Governor Koike held an urgent press conference to request the residents of Tokyo to refrain from going to customer services places, specifically food and drink spaces, bars, and nightclubs that are open from night time to early morning

(Tokyo Metropolitan Government, 2020b). She emphasized that these spaces could have conditions for the <Three Cs> in a denser manner. As much as avoiding the <Three Cs> govern people's behaviors and justify certain actions, there were still some who failed to avoid them. Any public figures that violated avoiding the <Three Cs> though were publicly criticized by the media.

For instance, Yuya Tegoshi, who was a member of a well-known boys' band, went to eat at a restaurant with a group of people during Japan's COVID-19 nationwide state of emergency (Sport Hochi, 2020). Immediately after the media reported about his group dinner, his agency prevented him from any entertainment activities. Later, he officially left his agency, but opened a personal Twitter account and a personal YouTube channel to try to remain active in the industry despite the criticism against him (The Chunichi Shimbun, 2020).

In a similar story, a gossip magazine reported a get-together and vacation in Okinawa between well-known celebrities Takayuki Yamada, Mackenyu Arata, and Niki Niwa (Friday Digital, 2020a; Friday Digital, 2020b). These public figures' behaviors activated the justification of <Three Cs>, and accordingly their actions were heavily criticized by the media and larger society. These examples demonstrate that the <Three Cs> unjustify certain behaviors and govern people's perspective toward these behaviors. Through this example, we can see McGee's (1980) explanation of how an ideograph "warrants the use of power, excuses behavior and belief which might otherwise be perceived as eccentric or antisocial, and guides behavior and belief into channels easily recognized by a community as acceptable and laudable" (p. 15). By publicly shaming those that violate the new ideology of the Three Cs, the rhetorical use of the <Three Cs> ideograph dictates what is acceptable and unacceptable under the current COVID-19 situation. It becomes clear that through this rhetorical usage within the context of COVID-19 in Japan, the <Three Cs> justify practice of power, as well as certain actions and beliefs as acceptable while others unacceptable.

Further, as McGee (1980) suggested, "ideology in practice is a political language, preserved in rhetorical documents, with the capacity to dictate decision and control public belief and behavior" (p. 5). In this similar vein, the <Three Cs> was used as political language by authorities in power with the intent to persuade public belief and control behavior related to the new way of living under the COVID-19 pandemic. As Prime Minister Shinzo Abe declared, "Our goal is to create a new normal for our everyday lives. From now on, let us change our mode of thinking" (Prime Minister of Japan and His Cabinet, 2020c, para. 8). Therefore, the intent behind this ideograph can be understood as present-day ideology formation.

As part of that (un)justification of certain behavior, there is a common understanding of the negative connotation with the <Three Cs>. Therefore, we argue that the <Three Cs> acts as a negative ideograph since it serves to discourage the general population from engaging with certain behavior. It should be noted that negative ideographs are not necessarily bad as the word negative might imply, but rather they discourage instead of encourage certain behavior. In this case, the <Three Cs> are

collectively considered as something to avoid. Precisely, with the aim that individuals in Japanese society try to stop spreading COVID-19, protect themselves and others in the community, and prevent themselves from giving or receiving the virus. Thus, the Three Cs symbolize collective commitment to discourage individuals from certain behaviors that put themselves and others in certain conditions.

### <Three Cs> as Culture-bound

Finally, the <Three Cs> appears to be culture-bound in Japanese community. McGee (1980) explained the notion of ideographs as culture-bound when “each member of the community is socialized, conditioned, to the vocabulary of ideographs as a prerequisite for ‘belonging’ to the society” (p. 15). Since the <Three Cs> rhetoric emerged from and spread out specifically around Japanese political discourse, it began the conditioning for what norms one must follow in order to belong in this ‘new’ culture of pandemic Japan, as Prime Minister Abe described. This cultural shift was observed through specific political campaigns that promoted new ways of enacting lifestyles.

For instance, the Go To campaign, which is an initiative of Japan’s national government, directly promotes and establishes the “new lifestyle [新たな生活様式]” in the era of COVID-19 while activating the avoidance of the <Three Cs> (e.g., Ministry of Land, Infrastructure, Transport and Tourism, 2020, p. 7; also see Ministry of Agriculture, Forestry and Fisheries of Japan, 2020; Ministry of Economy, Trade and Industry, 2020a; Ministry of Economy, Trade and Industry, 2020b). It includes four specific sub-campaigns aimed at assisting local industries significantly impacted by the pandemic: Go To Travel, Go To Eat, Go To Event and Go To Shotengai (shopping streets). The Go to Travel campaign states that they aim to establish and normalize “a safe and secure travel style [安全で安心な新しい旅のスタイル]” in this new era of COVID-19, as well as recover lost travel demand and stimulate local tourism-related consumption during travel (Ministry of Land, Infrastructure, Transport and Tourism, 2020, p. 7). The travelers and participating businesses (travel agencies, accommodation businesses, etc.) are to thoroughly engage with the avoidance of the <Three Cs> in this new culture of travel.

Similarly, the goal of the Go to Event campaign is to promote and normalize a new lifestyle with respect to various events related to cultural arts, sports and more, while reducing risk of the <Three Cs> (Ministry of Economy, Trade and Industry of Japan, 2020a). Along that trajectory, the Go to Eat campaign introduces how to enjoy eating at restaurants and other public spaces while staying safe under the COVID-19 condition (Ministry of Agriculture, Forestry and Fisheries of Japan, 2020). The Go to Shotengai (shopping streets) campaign aims to inform a safe way of going to shopping districts based on this new lifestyle, also. Together, the Go To campaigns with these four components of travel, event, eat, and shotengai, infuse the avoidance of the <Three Cs> into a new lifestyle within the Japanese cultural system (Ministry of Economy, Trade and Industry of Japan, 2020b).

This culture-bound aspect of the <Three Cs> demonstrates how the element of governing public consciousness seeps through

the ideograph. As McGee (1980) explained, an ideology created by terms used through political discourse “governs or ‘dominates’ our consciousness. In practice, therefore, ideology is a political language composed of a slogan-like term signifying collective commitment” (p. 15). The Japanese phrase for the <Three Cs> [3つの密 - *Mittsu no Mitsu*], thus can be classified as such a slogan-like term that is culture-bound and signifies collective commitment. That collective commitment of the ideograph in the case of the COVID-19 rhetorical situation is to halt the spread of the virus, which becomes culture-bound given the breath and spread of campaigns to protect not just one’s own health, but also that of protecting others, and by extension, protecting the economy that many world leaders seem to focus on when making decisions.

## DISCUSSION

The discussion section highlights the key findings from the analysis above while offering some alternate experiences that have occurred and criticisms of the Japanese response to COVID-19, in order to paint a more holistic image regarding the realities faced by Japanese citizens. In addition, given that the COVID-19 pandemic has been experienced as a worldwide phenomenon rather than solely Japanese, we offer a description of political slogans that emerged from certain governments that are considered successful in their response, as well as some that have been criticized regarding their COVID-19 rhetoric as brief comparative points. To conclude, limitations, implications, and potential future directions for the study are also addressed.

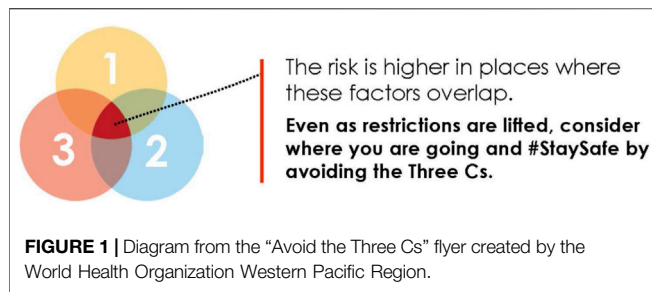
### The Rhetorical and Political Power of Japan’s <Three Cs>

Since the onset, Japan had largely been looked at as a “mystery” in regards to COVID-19. A common online news discourse emerged similar to what Sposato (2020) wrote for Foreign Policy: “In the battle with the coronavirus, Japan appears to be doing everything wrong . . . Yet with among the lowest death rates in the world, a medical system that has avoided an overloading crisis, and a declining number of cases, everything seems to be going weirdly right” (para 1). Perhaps where Japan had gone right was precisely in the rhetoric of their political discourse.

Based on observations and analyses of the speeches made by the Prime Minister of Japan and Governor of Tokyo at press conferences between February and May 2020, we argue that the <Three Cs> from their political discourse can be considered as a negative ideograph under the specific COVID-19 rhetoric in Japanese context. After all, the <Three Cs> followed the pattern with the four defining characteristics of ideograph provided by McGee (1980). The slogan:

- (1) was a commonly used term in political speeches;
- (2) was an abstract term symbolizing collective commitment to prevent the spread of COVID-19;





- (3) justified the practice of power and actions to eschew the condition of the Three Cs, as well as unjustified actions activating the Three Cs; and
- (4) was culture-bound in Japanese society.

Those four elements together were exemplified through all facets of society; the government, educational systems, organizational structures, as well as the general public and media coverage.

Avoiding the Three Cs ideology has even been used by the World Health Organization, specifically the Western Pacific Region branch, which includes Japan. They likewise have circulated a flyer that urged everyone to avoid: “1) Crowded places with many people nearby 2) Close-contact settings, especially where people have close-range conversations, and 3) Confined and enclosed spaces with poor ventilation” (World Health Organization, 2020a, para 2). They even include a venn-diagram to emphasize that “the risk is higher in places where these factors overlap” (see **Figure 1**).

This slogan of the <Three Cs> had also been noticed by non-Asian/Pacific media agencies. For example, Business Insider headlined an article about how “Japan avoided a lockdown by telling everyone to steer clear of the 3 C’s” (Feder, 2020). In the article, Feder (2020) addressed that “Lockdowns in the United States have been framed as extreme, temporary procedures, while in Japan the three C’s have been framed as a new, permanent lifestyle for residents” (para. 15). This again pinpoints to another example of how the <Three Cs> are guiding others’ behaviors in this rhetorical situation. The culture-bound element of the ideograph is likewise present since it is understood within the current cultural context of Japan, as well as the collective commitment toward this new way of life. Slogans used to combat COVID-19 and persuade culture during the pandemic are not unique to Japan though, as they have been observed across the world, albeit to varying degrees of success.

## International Comparisons of COVID-19 Political Slogans

As of July 2020, various political messages have been promoted regarding the COVID-19 pandemic by nation states, political agencies, and nationally/globally influential interest groups. Some national political responses have been praised, such as New Zealand, who have been described by Paul Garwood, head of leadership and communications at the World Health Organization, as having “led the way in demonstrating how a

Government can readily respond to an emergency and implement guidelines from the WHO” (as cited in Deguara, 2020, para. 3). The World Health Organization even created a mini-documentary highlighting New Zealand’s pandemic response (see World Health Organization, 2020d). Unlike in Japan though, the approach in New Zealand is one of both extremely strict requirements and empathetic communication from government officials.

For example, the prime minister of New Zealand, Jacinda Ardern, swiftly instructed all people to “act like you have COVID-19” when declaring a nation-wide month-long lockdown for everyone when the nation accumulated just 205 total cases (Menon, 2020). Yet, according to a (BBC News, 2020) article, the success of New Zealand’s response to COVID-19 rests mainly on the clarity of government messages, which were kind, supportive, empathetic, and supported by science. The prime minister and her cabinet even took a six-month 20 percent pay cut to show solidarity with their citizens (BBC News, 2020). Perhaps this could be seen as a “collective commitment” from government officials themselves. Similar to Japan though, slogans were a common thread in New Zealand where they used “Unite Against COVID-19” during the initial lockdown and “Unite for Recovery” once the lockdown ended (Davison, 2020). In line with the empathetic nature of official government communication, “Stay home, stay safe, and be kind” also emerged as a government slogan (Pacific Media Center, 2020).

On the other hand, the United Kingdom drew cross-continental criticism across multiple facets in their response and handling of the COVID-19 pandemic (Henley, 2020). Though they had a series of slogans like New Zealand and Japan, the slogans in the United Kingdom were at varying degrees of success. The initial slogan, “Stay home, protect the NHS, save lives” (NHS referring to the National Health Service, the publicly funded healthcare system in the United Kingdom) was introduced in March and reminded citizens of their duty to stay home (McGuinness, 2020). Once lockdown restrictions were eased, a second slogan emerged from political discourse: “Stay alert, control the virus, save lives,” which received criticism from officials and the general public for being vague and unclear (McGuinness, 2020).

Afterward, “Hands, face, space” became the slogan unveiled by Prime Minister Boris Johnson with a press conference and tweet on July 31st. The tweet included text, the hashtag #HandsFaceSpace, and a graphic with three images of Prime Minister Johnson; one with “Wash Hands” written over an image where he washes his hands, another with “Cover Face” written over an image where he wears a face mask, and the third with “Make Space” written over an image where he stands alone (Johnson, 2020). According to Waterson (2020), this was the prime minister’s third attempt and may have been inspired from a slogan in Catalanian political discourse: “Distància, mans, mascareta [*Distance, hands, mask*].” Like in Japan and New Zealand, recovery related campaigns and slogans also surfaced from political discourse in the United Kingdom, such as “Eat out to help out” (McGuinness, 2020; Waterson, 2020), which could be connected to the justification of certain behaviors characteristic of ideographs.

Like the United Kingdom, the United States government had also received extensive criticism for their response and handling of the COVID-19 pandemic. Former director general of the World Health Organization, Gro Harlem Brundtland, claimed the United States was even counterproductive during the pandemic (Kyodo News, 2020a). It is perhaps interesting that unlike the other political entities mentioned in the study, the United States did not seem to have a national slogan to combat COVID-19 or influence behavior. However, such attempts did exist at local and state levels. In many cases, slogans were sought out from the public rather than emerging out of political discourse.

For example, the city of Newark, New Jersey along with the Mayor's Office and in collaboration with their Board of Education created a contest with monetary prizes for students to create original public service announcements featuring a catchy slogan (Newark Board of Education, 2020). Boston University likewise solicited help from their communication students, in what resulted in adopting and filing a trademark for the slogan, "F\*ck It Won't Cut It" (DeCosta-Klipa, 2020). According to graduate student and the campaign's public relations manager, Hailey McKee, the slogan was based on the idea that "saying 'F-it' to responsible protocols won't keep [students] on campus" (DeCosta-Klipa, 2020, para 11). Given that many of the slogans in the United States emerged out of public discourse or the local level, they appear to fail to meet that "commonly used in political discourse" condition of an ideograph. Just as many countries around the world have been criticized for various reasons, Japan's COVID-19 government response was likewise not free from criticism despite the perceived success of their slogan use.

## Alternate Realities in Japan

Not all was utopic in regards to the politics surrounding COVID-19 in Japan. First, the perceived success of the <Three Cs> is not a sole contributing factor to the low rates of COVID-19 in Japan. There have been criticisms that Japan has low numbers because they have not tested as many people (see Wingfield-Hayes, 2020). There have also been connections to the fact that mask-wearing had already been a common cultural norm since ancient times in Japan when it was common to cover one's "mouth with paper or the sacred *sakaki* (Japanese cleyera) leaves to prevent one's 'unclean' breath from defiling religious rituals and festivals" (Martin, 2020, para. 25). Centuries later, during the 1918 flu pandemic, masks officially became everyday products for common people in Japan and have remained as part of the culture since (Martin, 2020).

Other criticisms come from residents of Japan themselves, who have expressed major discontent with their politicians. Based on a multi-national survey about government leaders' responses to the COVID-19 pandemic, Japan's leaders achieved the worst public rating out of all 23 nations and regions surveyed (Jiji News and Kyodo News, 2020). Japan's support rating was 5 percent for how their political leaders dealt with the pandemic crisis. For comparison, China received an 86 percent and the United States a

32 percent, while the average of all countries was 40 percent (Jiji News and Kyodo News, 2020).

Much of this virtually no support stems from criticism that Abe's administration delayed in declaring a state of emergency (Jiji News and Kyodo News, 2020). There was also a delay in active response related to the mask-shortage in Japan at the start of the pandemic (Akiyama, 2020). By the time the government had finally mailed two masks to each citizen, many residents across Japan had learned how to create their own masks thanks to social media tutorial videos. When the government finally mailed the masks, many locals thought it was too late since they made their own and criticized the cost of the 'two-mask' plan, which *Asahi Shimbun* (2020) reported at \$424 million (46.6 billion yen). Much of the criticism involves the lack of direct and strict action from the government though, while the political discourse used to influence collective action, (un)justify certain behaviors, and culturally bound the <Three Cs> is more indirect and reliant on the public to self-enforce. This demonstrates how ideographic criticism can reveal political irony since the public's perception of the government's performance seems incongruent with the messaging of the Three C's campaign at the very early stage of the pandemic.

It should also be acknowledged that although this study focused from the February to May 2020 timeline, there have been alternate experiences in Japan since then. Though daily new infection numbers remained relatively low and stable through June, it began to increase starting in July. The number of new cases went over 100 on July 2nd, then a peak of 1,581 by August 8th, followed by a drop through September to a second peak of 1,370 new cases by November 16th (Roser et al., 2020). Regardless of the change in trend for Japan's COVID-19 situation, the <Three Cs> continue as a culture-bound negative ideograph to govern and remind the public about their collective commitment to avoid certain behaviors in order to protect themselves and others.

## CONCLUSION

This study focused on political discourse specifically within Japanese cultural context with the aim to document the role of the widely circulated slogan, avoiding the *Three Cs*. In terms of ideologies, McGee (1980) explained that two exist at any specific moment within a culture. One is a "historically defined structure of ideograph meanings expanding and contracting from the birth of the society to its present" (McGee, 1980, p. 14). In this case, the ideograph should have historical roots to an already existing ideology from the past. However, one theoretical limitation of the study is that the <Three Cs> is a new and ongoing phenomenon that has taken over the Japanese political and cultural sphere as we write this research in 2020. Thus, there cannot be a historical structure to analyze with this ideology.

On the other hand, the <Three Cs> does meet the second condition for ideologies, which McGee (1980) described as *rhetorical* or "situationally defined synchronic structure of ideograph clusters constantly reorganizing itself to accommodate specific circumstances while maintaining its

fundamental consonance and unity” (p. 14). The <Three Cs> are specific to the rhetorical situation that emerged upon the COVID-19 pandemic political discourse in Japan. The ideograph was used to justify certain behaviors while unjustifying others, and worked to accommodate this specific circumstance while maintaining unity. Therefore, the <Three Cs> for now must be understood through the rhetorical perspective of ideologies rather than the historical. Future studies may benefit from a historical element to the <Three Cs> ideograph, and perhaps even a cross-cultural comparison at both the historical and rhetorical aspect given that varying political slogans have surfaced across the world under the COVID-19 situation.

The ideograph also served as a form of collective governance without the authorities having to create any specific laws or regulations punishable by fines that have been implemented in some other nations, such as Australia where states have raised millions of dollars from COVID-19 related fines (see Meixner et al., 2020). The influence of this new rhetorical ideograph even went beyond Japanese society to other governments and institutions. In July 2020, India’s Medical Education Minister, Dr K. Sudhakar, stated “that people should avoid the three ‘Cs’ - Closed spaces with improper ventilation, crowds (of more than two people) and close-contact settings” (Express News Service,

2020, para. 3). Sudhakar had taken it further though and “urged citizens to follow the three “Ws” - watch your distance (maintain six-feet distance), wear masks in public and wash hands frequently” (Express News Service, 2020, para. 4). Perhaps for future studies evaluating the historical element of the ideology, the <Three Ws> may serve an ideograph of its own or combine with the <Three Cs>. Given that Japan continued a culture of mask-wearing after they were mass-enforced during the 1918 flu pandemic, future studies may also analyze if and how the <Three Cs> continue or transform the political and culture-bound aspect in Japan post-COVID-19 pandemic.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## AUTHOR CONTRIBUTIONS

All authors contributed to the article and approved the submitted version.

## REFERENCES

- Akiyama, S. (2020). Where are the masks? Japan gov’t struggles in bid to boost supplies. *The Mainichi*. Available at: <https://mainichi.jp/english/articles/20200427/p2a/00m/0na/005000c> (Accessed April 27, 2020).
- Asahi Shimbun (2020). 46.6 billion yen needed to carry out Abe’s “two-mask” plan. *The A Asahi Shimbun*. Available at: <http://www.asahi.com/ajw/articles/13287353> (Accessed April 10, 2020).
- Barry, H. (1998). “Functions of recent U.S. presidential slogans,” in *Politically speaking: a worldwide examination of language used in the public*. Editors O. Feldman and C. Landtsheer (Westport, CN: Greenwood Publishing Group).
- BBC News (2020). Coronavirus: how New Zealand relied on science and empathy. *BBC News*. Available at: <https://www.bbc.com/news/world-asia-52344299> (Accessed April 20, 2020).
- Blythe, J. (2003). *Essentials of marketing communications*. Upper Saddle River, NJ: Prentice-Hall.
- Cloud, D. (2004). “To veil the threat of terror”: Afghan women and the in the imagery of the U.S. war on terrorism. *Q. J. Speech* 90 (3), 285–306.
- Condit, C., and Lucaites, J. (1993). *Crafting equality: America’s Anglo-African word*. Chicago, IL: University of Chicago Press.
- Connelly, E. (2012). State secrets and redaction: the interaction between silence and ideographs. *West. J. Commun.* 76 (3), 236–249. doi:10.1080/10570314.2011.653470
- Davison, I. (2020). Covid 19 coronavirus: government reverts to “unite against Covid-19” campaign name. *New Zealand herald*. Available at: <https://www.nzherald.co.nz/nz/covid-19-coronavirus-government-reverts-to-unite-against-covid-19-campaign-name/5aj5op7yvkud4en6ir3nh5vve/> (Accessed July 10, 2020).
- Davison, J. (2008). Rhetoric, repetition, reporting and the “dot.com” era: words, pictures, intangibles Accounting, *Auditing Account.* J. 21 (6), 791–826.
- DeCosta-Klipa, N. (2020). Boston University adopts profane slogan to get students to follow COVID-19 guidelines. *Boston.com*. Available at: <https://www.boston.com/news/coronavirus/2020/08/12/boston-university-profane-slogan-coronavirus> (Accessed August 12, 2020).
- Degura, B. (2020). Coronavirus: WHO showcases, phrases New Zealand’s effective Covid- 19 response with documentary. *Stuff*. Available at: <https://www.stuff.co.nz/national/health/coronavirus/122247181/coronavirus-who-showcases-praises-new-zealands-effective-covid19-response-with-documentary> (Accessed July 24, 2020).
- 2020, para. 3). Sudhakar had taken it further though and “urged citizens to follow the three “Ws” - watch your distance (maintain six-feet distance), wear masks in public and wash hands frequently” (Express News Service, 2020, para. 4). Perhaps for future studies evaluating the historical element of the ideology, the <Three Ws> may serve an ideograph of its own or combine with the <Three Cs>. Given that Japan continued a culture of mask-wearing after they were mass-enforced during the 1918 flu pandemic, future studies may also analyze if and how the <Three Cs> continue or transform the political and culture-bound aspect in Japan post-COVID-19 pandemic.
- Ewalt, J. (2012). A colonialist celebration of national: verbal, visual, and landscape ideographs at homestead national monuments of America. *West. J. Commun.* 75 (4), 367–385. doi:10.1080/10570314.2011.586970
- Express News Service (2020). Avoid 3 ‘Cs’ - closed spaces, crowds, close contact. *The New Indian express*. Available at: <https://www.newindianexpress.com/states/karnataka/2020/jul/12/avoid-3-cs—closed-spaces-crowds-close-contact-2168657.html> (Accessed July 12, 2020).
- Feder, S. (2020). Japan avoided a lockdown by telling everyone to steer clear of the 3 C’s. Here’s what that means. *Business Insider*. Available at: <https://www.businessinsider.in/science/news/japan-avoided-a-lockdown-by-telling-everyone-to-steer-clear-of-the-3-cs-heres-what-that-means-/articleshow/76071178.cms>
- Friday Digital. (2020a). Not only in Okinawa. A big smile that Takayuki Yamada showed at Ginza during Covid-19. *Friday Digital*. Available at: <https://friday.kodansha.co.jp/article/115232> (Accessed May 21, 2020).
- Friday Digital. (2020b). The difference between handwritten apology by Shinsuke Nitta and silence by Takayuki Yamada about the Okinawa trip during the COVID-19. *Friday Digital*. Available at: <https://friday.kodansha.co.jp/article/115462> (Accessed May 23, 2020).
- Hartig, H. (2018). Political slogans as instruments of international government communication – the case of China. *J. Int. Commun.* 24 (1), 115–137. doi:10.1080/13216597.2018.1444664
- Henley, J. (2020). “Complacent” UK draws global criticism for Covid-19 response. *The Guardian*. Available at: <https://www.theguardian.com/world/2020/may/06/complacent-uk-draws-global-criticism-for-covid-19-response-boris-johnson> (Accessed May 06, 2020).
- Ishiwatari, R. (2020). 92.2% answered graduation ceremony is canceled or refuses parents ~ nationwide Survey of 743 universities’ graduation ceremony. *Yahoo Japan News*. Available at: <https://news.yahoo.co.jp/byline/ishiwatariiei/20200310-00166951/> (Accessed March 10, 2020).
- Jackson, R. (2011). Culture, identity and hegemony: continuity and (the lack of) change in US Counterterrorism policy from Bush to Obama. *Int. Polit.* 48 390–411. doi:10.1057/ip.2011.5
- Japan Broadcasting Corporation (n.d.a). Special site new Coronavirus [Tokusetsu saito shingata koronairusu]. Available at: <https://www3.nhk.or.jp/news/special/coronavirus/chronology/#mokuji1>.
- Japan Broadcasting Corporation (n.d.b). What happens for reopening school. Available at: <https://www3.nhk.or.jp/news/special/coronavirus/school-guideline/#mokuji5>.

- Jasinski, J. (2010). *Sourcebook on rhetoric: key concepts in contemporary rhetorical studies*. Thousand Oaks, CA: Sage Publications.
- Jiji News and Kyodo News. (2020). Abe administration bombs in global survey on coronavirus response. *The Japan Times*. Available at: [https://www.japantimes.co.jp/news/2020/05/09/national/abe-coronavirus-survey/#.Xs\\_cHRNKiRt](https://www.japantimes.co.jp/news/2020/05/09/national/abe-coronavirus-survey/#.Xs_cHRNKiRt). (Accessed May 09, 2020).
- Johnson, B. (2020). There are some very simple ways we can all protect ourselves and others from the spread of coronavirus. Wash your... [Tweet]. Twitter. Available at: <https://twitter.com/BorisJohnson/status/1289171088430239744>. (Accessed July 31, 2020).
- Kanemoto, E. (2019). Rhetorical complexity of advocating intercultural peace: post-World War II peace discourse. Doctoral dissertation, Bowling Green (OH): Bowling Green State University. OhioLINK Electronic Theses and Dissertations Center.
- Kelly, C. R. (2014). "We are not free": the meaning of <freedom> in American Indian resistance to President Johnson's war on poverty. *Commun. Q.* 62 (4), 455–473. doi:10.1080/01463373.2014.922486
- Koc, E., and Ilgun, A. (2010). An investigation into the discourse of political marketing communications in Turkey: The use of rhetorical figures in political party slogans. *J. Polit. Marketing* 9 (3), 207–224. doi:10.1080/15377857.2010.497742
- Kyodo News. (2020a). Ex-WHO chief says U.S. "counterproductive" on virus, world order. *Kyodo News*. Available at: <https://english.kyodonews.net/news/2020/08/6aa730532d0a-ex-who-chief-says-us-counterproductive-on-virus-world-order.html> (Accessed August 11, 2020).
- Kyodo News. (2020c). Many firms continue to push teleworking after emergency state lifted. *The Japan Times*. Available at: <https://www.japantimes.co.jp/news/2020/05/26/business/many-firms-continue-push-teleworking-emergency-state-lifted/> (Accessed May 26, 2020).
- Lu, X., and Simons, H. W. (2006). Transitional rhetoric of Chinese communist party leaders in the post-Mao reform period: dilemmas and strategies. *Q. J. Speech* 92 (3), 262–286.
- Lu, X. (1999). An ideological/cultural analysis of political slogans in communist China. *Discourse and Society* 10 (4), 487–508. doi:10.1177/0957926599010004003
- Martin, A. (2020). The history behind Japan's love of face masks. *The Japan Times*. Available at: <https://www.japantimes.co.jp/news/2020/07/04/national/science-health/japans-history-wearing-masks-coronavirus/#.XxZKDS10d24> (Accessed July 04, 2020).
- McGee, M. C. (1980). The "Ideograph": a link between rhetoric and ideology. *Q. J. Speech* 66 (1), 1–16.
- McGee, M. C., and Martin, M. A. (1983). Public knowledge and ideological argumentation. *Commun. Monogr.* 50, 47–65. doi:10.1080/03637758309390153
- McGuinness, A. (2020). Coronavirus: how the PM's slogans have changed. *Sky News*. Available at: <https://news.sky.com/story/coronavirus-how-the-pms-slogans-have-changed-12040037> (Accessed July 31, 2020).
- Meixner, S., Nally, A., and Daisy, J. (2020). Australian state raise millions from coronavirus fines. *ABC News*. Available at: <https://www.abc.net.au/news/2020-08-03/coronavirus-covid19-public-health-breach-fines-money-revenue/12498310> (Accessed August 04, 2020).
- Menon, P. (2020). "Act like you have COVID-19": PM Arden says as New Zealand heads into lockdown. *Reuters*. Available at: <https://www.reuters.com/article/us-health-coronavirus-newzealand-emergen/act-like-you-have-covid-19-pm-arden-says-as-new-zealand-heads-into-lockdown-idUSKBN21C061> (Accessed March 24, 2020).
- Ministry of Agriculture, Forestry and Fisheries of Japan (2020). About "go to eat campaign business". Available at: <https://www.maff.go.jp/j/shokusan/gaisiyoku/hoseigoto.html> (Accessed November 13, 2020).
- Ministry of Economy, Trade and Industry of Japan (2020a). Go to event business (Demand stimulating campaign business) Materials about open call for participants among ticket sale companies and more. Available at: <https://gotoevent.go.jp/> (Accessed November 04, 2020).
- Ministry of Education, Culture, Sports, Science and Technology of Japan (n.d.). Implementation status of temporary closures at schools to prevent new coronavirus infections. Available at: [https://www.mext.go.jp/content/20200424-mxt\\_kouhou01-000006590\\_1.pdf](https://www.mext.go.jp/content/20200424-mxt_kouhou01-000006590_1.pdf).
- Ministry of Health, Labour and Welfare of Japan (n.d.). Requests for the corporation to Labor- management organizations. Available at: [https://www.mhlw.go.jp/stf/seisakunitsuite/newpage\\_00007.html](https://www.mhlw.go.jp/stf/seisakunitsuite/newpage_00007.html).
- Ministry of Land, Infrastructure, Transport and Tourism (2020). Go to Travel Business. Available at: <https://www.mlit.go.jp/kankochu/content/001358665.pdf> (Accessed November 12, 2020).
- Ninon Keizai Shimbun (2020). In Saitama Prefecture, school restarts one after another from June, staggered school attendance. *Nihon Keizai Shimbun*. Available at: <https://www.nikkei.com/article/DGXMZO59527960V20C20A5L72000/> (Accessed May 25, 2020).
- Pacific Media Centre (2020). "Stay home, stay safe, be kind": what NZ can teach the world about covid-19. *Asia Pacific Report*. Available at: <https://asiapacificreport.nz/2020/05/30/stay-home-stay-safe-be-kind-what-nz-can-teach-the-world-about-covid-19/> (Accessed May 30, 2020).
- Prime Minister of Japan and His Cabinet (2020a). [COVID-19] Press Conference by the Prime Minister. Cabinet public relations office, Cabinet Secretariat. Available at: [https://japan.kantei.go.jp/98\\_abe/statement/202002/\\_00002.html](https://japan.kantei.go.jp/98_abe/statement/202002/_00002.html) (Accessed March 28, 2020).
- Prime Minister of Japan and His Cabinet (2020b). [COVID-19] Press Conference by the Prime Minister (Opening Statement). Cabinet public relations office, Cabinet Secretariat. Available at: [https://japan.kantei.go.jp/98\\_abe/statement/202002/\\_00002.html](https://japan.kantei.go.jp/98_abe/statement/202002/_00002.html) (Accessed February 29, 2020).
- Prime Minister of Japan and His Cabinet (2020c). [COVID-19] Press Conference by the Prime minister regarding the Novel coronavirus. Cabinet Public Relations Office, Cabinet Secretariat. Available at: [https://japan.kantei.go.jp/98\\_abe/statement/202005/\\_00003.html](https://japan.kantei.go.jp/98_abe/statement/202005/_00003.html) (Accessed May 25, 2020).
- Prime Minister's office of Japan and Ministry of Health, Labour and Welfare (2020). *Stop the spread of COVID-19: How to avoid the 3Cs*. Available at: [http://japan.kantei.go.jp/ongoingtopics/COVID19CASFlyer/PROffice3CGuide\\_en.pdf](http://japan.kantei.go.jp/ongoingtopics/COVID19CASFlyer/PROffice3CGuide_en.pdf).
- Roser, M., Ritchie, H., Ortiz-Ospina, E., and Hasell, J. (2020). Coronavirus pandemic (COVID-19). *our world in data*. Available at: <https://ourworldindata.org/coronavirus/country/japan?country=~JPN#citation>.
- Ministry of Economy, Trade and Industry of Japan (2020b). Announcement about go to shopping, *shopping streets business*. Available at: <https://www.meti.go.jp/covid-19/goto-shoutengai/index.html>. (Accessed October 30, 2020).
- Newark Board of Education (2020). COVID-19 health and safety public service announcement with slogan contest: calling all newark students to participate!. *Newark Board of Education*. Available at: <https://www.nps.k12.nj.us/covid-19-health-safety-psa/>.
- Sport Hoshi (2020). NEWS Yuya Tegoshi refrains from activities, Johnny's said "unacceptable" about drinking without remorse, *Sport Hoshi*. [in Japanese, with English summary]. Available at: <https://hoshi.news/articles/20200526-OHT1T50320.html>.
- Sposato, W. (2020). Japan's halfhearted coronavirus measures are working anyway. *Foreign Policy*. Available at: <https://foreignpolicy.com/2020/05/14/japan-coronavirus-pandemic-lockdown-testing/>. (Accessed May 14, 2020).
- The Chunichi Shimbun (2020). Yuya Tegoshi's twitter exceeded 1 million followers in 4 days...press conference from 8 pm on the 23rd. *The Chunichi Shimbun*. Available at: <https://www.chunichi.co.jp/article/77303> (Accessed June 23 2020).
- The International Olympic Committee (2020). The president of the international olympic committee, Thomas Bach, and the prime minister of Japan, Abe Shinzo, held a conference call this morning to discuss the constantly changing environment with regard to covid-19 and the olympic games. Available at: <https://www.olympic.org/news/joint-statement-from-the-international-olympic-committee-and-the-tokyo-2020-organising-committee>. (Accessed February 14, 2020).
- Kyodo News (2020b). Fujitsu to halve office space in push for remote work amid pandemic. *The Japan Times*. Available at: <https://www.japantimes.co.jp/news/2020/07/06/business/corporate-business/fujitsu-office-space-remote-work/>. (Accessed July 06, 2020).
- The Los Angeles Times (1988). China to furl red flag, its maoist theoretical journal. *The Los Angeles Times*. Available at: <https://www.latimes.com/archives/la-xpm-1988-05-01-mn-3384-story.html>. (Accessed May 01, 2020).
- Tokyo Metropolitan Government (2020a). Governor Koike "governor's room"/ Press Conference (Reiwa 2nd year, 23th March). Available at: <https://www.metro.tokyo.lg.jp/tosei/governor/governor/kishakaiken/2020/03/23.html>. (Accessed March 23, 2020).
- Tokyo Metropolitan Government (2020b). Governor koike "governor's room"/ press conference (Reiwa 2nd year, 30th March). Available at: <https://www.metro.tokyo.lg.jp/tosei/governor/governor/kishakaiken/2020/03/30.html>. (Accessed March 30, 2020).



- Tokyo Metropolitan Government (2020c). Message from governor Koike on the novel coronavirus. Available at: [https://www.metro.tokyo.lg.jp/english/governor/act/2020/0206\\_00.html](https://www.metro.tokyo.lg.jp/english/governor/act/2020/0206_00.html). (Accessed May 13, 2020).
- Waterson, J. (2020). Hands, face, space: Boris Johnson unveils new Covid-19 slogan. *The Guardian*. Available at: <https://www.theguardian.com/uk-news/2020/jul/31/hands-face-space-boris-johnson-unveils-new-coronavirus-slogan>. (Accessed July 31, 2020).
- Wingfield-Hayes, R. (2020). Coronavirus: Japan's low testing rate raises questions. *BBC News*. Available at: <https://www.bbc.com/news/world-asia-52466834>. (Accessed April 30, 2020).
- World Health Organization (2020a). Avoid the three Cs. Available at: [https://www.who.int/images/default-source/wpro/countries/malaysia/infographics/three-3cs/final-avoid-the-3-cs-poster.jpg?sfvrsn=638335c1\\_2](https://www.who.int/images/default-source/wpro/countries/malaysia/infographics/three-3cs/final-avoid-the-3-cs-poster.jpg?sfvrsn=638335c1_2).
- World Health Organization (2020b). Novel Coronavirus – Japan (ex-China). Available at: <https://www.who.int/csr/don/16-january-2020-novel-coronavirus-japan-ex-china/en/> (Accessed January 16, 2020).
- World Health Organization (2020c). Archived: WHO timeline - COVID-19. Available at: <https://www.who.int/news/item/27-04-2020-who-timeline-covid-19> (Accessed April 27, 2020).
- World Health Organization (2020d). Sharing COVID-19 experiences: the New Zealand response. [Online Video]. Available at: <https://www.facebook.com/WHO/videos/300921684370884/>. (Accessed July 07, 2020).
- Yamaguchi, M. (2020). Japan's Hokkaido declares state of emergency over virus. *ABC News*. Available at: <https://abcnews.go.com/Health/wireStory/japans-hokkaido-declares-state-emergency-virus-69277414>. (Accessed February 28, 2020).
- Young, S. (2006). Australian election slogans, 1949-2004: where political marketing meets political rhetoric. *Aust. J. Commun.* 33 (1), 1–20.

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Allgayer and Kanemoto. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# A Multi-Criteria Framework for Pandemic Response Measures

Love Ekenberg<sup>1,2,3\*</sup>, Adriana Mihai<sup>3,4</sup>, Tobias Fasth<sup>2,5</sup>, Nadejda Komendantova<sup>1,3</sup> and Mats Danielson<sup>2,1</sup>

<sup>1</sup> International Institute for Applied Systems Analysis, IIASA, Laxenburg, Austria, <sup>2</sup> Department of Computer and Systems Sciences, Stockholm University, Kista, Sweden, <sup>3</sup> Innovating Governance, Vienna, Austria, <sup>4</sup> Centre of Excellence for the Study of Cultural Identity, University of Bucharest, Bucharest, Romania, <sup>5</sup> Department of Public Health Analysis and Data Management, Public Health Agency of Sweden, Solna, Sweden

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

David Alfredo Medina Ortiz,  
University of Chile, Chile  
Per-Erik Malmnas,  
Stockholm University, Sweden  
Tara Keshar Nanda Baidya,  
Pontifical Catholic University of Rio de  
Janeiro, Brazil  
Johan Thorbiörnson,  
Royal Institute of Technology, Sweden

### \*Correspondence:

Love Ekenberg  
ekenberg@iiasa.ac.at

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 22 July 2020

**Accepted:** 12 March 2021

**Published:** 20 April 2021

### Citation:

Ekenberg L, Mihai A, Fasth T,  
Komendantova N and Danielson M  
(2021) A Multi-Criteria Framework for  
Pandemic Response Measures.  
Front. Public Health 9:583706.  
doi: 10.3389/fpubh.2021.583706

In managing the COVID-19 pandemic, several compelling narratives seem to have played a significant role in the decision-making processes regarding which risk mitigation and management measures to implement. Many countries were to a large extent unprepared for such a situation, even though predictions about a significant probability for a pandemic to occur existed, and national governments of several countries often acted in an uncoordinated manner, which resulted in many inconsistencies in the disaster risk reduction processes. Limited evidence has also made room for strategic narratives meant to persuade the public of the chosen set of actions, even though the degree of uncertainty regarding the outcomes of these was high, further complicating the situation. In this article, we assume a normative standpoint regarding rhapsodic decision making and suggest an integrated framework for a more elaborated decision analysis under the ambiguity of how to contain the virus spread from a policy point of view, while considering epidemiologic estimations and socioeconomic factors in a multi-stakeholder-multi-criteria context based on a co-creative work process for eliciting attitudes, perceptions, as well as preferences amongst relevant stakeholder groups. The framework, applied in our paper on Romania for demonstrative purposes, is used for evaluating mitigation measures for catastrophic events such as the COVID-19 situation, to mobilize better response strategies for future scenarios related to pandemics and other hazardous events, as well as to structure the production and analysis of narratives on the current pandemic effects.

**Keywords:** multi-criteria decision analysis, managing and mitigating the risk of COVID 19 pandemic, risk governance, SEIR models, participation and inclusion

## INTRODUCTION

The recent emergence of the COVID-19 pandemic situation highlighted that many countries have to a large extent been unprepared for it (1). Decision-makers had to operate in conditions of severe uncertainty about the case fatality rate, the spreading of the virus, the timing of infectiousness, the number of asymptomatic cases—just to mention a few (2). Risk mitigation measures such as vaccines were missing (3) and decision-makers did not have reliable information about critical measures to protect society from the virus spread or at least to reduce its exposure and vulnerability. Another critical problem in assessing the risk was that the evidence about the case fatality rate was unknown (4). As a result of this and many other factors during the COVID-outbreak (5),

public authorities had to make decisions based on uncertain quantitative evidence and expert scientific advice (e.g., about possible future scenarios), on assessments of the health system capacity (especially of intensive care units), on expected public adoption of more or less restrictive measures, and on the evolution of national public debates about the issue (6). Nevertheless, the disaster risk reduction of the COVID-19 pandemic showed that in deciding which measures to implement, many countries acted in an apparently uncoordinated manner, at least at the beginning of the pandemic. The measures undertaken by bordering countries or regions within one country were many times inconsistent, and decisions on whether or not to impose lockdown were not taken only based on the number of confirmed cases. The effects of these inconsistencies are to a large extent still unforeseeable. Moreover, many non-pharmaceutical measures are progressively limiting individual freedom and have high economic and societal costs when undertaken with the aim to avoid fatalities in the short term, even though the same measures might produce indirect long-term fatalities due to economic recession and restricted access to healthcare by non-COVID-19 patients, restricted access to education (7) and other effects upon a large number of socioeconomic factors.

Furthermore, limited evidence has made room for strategic narratives meant to persuade the public of a chosen set of actions even though the degree of uncertainty regarding the outcomes of these was high. These narratives have explanatory power, reducing the cognitive overload of information, but also mobilizing power, in particular in crisis communication where stories that give a sense of collective action, such as to fight against a threat, are preferred. This threat is often framed by assigning blame to various actors so as to stir anger (against, for instance, China or the novel coronavirus itself), or by using aggressive representations of the threat and its possible impact to stir fear (8). The latter include early media reports on Lombardy and Wuhan as well as the “flatten the curve” visual metaphor indicating how the estimated numbers of cases exceed the limits of the sanitary systems if more aggressive social distancing measures are not implemented. In crisis communication, some of the downsides of this strategy, including social and political polarization, oversimplification of the problem, and anxiety and other negative psychological reactions, are traded for the benefit of the proposed course of action which needs to be adopted by the public. However, without a clear estimate of the benefits of the chosen set of measures, the use of persuasive narratives can be unjustified and trigger mistrust in the communicators, as well as low compliance rates to the current and future measures to mitigate the pandemic.

Several cognitive and behavioral biases seem also to have played a role in the decision-making processes. One such is connected with risk perceptions under conditions of ambiguity (9). A probable component is also bounded rationality, when individuals are limited regarding their ability or willingness to collect information and are unable to identify an even perceived optimal solution, leading to decisions being made in a significantly simplified decision space. Decision-makers thus search in this sense for a satisfactory solution, but they focus only on a limited set of options from available alternatives (10, 11). Then there is an inevitable component of dread risk (compare,

e.g., with hazardous technologies) connected with the people's judgments about unknown risks and their “perceived lack of control, dread, catastrophic potential, fatal consequences, and the inequitable distribution of risks and benefits” (12).

We do not criticize the adopted measures *per se*, but rather the existing decision-making mechanisms under conditions of uncertainty, where reliable data is scarce and the impact of the chosen policy across a variety of interconnected sectors and social categories is potentially quite serious. Rather than looking only at epidemiologic and healthcare factors, our purpose is to expand the policy problem and to include socioeconomic factors as well in the decisions over measures to be adopted in response to the pandemic, since the consequences of any chosen policy upon a variety of fields and groups need to be carefully and transparently weighed.

In this paper, we present a framework for decision analysis under ambiguity on how to treat the virus spread from a policy point of view. Our framework takes into consideration both epidemiologic estimations and socioeconomic factors and could also provide an enabler for strategic communication in the public sphere and facilitate a discussion about a range of policies, even in contexts of strong uncertainty. A main part of this is a multi-stakeholder-multi-criteria framework for eliciting attitudes, perceptions and preferences amongst relevant stakeholder groups. The decision process is based on a recognition of the complex relationships between different criteria and is supposed to support national and local strategies in dealing with pandemic emergencies and action plans, allowing for an alignment of overall objectives with perceptions and preferences of various stakeholder groups on priorities. Since there is a heterogeneity of opinions and potential conflicts of various stakeholders about disaster risk reduction measures, the recommendations should be based on compromise solutions to increase the quality, acceptability and legitimacy of the decision-making processes.

In the following sections, we first provide an overview of the various non-pharmaceutical measures put in place in order to mitigate the pandemic, in which we trace a number of inconsistent emergency responses and the gaps in estimating measures' impacts. Since uncertainty in epidemiologic data and projections has been shown to be a pervasive problem in current risk estimations, we then present a decision analytical framework that can be used under conditions of severe uncertainty, which presupposes the implementation of participatory components and a formalized evaluation process of the possible measures which can be adopted. We then exemplify how our framework can be applied at a national level, using Romania as a case study, for which we use an augmented SEIR model for epidemiologic data estimations, publicly available official reports for socioeconomic data and a stakeholder questionnaire for showcasing priority ranking in pandemic responses.

## MEASURES UNDER UNCERTAINTY

Measures to contain the spread of the novel SARS-CoV-2 virus have to a large extent been based on various epidemiologic risk assessments, which were made primarily by centers of disease control and prevention in Europe and the USA and by the

World Health Organization, as well as by various consultants and trusted parties (13). These assessments established scenarios starting from the number of confirmed infections in a country, with every scenario having a series of recommendations on containment measures to use in order to limit the spread of the virus. There are, however, challenges with modeling the effects of risk mitigation measures. Many epidemiologic models do not take into consideration demographics, distribution of population, age groups and their interaction patterns. Furthermore, there is limited evidence included in currently used models (14) on how each measure reduces the rate of transmissibility. The assumptions which serve as a basis for predictions are that there is no change in behavior and that preventive measures are put in place at one specific time-point. Then time calibration is done using the observed number of case fatalities and estimates of the time between infection and death and the infection fatality risk. It is also assumed that the overall effect of preventive measures is known. The effects are estimated from the observed increased doubling time after preventive measures are put in place. However, the predictions are highly sensitive to the doubling times without and with preventive measures, as well as to, for instance, the reproduction number, but less sensitive to the estimates used for time-calibration: observed number of case fatalities, the typical time between infection and death, and the infection fatality risk (15).

Aside from the increased healthcare and treatment optimization efforts, non-pharmaceutical interventions are layered progressively, starting from more low-cost measures (increasing personal hygiene through hand-washing, disinfecting surfaces and wearing face masks), to isolating individuals confirmed positive with the virus, to, eventually, more aggressive and costly social distancing measures. Countries have taken different approaches as to which set of measures to introduce and when, which of course is difficult given the uncertainty regarding the time frame for containing the pandemic, how much the economy can sustain the associated costs of social distancing and isolation measures, as well as the uncertainty of how long citizens can comply with certain measures.

For instance, in Romania, previous risk assessments on severe flu epidemic scenarios made in 2016 (16), considered a novel flu virus strain, with an attack rate of 35% (higher among children), a case fatality rate between 0.4 and 1.2%, leading to 30,000 hospitalizations and more than 1,000 deaths among the vulnerable age groups: people of all ages suffering from chronic illnesses, healthcare system employees, social protection facilities' employees and residents, and elderly people. In terms of impact, the health and healthcare costs were considered very high, while the economic costs were estimated to have a medium impact of 101–500 million Euro (0.03 of GDP). The non-pharmaceutical measures to contain this epidemic scenario included possible school closures affecting, for more than a week, 500,000 students at most, temporary workplace disruptions affecting mostly 500,000 employees and postponements of cultural and sports events. In contrast, between March 2020 and July 2020, the partial lockdown measures taken to contain the novel coronavirus in Romania severely affected 900,000 primary and secondary school students with no access to education for 4 months (17), led

to over 900,000 suspended work contracts and almost 300,000 unemployed. The economic costs associated with the measures had an impact of over 4 billion euro (1.7–1.9 of GDP) by July 2020 (18, 19), at a time when in Romania there were 1,900 deaths caused by COVID-19, the majority of confirmed cases (over 40,000) being however asymptomatic or mild. The uncertainty of epidemiologic evidence transferred to general uncertainty about policy impact, leading to much higher socioeconomic costs than the ones previously envisioned in case of a severe epidemic.

Some countries, such as Japan, have mainly focused on contact tracing and testing, recommending people to restrict their travels, and teach and work from home. Sweden chose to cancel larger public events, but did not close primary schools and workplaces, while the idea of keeping social distance has been largely promoted. South Korea had a similar approach, but with more intensive contact tracing using digital systems. Interestingly, Taiwan, in spite of its proximity to China, had one of the lowest stringency levels (20), as they did not close down schools, workplaces or public transport, and instead mostly focused on tracing and isolating measures. Taiwan's experience with the 2003 SARS epidemic could account for a series of quick decisions involving travelers' screening, a wide distribution of masks, hand sanitizers and thermometers (21), as well as the investment of ~\$6.8 million into the manufacturing sector to create 60 new mask production lines.

There is a dominant approach, however, which seems to have been preferred by countries including Romania, Austria, Denmark, Norway, Germany, and many others, who have adopted extreme social distancing measures going from case quarantine and public gatherings bans to partial lockdowns, closing schools and many workplaces, public transport, only allowing people to leave their homes for specific purposes, with an even tighter curfew imposed on the elderly. These measures were defended for their short-term capacity to reduce the rate of transmissibility and to flatten the epidemic curve as much as possible in order to primarily keep the hospital systems from getting overburdened.

The short-, medium- and long-term socioeconomic costs associated with these extreme measures are definitely a matter of discussion and have been putting pressure on countries to relax the situation. It has also been argued that "the incremental effect of adding another restrictive measure is only minimal and must be contrasted with the unintended negative effects that accompany it" (22). We actually begin to know more about some measures' effectiveness in containing the virus spread. For instance, combining case quarantine with other public health measures is shown to be more effective than only relying on case quarantine. When combined with contact tracing, the impact of some measures increases (23). Contact tracing combined with public disclosure of active cases' location seems to lower the number of deaths, having 50% lower economic costs than full lockdown (24). A comparatively cheap measure is to wear masks and some evidence suggests that wearing such can reduce transmissibility and be highly effective when compliance is high, at the same time substantially reducing both the death toll and the economic impact (25). Wearing them at 96% alone could flatten an epidemic growing at a rate of 0.3/day by bringing down



the reproduction number from an original value of 3.68 to 1. But what about the other measures? How effective is it to close schools, close borders and to suspend or reduce national and international travels (26), or restrict certain workplaces' activity? And, finally, how much can a country build up its healthcare system during the restriction period?

A detailed analysis of all sectors of all countries is naturally a tremendous work and definitely beyond the scope of this article, and we will herein highlight some classes of measures for a more high-level perspective. There are various possibilities to combine measures in order to see their different effects in reducing the rate of transmissibility, while also looking at their different consequences under other criteria, including indirect deaths in different groups, inhibited work capacity in the longer and short term, or social costs, as well as their effects on democracy and human rights, among others.

We recognize that socioeconomic conditions, as well as healthcare capacities, can be very different, affecting the feasibility of some measures for particular regions, but also the quality of data. Therefore, any framework must be used with an awareness of national and regional conditions, and in health emergencies, the Global Health Security Index for instance can provide rapid data on a country's detection, response and healthcare capacity, as well as on its norms and risks so as to have a baseline when considering mitigation measures. The COVID-19 spread pattern also emphasizes that the model must be flexibly used and regionally adapted. Nevertheless, measures need to be based on adequate risk estimations of a situation as far as possible, including epidemiologic modeling and integrated analyses of the costs of reducing the risk, as well as a more systematic analysis of the extent to which various measures can reduce it. Because of the fluctuating data quality and other factors, any framework must be able to handle the various uncertainties involved. Furthermore, individual perception and factors influencing the said perceptions, including behaviors, narratives and framing, as well as the emotions stirred by media representations and by the level of uncertainty, must be taken into consideration during the deliberation. And there must be a preparedness which needs to be made in advance, as much as possible.

## THE DECISION ANALYTICAL FRAMEWORK

There are several studies investigating specific performance aspects of interventions against pandemics but they are most often limited to a single scenario and they are seldom designed to explicitly acknowledge the inherent uncertainties in both simulation results and scenario likelihoods. We have previously applied more dynamic multi-criteria decision analysis approaches to synthesize outcome predictions and stakeholder preferences from multiple perspectives into decision recommendations (27). Applied to the COVID-19 mitigation problem, the methodological components could, for instance, be partitioned into (i) a co-creative preference elicitation component, (ii) an epidemiological component, (iii) a socioeconomic component, and (iv) an aggregation and

analysis component. The basic idea is to, relative to a set of possible mitigation measures, model the actual spread and its effects on the population with respect to critical health care, taking demographic and regional conditions into account, and furthermore estimate the effects from other perspectives, predominantly socioeconomic. A main point here is also that there should be adequate support tools for the deliberative process for structuring the decision situation and for providing information regarding possible measures and criteria. These processes should of course, to a large extent, be in place in advance and not conceived during an emergency, when there might be very little time for a more time-consuming decision apparatus.

## The Need for Participatory Components

The involvement of stakeholders in decision-making processes and model development is generally essential for catering to stakeholder requirements, but also for increasing the acceptability of the chosen set of measures. Policy-makers need to weigh their decisions against, among other things, the political costs of implementing sometimes unpopular sets of rules affecting social mobility, social interaction, or work organization. Not least in public health emergency situations, a distributed decision-making process could contribute to ensuring that the responsibility for the result is as well distributed, lowering the political costs and making way for a consideration of a variety of criteria relevant to the problem at hand.

A number of techniques may here be employed, relying on models from the decision-analytic field aimed at eliciting users' values through studying their preferences and gathering preferential data from several stakeholders in order to provide at least reasonable values, while keeping within the resource limits available (28). From the outset, it is usually a good idea to identify and have access to the relevant stakeholders for the problem which is addressed. In the case of situations such as the SARS-CoV-2 pandemic, aside from the first responders including the government, national institutes of public health and the sanitary system, social and economic agents should also be included since the non-pharmaceutical measures which are taken have a direct impact upon their activity. Among these, representatives of the business sector and in particular of the industries directly affected by the various measures discussed, such as the hospitality industry, retail, cultural, and educational sectors and transportation, should be part of the elicitation process. Of course, chain reactions affect other sectors as well including banking, suppliers and various small and medium enterprises which are affected by lowered consumption during various measures' implementations, so representatives of both business owners and employees would need to be included. Social groups need to be represented as broadly as possible through, for instance, relevant members of civil society with good knowledge, and experience with communities and municipalities. The need to protect vulnerable groups from the virus primarily concerns the care for the elderly and chronically ill patients, who are more exposed to serious forms of COVID-19. In addition to these, other groups who are directly affected by the measures under consideration include a variety of patients in need of healthcare

whose access to medical services could be jeopardized during a lockdown, as well as women at risk of domestic violence, children and families at risk of poverty or precarious workers. Policymakers have the institutional legitimacy and capacity to call for broad participation in the elicitation process and many of them have had consultations with some of the stakeholders in order to, among other things, allocate supplementary funds and financial stimuli packages to mitigate the socioeconomic costs of a lockdown. However, such consultations are unstructured, often not transparent and can—intentionally or not—give a higher weight to some groups who are, for instance, more dominant or outspoken in the public sphere.

There are various guidelines to inform decision-makers of the acceptable norms that need to be taken into consideration when weighing the various policy solutions for managing the pandemic long-term, such as ensuring well-being, liberty and justice (29). This ethical component can be further detailed by including the ethics of care (30), where the moral salience of meeting the needs of vulnerable groups also implies the question of which vulnerable groups need more or equal protection in the current crisis, entailing perhaps equal weights for groups affected directly by COVID-19 and groups affected by the containment measures. It could be more informative (and perhaps less triggering in the public debate) to define the problem using cultural norms, drawing on cultural theories of risk (31, 32) which inform a criteria evaluation according to the analytic tool which distinguishes five cultural typologies—individualism, egalitarianism, hierarchism, fatalism and autonomy—characterizing people's preferences regarding how to manage, for instance, a pandemic. An individualist voice would choose a cost-benefit calculation, favoring a narrative that recognizes the trade-off between lives saved and economic costs, and between lives lost short-term and long-term. If the individualist would support a set of measures to “flatten the curve” as long as it would not bring intolerable economic costs [see, for instance, public statements voicing concerns that the cure must not be worse than the disease (33)], an egalitarian would reject economic considerations and cost-benefit analyses, placing a higher value on equity and on protecting vulnerable groups of the population first.

Depending on the available time frame, on the level of access to different stakeholder groups as well as on external circumstances which could make collaborative workshops difficult to organize (such as strict social distancing measures), various elicitation methods can be used to obtain rankings of the criteria with various degrees of robustness. Data from available surveys on social values (34–36) and cultural frames (32) can provide a preliminary hierarchy of people's values in the region where the measures have to be selected. Such frames can be identified in existing cultural analyses of specific regions, but they can also be extracted from public statements and texts circulated in mass media and social media, once the problem becomes part of the public agenda. These, however, have some limitations in eliciting evaluations from multiple stakeholders, as the visibility of different voices in the public sphere is not equal and is often affected by, among other things, restricted access, media partisanship, echo chambers, and institutional and commercial

dominance. One of the challenges in designing a participatory approach to multi-criteria decision analysis is, therefore, to avoid reproducing the same inequalities in representation that are well-known in mainstream as well as social media.

A full societal analysis is far beyond the ambitions of this article, but it deserves to be emphasized that there are several options to create a transparent and deliberated framework for eliciting societal preferences. To demonstrate a comparatively uncomplicated method for at least obtaining a template for how a larger-scale survey could look, we designed a questionnaire by which to elicit some stakeholders' preferences (see **Appendix 1**) and tested it in Romania on a limited amount of stakeholders, addressing differences in risk perception and in assessing the severity of the risks. A continuation here could be the organization of stakeholder processes with the implementation of further engagement methods such as discussion workshops and forums when this is again possible vis-à-vis mobility and other restrictions. Our former experiences in particular regarding stakeholder workshops in a structured manner have been very promising (37).

## The Evaluation Process

A multitude of methods for analyzing and evaluating decision problems with multiple stakeholders and multiple criteria have been developed during the last decades. A fundamental component here is a set of criteria, under which the various options are considered. The possible measures to be taken are valued under each criterion and the relative importance of the criteria themselves is usually represented by a set of weights that can be defined in several ways. For instance, a set of criteria for the COVID-19 pandemic could include:

- a. Epidemiological & healthcare systems effects: (a1) direct fatalities, (a2) indirect fatalities;
- b. Economic aspects: (b1) short term costs, (b2) unemployment, (b3) taxes, (b4) specific industries affected, (b5) growing industries;
- c. Social and behavioral aspects: (c1) human rights, (c2) protection of vulnerable groups, (c3) criminality rates, (c3) mental health, (c4) education and training;
- d. Environmental: (d1) climate change;
- e. Political and governance: (e1) risk of short-term governmental abuse, (e2) citizen approval of measures, (e3) trust in the government, (e4) resilience – improving preparedness for catastrophic events;

as well as others, a set that can be refined after further literature reviews, projections and data elicitation from stakeholders. Our current set of criteria was established after media monitoring of pandemic response statements between February and June 2020, as well as after an initial round of research surveys of scientific and gray literature on COVID-19.

For the particular evaluations in our suggested framework, we use a method for integrated multi-attribute evaluation under risk, subject to incomplete, or imperfect information. The software originates from our earlier work on evaluating decision situations using imprecise utilities, probabilities, and weights, as well as qualitative estimates between these components derived from

convex sets of weight, utility and probability measures. To avoid some mathematical aggregation problems when handling set membership functions and similar, we introduced higher-order distributions for better discrimination between the possible outcomes (38). For the decision structure, we use a common tree formalism. The data quality and regional conditions can be very different and there are thus large uncertainties in the background material that must be considered. We must therefore have a mechanism for taking this into account, but still being able to use the available data, even if the actual uncertainties are significant, and the use of, e.g., precise numbers is misleading. To alleviate some of the problems, we suggest a new evaluation method based on the resulting belief mass over the output intervals, but without trying to introduce further complicating aspects into the decision situation. During the process, we consider the entire range of values as the alternatives presented across all criteria as well as how plausible it is that an alternative outranked the remaining ones, and thus provide a robustness measure. Because of the complexity in these calculations, we use the software tool DecideIT for the analysis which allows for imprecision of the kinds that exist in this case. The tool is based on patented algorithms (39) and several versions have been successfully used in a variety of decision situations, such as large-scale energy planning (37), allocation planning (27), demining (40), financial risks (41), gold mining (42), and many others (43).

In the suggested framework, stakeholder preference elicitation is used for building preference structures where potential conflicts can arise. Here so-called surrogate weights have turned out to be useful, but since the elicitation can still be uncertain and the surrogate weights might not be a fully adequate representation of the preferences involved, we also work with intervals and their associated belief distributions, to accommodate for the uncertainties involved, cf. (38, 44).

The multi-criteria decision problem is evaluated as a multi-linear problem against the (imprecise) background information; in the next section, we provide the computational details of this process. Solving multi-linear optimization problems is generally hard. There have been several attempts to solve such problems, for instance, using active set methods or simplex-like methods using varieties of reduced gradients. There are also algorithms based on primal, dual, or primal-dual active set methods, that also are less suited for the problems that we have at hand. Further methods are based on linear complementarity programming theory, where iterative schemes are introduced. These general methods have their merits, but when working with imprecise information and using various kinds of sensitivity analyses, the decision problems that we are concerned with here become quite simple but non-linear indefinite. The main iteration of our particular method generates iterative sequences that are computationally demanding from an interactive point of view, why general methods are less adequate for such problems. We base the multi-linear solver on a set of algorithm libraries particularly designed for such problems (45). The details of these libraries are beyond the scope of this article. However, we below discuss the main principles from a conceptual viewpoint.

## Rankings

We have in a number of papers argued for a set of alternatives to standard ways of addressing rankings in a computationally meaningful way. A promising such has turned out to be a new cardinal ranking method and we have there demonstrated that it is both more robust than the ones from the SMART family, AHP and many others, c.f., e.g., (46) for an overview. Below we briefly outline the main ideas behind this, using the notation from (47).

Assuming an ordering of  $N$  criteria, where we have an informal strength notation between the criteria as well as the measures in question, we suggest the translation:

- $>_0$  Equally important (as good as)
- $>_1$  Slightly more important (slightly better than)
- $>_2$  More important (better than)
- $>_3$  Much more important (much better than)

We use  $>_i$  to express the strength in the rankings between criteria and measures, where  $>_0$  is the usual ordinal ranking  $>$ . For instance, in a criteria ranking, we get a user ordering  $w_1 >_{i_1} w_2 >_{i_2} \dots >_{i_{n-1}} w_n$ . This is transformed into an ordering containing the symbols  $=$  and  $>$  by introducing auxiliary variables  $x_{(ki)}$ :

$$\begin{aligned} w_k >_0 w_{k+1} &\text{ is } w_a = w_b \\ w_k >_1 w_{k+1} &\text{ is } w_a > w_b \\ w_k >_2 w_{k+1} &\text{ is } w_k > x_{(k1)} > w_{k+1} \\ w_k >_i w_{k+1} &\text{ is } w_k > x_{(k1)} > \dots > x_{(k(i-1))} > w_{k+1} \end{aligned} \quad (1)$$

This establishes a new Euclidian space defined by the simplexes constrained by the new orderings and we obtain a computationally meaningful representation of the strengths. Now the number transformation of the criteria ranking is given by assigning a number to each position in the complete ordering, starting with the most important position as number 1. Each criterion  $i$  then get the position  $p(i) \in \{1, \dots, Q\}$ , where  $Q$  is the total number of positions. For every two adjacent criteria  $c_i$  and  $c_{i+1}$ , whenever  $c_i >_{s_i} c_{i+1}$ ,  $s_i = |p(i+1) - p(i)|$ . Position  $p(i)$  thus represents the importance as stated by the decision-maker.

The weights are then obtained by

$$w_i^{CSR} = \frac{\frac{1}{p(i)} + \frac{Q+1-p(i)}{Q}}{\sum_{j=1}^N \left( \frac{1}{p(j)} + \frac{Q+1-p(j)}{Q} \right)}$$

The transformation of the mitigation value orderings is analogous. In summary, the process is then simple:

1. For each criterion in turn, rank the alternatives from the worst to the best outcome. The strength is expressed in the notation with “ $>_1$ ” symbols.
2. For each criterion in turn, rank the importance of the criteria from the least to the most important. The strength is expressed in the notation with “ $>_1$ ” symbols.
3. The weighted overall value is calculated by multiplying the centroid of the weight simplex with the centroid of the alternative value simplex.

Thus, the transformation of the rankings does not introduce any computational difficulties.

## Evaluation Method

What we actually evaluate here are special cases of expected values, weighted by criteria weights and (in some cases) probabilities. Furthermore, we use interval considerations that can be represented by random variables to take the inherent uncertainties into consideration. The general expected value in these contexts can be expressed as:

$$E(M_i) = \sum_{i_1=1}^{n_{i_0}} w_{ii_1} \sum_{i_2=1}^{n_{i_1}} w_{ii_1 i_2} \cdots \sum_{i_{m-1}=1}^{n_{i_{m-2}}} p_{ii_1 i_2 \cdots i_{m-2} i_{m-1}} \sum_{i_m=1}^{n_{i_{m-1}}} p_{ii_1 i_2 \cdots i_{m-2} i_{m-1} i_m} v_{ii_1 i_2 \cdots i_{m-2} i_{m-1} i_m}$$

given the distributions over random variables  $w$ ,  $p$ , and  $v$ .

We also introduce a belief calculus for evaluating structures, i.e., foremost a way of determining the beliefs in various parts of the weight and value intervals given interval input. This is to enhance the capacity to discriminate between the strategies and receive better estimates due to the possibility to use the information that the tree structure provides and the rapid concentration of belief mass as explained in details in (44). To evaluate this, we use the methods from (44), taking into account that there are only two operators of relevance here, multiplication and addition. The addition case is covered by ordinary convolution, i.e., assume that  $h$  is the distribution on a sum  $z = x + y$  associated with the distributions  $f(x)$  and  $g(y)$ , then the resulting distribution  $h(z)$  is

$$h(z) = \frac{d}{dz} \int_0^z f(x) g(z-x) dx.$$

The multiplication case is quite similarly handled. With the same assumptions as above, the cumulative multiplied distribution  $h(z)$  is derived by first defining

$$\begin{aligned} H(z) &= \iint_{\Gamma_x} f(x) g(y) dx dy = \int_0^1 \int_0^{z/x} f(x) g(y) dx dy \\ &= \int_z^1 f(x) G(z/x) dx \end{aligned}$$

where  $G$  is a primitive function to  $g$ ,  $\Gamma_z = \{(x, y) \mid x \cdot y \leq z\}$ , and  $0 \leq z \leq 1$ .

Then let  $h(z)$  be the corresponding density function:

$$h(z) = \frac{d}{dz} \int_z^1 f(x) G(z/x) dx = \int_z^1 \frac{f(x) g(z/x)}{x} dx.$$

Thus, the addition of the products is the standard convolution of two densities and the multiplication part is handled by a just slightly more complicated operation. Combining these two operations, we straightforwardly obtain the distribution over the expected utility.

The results of the process will then be a detailed analysis of each option's performance compared with the others, and a sensitivity analysis to assess the robustness of the result. During the process, the entire range of mitigation measures across all criteria can be analyzed as well as how plausible it was that a strategy would outrank the remaining ones, and thus provide a robustness measure for the stability of the respective strategies.

## AN EXAMPLE APPLICATION OF THE FRAMEWORK

The following is an example of how plausible emergency responses can be systematically analyzed in a larger setting. We use our framework to evaluate different measures that could be adopted in Romania in response to the epidemic against a subset of criteria from the larger set described above in section The Evaluation Process. These were ranked by a small group of stakeholders in a consultation process using an online questionnaire which will be discussed in the next subsection. Then, we describe the input data to estimate the impacts of the alternative measures across every criterion.

Identifying the best set of measures to be implemented would firstly involve defining possible alternatives for Romania's response to the epidemic. Typical mitigation measures are partitioned into sets with different subordinate restriction levels, reflecting some important aspects of possible mitigation strategies, such as (14) going from an unmitigated epidemic to a suppression strategy or (48) proposing a schedule for every industrial sector activity in a risk adjustment strategy. Another option is to devise a set of measures that combines these approaches and also reflects the most common public debates on this issue:

- Level 1: An unmitigated epidemic—a scenario in which no other action is taken except pharmaceutical measures and case isolation;
- Level 2: Mitigation adding to pharmaceutical measures and case isolation, public communication encouraging increased hygiene and personal protection, localized action (closing a school/workplace in case of a number of cases)—influenza epidemics protocol
- Level 3: Mitigation adding to pharmaceutical measures and case isolation, personal protective measures (stay home when sick, hand-washing, respiratory etiquette, clean frequently touched surfaces daily, wearing face masks), mild social distancing measures (large public gatherings banned, work from home where possible, social distancing recommended);
- Level 4: Suppression (partial lockdown)—pharmaceutical measures and case isolation, personal protective measures (stay home when sick, hand-washing, respiratory etiquette, clean frequently touched surfaces daily, wearing face masks), imposed social distancing measures and restrictions on



mobility: school closures, restaurants and large shopping centers closed, “stay-at-home” orders—as implemented in Romania for 2 months.

A full-scale multi-criteria decision analysis should also include collected data following a more extensive criteria setup which can be subject to refinement when gathering more available evidence, but for demonstrational purposes, we use the following criteria:

Health impact
• Direct fatalities
Economic impact
• Short-term costs
• Impact on specific industries
Socio-behavioural impact
• Human rights
• Vulnerable groups
• Access to education
• Mental health
Political and governance impact
• Risk of governmental abuses
• Resilience

On these aspects, we have gathered stakeholder preferences as described below and we have estimated the values for the respective measures under each criterion, the input data being explained in sections The Choice of an Epidemiological Model and Socio-Economic Estimates. Needless to say, other data, such as business demographics data would be required to produce an estimate of how many lives can be saved as well as what the direct short-term and long-term costs of different risk mitigation measures would be. For our purposes here, we will handle this on a higher level of abstraction. Each component requires a significant amount of investigation in itself regarding the correlations between different factors, so the actual estimates herein are used for demonstration purposes only and can be updated with more extensive impact assessments. As more data becomes available from these fields, the model can be continuously updated for every criterion to produce new results, without its performance being affected.

## Eliciting Stakeholder Preferences

The participatory process was organized in the form of an in-depth web-based survey. The questionnaire for this survey was developed based on a comprehensive literature review about factors that are relevant for COVID-19 disaster risk reduction, and it addressed questions regarding risk perception, preferences for measures to be taken, and evaluations of relative criteria importance. We used an automatic web questionnaire (**Appendix 1**) to elicit stakeholder opinions, which was sent in June–July 2020 to 17 government officials, 16 healthcare experts, 11 representatives from the business sector, 9 non-governmental organizations, and 11 experts from academia. Sixteen respondents filled in the questionnaire, out of which three were medical doctors specialized in epidemiology, pulmonology, and public healthcare, five were university researchers specialized

in sociology, political sciences, and philosophy, one was a representative of a workers’ federation in Romania, and the rest were employees in the public sector and in NGOs. Since the purpose of the questionnaire was to both test the validity of the elicitation method for multi-criteria multi-stakeholder decision analyses on pandemic responses, and to obtain a sample of criteria rankings for our demonstrative evaluation, we consider the number to be sufficient, but not by any means representative at a national scale. In a full-scale setting, this should be quantitatively and qualitatively elaborated in a variety of respects, and augmented, e.g., via stakeholder discussion workshops, preferably supported by institutions with decision-making attributions in managing the epidemic crisis.

The result of this survey was that two-thirds of the respondents considered that an unacceptably high mortality of COVID-19 in Romania would have been between 1,001 and 5,000 deaths, a risk they considered to be very serious and very likely to happen<sup>1</sup>. One-third of the respondents (mainly sociology and public health policy experts) perceived the risk differently since the mortality caused by COVID-19 deemed by them to be unacceptable was significantly higher (between 10,001 and 20,000 deaths), an outcome which they estimated to be likely or very likely. Depending on this risk perception, stricter social distancing measures to keep the critical cases within the acceptable range can be justified or not, so a more representative number of respondents could ensure that the response to the current pandemic is not perceived as being disproportionate.

The most stringent problems brought by the SARS-CoV-2 pandemic in Romania were, according to the responses, the following (in no particular order): premature deaths and threats to people’s health; the economic impact, including social and economic depression, loss of jobs, small companies closing down; the increased social isolation of the elderly and of those with less material means; overburdening the healthcare system, the lack of education for personal hygiene; the risks for mental health; the population’s lack of trust long-term and disrespect toward rules, as well as the political calculations above medical and scientific interventions and the lack of evidence in decisions made. These suggested problems confirm the reliability of the proposed set of criteria for our integrated model of evaluation.

The survey asked respondents to evaluate 6 different measures, including alongside the ones we described a testing and contact tracing strategy and an enhanced isolation of the elderly strategy; however, since both of them are unfeasible for Romania, the former due to lack of infrastructural capacity and the latter due to a downright rejection of it by the public on ethical grounds, our evaluation focuses on the 4 alternative measures and selected criteria listed above. In evaluating the set of measures, respondents’ preferences were expressed by ordering the given alternative measures, followed by the ordering of the different criteria and sub-criteria, from the least important (coded with the value 0) to the most important aspects (coded with value 14) for them. The results of their aggregated weights show that the measures preferred by respondents in mitigating

<sup>1</sup> When the questionnaire was sent, there had already been over 1,500 deaths caused by COVID-19 in Romania.

the SAS-CoV-2 epidemic in Romania are the ones that have been applied in real-life (lockdown—Level 4 in our analysis), followed by the measures being applied during influenza epidemics (Level 2) and by Sweden's measures (Level 3). These weighed significantly more than not using any non-pharmaceutical measures to mitigate the epidemic (Level 1). In what concerns the criteria rankings relevant for our demonstration here, respondents considered that the health aspects were much more important than the economic impact, which in turn was seen as much more important than social and behavioral aspects. The political and governmental aspects were weighed as being less important than the social aspects. In what concerns sub-criteria, the impact on specific industries was considered more important than the short-term costs (measured here through GDP decrease). The impacts on human rights, on education and on mental health were seen as equally important, while the impact on vulnerable groups was considered much less important than the former aspects. How these weights are calculated in the formal decision analysis will be explained in section Measures and Criteria.

## Value Estimates

In this section, we will describe the data collection process on which the value estimates used in our impact assessments for the chosen criteria rely. Since the biggest degree of uncertainty, but also the justification of some countries' mitigation measures, resided in estimations of the virus spread and resulting fatalities, we will firstly present a model we have used to estimate the direct fatalities which would result in the 4 different scenarios under evaluation. Secondly, we will describe socio-economic data on which our assessments were based. What is important for the evaluation of alternatives is to have variables that indicate the impact of every set of measures at a local level; thus, matters such as infrastructure (number of hospitals, ICU beds, or ventilators), access to healthcare or institutional capacity, which are not influenced by the non-pharmaceutical measures considered here, represent the local benchmark used when comparing the impact estimations. Such a benchmark could be set, as abovementioned, by the Global Health Security Index (1) or by the INFORM Risk Index (49), where Romania's estimated risk class is low, but its institutional coping capacity is at high risk (INFORM Institutional 5.7).

## The Choice of an Epidemiological Model

In epidemiological modeling, there are various tools available for supporting scenario analyses and (assumingly) producing acceptable forecasts in a timely manner. System Dynamics is a natural choice for implementing models simulating transmission processes since the methodology presupposes a holistic approach and focuses on how the parts in the system affect each other with reinforcing or balancing feedback loops (50, 51). The family of SEIR (Susceptible, Exposed, Infected, Recovered) models are quite common to represent the spread of disease in a population, where people are divided into compartments depending on their immunity status. In these models, a system of coupled differential equations governs the flows between the different compartments over time, where people becoming infected move

from S to I and people who recover (or die) move from I to R. SEIR models usually operate on individual mortality, disease spread rate, recovery rate and the mean infection time, rate of movement from the exposed class to the infectious class, the mean latency period, and the basic reproduction number  $R_0$  (52). During the latter decade, various simulation environments have also emerged, such as AnyLogic, enabling for swift usage of, e.g., generic SEIR modeling which has been used in some recent studies, including studies of the Corona SARS-2, MERS, and the Zika virus (53, 54). Alternative models are taking more parameters into account and hopefully producing better predictions. For instance, in Sweden, the National Board of Health and Welfare has supported research and development of a decision support tool to complement the individual-based, total population model MicroSim (55, 56). In order to model the effects of containment measures applied for a specific demographic, models such as (57) or the COVID-19 scenarios at the University of Basel (58), or another candidate in the abundance thereof, could also be considered depending on the circumstances and the available level of specificity for the data sets, social characteristics and healthcare capacity. There are still many critical uncertainties with COVID-19 and every model with higher complexity than the training and validation data should be used very carefully as a decision basis, in particular since SARS-CoV-2 does not seem to behave like, e.g., a seasonal influenza, but is instead acting more "local," why the micro and meso perspectives must play an important role.

For our purposes herein, we apply regionalized demography augmented SEIR model for modeling the health effects of various risk mitigation measures. The model thus requires country-specific information (see **Appendix 2**) including population size in country/region/city divided into age groups, so as to model the effects of various measures in the desired area. It moreover can include morbidities in the population per age group, in as much as these figures are available in national statistics and relevant literature, and current numbers of confirmed cases per day, divided per age group and case severity. The benchmark for the medical system capacity (no. of ICU beds, ventilators, medication, testing capacity) should in principle be run against structural possibilities to increase it in a given timeframe, namely access to national or international funds, workforce capacity, relevant research, etc. As will be seen from the example demonstration below, it seems to work quite decently, but can be substituted by any other adequate one if preferred and more data is available.

The simulations of the measures' effects in containing the virus spread in Romania below were made in AnyLogic 8, based on a data set that should be adjusted and adapted to different regions. As input, the model uses the Romanian population divided into three age groups: 0-19, 20-59, and 60 years or older, according to national severity profiles which show a higher incidence of severe COVID-19 cases and deaths in the 60+ age group, due to existing comorbidities (59). The number of days between being infected to becoming infectious is, on average, 5.1 days (60, 61), and the time being infectious 5.0 (62). The model was fitted against the daily number of reported cases, fatalities and ICU occupancy in Romania by January 3rd, 2021.

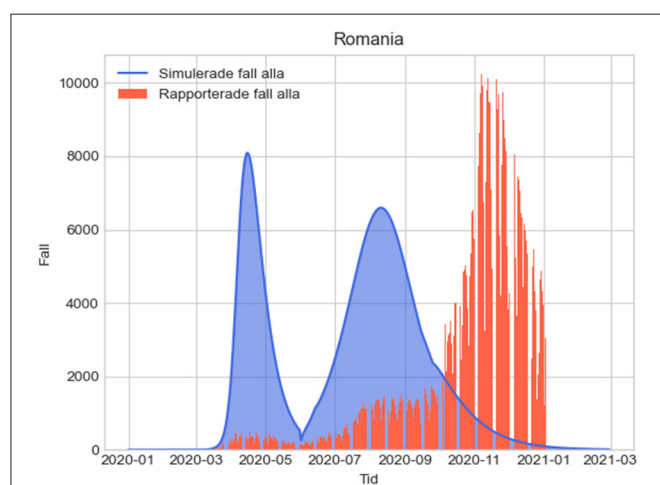
An infectivity parameter, a relative contact reduction, and the proportion of unreported cases were calibrated for each age-group. Unreported cases were assumed to be less infectious than reported cases, considering that these have milder symptoms. The contact profile changes three times during the simulation, and we have two periods with different infectivity and share of unreported. Further details regarding input parameters are found in **Appendix 2**. This baseline scenario was then used to simulate the various strategies of mitigation, starting with January 3rd, 2021. The 14-day case notification rate per 100.000 was 253.08, a significantly increased rate compared to the June-July period when the rate was 31.2.

The results from the four alternative measures with their assumptions are provided in **Figures 1–4** below, where the

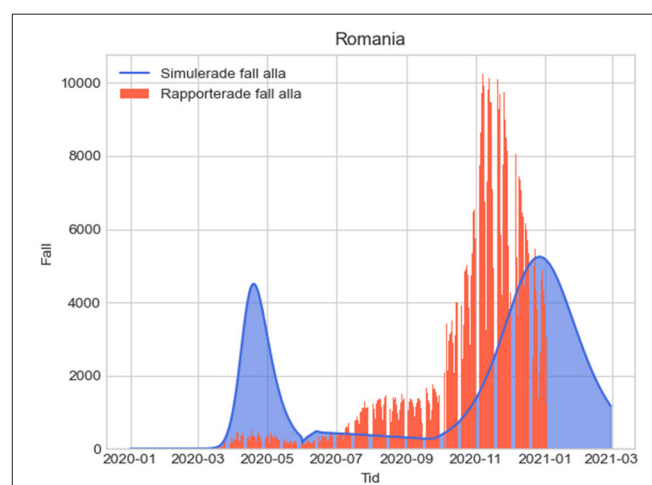
simulated results from December 31, 2019, to the end of 2021 are shown together with the actual reported cases by January 3rd, 2021. Since our example uses values estimating the impact of various measures for the year 2020, in estimating direct fatalities we have summed the total of unreported infections in one year for scenarios 1-4 and then assumed an infection fatality rate of 0.23 (63), which can of course be modified accordingly when other values are established.

In the figures below, the red graphs show the number of simulated reported positive cases per day, and the blue ones show the simulated unreported cases per day:

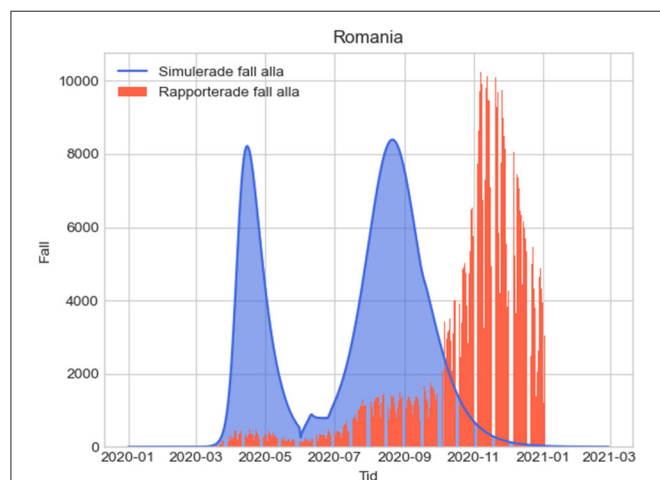
Since the estimations do not take into consideration other factors such as improvements of treatments, regional patterns of spread and other variables, we used a 10% confidence interval



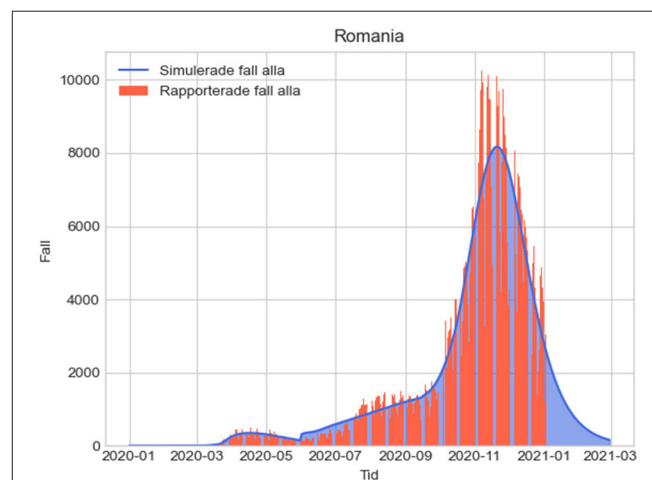
**FIGURE 1 | L1:** Epidemiologic evolution without any social distancing measures. Total unreported cases 2020-2021: 14,260,483.4; total unreported cases 2020: 14,260,483.4; total estimated fatalities 2020: 32,799.11182.



**FIGURE 3 | L3:** Epidemiologic evolution with social distancing recommended. Total unreported cases 2020-2021: 12,930,507.92; total unreported cases 2020: 9,623,212.942; total estimated fatalities 2020: 22,133.38.



**FIGURE 2 | L2:** Epidemiologic evolution using the influenza season protocols. Total unreported cases 2020-2021: 14,855,222.113; total unreported cases 2020: 14,847,477.491; total estimated fatalities 2020: 34,149.19.



**FIGURE 4 | L4:** Epidemiologic evolution with suppression for 2 months. Total unreported cases 2020-2021: 13,490,259.84; total unreported cases 2020: 12,525,884.439; total estimated fatalities 2020: 28,809.53.

for the total estimated fatalities. In this case, in scenario 4 using the real-life measures taken in Romania, we obtain an interval of [25929; 31691]. This is consistent with the sum of reported fatalities in Romania caused by COVID-19 in 2020 (around 17,000) and excess deaths caused by conditions that could reasonably be attributed to undetected COVID-19, such as among others, circulatory system diseases (10,000 more deaths than in 2019). Recent analyses based on excess mortality in Romania in 2020 also suggest that the real figure of COVID-19 fatalities was most likely over 26,000 in the first year of the pandemic (64).

### Socio-Economic Estimates

If the number of total COVID-19 fatalities for every level was obtained using the abovementioned epidemiologic model, the estimated socio-economic impact of every set of measures was based on various data sources and indices, which will be explained below. These estimations can, of course, be refined at any point. The framework does not depend on the input data or on certain epidemiologic or economic models chosen to generate such data. However, the results of the final evaluation of alternatives do depend on the input data, therefore the following evaluation is subject to change if different data will be produced. Note that in the evaluations, we make the quite uncontroversial assumptions that more cases, less GDP decrease, and fewer students getting education are considered to be inferior to fewer cases and so on.

The short-term costs are measured by GDP growth, which was  $-5.0$  in Romania in 2020 (65), this corresponding to our Level 4, the real-life scenario where the two months of lockdown included closures of non-essential shops, restaurants, theaters and schools, among others. Employees working in affected sectors were sent to technical unemployment, and the government introduced a deferral of payment of certain taxes and utilities, as well as a moratorium on loan repayment for companies and individuals. Monthly estimates of GDP growth in 2020 recorded by the COVID-19—Romanian Economic Impact Monitor (66) show that the GDP growth forecast was estimated at  $-10.3\%$  during the lockdown, followed by  $-5.7\%$  in July–September and by  $-1.5\%$  in October–December 2020, as various sectors were allowed to reopen their activity and citizen mobility increased. Taking into consideration the various trans-border effects of measures taken within the EU and globally, affecting macroeconomic indicators and some sectors' activities, including trade and tourism, we have estimated GDP deficits for other

scenarios as being slightly smaller in case of recommended social distancing and much smaller in case no social distancing measures are introduced. Similarly, the effect of the four different mitigation strategies upon specific sectors' economic activity gradually worsens as more sectors are either closed or are indirectly affected by closures and imposed social distancing. According to the abovementioned Economic Impact Monitor, economic activity indicators show that, aside from health services and the public administration sectors, all other economic sectors were negatively impacted, the most affected industries being tourism and hospitality ( $-64.4\%$  in Q2 of 2020), culture and arts ( $-60.4\%$ ), and the heavy industries ( $-29.1\%$ ). In Q3, corresponding to a Level 3 stringency level in our evaluation, most sectors recovered, aided by governmental fiscal facilities as well, except for agriculture ( $-19.4\%$ ). It is, thus, reasonable to consider that the more stringent the measures are, the more industries get negatively impacted, resulting in the ordinal ranking in Table 1 below.

Qualitative assessments are also made for two socio-behavioral criteria, namely human rights and mental health. The impact of alternative measures upon these aspects also worsens as stringency levels increase; before introducing lockdown, the Romanian state activated Art. 15 of the European Convention on Human Rights on March 15, 2020. The derogation gave the government broad powers in taking measures to contain the spread of the virus, trading off rights such as access to healthcare, freedom of movement, freedom of assembly, access to justice and access to education (67). For two months, both public and private hospitals suspended healthcare for all non-emergent medical cases by a governmental order, affecting chronic patients' treatments: compared with 2019, in April and May 2020 there were 70.98% and, respectively, 61.48% fewer hospitalizations, and specifically around 80% less chronic patients' hospitalizations (68). In Romania, there are 17,500 TB patients, 16,500 HIV patients, over 1 million diabetes patients and 488,824 cancer patients. For estimating the impact on human rights of other measures, we take into consideration border restrictions, case quarantine and temporary school closures (Level 2), as well as limits to the freedom of assembly through bans of large gatherings (Level 3).

In what concerns mental health, preliminary reports from the COH-FIT project (69) on Romanians' mental health during the pandemic show worsening stress and nervousness levels reported by almost half of respondents within the population aged 28–50 years old, as well as an intensification of pre-existing conditions

**TABLE 1** | The value estimates for the respective measure under each criterion.

Criterion/ Measure	Health	Economic		Social and behavioral				Political and governance	
	Direct fatalities	Short term costs	Impact on specific industries	Human rights	Vulnerable groups	Access to education	Mental health	Risk of abuses	Resilience
Level 1	29438.1–35979.9	1–3	Better than L2	Better than L2	1.4	0	Better than L2	6.49	47.9
Level 2	30733.2–37562.8	1–4	Better than L3	Better than L3	1.4	14–28	Better than L3	6.49	44.9
Level 3	19752.3–24141.7	3–5	Much better than L4	Better than L4	1.6	0	Better than L4	6.44	50.9
Level 4	25928.6–31690.5	5–6			1.7	54–84		6.4	41.9



reported by a third of respondents, and an increased sense of loneliness. The reported factors which exacerbated the impact were poverty, unemployment, physical diseases and the loss of a loved one. During lockdown, a series of five national surveys on Romanians' perceptions, attitudes and behaviors, conducted by the Romanian Institute for Evaluation and Strategy (IRES), showed that loneliness was substantially reported by teenagers and by the elderly respondents, while 4 in 10 respondents reported they feared losing their means of livelihood because of the crisis (70). Separating measures' effects from the effects the pandemic itself is difficult since COVID-19 and the fear of disease can cause declining mental health and well-being on their own, as reports have shown. However, declining mental health due to isolation and financial scarcity associated with job losses can be attributed to mitigation measures. Therefore, we have considered that the impact of Levels 1 and 2 on mental health is smaller than the impact of Level 3, which involves social distancing, the highest negative impact on this criterion being under Level 4.

For estimating the impact of various measures on education, we looked at the number of school days lost in each case. During the lockdown period, an initial school closure for 18 days led 3,526,200 students to not have access to education. After this, the educational activities were resumed online for another 36 days, but an estimated number of 903,870 students (32% of pre-university students) did not have access to distance learning (71) due to lack of material means, such as digital devices or internet access. From September until November 2020, more localized measures were introduced, whereby the choice for face-to-face, hybrid or distance learning was continuously revised based on incidence rates at county levels, therefore a precise number of days lost during this period is difficult to estimate. After November 9th, all schools switched to distance learning. In estimating the number of days for other measures, we assume schools do not close (Levels 1 and 3) or that only schools with 3 confirmed cases switch to distance learning for 14 days (Level 2).

In estimating the impact of mitigation measures upon vulnerable groups we used values from the INFORM Index for Risk Management (49), where Romania had a score of 1.7 for the Vulnerability component for 2020. Compared to 2019, this score has remained constant and the Vulnerable groups indicator has slightly improved (from 1.5 to 1.4), but data reliability in estimating its sub-indicators could be affected by the reduced access to healthcare during and after lockdown by chronic patients, as described above. Moreover, the socio-economic vulnerability has worsened, in particular with regard to inequality (from 2.7 to 3.5). For these reasons, we use the general Vulnerability Index in our estimates, which we suggest would be lower for Levels 1-3, in correlation with less severe economic impacts.

Finally, we have used two more indices, this time to assess the measures' effects on political and governance aspects; the risk of governmental abuses was measured through the 2020 Democracy Index (72) and the impact on resilience was estimated using Bloomberg's Covid Resilience Ranking (73). Compared to 2019, the functioning of government has slightly worsened (from 5.71 to 5.36), decreases in political culture (from 4.38 to 3.75) and

civil liberties (from 7.65 to 7.06) also being noticeable during the pandemic. We assume that, as civil liberties would increase under Levels 3, 2, and 1, so would Romania's democracy score. Other sources can of course be used, such as the Political and security risk and the Socio-economic resilience indicators of the Global Health Security (GHS) Index, both indicators mainly relying on data from The Economist Democracy Index.

Needless to say, the values should, in an extended analysis, be refined through economic models, empirical data, more well-deliberated qualified estimates, etc. The measures considered under the respective criteria are summarized in **Table 1**.

## Measures and Criteria

As described in section Eliciting Stakeholder Preferences, the sampled opinions are too few to be representative and the example questionnaire is not granulated enough for a real model input, which is why the limited representation below should be considered as a model demonstration and not a policy recommendation. It nevertheless indicates that this representation format actually is very feasible and should be quite straightforward to use in an extended study, thus we suggest a representation of a subset of the preferences as a ranking of the criteria:

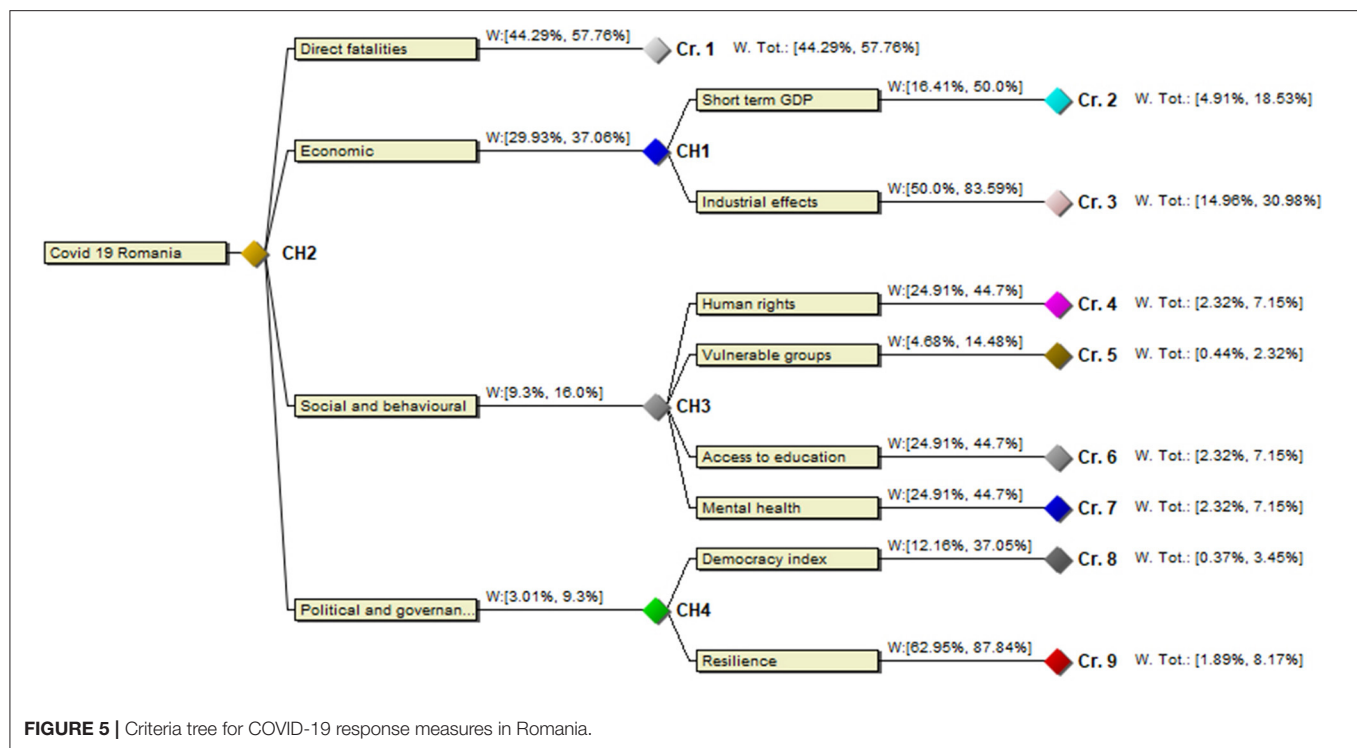
- CH2: Direct fatalities >> Economic >> Social and behavioral > Political and governmental
- CH1: Industrial effects > Short term GDP
- CH3: Human rights = Access to education = Mental health >> Vulnerable groups
- CH4: Resilience >> Risk of governmental abuses

This is not a pure ordinal ranking and we have to use a different representation thereof. We need supplementary statements for the criteria to calibrate the different scales involved since they are of very different character and we simply assume (because a formal P-SWING procedure was not performed) that this representation becomes the criteria tree in **Figure 5**.

We then again use the notation from (37) to represent the strength of the rankings between the criteria by introducing auxiliary variables  $x_i$  and we obtain the ranking  $w(\text{fatalities}) > x_1 > w(\text{economy}) > x_2 > w(\text{social}) > x_3 > w(\text{political})$ , denoting the weight of fatalities by  $w(\text{fatalities})$  and so on. This theory behind the process is explained in detail in *ibid*. Using the more elaborated theory, we could considerably have refined the elicitation of the rankings between criteria, but such an analysis is beyond the scope of this article. Finally, for the alternatives, we have a mixture of interval estimates and a ranking.

## Aggregation and Evaluation

The multi-criteria decision problem is evaluated against the background information using the method described in section Evaluation Method above. This means in this simple case, without sub-criteria, that we evaluate weighted averages of the figures involved, or, more precisely, equations of the format  $E(M_j) = \sum w_i v_{ij}$ , where  $w_i$  is the weight variable of criterion  $i$  and  $v_{ij}$  is the value variable of measure  $j$  under criterion  $i$ . The value  $E(M_j)$  is computed by solving successive optimization problems by the program DecideIT, implementing the ideas described in



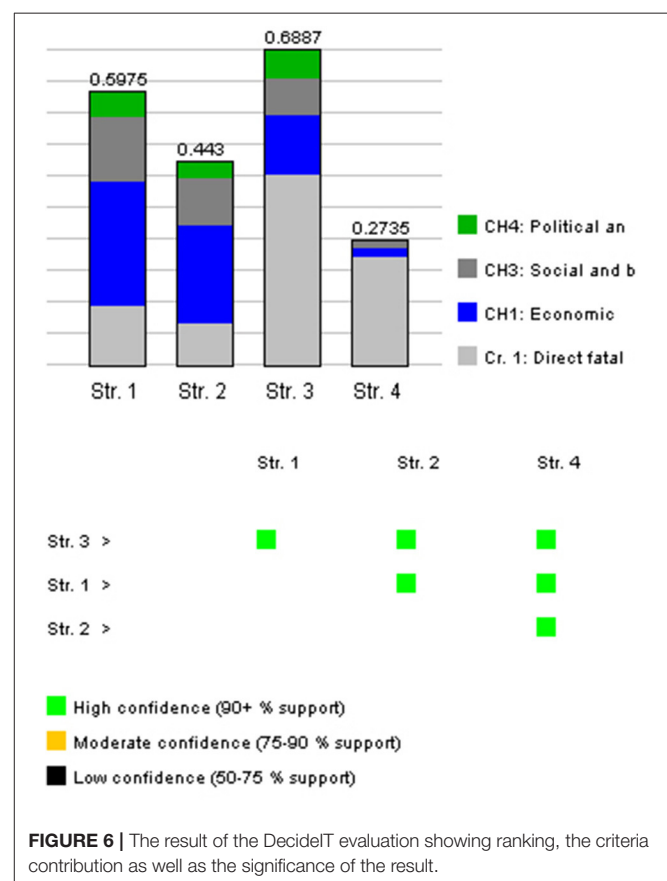
section Evaluation Method. The result of our example is provided in **Figure 6**.

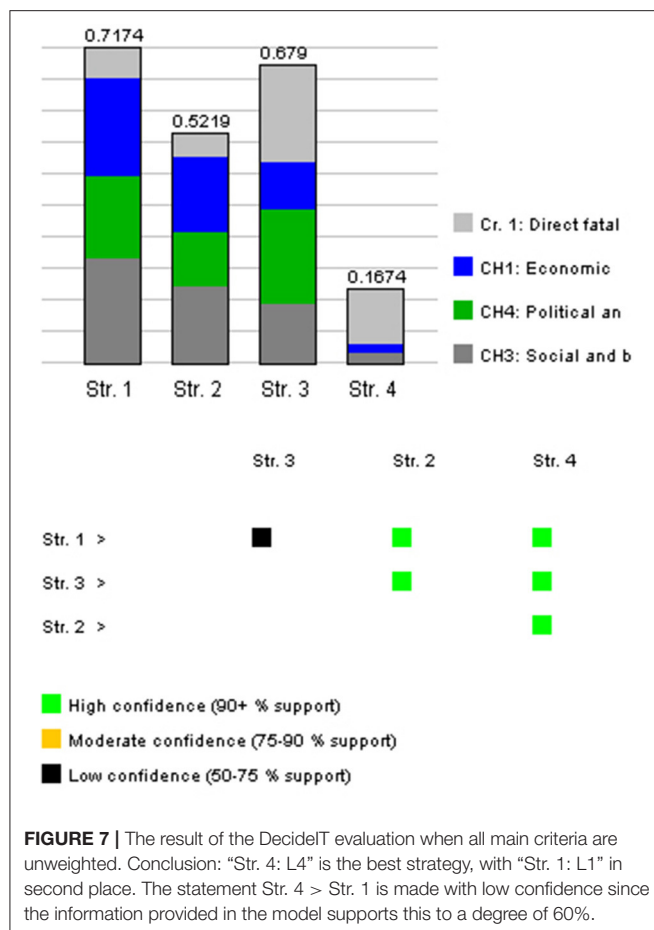
In the figure, the higher the bar for the measure, the better it is, given the background information. The bars also show how much each criterion contributes to the respective values, based on the possible ranges of the resulting weighted averages of the respective measures. Furthermore, the robustness of the opinions is color marked. Green means that there is a significant difference between the features and that there must be substantial changes in the input data for it to change. Yellow means that there is still a difference, but it is more sensitive to input data. Black means that there is no significant difference between the desirability of the measure. The confidence measure just the proportion of the volume under the resulting distribution as explained in section Evaluation Method. An extended explanation of the semantics regarding the bars and the color markings is also provided in (28).

In summary, the differences are all significant where L3 is the best strategy, followed by L1, L2, and L4. L3 is clearly the best option in this example. Furthermore, this result is quite robust. We can also note how this significantly differs from the uninformed intuitive rankings from the results of the questionnaire.

Needless to say, different data would affect the result. For instance, if we consider when all main criteria are unweighted, given the value ranges, the result would be the one in **Figure 7**. As can be seen from the figure, the ranking is changed, but the difference between L1 and L3 has lower confidence.

Note again that our point here is not that this in any way provides a conclusive recommendation plan. Our purpose here





is to demonstrate a methodology for solving such complex problems under large uncertainties in multi-stakeholder settings and to show as well that there are effective tools available for the quite elaborate calculations involved.

## CONCLUDING REMARKS

In this paper, we have presented a policy- and decision-support framework for managing the response to the SARS-CoV-2 pandemic and other future hazard scenarios, characterized by a large degree of uncertainty. The framework can be implemented both during emergency preparedness and ongoing response, by relevant authorities and experts alike. Naturally, the more reliable data on relevant criteria, the better, to obtain evaluation results that have a higher degree of confidence. However, without an adequate decision mechanism to aggregate and evaluate data, and without a stakeholder consultation process to establish the local priorities in mitigation response, epidemiologic data alone cannot automatically translate into appropriate policies. We thus recommend policy-makers at national and regional levels to use multi-criteria decision support tools and multi-stakeholder frameworks in deliberating upon the best course of action in current and future hazard scenarios. The framework should be regionally adapted and

used, given differing socioeconomic conditions across a state, as well as different spread patterns. This is why the stakeholder consultation component is meaningful since sociocultural groups can have different priorities for particular regions. Obtaining regional socioeconomic data can pose some difficulties as it depends, among other things, on reporting protocols and on chain effects with other regions. However, the set of criteria employed can be tailored to the needs and capabilities of any region.

Crisis scenarios are indeed tremendously complex from a societal viewpoint and can result in highly undesirable side effects as well, which is why an approach cannot be restricted to a single criterion, such as fatality rate or financial short-term effects, but should rather be situated within a wider field of social shaping. There is certainly a multitude of relevant aspects on the current crisis and the main purpose of this article has been to suggest what a framework for pandemic modeling, including epidemiological and socioeconomic factors, could look like, as well as to emphasize that such analyses should really be done as a basis for evidence-based policymaking regarding pandemic situations. Representing complex scenarios in socioeconomic systems has the potential to inform policy formation processes, and we believe that such a framework can decrease irrational decisions disturbed by a variety of cognitive and political biases as well as reducing the number of measures with insignificant effects or with highly undesirable side-effects.

The transformation of societal systems cannot be determined solely by any technological or economic assumed rationality. Rather, there is a wide range of social, political and institutional factors that interact in a systemic fashion and influencing their development. The acknowledgment of the multiple factors at stake in handling the crisis has more often than not been omitted from public communication, where public officials' statements mostly framed the problem unilaterally, basing their narratives on warnings coming from the medical and public health scientific community. Since the current pandemic has primarily been considered a public health problem, strategies to mitigate the direct impact of COVID-19 upon the population have been persuasively communicated. Ethically justifiable use of narratives in science and evidence communication should, in principle, act for the common benefit and not “restrict an individual's autonomy to make decisions” (74). Persuasion can be used where there is a high consensus that science “can justify the best course of action,” in particular for emergency actions. However, the assumed best course of action must be carefully deliberated and motivated.

Our study provides a feasible methodology for structuring available – even if imprecise – evidence and preferences, which also serve as a support for publicly communicating the decision-making process. The long-term effects require sub-decisions as well, further complicating a naturally simplified analysis. For instance, macroeconomic policy actions and fiscal measures are critical to longer-term effects, something that the various types of austerity measures in the aftermath of the global financial crisis have emphatically highlighted, as well as to their effects on other criteria involved such as mental health (75, 76) and the irrational growth of political populism and power abuse

as well as distractions, cf. (77–79). Furthermore, international comparisons are problematic due to the regional nature, as well as other factors, of the COVID-19 spread patterns. Therefore, comparisons between national strategies are very difficult to evaluate in a reasonable way. For instance, Sweden as a quite interesting case has taken a different approach compared to many other countries, but the result could have been very different in countries with different healthcare systems, demographics, telecommunication situations, authority trust and relations to social contracts, traveling patterns and so on. Therefore, a framework like this must be used with an awareness of national and regional conditions. The COVID-19 spread pattern furthermore emphasizes that the model must be flexibly used and regionally adapted.

It is also difficult to adequately make trade-offs between different criteria, in particular when the stakes in many cases are high, but trade-offs must nevertheless be considered when handling such situations and it should be transparent which they are and how they affect the actual decision making, even if the trade-offs are not always clear (80). As it now happens, these are often hidden, making it impossible to scrutinize the decisions that have been taken. For instance, the 70+ age group accounts for an overwhelming number of all deaths. Areas, even in reasonably wealthy countries or regions, having a higher proportion of first- and second-generation immigrants have been significantly more affected. How should this be considered compared to other effects? Should there be another type of precautionary measures and even society constructs so that particularly vulnerable and socially underprivileged groups are better protected when these types of events occur? In an international setting, such questions will be even more important in a variety of respects, not the least since many countries will suffer tremendously from the various socioeconomic side-effects of pandemics, exacerbating poverty and inequality, even aside from the much higher direct effects due to limited health care systems. These kinds of questions must nevertheless be clarified in advance and well-anchored in the broader populations, another reason why transparent and deliberated policies should be analyzed and in place beforehand. To do this, there is a need for integrated methodologies and decision processes for how country strategies and action plans should be aligned with overall objectives and stakeholder perceptions and preferences. Deliberated strategies must be a prerequisite for policy formation and they should furthermore be developed together with the civil society in order to be better prepared for future crises.

In a deliberate design, stakeholders would be made more aware of the availability of different options regarding each

of the pertinent hazards to their communities, as well as the impact of their preferences on risk management and on the broader society. This would probably facilitate improvements in resilience as well to future extreme hazard events, particularly in a multi-hazard context where it could deliver effective solutions for a multi-stakeholder planning approach and strengthen policy coherence by identifying management options, thereby contributing to more resilient regions. The management options can be communicated with stakeholders who could also be used to gather feedback about how they recognize these options and determine the possible opportunities and constraints from their viewpoint. The participatory approach of engaging different stakeholders would help to ensure the buy-in of stakeholders and encourage them to take on board the final results and raise the understanding for various measures, while still being aware of side-effects that are violating other fundamental societal effects. If this work could be undertaken, an applied framework would then define a blueprint for how crisis preparedness could be better carried out, implemented and scaled up.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

## FUNDING

This research was funded by the European Union's Horizon 2020 Programme call H2020-INFRAEOSC-05-2018-2019, Grant Agreement number 831644, via the EOSCsecretariat.eu.

## ACKNOWLEDGMENTS

The authors would also like to thank Professor Magnus Boman for valuable comments.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2021.583706/full#supplementary-material>

## REFERENCES

1. GHS. *Global Health Security Index* (2020). Available online at: <https://www.ghsindex.org/> (accessed June 15, 2020).
2. Andersen K, Rambaut A, Lipkin W, Holmes E, Carry R. The proximal origin of SARS-CoV-2. *Nature Medicine*. (2020) 26:450–2. doi: 10.1038/s41591-020-0820-9
3. Amanat F, Krammer F. SARS-CoV-2 vaccines: status report. *Immunity*. (2020) 52:583–9. doi: 10.1016/j.immuni.2020.03.007
4. Muttarak R. *Explaining the COVID-19 Outbreak and Mitigation Measures* (2020). Available online at: <https://blog.iiasa.ac.at/2020/03/10/explaining-the-covid-19-outbreak-and-mitigation-measures/> (accessed March 20, 2020).
5. The New York Times. *Embracing the Uncertainties* (2020). Available online at: <https://www.nytimes.com/2020/04/07/science/coronavirus-uncertainty-scientific-trust> (accessed April 7, 2020).
6. Time. *The National Divide Over COVID-19 Testing Threatens Our Progress* (2020). Available online at: <https://time.com/5826997/>



- divide-covid-19-testing-threatens-progress/ (accessed April 27, 2020).
7. UNESCO. *Adverse Consequences of School Closures* (2020). Available online at: <https://en.unesco.org/covid19/educationresponse/consequences> (accessed May 20, 2020).
  8. Thibodeau PH, Boroditsky L. Metaphors we think with: the role of metaphor in reasoning. *PLoS ONE*. (2011) 6:2. doi: 10.1371/journal.pone.0016782
  9. Ellsberg D. Risk, ambiguity, and the savage axioms. *Q J Econ*. (1961) 75:643–69.
  10. Lindblom C. The handling of norms in policy analysis. In: *The Allocation of Economic Resources: Essays in Honor of Bernard Francis Haley*. Abramovitz M, editors. Stanford, CA: Stanford University Press (1959). p. 160–79.
  11. Simon H. *Models of Bounded Rationality Behavioral Economics and Business Organization, Volume 2*. Cambridge, MA: MIT Press. (1982) 505p.
  12. Slovic P. Perception of risk. *Science*. (1987) 236:280–5.
  13. Walker P, Whittaker C, Watson O, Baguelin M, Ainslie KEC, Bhatia S, et al. *The Global Impact of COVID-19 and Strategies for Mitigation and Suppression*. Imperial College London. (2020). doi: 10.25561/77735
  14. Ferguson N, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, et al. *Impact of Non-Pharmaceutical Interventions (NPIs) to Reduce COVID-19 Mortality and Healthcare Demand*. Imperial College London. (2020). doi: 10.25561/77482
  15. Britton T. Basic estimation-prediction techniques for Covid-19, and a prediction for Stockholm. *ArXiv [Preprint]*. (2020). doi: 10.1101/2020.04.15.20066050
  16. National Institute of Public Health. *Descriere 5 Scenarii Reprezentative - Epidemii* (2016). Available online at: [https://gis.ro-risk.ro/site/documente/RezultateRO-RISK/Epidemii/Cap.4.%20Descriere%205%20scenarii%20epidemii\\_draft.pdf](https://gis.ro-risk.ro/site/documente/RezultateRO-RISK/Epidemii/Cap.4.%20Descriere%205%20scenarii%20epidemii_draft.pdf) (accessed May 19, 2020).
  17. Fundatia Viata si Lumina. *FEPAL - Federatia Parintilor si Apartinatorilor Legali, IRES. Școala în stare de urgență: Accesul copiilor Școlari din România la educație online - Studiu național* (2020). Available online at: [https://ires.ro/uploads/articole/ires\\_accesul-elevilor-scolari-la-educatie-online\\_policy-paper\\_mai-2020.pdf](https://ires.ro/uploads/articole/ires_accesul-elevilor-scolari-la-educatie-online_policy-paper_mai-2020.pdf) (accessed June 1, 2020).
  18. Ministry of Public Finances. *Executia Bugetului General Consolidat* (2020). Available online at: [https://www.mfinante.gov.ro/static/10/Mfp/buget/executii/nota\\_bgcm2020.pdf?fbclid=IwAR1TyhNP7uechKn4zMrfKz/NzPtFf2dDAhQ4WgX2vH8M-hMhbS\\_E9i\\_TXg](https://www.mfinante.gov.ro/static/10/Mfp/buget/executii/nota_bgcm2020.pdf?fbclid=IwAR1TyhNP7uechKn4zMrfKz/NzPtFf2dDAhQ4WgX2vH8M-hMhbS_E9i_TXg) (accessed May 30, 2020).
  19. Comisia Națională de Strategie și Prognoză. *Proiecția Principalilor Indicatori Macroeconomi - 2020* (2020). Available online at: [http://www.cnp.ro/user/repository/prognoze/Prognoza\\_principalilor\\_indicatori\\_maeconomi\\_2020\\_varianta\\_preliminara.pdf](http://www.cnp.ro/user/repository/prognoze/Prognoza_principalilor_indicatori_maeconomi_2020_varianta_preliminara.pdf) (accessed April 25, 2020).
  20. Hale T, Webster S, Petherick A, Phillips T, Kira B. *Oxford COVID-19 Government Response Tracker, Blavatnik School of Government* (2020). Available online at: <https://covidtracker.bsg.ox.ac.uk/> (accessed May 20, 2020).
  21. Business Insider. *Taiwan Has only 77 Coronavirus Cases. Its Response to the Crisis Shows That Swift Action and Widespread Healthcare Can Prevent an Outbreak* (2020). Available online at: <https://www.businessinsider.com/coronavirus-taiwan-case-study-rapid-response-containment-2020-3> (accessed May 17, 2020).
  22. Nussbaumer-Streit B, Mayr V, Dobrescu AI, Chapman A, Persad E, Klerings I, et al. Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. *Coch Datab Syst Rev*. (2020) 4:13574. doi: 10.1002/14651858.CD013574
  23. Tian L, Li X, Qi F, Tang V, Tang V, Liu J, et al. Calibrated intervention and containment of the COVID-19 pandemic. *ArXiv [Preprint]*. (2020). Available online at: <https://arxiv.org/abs/2003.07353v6>
  24. Argente D, Hsieh C-T, Lee M. The cost of privacy: welfare effects of the disclosure of Covid-19 cases. *SSRN Electronic J*. (2020). doi: 10.2139/ssrn.3601143
  25. Howard J, Huang A, Li Z, Tufekci Z, Zdiman V, van der Westhuizen H-M, et al. Face masks against COVID-19: an evidence review. *Preprints [Preprint]*. (2020). doi: 10.20944/preprints202004.0203.v3
  26. Camitz M, Liljeros F. The effect of travel restrictions on the spread of a moderately contagious disease. *BMC Med*. (2006) 4:32. doi: 10.1186/1741-7015-4-32
  27. Larsson A, Fasth T, Wärnhjelm M, Ekenberg L, Danielson M. Policy analysis on the fly with an online multi-criteria cardinal ranking tool. *J Multi-Criteria Dec Anal*. (2018) 25:55–66. doi: 10.1002/mcda.1634
  28. Danielson M, Ekenberg L, Komendantova N, Al-Salaymeh A, Marashdeh L. A participatory MCDA approach to energy transition policy formation. In: de Almeida A, Ekenberg L, Scarf P, Zio E, Zuo MJ, editors. *Multicriteria Decision Models and Optimization for Risk, Reliability, and Maintenance Decision Analysis-Recent Advances*. Cham: Springer International Publishing AG (2020).
  29. Bernstein J, Hutler B, Rieder T, Han H, Barnhill A. *An Ethics Framework for the COVID-19 Reopening Process* (2020). Available at: <https://bioethics.jhu.edu/research-and-outreach/covid-19-bioethics-expert-insights/resources-for-addressing-key-ethical-areas/grappling-with-the-ethics-of-social-distancing/> (accessed May 14, 2020).
  30. Held V. *The Ethics of Care: Personal, Political and Global*. Oxford and New York, NY: Oxford University Press. (2006).p. 211.
  31. Douglas M, Wildavsky AB. *Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers*. Berkeley, CA: University of California Press. (1982).p. 224.
  32. Thompson M, Ellis R, Wildavsky A. *Cultural Theory*. Boulder: Westview Press. (1990).p. 296.
  33. The New York Times. *Trump Says Coronavirus Cure Cannot 'Be Worse Than the Problem Itself'* (2020). Available online at: <https://www.nytimes.com/2020/03/23/us/politics/trump-coronavirus-restrictions.html> (accessed March 29, 2020).
  34. Schwartz SH. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. In: *Advances in Experimental Social Psychology*, Zanna MP, editor. San Diego, CA: Academic Press (1992). pp. 1–65.
  35. Fischer R, Schwartz SH. Whence differences in value priorities?: individual, cultural, or artifactual sources. *J Cross-Cult Psychol*. (2010) 42:1127–44. doi: 10.1177/0022022110381429
  36. Schwartz SH. An overview of the Schwartz theory of basic values. *Online Read Psychol Cult*. (2012) 2:1. doi: 10.9707/2307-0919.1116
  37. Komendantova N, Ekenberg L, Marashdeh L, Al-Salaymeh A, Danielson M, Linnerooth-Bayer J. Are energy security concerns dominating environmental concerns? Evidence from stakeholder participation processes on energy transition in Jordan. *Climate*. (2018) 6:88. doi: 10.3390/cli6040088
  38. Danielson M, Ekenberg L. *An Improvement to Swing Techniques for Elicitation in MCDM Methods, Knowledge-Based Systems*. (2019) 168:70–9. doi: 10.1016/j.knosys.2019.01.001
  39. Danielson M, Ekenberg L, inventors. *Method for Decision and Risk Analysis in Probabilistic and Multiple Criteria Situations*. United States patent US 7257566 (2007).
  40. Ekenberg L, Fasth T, Larsson A. Hazards and quality control in humanitarian demining. *Int J Q Reliab Manag*. (2018) 35:4. doi: 10.1108/IJQRM-01-2016-0012
  41. Danielson M, and Ekenberg L. Efficient and sustainable risk management in large project portfolios. In: *Perspectives in Business Informatics Research: Proceedings*. Zdravkovic J, Grabis J, Nurcan S, Stirna J, editors. Cham: Springer (2018). p. 143–157.
  42. Mihai A, Marincea A, Ekenberg L. A MCDM analysis of the Roșia Montană gold mining project. *Sustainability*. (2015) 7:7261–88. doi: 10.3390/su7067261
  43. Ekenberg L, Hansson K, Danielson M, Cars G. Deliberation, representation, and equity: research approaches, tools, and algorithms for participatory processes. *Open Book Publishers*. (2017) 2017:380. doi: 10.11647/OBP.0108
  44. Danielson M, Ekenberg L, Larsson A. A second-order-based decision tool for evaluating decisions under conditions of severe uncertainty. *Knowled Bas Syst*. (2020) 2020:191. doi: 10.1016/j.knosys.2019.105219
  45. Danielson M, Ekenberg L. Development of algorithms for decision analysis with interval information. In: *New Trends in Software Methodologies, Tools and Techniques*. Fujita H, Marirk V, editors. Amsterdam: IOS Press (2009). p. 314–35.
  46. Danielson M, Ekenberg L. Automatic criteria weight generation for multi-criteria decision making under uncertainty, to appear in the proceedings from innovation for systems information and decision: models and applications. In: de Almeida AT, Morais DC, editors. *Lecture Notes in Business Information Processing Volume 405*. Chennai: Springer (INSID 2020).

47. Danielson M, Ekenberg L. The Car method for using preference strength in multi-criteria decision making. *Group Dec Neg.* (2016) 25:4. doi: 10.1007/s10726-015-9460-8
48. Government of South Africa. *Draft Framework for Consultation on COVID-19 Risk Adjusted Strategy* (2020). Available online at: <https://sacoronavirus.co.za/covid-19-risk-adjusted-strategy/> (accessed April 30, 2020).
49. European Commission DRMKC. *INFORM Risk Index 2021* (2021). Available online at: <https://drmkc.jrc.ec.europa.eu/inform-index/> (accessed January 15, 2021).
50. Forrester JW. *Principles of Systems*. Cambridge MA: Productivity Press. (1968).
51. Sterman JD. System dynamics modeling: tools for learning in a complex world. *Calif Manag Rev.* (2001) 43:4. doi: 10.2307/41166098
52. Li MY, Muldowney JS. Global stability for the SEIR model in epidemiology. *Math Biosci.* (1995) 125:155–64.
53. Shi P, Dong Y, Yan H, Zhao C, Li X, Liu W, et al. Impact of temperature on the dynamics of the COVID-19 outbreak in China. *Sci Total Environ.* (2020) 2020:728. doi: 10.1016/j.scitotenv.2020.138890
54. Jang J, Ahn I. Simulation of infectious disease spreading based on agent based model in South Korea. *Adv Sci Tech Lett.* (2016) 128:53–8. doi: 10.14257/astl.2016.128.11
55. Brouwers L, Camitz M, Cakici B, Mäkilä K, Saretok P. MicroSim: Modeling the Swedish Population. *arXiv [Preprint]*. (2009). Available online at: <https://arxiv.org/abs/0902.0901v1>
56. Brouwers L, Cakici B, Camitz M, Tegnell A, Boman A. Economic consequences to society of pandemic H1N1 influenza 2009: Preliminary results for Sweden. *Euro Surveill.* (2009) 14:37. doi: 10.2807/ese.14.37.19333-en
57. Flaxman S, Mishra S, Gandy A et al. Estimating the effects of non-pharmaceutical interventions on COVID-19 in Europe. *Nature.* (2020) 584:257–61. doi: 10.1038/s41586-020-2405-7
58. Noll N, Aksamentov I, Druelle V, Badenhorst A, Ronzani B, Jefferies G, et al. COVID-19 Scenarios: an interactive tool to explore the spread and associated morbidity and mortality of SARS-CoV-2. *medRxiv [Preprint]*. (2020). doi: 10.1101/2020.05.05.20091363
59. Pantea Stoian A, Pricop-Jeckstadt M, Pana, A. Death by SARS-CoV 2: a Romanian COVID-19 multi-centre comorbidity study. *Sci Rep* (2020) 10:21613. doi: 10.1038/s41598-020-78575-w
60. Li Q, Guan X, Wu P. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. *N Engl J Med.* (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
61. Linton NM, Kobayashi T, Yang Y. Incubation period and other epidemiological characteristics of 2019 novel coronavirus infections with right truncation: a statistical analysis of publicly available case data. *J Clin Med.* (2020) 9:2. doi: 10.3390/jcm9020538
62. Wölfel R, Corman VM, Guggemos W. Virological assessment of hospitalized patients with COVID-2019. *Nature.* (2020) 581:465–9. doi: 10.1038/s41586-020-2196-x
63. Ioannidis JPA. Infection fatality rate of COVID-19 inferred from seroprevalence data. *Bull World Health Organ.* (2021) 99:19–33F. doi: 10.2471/BLT.20.265892
64. Sandu D. *Căți români a ucis COVID-19 cu Adevărat?* (2021). Available online at: <https://mindcraftstories.ro/coronavirus/cati-romani-a-ucis-covid-19-cu-adevarat/> (accessed January 22, 2021).
65. European Commission. *Economic Forecast for Romania*. Available online at: [https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-performance-country/romania/economic-forecast-romania\\_en](https://ec.europa.eu/info/business-economy-euro/economic-performance-and-forecasts/economic-performance-country/romania/economic-forecast-romania_en) (accessed February 15, 2021).
66. UBB-FSEGA. *COVID-19 - Romanian Economic Impact Monitor* (2020). Available online at: <https://econ.ubbcluj.ro/coronavirus/> (accessed January 28, 2021).
67. Human European Consultancy. *Coronavirus pandemic in the EU – Fundamental Rights Implications*. Romania (2020). Available online at: [https://fra.europa.eu/sites/default/files/fra\\_uploads/ro\\_report\\_on\\_coronavirus\\_pandemic\\_june\\_2020.pdf](https://fra.europa.eu/sites/default/files/fra_uploads/ro_report_on_coronavirus_pandemic_june_2020.pdf) (accessed November 30, 2020).
68. Fundatia Romanian Angel Appeal – Apelul Îngerului Român and Observatorul Român de Sănătate. *Impactul Pandemiei COVID-19 Asupra Accesului Bolnavilor Cronici la Servicii Medicale*. Focus pe TBC, HIV, oncologie, diabet (2020). Available online at: [https://health-observatory.ro/wp-content/uploads/2020/10/Raport\\_ORIS-impact\\_pandemie\\_cronici\\_2020.pdf](https://health-observatory.ro/wp-content/uploads/2020/10/Raport_ORIS-impact_pandemie_cronici_2020.pdf) (accessed October 3, 2020).
69. Romania Insider. *The Emotional Impact of COVID-19: Romanians Are Sadder and Angrier, Study Shows* (2020). Available online at: <https://www.romania-insider.com/covid-romanians-sadder-angrier-study> (accessed January 4, 2021).
70. IRES. *O Lună de Singurătate: Starea Emoțională a Românilor În Pandemie* (2020). Available online at: <https://ires.ro/articol/389/o-luna-de-singur-tate---starea-emo%C8%9Bional%C4%83-a-romanilor-in-pandemie> (accessed May 2, 2020).
71. IRES. *Școala în Stare de Urgență: Accesul Copiilor Școlari din România la Educație Online*. Available online at: [https://cdn.edupedu.ro/wp-content/uploads/2020/05/ires\\_accesul-elevilor-din-romania-la-educatie-online\\_studiu-national\\_aprilie-2020.pdf](https://cdn.edupedu.ro/wp-content/uploads/2020/05/ires_accesul-elevilor-din-romania-la-educatie-online_studiu-national_aprilie-2020.pdf) (accessed May 2, 2020).
72. The Economist Intelligence Unit. *Democracy Index 2020: In Sickness and in Health?* (2021). Available online at: <https://www.eiu.com/n/campaigns/democracy-index-2020/> (accessed February 2, 2021)
73. Bloomberg. *The Covid Resilience Ranking. The Best Worst Places to Be in Covid: U.S. Stages a Recovery* (2020). Available online at: <https://www.bloomberg.com/graphics/covid-resilience-ranking/> (accessed February 20, 2020).
74. Dahlstrom MF, Ho SS. Ethical considerations of using narrative to communicate science. *Sci Commun.* (2012) 34:592–617. doi: 10.1177/1075547012454597
75. Case A, Deaton A. Mortality and morbidity in the 21st Century. *Brook Econ Activ.* (2017) 1:397–476. doi: 10.1353/eca.2017.0005
76. Reeves A, McKee M, Stuckler D. Economic suicides in the great recession in Europe and North America. *Br J Psychiatry.* (2014) 205:246–7. doi: 10.1192/bjp.bp.114.144766
77. Bor J. Diverging life expectancies and voting patterns in the 2016 US presidential election. *Am J Public Health.* (2017) 107:1560–2. doi: 10.2105/AJPH.2017.303945
78. The New York Times. *Poland and Hungary Use Coronavirus to Punish Opposition* (2020). Available online at: <https://www.nytimes.com/2020/04/22/world/europe/poland-hungary-coronavirus.html> (accessed April 26, 2020).
79. The Guardian. *Studies Add to Alarm Over Deforestation in Brazil Under Bolsonaro* (2020). Available online at: <https://www.theguardian.com/environment/2020/may/28/studies-add-to-alarm-over-deforestation-in-brazil-under-bolsonaro-covid-19> (accessed May 28, 2020).
80. Correia S, Luck S, Verner E. Pandemics depress the economy, public health interventions do not: evidence from the 1918 flu. *SSRN Electronic J.* (2020). doi: 10.2139/ssrn.3561560

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The reviewer P-EM declared a shared affiliation, with no collaboration, with several of the authors LE, TF, and MD to the handling editor at the time of the review.

Copyright © 2021 Ekenberg, Mihai, Fasth, Komendantova and Danielson. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Research on International Cooperative Governance of the COVID-19

Xueyu Lin<sup>1</sup>, Hualei Yang<sup>1</sup>, Yuanyang Wu<sup>1</sup>, Xiaodong Zheng<sup>2\*</sup>, Lin Xie<sup>3</sup>, Zheng Shen<sup>4</sup> and Sen Hu<sup>5</sup>

<sup>1</sup> School of Public Administration, Zhongnan University of Economics and Law, Wuhan, China, <sup>2</sup> School of Economics, Zhejiang Gongshang University, Hangzhou, China, <sup>3</sup> Institute of Population and Labor Economics, The Chinese Academy of Social Science, Beijing, China, <sup>4</sup> School of Economics and Management, Zhejiang A&F University, Hangzhou, China, <sup>5</sup> School of Management Science and Engineering, Nanjing University of Information Science and Technology, Nanjing, China

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Emma Ruth Miller,  
Flinders University, Australia  
Victoria Ann Newsom,  
Olympic College, United States

### \*Correspondence:

Xiaodong Zheng  
zhengxd@zjgsu.edu.cn

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 28 May 2020

**Accepted:** 31 March 2021

**Published:** 29 April 2021

### Citation:

Lin X, Yang H, Wu Y, Zheng X, Xie L, Shen Z and Hu S (2021) Research on International Cooperative Governance of the COVID-19.  
*Front. Public Health* 9:566499.  
doi: 10.3389/fpubh.2021.566499

Since the first case of the novel coronavirus (SARS-CoV-2) was reported in Wuhan, China, in December 2019, the coronavirus disease (COVID-19) has quickly spread to all the corners of the world. Amid the global public health threats posed by the COVID-19 pandemic, active cooperative governance has gradually emerged as the most powerful weapon against its spread. To facilitate international cooperation for pandemic governance, this paper applied the evolutionary game theory to analyze the factors influencing active cooperative governance and, based on the results, proposed a series of recommendations for promoting international cooperation. (1) leveraging the role of international organizations to reduce the cost of realizing the strategy of active cooperative governance, (2) promoting the international exchange of related experiences to lower the cost of active pandemic governance, (3) sustaining productive and daily activities during the pandemic in a classified and hierarchical manner to reduce the economic loss incurred by active pandemic governance, and (4) optimizing the incentive measures of international organizations to facilitate the selection of active cooperative governance. Finally, from the four aspects of resource management of pandemic treatment, supply management of living materials, population flow cooperation management, and governance fund cooperation management, this paper gives the path of international pandemic cooperative governance.

**Keywords:** evolutionary game, novel coronavirus, COVID-19, international cooperative governance, health policy

## INTRODUCTION

Since the first case of the novel coronavirus (SARS-CoV-2) was reported in Wuhan, China, in December 2019, the coronavirus disease (COVID-19) has quickly spread to all the corners of the world (1). In January 2020, the World Health Organization (WHO) declared the coronavirus outbreak a public health emergency of international concern (PHEIC) (2). Sometime around March 22, 2020, infections began to break out massively on a global scale, with a drastic spike reported in both confirmed cases and the death toll. As of March 11, 2021, a total of 118,584,961 confirmed cases and 2,630,190 deaths have been

reported worldwide<sup>1</sup>. This global public health emergency has hitherto affected almost all countries and regions including Europe, North America, Asia, and Africa, the global landscape finds itself facing a grave crisis and projects a gloomy outlook.

Owing to its longevity and extensiveness, the COVID-19 outbreak has dealt a severe blow to the global socio-economic order (3). In 2020, in addition to China and Turkey, the economic growth of major economies in the world such as the United Kingdom, the United States, Germany, France, Italy, and Japan all was negative. On January 25, 2021, the World Bank scaled down the global growth forecast by 0.2–3.2%. SARS-CoV-2, with its high potential of human-to-human transmission (4, 5), has wreaked economic havoc on global industries ranging from film and entertainment, catering, transportation and logistics, to tourism, retail, and export. The only effective remedy for this global socio-economic crisis is to contain the spread of COVID-19 as efficiently as possible.

A virus knows no borders or race. Although countries worldwide have rolled out countermeasures in response to the outbreak, their effectiveness has fallen short of expectations (6). In the face of the acuteness of this global public health crisis, Bruce Aylward, a senior advisor to the WHO, urged countries to foster information sharing and practice solidarity to wage a concerted battle against SARS-CoV-2. A single country's triumph will not bring the global pandemic to a close; the only way to declare an end to this global public health emergency once and for all is to ensure that every country can recover from its disruption (7). If SARS-CoV-2 is allowed to spread unchecked in vulnerable communities lacking access to testing equipment, ventilators, and medical supplies across poorer cities in Africa, Asia, and Latin America, it will linger there in the long run and reinvade other parts of the world, thus prolonging the public health crisis indefinitely (8, 9). Thus, in building a community with a shared future for mankind, countries must unite, join hands, and work in solidarity to defeat SARS-CoV-2 as soon as possible and minimize the loss caused by the pandemic (10–13). By searching the keyword “international cooperation to respond to the pandemic” in Web of Science, 277 related records were found, among which the top three topics were infectious diseases, public environmental occupational health, and international relations. There is no content directly related to international cooperation to control the pandemic situation or to promote the realization of cooperative governance. This topic has not been paid attention to in the current research.

Various strategies, based on lockdown, quarantine, increase medical and health resources, and international cooperation, to manage this pandemic have been extensively studied by numerous scholars (14–22). However, among all these studies, few have adopted the game theory as the theoretical and methodological underpinning for discussing the international cooperative governance against COVID-19. Active pandemic governance mainly refers to all countries in the world fighting COVID-19 through joint cooperation. As COVID-19 continues to spread to now also affect low resource countries who, under

regular circumstances, have very limited capacity for intensive care, all countries hope that we will not repeat the mistakes of the past as seen with the HIV epidemic where life-saving drugs were only available in high resource countries, leaving impoverished nations with limited or no access to life-sustaining therapies. Therefore, it is necessary to govern through cooperation among countries, which is also advocated by the World Health Organization and expected by leaders of various countries, for example, President Xi Jinping attended the Extraordinary G20 Virtual Leaders' Summit and gave a speech titled “Working Together to Defeat the COVID-19 Outbreak” (23).

The reason why we use game theory to analyze lies in the tragedy of Commons in pandemic prevention and control. In the pandemic prevention and control, countries will face the dual choice of controlling the number of infected people and economic restart. If a country pays attention to the economic effect and ignores the increase in the number of infected people, it will choose to restart the economy as soon as possible. The close contact brought by the restart of economic activities will increase the number of infected people, thus aggravating the infection situation of the whole region, which leads to the conflict between individual interests and collective interests. In this case, we need to use game theory to analyze. Game theory is widely used in environmental cooperative governance. Examples of using game theory to study global social and economic problems such as *Greenhouse Gas Reduction Coalition and Its Stability Analysis—Based on the Perspective of Game Theory* (24), which examines the emission reduction actions of various countries from the perspective of game theory, and analyzes the possible cooperative emission reduction modes of various countries by using single alliance, Kyoto alliance and generalized Alliance respectively; *The Games of All Interest Groups Around the World in Carbon Emission Reduction and Some Discussions on China's Strategies* (25), which tries to use games theory to explain some contents between all interest groups in “Kyoto Protocol” and points out the causations of their contention; and *International Carbon Reduction Game with Low Carbon Development and China's Countermeasures* (26), which builds a game model to analyze the strategies of international carbon reduction parties at different stages.

In the current study, the application of game theory mainly focuses on non-cooperative game and cooperative game. A cooperative game is a game in which individuals cooperate to maximize the interests of the team, so as to promote the optimization of individual interests. The game theory focuses on the game behavior and strategy of the relevant stakeholders, which is suitable for the study of the cooperative relationship between countries. In the research object, game theory is aimed at different decision-making subjects, each subject represents their own interests, through the game behavior between different subjects to form an internal or external balance state. In the cooperative management of the pandemic situation, the game between governments is a repeated game process of random pairing and mutual learning, and its strategy adjustment process can be simulated by a replication dynamic mechanism. The evolutionary game analysis can reflect the behavior evolution path and stability strategy of governments

<sup>1</sup>Data sources: [https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari\\_pc\\_3](https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari_pc_3).



in pandemic control, which has a certain reference significance for better carrying out pandemic control and reducing the losses caused by the pandemic. As far as research questions and content are concerned, few scholars have delved into issues such as how to enable and partake in international cooperative governance against COVID-19. Thus, the marginal contributions of this paper are two-fold. First, compared to previous studies (27–29), this paper enriches the research methodology on international cooperative governance against the COVID-19 outbreak by drawing on evolutionary game theory. Second, while numerous scholars have called upon international communities to collectively fight against COVID-19 (30, 31), studies on how to achieve international cooperation have been found wanting. To this end, the present study contributes to research content by exploring the enabling mechanisms and cooperative pathways at play based on an evolutionary game.

This paper is structured as follows: first, the evolutionary game model is employed to analyze the factors influencing the strategic choice of active cooperative governance, both with and without constraints. Second, it analyzes the ways to enable the strategic selection of active cooperative governance by regulating variables such as the cost of active pandemic governance, cost of active cooperative governance, the economic loss incurred by active pandemic governance, and incentives for active and passive pandemic governance. The enabling mechanisms of international cooperative governance are analyzed and examined from four aspects: reducing the cost of cooperation by leveraging the role of international organizations, reducing the cost of governance by sharing experiences in pandemic governance, reducing economic loss by sustaining production during the pandemic, and guiding active cooperative governance by optimizing incentives. Lastly, this paper discusses the ways to partake in cooperative governance based on four aspects: management of COVID-19 relief resources, management of daily supplies, cooperative management of population movement, and cooperative management of government funds.

## METHODS

### Variable Description

As the outbreak of COVID-19, a country or region first encounters the health crisis caused by the spread of the virus, and the intervention measures, such as isolation to prevent the spread of the pandemic, will reduce the number of infected persons, control the spread of the pandemic, and achieve prevention and control gains; secondly, economic development can bring economic benefits to the country or region, and the pandemic prevention and control will affect the economic recovery progress of the country or region and affect economic benefits. At the same time, due to population mobility, infected people will flow between countries. If one country actively controls the pandemic and the other country responds negatively, infected people from countries that respond negatively will have negative externalities, which will affect the prevention and control effect of other countries. If the two countries actively respond, reach a cooperative alliance and jointly control the pandemic situation, it will bring common benefits of pandemic

prevention and control, such as regional traffic recovery and smooth foreign trade.

Let  $Ri_1$  and  $Ri_2$  represent the individual benefit arising from the active pandemic governance undertaken separately by two affected countries, such as the national health brought by the control of pandemic, whereas  $Rp_1$  and  $Rp_2$  denote the public returns arising from the same, such as the positive externality brought by the prevention of infected people.  $Rp$  and  $Rs$ , respectively, stand for the public and shared returns gained when active pandemic governance is undertaken by both the affected countries, the public returns are economic benefits created by the restoration of public transport and trade in the region, the shared returns are the benefits of cooperation between the two countries; in most cases,  $Rp > Rp_1 + Rp_2$ .  $Cp_1$  and  $Cp_2$  represent the costs of active pandemic governance undertaken by both affected countries, such as the medical cost of treating infected patients within the country, whereas  $Lp_1$  and  $Lp_2$  indicate the losses incurred by the two affected countries because of the pandemic, such as the health loss caused by the death of infected patients.  $Le_1$  and  $Le_2$  denote the economic losses caused by active pandemic governance undertaken by both the affected countries, such as business stops and financial allocation to buy medical supplies.  $Ce$  is the cost incurred by the two affected countries realizing the strategy of active cooperative governance, such as the cost of negotiations, contracts, and political agenda between the two countries to achieve cooperation.  $\theta$  denotes the externality coefficient between the affected countries. It is assumed that the negative externality coefficient of the pandemic equals its positive externality coefficient, where  $0 < \theta < 1$ .  $E$  is the reward conferred by a coalition on both players involved in active cooperative governance, for example, WHO provides financial assistance to regions or countries with active cooperation, while  $F$  is the punishment levied by the same on an affected country for passive governance, for example, WHO criticizes the United States for its negative response to the pandemic. When one of the two players partake in passive governance, the other will receive a subsidy,  $Sf$ , from the coalition for its active pandemic governance, such as the scientific research and material support provided by the World Health Organization to the country that actively responds. All the parameters above are positive values.

### Evolutionary Game Model

The model settings are mainly derived from the evolutionary game model of air pollution control developed by Gao et al. (32). Without the constraint of the coalition, whether an affected country undertakes active governance depends on the associated costs and returns. Similarly, whether or not it partakes in active cooperative governance is conditioned by the associated transaction costs, and shared and public returns. In a payoff matrix, when both affected countries opt for active governance, they will be subject not only to the individual returns, costs, and economic losses associated with active pandemic governance but also to the public and shared returns, arising from active cooperative governance, as well as the cost of realizing the strategy of active cooperative governance.

**TABLE 1** | Payoff matrix between two affected countries.

	Active governance by Affected Country 2	Passive governance by Affected Country 2
Active governance by Affected Country 1	$Ri_1 + Rp + Rs - Cp_1 - Le_1 - Ce,$ $Ri_2 + Rp + Rs - Cp_2 - Le_2 - Ce$	$Ri_1 + Rp_1 - Cp_1 - Le_1 - \theta Lp_2,$ $-Lp_2 + \theta Lp_2$
Passive governance by Affected Country 1	$-Lp_1 + \theta L,$ $Ri_2 + Rp_2 - Cp_2 - Le_2 - \theta Lp_1$	$-Lp_1 - \theta Lp_2, -Lp_2 - \theta Lp_1$

When both affected countries adopt the strategy of passive pandemic governance, their respective returns will be  $-Lp_1 - \theta Lp_2$  and  $-Lp_2 - \theta Lp_1$ , respectively. When Affected Country 1 chooses active pandemic governance, and Affected Country 2 chooses a passive alternative, the former's returns will be  $Ri_1 + Rp_1 - Cp_1 - Le_1 - \theta Lp_2$ , and the latter's returns will be  $-Lp_2 + \theta Lp_2$ . When their choices are swapped, the returns of Affected Countries 1 and 2 will be  $-Lp_1 + \theta Lp_1$  and  $Ri_2 + Rp_2 - Cp_2 - Le_2 - \theta Lp_1$ , respectively. When both countries choose active pandemic governance, their returns will be  $Ri_1 + Rp + Rs - Cp_1 - Le_1 - Ce$  and  $Ri_2 + Rp + Rs - Cp_2 - Le_2 - Ce$ , respectively. The payoff matrix of the two affected countries under different strategies is shown in **Table 1**.

Suppose the probabilities that the strategy of active pandemic governance is chosen by Affected Countries 1 and 2 equal  $x$  and  $y$ , respectively. Then, the probabilities of them selecting passive pandemic governance are defined as  $1 - x$  and  $1 - y$ , respectively.

The expected utilities of Affected Countries 1 and 2 when both choose active pandemic governance are defined as follows:

$$\begin{cases} u_{11} = y(Ri_1 + Rp + Rs - Cp_1 - Le_1 - Ce) \\ \quad + (1 - y)(Ri_1 + Rp_1 - Cp_1 - Le_1 - \theta Lp_2) \\ u_{21} = x(Ri_2 + Rp + Rs - Cp_2 - Le_2 - Ce) \\ \quad + (1 - x)(Ri_2 + Rp_2 - Cp_2 - Le_2 - \theta Lp_1) \end{cases} \quad (1)$$

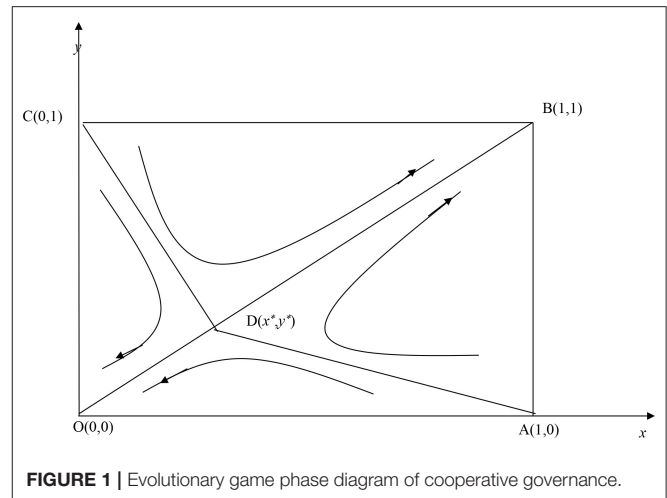
The expected utilities of Affected Countries 1 and 2 when both choose passive pandemic governance are expressed as follows:

$$\begin{cases} u_{12} = y(-Lp_1 + \theta Lp_1) + (1 - y)(-Lp_1 - \theta Lp_2) \\ u_{22} = x(-Lp_2 + \theta Lp_2) + (1 - x)(-Lp_2 - \theta Lp_1) \end{cases} \quad (2)$$

The average expected utilities of Affected Countries 1 and 2 when active and passive pandemic governance, respectively, are chosen are as follows:

$$\begin{cases} \tilde{u}_1 = xu_{11} + (1 - x)u_{12} \\ \tilde{u}_2 = yu_{21} + (1 - y)u_{22} \end{cases} \quad (3)$$

To obtain the evolutionary equilibrium strategy of each affected country, it is important to first define the replicator dynamics equations for Affected Countries 1 and 2, and then let them be 0. With that as a necessary condition for the evolutionary equilibrium strategy, the equilibrium must also be solved

**FIGURE 1** | Evolutionary game phase diagram of cooperative governance.

according to Friedman's method. The replicator dynamics equations are defined as follows:

$$\begin{cases} F(x) = \frac{dx}{dt} = x(u_{11} - \tilde{u}_1) = x(1 - x)(u_{11} - u_{12}) \\ F(y) = \frac{dy}{dt} = y(u_{21} - \tilde{u}_2) = y(1 - y)(u_{21} - u_{22}) \end{cases} \quad (4)$$

Let  $F(x)$  and  $F(y)$  be 0. Five strategy equilibrium points for Affected Countries 1 and 2 are obtained: O (0, 0), C (0, 1), A (1, 0), B (1, 1), and D ( $x^*$ ,  $y^*$ ), where  $x^* = \frac{-Ri_2 - Rp_2 - Lp_2 + Cp_2 + Le_2}{Rp + Rs - Rp_2 - \theta Lp_2 - Ce}$ ,  $y^* = \frac{-Ri_1 - Rp_1 - Lp_1 + Cp_1 + Le_1}{Rp + Rs - Rp_1 - \theta Lp_1 - Ce}$ . The specifics are shown in **Figure 1**.

## RESULTS

### Basic Model Analysis

According to Friedman's methods, this study identifies (0, 0) and (1, 1) as the evolutionarily stable strategies for the two affected countries. The corresponding strategies are for both countries to choose passive and active pandemic governance, respectively, with ( $x^*$ ,  $y^*$ ) as the saddle point. When the probability of active governance being initially adopted by both Affected Countries 1 and 2, ( $x_0$ ,  $y_0$ ), falls within ABCD, the two countries will lean toward the strategy profile of active cooperative governance over time. In other words, the system will converge to (1, 1). However, when the said probability falls within AOCD, the two countries will lean toward passive non-cooperative governance, and the system will converge to (0, 0). The details are mentioned in **Figure 1**. The surface area of ABCD should be expanded to increase the probability of the system converging to the state of active cooperative governance along BD. The surface area of ABCD is defined as follows:

$$S_{ABCD} = 1 - \frac{x^* + y^*}{2} \quad (5)$$

Substitute the values of  $x^*$  and  $y^*$  into  $S_{ABCD}$  to obtain the following equation:

$$S_{ABCD} = 1 + \frac{1}{2} \frac{Ri_2 + Rp_2 + Lp_2 - Cp_2 - Le_2}{Rp + Rs - Rp_2 - \theta Lp_2 - Ce} + \frac{1}{2} \frac{Ri_1 + Rp_1 + Lp_1 - Cp_1 - Le_1}{Rp + Rs - Rp_1 - \theta Lp_1 - Ce} \quad (6)$$

To enable each affected country to converge to the state of active cooperative governance, this study first observed the effects of changes in the following parameters on  $S_{ABCD}$ : costs of active pandemic governance ( $Cp_1$  and  $Cp_2$ ), economic losses caused by active pandemic governance ( $Le_1$  and  $Le_2$ ), and the cost of realizing the strategy of active cooperative governance ( $Ce$ ). The partial derivatives of  $Cp_k$ ,  $Le_k$ , and  $Ce$  are computed with respect to  $S_{ABCD}$ . Considering that the above parameters are all above 0,  $Rp + Rs > Rp_k - \theta Lp_k - Ce$ , and  $Ri_k + Rp_k + Lp_k < Cp_k + Le_k$ , the following can be obtained:

$$\begin{cases} \frac{\partial S_{ABCD}}{\partial Cp_k} = \frac{-1}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)} < 0 \\ \frac{\partial S_{ABCD}}{\partial Le_k} = \frac{-1}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)} < 0 \\ \frac{\partial S_{ABCD}}{\partial Ce} = \sum_{k=1}^2 \frac{Ri_k+Rp_k+Lp_k-Cp_k-Le_k}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)^2} < 0 \end{cases} \quad (7)$$

This implies that, if the costs of active pandemic governance, the economic losses caused by such governance, and the cost of realizing the strategy of active cooperative governance are lower, the affected countries are more likely to choose the strategy of active cooperative governance over time.

In reality, first of all, in terms of the cost of controlling the pandemic, due to the differences in the economic level between countries and the ability of national financial investment, developed countries can spend more manpower and material resources to control the pandemic, while poor countries cannot afford the huge investment in pandemic prevention materials; secondly, in terms of the capacity of bearing economic loss, in order to reduce the death and spread of patients, developed countries tend to take longer-term measures of trade stop, blockade and isolation, while poor areas cannot afford long-term economic losses. Finally, in terms of the cost of cooperation strategy, if the two countries have a similar political and economic background and previous cooperation foundation, the resistance of cooperation between the two countries will be greatly reduced, thus contributing to the realization of cooperation. However, if there are huge economic differences and national contradictions, the increase of cooperation costs will hinder the realization of cooperative governance. Therefore, the lower the cost of controlling the pandemic, the smaller the economic loss and the lower the cost of achieving the cooperation strategy are conducive to the realization of the cooperation strategy.

Furthermore, the effects of the following parameters on  $S_{ABCD}$  are also observed: individual returns of active pandemic governance ( $Ri_1$  and  $Ri_2$ ), public returns of active cooperative governance ( $Rp$ ), shared returns of active cooperative governance ( $Rs$ ), and losses incurred by the pandemic ( $Lp_1$  and  $Lp_2$ ). The partial derivatives of  $Ri_k$ ,  $Rp$ ,  $Rs$ , and  $Lp_k$  are obtained with respect to  $S_{ABCD}$ . Considering that  $\theta > 0$ ,  $Rp + Rs > Rp_k -$

$\theta Lp_k - Ce$ , and  $Ri_k + Rp_k + Lp_k < Cp_k + Le_k$ , the following can be obtained:

$$\begin{cases} \frac{\partial S_{ABCD}}{\partial Ri_k} = \frac{1}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)} > 0 \\ \frac{\partial S_{ABCD}}{\partial Rp} = \sum_{k=1}^2 \frac{Cp_k+Le_k-Ri_k+Rp_k+Lp_k}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)^2} > 0 \\ \frac{\partial S_{ABCD}}{\partial Rs} = \sum_{k=1}^2 \frac{Cp_k+Le_k-Ri_k+Rp_k+Lp_k}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)^2} > 0 \\ \frac{\partial S_{ABCD}}{\partial Lp_k} = \sum_{k=1}^2 \left[ \frac{\theta(Ri_k+Rp_k+Lp_k-Cp_k-Le_k)+Rp+Rs-Rp_k-\theta Lp_k-Ce}{2(Rp+Rs-Rp_k-\theta Lp_k-Ce)^2} \right] > 0 \end{cases} \quad (8)$$

This implies that, if the individual returns of active pandemic governance, the public and shared returns of active cooperative governance, and the losses incurred by the pandemic are higher, the affected countries are more likely to choose the strategy of active cooperative governance over time.

Specifically, in reality, first of all, in the area of self-earnings, controlling the pandemic situation and reducing the number of infected persons will bring their own benefits to the national health, the credibility of the government, and the enhancement of the international image, which will promote the countries to actively respond to COVID-19. Secondly, active governance will reduce the number of domestic infections and reduce the number of domestic infections that will affect other countries' prevention of the pandemic. The prevention in own country can bring positive externalities to the prevention of other countries. At the same time, the cooperative governance will bring the partners the common benefits of the two countries' trade recovery. The improvement of public benefits and common benefits will promote cooperation. Finally, in terms of the harm of the pandemic, the more serious the economic and social harm caused by the pandemic, the more difficult it is for a single country to deal with it, and the need for other countries to cooperate, the easier the cooperation strategy will be achieved. Therefore, the greater the individual benefits, public benefits, common benefits, and the harm of the pandemic, the easier the cooperative governance strategy will be achieved.

## Extended Analysis

The above analysis is set against an unconstrained background. However, in reality, the affected countries are under constraints imposed by a variety of international organizations currently in force, including the United Nations (UN), WHO, World Trade Organization (WTO), IMF, International Labor Organization, and Food and Agriculture Organization (33, 34). To some degree, these international coalitions are analogous to a coalition government, which can reward or punish countries for active or passive pandemic governance. The WTO, for example, punishes countries for passive pandemic governance by imposing bans or tariff hikes on their import and export, while rewarding their active counterparts by lowering the import and export tariffs. Compared with the above strategy game which was without constraints, the coalition's punishment to countries for passive pandemic governance ( $F$ ), subsidy for active pandemic governance ( $Sf$ ), and reward for forming an alliance in active cooperative governance ( $E$ ), are now added to the payoff matrix

**TABLE 2 |** Payoff matrix between two affected countries under constraints.

	Active governance by Affected Country 2	Passive governance by Affected Country 2
Active governance by Affected Country 1	$Ri_1 + Rp + Rs - Cp_1 - Le_1 - Ce + E$ , $Ri_2 + Rp + Rs - Cp_2 - Le_2 - Ce + E$	$Ri_1 + Rp_1 - Cp_1 - Le_1 - \theta Lp_2 + Sf$ , $-Lp_2 + \theta Lp_2 - F$
Passive governance by Affected Country 1	$-Lp_1 + \theta Lp_1 - F$ , $Ri_2 + Rp_2 - Cp_2 - Le_2 - \theta Lp_1 + Sf$	$-Lp_1 - \theta Lp_2 - F$ , $-Lp_2 - \theta Lp_1 - F$

shown in **Table 1**. The revised payoff matrix under constraints is shown in **Table 2**.

First, this study defines the system of replicator dynamics equations and lets them be 0. Once again, five strategy equilibrium points for the two affected countries can be obtained: O (0, 0), C (0, 1), A (1, 0), B (1, 1), and D ( $x^*, y^*$ ), where  $x^* = \frac{-Ri_2 - Rp_2 - Lp_2 - F - Sf + Cp_2 + Le_2}{Rp + Rs + E - Rp_2 - \theta Lp_2 - Ce - Sf}$  and  $y^* = \frac{-Ri_1 - Rp_1 - Lp_1 - F - Sf + Cp_1 + Le_1}{Rp + Rs + E - Rp_1 - \theta Lp_1 - Ce - Sf}$ .

Similarly, according to Friedman's method, the strategy equilibrium points (0, 0) and (1, 1) are identified as evolutionarily stable strategies. When the probability of active governance being initially adopted by both Affected Countries 1 and 2, ( $x_0, y_0$ ), falls within ABCD, the countries will lean toward the strategy of active cooperative governance over time. In other words, the system will converge to B (1, 1). However, if the probability falls within AOCD, the countries will lean toward passive non-cooperative governance, and the system will converge to O (0, 0). If the probability of the affected countries choosing the strategy of active cooperative governance is to be increased over time, it is necessary that saddle point D is moved to the origin 0, in order to expand the surface area of ABCD. Considering that the surface area of ABCD is defined as  $S_{ABCD} = 1 - (x^* + y^*)/2$ , and the values of  $x^*$  and  $y^*$  are substituted into  $S_{ABCD}$ , the following can be obtained:

$$S_{ABCD} = 1 + \frac{1}{2} \left( \frac{Ri_2 + Rp_2 + Lp_2 + F + Sf - Cp_2 - Le_2}{Rp + Rs + E - Rp_2 - \theta Lp_2 - Ce - Sf} + \frac{Ri_1 + Rp_1 + Lp_1 + F + Sf - Cp_1 - Le_1}{Rp + Rs + E - Rp_1 - \theta Lp_1 - Ce - Sf} \right) \quad (9)$$

The previous section has already probed the effects of the following parameters on  $S_{ABCD}$ : costs of active pandemic governance ( $Cp_1$  and  $Cp_2$ ), economic losses caused by active pandemic governance ( $Le_1$  and  $Le_2$ ), the cost of realizing the strategy of active cooperative governance ( $Ce$ ), individual returns of active pandemic governance ( $Ri_1$  and  $Ri_2$ ), public and shared returns of active cooperative governance ( $Rp$  and  $Rs$ ), and losses incurred by the pandemic ( $Lp_1$  and  $Lp_2$ ).

In this section, the analytical focus shifts to the effects of the following parameters on  $S_{ABCD}$ : coalition government's punishment for passive pandemic governance ( $F$ ), subsidy for active pandemic governance ( $Sf$ ), and reward for forming an alliance of active cooperative governance ( $E$ ). The partial

derivatives of  $E$ ,  $F$ , and  $Sf$  are computed with respect to  $S_{ABCD}$ . Considering that  $Cp_k + Le_k > Ri_k + Rp_k + Lp_k + F + Sf$ ,  $Rp + Rs + E > Rp_k + \theta Lp_k + Ce + Sf$ , and  $Rp + Rs > Cp_k + Le_k + Ce$ , the following can be obtained:

$$\begin{cases} \frac{\partial S_{ABCD}}{\partial E} = \sum_{k=1}^2 \frac{Cp_k + Le_k - Ri_k - Rp_k - Lp_k - F - Sf}{2(Rp + Rs + E - Rp_k - \theta Lp_k - Ce - Sf)^2} > 0 \\ \frac{\partial S_{ABCD}}{\partial F} = \sum_{k=1}^2 \frac{1}{2(Rp + Rs + E - Rp_k - \theta Lp_k - Ce - Sf)} > 0 \\ \frac{\partial S_{ABCD}}{\partial Sf} = \sum_{k=1}^2 \frac{Ri_k + (1 - \theta)Lp_k + E + F + Rp + Rs - Cp_k - Le_k - Ce}{2(Rp + Rs + E - Rp_k - \theta Lp_k - Ce - Sf)^2} > 0 \end{cases} \quad (10)$$

This means that if the joint organization punishes the countries that choose not to actively control the pandemic, subsidizes the countries that choose to actively control the pandemic, and rewards the alliance for actively cooperate to governance the pandemic, over time, each country will be more likely to choose the strategy of active cooperative governance. Specifically speaking, first, the punishment for the countries who negatively respond to the pandemic will promote the realization of cooperation, such as the World Health Organization's public criticism of the negative attitude of the United States in the early stage of the pandemic; second, subsidies will be given to the countries with active governance, and the financial assistance, scientific research and material assistance provided by the World Health Organization to the poor areas will help them control the pandemic. Finally, on the reward for the governance alliance, the WHO thanks the EU leaders for their efforts in uniting the world to fight the pandemic and providing the EU with materials for defeating the pandemic. Therefore, punishing the countries that negatively respond, subsidizing the countries that positively governance and rewarding the cooperative governance alliance are conducive to the achievement of cooperative strategies.

Summarizing the above, three conclusions can be drawn. First, if the costs of active pandemic governance, the economic losses incurred by such governance, and the cost of enabling the strategic choice of active cooperative governance are lower, the affected countries are more likely to choose active cooperative governance over time. Second, if the individual returns of active pandemic governance, the public and shared returns of active cooperative governance, and the socio-economic impacts of the pandemic are higher, the affected countries are more likely to adopt active cooperative governance over time. Third, if the coalition punishes countries for passive pandemic governance, subsidizes countries for active pandemic governance, and rewards alliances of active cooperative governance, the affected countries are more likely to opt for active cooperative governance over time. Additionally, the strategic continuity of active cooperative governance is determined by the magnitude of its returns and the constraints imposed by the coalition.

## DISCUSSION

### Recommendations for Enabling Cooperative Governance

This study adopts the evolutionary game model to analyze factors influencing the strategic choice of active cooperative



governance, along with the ways to enable such a choice. The individual returns of active pandemic governance, public and shared returns of active cooperative governance, and the socio-economic impacts of the pandemic are some of the more objective variables. Thus, to enable the strategic selection of active cooperative governance, efforts should be made to regulate the costs of active pandemic and active cooperative governance, the economic loss incurred by active pandemic governance, and the incentives for active and passive pandemic governance. The detailed measures are as follows: (1) leveraging the role of international organizations to reduce the cost of adopting active cooperative governance, (2) promoting the international exchange of related experiences to lower the cost of active pandemic governance, (3) sustaining productive and daily activities during the pandemic in a classified and hierarchical manner to reduce the economic loss incurred by active pandemic governance, and (4) optimizing the incentive measures of international organizations to guide countries adopt the strategy of active cooperative governance.

To reduce the cost of strategic selection, the UN—as the most authoritative of comprehensive international organizations—approved a draft resolution titled “Global Solidarity to Fight the Coronavirus Disease 2019 (COVID-19),” introduced by six countries including Singapore, Ghana, and Indonesia, during the UN General Assembly. The resolution was co-sponsored by over 180 countries. The General Assembly’s call for global solidarity and concerted efforts against the pandemic marked an important step in advancing international cooperation. The approval of the draft resolution saved the costs of negotiation and contract administration and lowered the threshold and resistance against international cooperation.

To reduce the cost of governance, the mortality rate of COVID-19 patients approximated to 4% in China and exceeded 6% in other regions. It is necessary for the hardest-hit areas such as Europe to draw on China’s therapeutic regimens for a higher recovery rate. China has shared its experience and practices with over 10 countries including France, Portugal, and Denmark with regard to virological characteristics, anti-pandemic philosophy, and the latest research achievements in pathology. It also imparted to Europe information that is highly instrumental in clinical treatments, including information on Chinese medicine and many other clinical regimens, as well as the recommended dosage, contraindications, and efficacy of an antimalarial drug and other agents.

To reduce economic losses, it is important to ensure the smooth and continued operations of the global economy and trade. On the one hand, excessive draconian measures should be prohibited. Emergency measures should not stand in the way of global trade and supply chain operations. On the other hand, countries should endeavor to enact trade facilitation policies. Measures like tariff reduction, the lifting of trade barriers, and unimpeded trade should be implemented proactively, whereas trade disputes such as trade wars and tariff wars should be avoided. In terms of pandemic prevention and economic growth, we should learn from China’s experience and implement production by classification according to the costs and benefits of pandemic prevention and production

in various industries. First of all, no matter how severe the pandemic situation is, it is necessary to ensure the production of enterprises supplying medical materials, water, electricity, gas, communications and other basic living materials. Basic material support is the basis of pandemic prevention and control, and only by ensuring the production of these enterprises can we better prevent and control the pandemic. Second, governments should ensure safe production among enterprises by category and in stages on the premise that prevention and control can be carried out effectively. Enterprises in which employees can be segregated during production, those where production and consumption are separable, and those that encounter less negative impact from pandemic prevention and control can carry out production with specific conditions during the outbreak. However, enterprises that are unable to meet these criteria must wait for the pandemic to ease or end before they can resume production.

To optimize incentive measures, international organizations should reward countries that actively engage in global pandemic governance. They should offer them incentives such as waiving or reducing the current year’s membership fees and lowering import and export tariffs.

## Recommendations for Partaking in Cooperative Governance

The above discussion analyzed the influencing factors and enabling mechanisms associated with strategy realization for active cooperative governance. After strategy realization, measures to exploit each country’s advantages to the fullest for the sake of global resource allocation against COVID-19 also warrant further investigation.

First of all, the COVAX Global New Crown Vaccine Initiative (New Crown Pneumonia Vaccine Implementation Program), jointly led by the World Health Organization and the GAVI Alliance, is currently the most effective mechanism for the equitable sharing of safe and effective vaccines worldwide, with the goal of promoting equitable global vaccine distribution. Effective vaccines should become global public goods, and first be provided to people in urgent need around the world (35). The ultimate victory in the global fight against the pandemic can only be achieved if countries around the world work together to ensure fair, equitable, and transparent distribution of the COVID-19 vaccine worldwide, and actively build a human health community (36). Moreover, relief resources including medical equipment, COVID-19 research and development, and medical personnel should be allocated inter-regionally according to the varying numbers of infections and severity of supply shortage among countries (37). Given the limited resources, the top priority should be to save as many lives as possible. With China being the world’s largest manufacturer of medical protective wear and surgical masks (38), the Chinese government and enterprises have orchestrated multiple supply donations to European regions in a bid to overcome resource limitations. Second, as national supply reserves are limited in the time of closed-off management, the trade of daily essentials such as drugs and food must be sustained (39–41). Breaking the

supply chain will jeopardize the domestic supplies of resources in the lesser endowed import countries. Should the pandemic show trends of extending into the long term, the exhaustion of domestic resources coupled with restricted imports will be a time bomb that can set off domestic crises. Furthermore, the excessive bans on aviation and transport have disrupted the order of the international trade system (42), crippling the role of resource-endowed countries in resource allocation. Third, as the global movement of the population will accelerate the spread of the virus, countries should make a coordinated effort to manage the movement of people (43, 44). While the hardest-hit countries should see it as their foremost task to restrict outbound travels, recovering countries should commit themselves to curtail inbound travels, while countries nearing the tail end of the outbreak should focus on blocking imported cases. Lastly, due to the devastating economic fallout of the pandemic, relief funds should be established with international cooperation to aid economically challenged countries. As poorer countries suffer the risks of higher incidence and mortality rates, the funds should serve the functions of reciprocal aid-giving and risk-sharing to expand the capacity of vulnerable regions in disease control and prevention.

## LIMITATION

Although this study scientifically expounds the view of international cooperation to respond to the COVID-19 by using game theory, it still has the following limitations. First, the game theory assumes that all subjects participating in decision-making are rational and represent their interests. However, in reality, the behavior of countries cannot keep rational all the time, which will affect the applicability of the conclusion. Secondly, although we consider the factors that affect the cooperation between countries as much as possible, there are still some factors that are difficult to consider, such as political factors, which will affect national decision-making. Third, our results have not taken into account the dynamic changes of the COVID-19. Despite the limitations, this study has important implications for international cooperation to manage pandemics.

## CONCLUSIONS

In the face of the global public health threats posed by the COVID-19 pandemic, active cooperative governance has evolved into the strongest weapon against the outbreak. That being said, some national governments have stuck to passive solutions due to an inadequate understanding of the dangers of the outbreak. To facilitate international cooperative governance, this paper studies the factors of active cooperative governance in each pandemic area based on the evolutionary game method, and based on the analysis of influencing factors, gives the policy path of how to promote international cooperation in a pandemic situation and how to carry out national cooperative governance in a pandemic situation.

What factors affect the international cooperation of pandemic control? First, if the costs of active pandemic governance, the economic losses incurred by such governance, and the costs of enabling the strategic choice of active cooperative governance are lower, the affected countries are more likely to choose the strategy of active cooperative governance over time. Second, if the individual returns of active pandemic governance, the public and shared returns of active cooperative governance, and the socio-economic impacts of the pandemic are higher, the affected countries are more likely to adopt the strategy of active cooperative governance over time. Third, if the coalition punishes countries for passive pandemic governance, subsidizes countries for active pandemic governance, and rewards alliances of active cooperative governance, the affected countries are more likely to opt for active cooperative governance over time.

The following recommendations are also proposed for enabling active cooperative governance among countries: (1) leveraging the role of international organizations to reduce the cost of realizing the strategy of active cooperative governance, (2) promoting the international exchange of related experiences to lower the cost of active pandemic governance, (3) sustaining productive and daily activities during the pandemic in a classified and hierarchical manner to reduce the economic losses incurred by active pandemic governance, and (4) optimizing the incentive measures of international organizations to guide countries and effectively facilitate the selection of active cooperative governance strategies. The marginal contribution of this study lies in drawing upon the evolutionary game perspective to identify the enabling mechanisms and cooperative pathways underlying international cooperative governance.

How to carry on the international pandemic situation cooperation governance? First, in terms of medical material management, global allocation of medical equipment resources, collective cooperation in scientific research, and relevant assistance from medical staff; second, in terms of supply management of living materials, global allocation of food and other necessities of life, and international trade cannot prohibit or restrict exports; third, in terms of population flow and cooperation management, countries in the severely affected areas should restrict population Outflow: countries with a good pandemic situation should restrict the inflow of population, and countries close to the end of the pandemic should strictly prevent the import from abroad. Fourthly, in terms of fund management for pandemic control, through the United Nations and other international organizations, a fund pool for pandemic control should be set up to increase financial assistance to the severely affected areas, vulnerable areas, and economically difficult areas.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

## AUTHOR CONTRIBUTIONS

HY and XZ: conceptualization. HY, SH, and YW: methodology. XZ, XL, and ZS: validation. HY, YW, and LX: formal analyses and investigation. HY, YW, XL, and XZ: writing—original draft preparation. All authors contributed to the article and approved the submitted version.

## REFERENCES

- James JJ. Covid-19: from epidemic to pandemic. *Disaster Med Public Health Preparedness*. 1–5. doi: 10.1017/dmp.2020.84
- Harapan, H., Itoh, N., Yufika, A., Winardi, W., Keam, S., Te, H., et al. Coronavirus disease 2019 (COVID-19): a literature review. *J Infect Public Health*. (2020) 13:667–73. doi: 10.1016/j.jiph.2020.03.019
- Ayittey FK, Ayittey MK, Chiwero NB, Kamasah JS, Dzuovor C. Economic impacts of Wuhan 2019-nCoV on China and the World. *J Med Virol*. (2020) 92:473–5. doi: 10.1002/jmv.25706
- Phan, T. (2020). Novel coronavirus: from discovery to clinical diagnostics. *Infect Genet Evol*. 79:104211. doi: 10.1016/j.meegid.2020.104211
- Ralph R, Lew J, Zeng T, Francis M, Xue B, Roux M, et al. 2019-nCoV (Wuhan virus), a novel Coronavirus: human-to-human transmission, travel-related cases, and vaccine readiness. *J Infect Dev Countries*. (2020) 14:3–17. doi: 10.3855/jidc.12425
- Haffajee RL, Mello MM. Thinking globally, acting locally-The US response to COVID-19. *N Engl J Med*. (2020) 382:e75. doi: 10.1056/NEJMp2006740
- Gates B. Responding to Covid-19-a once-in-a-century pandemic? *N Engl J Med*. (2020) 382:1677–9. doi: 10.1056/NEJMp2003762
- Ahmed F, Ahmed NE, Pissarides C, Stiglitz J. Why inequality could spread COVID-19. *Lancet Public Health*. (2020) 5:e240. doi: 10.1016/S2468-2667(20)30085-2
- Arora G, Kroumpouzos G, Kassir M, Jafferany M, Lotti T, Sadoughifar R, et al. Solidarity and transparency against the COVID-19 pandemic. *Dermatol Ther*. (2020) 33:e13359. doi: 10.1111/dth.13359
- Alexander M. Let's conquer COVID-19 and sustain our abilities. *Spinal Cord Series Cases*. (2020) 6:19. doi: 10.1038/s41394-020-0271-z
- Allahverdiipour H. Battle against novel coronavirus 2019-nCoV: international commitment to develop worldwide informing campaigns. *Health Promot Perspect*. (2020) 10:94. doi: 10.34172/hpp.2020.15
- Deng CX. The global battle against sars-cov-2 and covid-19. *Int J Biol Sci*. (2020) 16:1676–7. doi: 10.7150/ijbs.45587
- Momplaisir F. The COVID-19 pandemic: we are all in this together. *Clin Infect Dis*. (2020) 71:892–3. doi: 10.1093/cid/ciaa369
- Chinazzi M, Davis JT, Ajelli M, Gioannini C, Litvinova M, Merler S, et al. The effect of travel restrictions on the spread of the 2019 novel coronavirus (COVID-19) outbreak. *Science*. (2020) 368:395–400. doi: 10.1126/science.aba9757
- Gong F, Xiong Y, Xiao J, Lin L, Liu X, Wang D, et al. China's local governments are combating COVID-19 with unprecedented responses—from a Wenzhou governance perspective. *Front Med*. (2020) 14:220–4. doi: 10.1007/s11684-020-0755-z
- Hellewell J, Abbott S, Gimma A, Bosse NI, Jarvis CI, Russell TW, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. *Lancet Global Health*. (2020) 8:e488–96. doi: 10.1016/S2214-109X(20)30074-7
- Kraemer MU, Yang CH, Gutierrez B, Wu CH, Klein B, Pigott DM, et al. The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*. (2020) 368:493–7. doi: 10.1126/science.abb4218
- Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, et al. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *J Travel Med*. (2020) 27:taaa037. doi: 10.1093/jtm/taaa037
- Prem K, Liu Y, Russell TW, Kucharski AJ, Eggo RM, Davies N, et al. The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study. *Lancet Public Health*. (2020) 5:e261–70. doi: 10.1101/2020.03.09.20033050

## FUNDING

This study was supported by the Ministry of Education of Humanities and Social Science project (Grant numbers 19YJC790167; 20YJC790187), the National Natural Science Foundation of China (Grant number: 72003173), and the Natural Science Foundation of Zhejiang Province, China (Grant number: LY21G030008).

- Tian H, Liu Y, Li Y, Wu CH, Chen B, Kraemer MUG, et al. An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. *Science*. (2020) 368:638–42. doi: 10.1126/science.abb6105
- Zhang L, Li H, Chen K. Effective risk communication for public health emergency: reflection on the COVID-19 (2019-nCoV) outbreak in Wuhan, China. *Healthcare*. (2020) 8:64. doi: 10.3390/healthcare8010064
- Xie L, Yang H, Zheng X, Wu Y, Shen Z. Medical resources and coronavirus disease (covid-19) mortality rate: evidence and implications from Hubei Province in China. *PLoS One*. (2021) 16:e244867. doi: 10.1371/journal.pone.0244867
- World Health Organization. *Infection Prevention and Control During Health Care When Novel Coronavirus (nCoV) Infection is Suspected: Interim Guidance* (2020).
- Deng X, Qu XS. Greenhouse gas reduction coalition and its stability analysis-based on the perspective of game theory (in Chinese). *J Beijing Inst Technol*. (2017) 19:25–32.
- Li HT, Xu XG, Liu WZ. The games of all interest groups around the world in carbon emission reduction and some discussions on China's strategies (in Chinese). *China Popul Resour Environ*. 5:93–7.
- Zhong YY, Zhang C. International carbon reduction game with low carbon development and China's countermeasures (in Chinese). *J Yunnan Finan Trade Inst*. (2018) 34:106–12.
- Kandel N. Is there a business continuity plan for emergencies like an Ebola outbreak or other pandemics? (in Chinese). *J Bus Contin Emer Plan*. (2015) 8:295–8.
- Kandel N, Sreedharan R, Chungong S, Sliter K, Nikkari S, Ijaz K, et al. Joint external evaluation process: bringing multiple sectors together for global health security. *Lancet Global Health*. (2017) 5:e857–8. doi: 10.1016/S2214-109X(17)30264-4
- Kandel N, Chungong S, Omaar A, Xing J. Health security capacities in the context of COVID-19 outbreak: an analysis of International Health Regulations annual report data from 182 countries. *Lancet*. (2020) 395:1047–53. doi: 10.1016/S0140-6736(20)30553-5
- Cattani M. Global coalition to accelerate COVID-19 clinical research in resource-limited settings. *Lancet*. (2020) 395:1322–5. doi: 10.1016/S0140-6736(20)30798-4
- Qian X, Ren R, Wang Y, Guo Y, Fang J, Wu ZD, et al. Fighting against the common enemy of COVID-19: a practice of building a community with a shared future for mankind. *Infect Dis Poverty*. (2020) 9:1–6. doi: 10.1186/s40249-020-00650-1
- Gao M, Guo SH, Xia LL. Analysis on the formation and stability of cooperation management alliance of air pollution control among local governments: based on the evolutionary game(in Chinese). *Chin J Manag Sci*. (2016) 24:62–70.
- World Trade Organization. *Message of Director-General Roberto Azevêdo on Trade Outlook* (2020).
- IMF. *Confronting the Crisis: Priorities for the Global Economy*. International Monetary Fund (2020).
- Guterres A. *UN Chief: COVID-19 Vaccine Must be a Global Public Good*. Sina Finance and Economics (2021). Available online at: <https://baijiahao.baidu.com/s?id=1693961187827263218&wdfr=spider&for=pc> (accessed March 12, 2021).
- Alaran AJ, Adebisi YA, Badmos A, Khalid-Salako F, Gaya SK, Ilesanmi EB, et al. Uneven power dynamics must be levelled in COVID-19 vaccines access and distribution. *Public Health Pract*. (2021) 2:100096. doi: 10.1016/j.puhp.2021.100096

37. Hellwig, M. D., and Maia, A. (2021). A covid-19 prophylaxis? Lower incidence associated with prophylactic administration of ivermectin. *Int J Antimicrob Agents*. 57:1–3. doi: 10.1016/j.ijantimicag.2020.106248
38. MITT. *China is the World's Largest Producer of Face Masks, Accounting for Half of Global Production*. iFeng (2020). Available online at: [https://tech.ifeng.com/c/7vEPqIohBeS?ivk\\_sa=1023197a](https://tech.ifeng.com/c/7vEPqIohBeS?ivk_sa=1023197a) (accessed March 12, 2021).
39. Chitrakar B, Zhang M, Bhandari B. Improvement strategies of food supply chain through novel food processing technologies during COVID-19 pandemic. *Food Control*. (2021) 125:108010. doi: 10.1016/j.foodcont.2021.108010
40. Faiva E, Hashim HT, Ramadhan MA, Musa SK, Bchara J, Tuama YD, et al. *Lessons from the covid-19 Situation: Rethinking Global Supply Chain Networks and Strengthening Supply Management in Public Procurement in Germany*. IUBH Discussion Papers - Transport and Logistik (2020).
41. Bracci A, Nadini M, Aliapoulos M, McCoy D, Gray I, Teytelboym A, et al. Dark Web Marketplaces and COVID-19: before the vaccine. *EPJ Data Sci*. (2021) 10:1–26. doi: 10.1140/epjds/s13688-021-00259-w
42. König A, Dressler A. A mixed-methods analysis of mobility behavior changes in the COVID-19 era in a rural case study. *Eur Trans Res Rev*. (2021) 13:1–13. doi: 10.1186/s12544-021-00472-8
43. Wu X, Yin J, Li C, Xiang H, Lv M, Guo Z. Natural and human environment interactively drive spread pattern of COVID-19: a city-level modeling study in China. *Sci Total Environ*. (2020) 756:143343. doi: 10.1016/j.scitotenv.2020.143343
44. Yang H, Hu S, Zheng X, Wu Y, Lin X, Xie L, et al. Population migration, confirmed COVID-19 cases, pandemic prevention, and control: evidence and experiences from China. *Z Gesundh Wiss*. (2020) 1–7. doi: 10.1007/s10389-020-01403-y [Epub Ahead of Print].

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright © 2021 Lin, Yang, Wu, Zheng, Xie, Shen and Hu. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.





# “Salus Populi Suprema Lex”: Considerations on the Initial Response of the United Kingdom to the SARS-CoV-2 Pandemic

Evaldo Favi<sup>1,2\*</sup>, Francesca Leonardis<sup>3†</sup>, Tommaso Maria Manzia<sup>4</sup>, Roberta Angelico<sup>4</sup>,  
Yousof Alalawi<sup>5</sup>, Carlo Alfieri<sup>2,6</sup> and Roberto Cacciola<sup>4,5</sup>

<sup>1</sup> Department of General Surgery, Renal Transplantation, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy, <sup>2</sup> Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy, <sup>3</sup> Intensive Care Unit, Department of Surgical Sciences, Università di Tor Vergata, Rome, Italy, <sup>4</sup> HPB Surgery and Transplantation, Department of Surgical Sciences, Università di Tor Vergata, Rome, Italy, <sup>5</sup> Department of Surgery, Kidney Transplantation, King Salman Armed Forces Hospital, Tabuk, Saudi Arabia, <sup>6</sup> Department of Internal Medicine, Nephrology, Dialysis and Renal Transplantation, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Victoria Ann Newsom,  
Olympic College, United States  
Nora Abdul-Aziz,  
University of Toledo, United States

### \*Correspondence:

Evaldo Favi  
evaldofavi@gmail.com

<sup>†</sup>These authors share first authorship

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 25 December 2020

**Accepted:** 02 September 2021

**Published:** 30 September 2021

### Citation:

Favi E, Leonardis F, Manzia TM,  
Angelico R, Alalawi Y, Alfieri C and  
Cacciola R (2021) “Salus Populi  
Suprema Lex”: Considerations on the  
Initial Response of the  
United Kingdom to the SARS-CoV-2  
Pandemic.  
Front. Public Health 9:646285.  
doi: 10.3389/fpubh.2021.646285

In several countries worldwide, the initial response to coronavirus disease 2019 (COVID-19) has been heavily criticized by general public, media, and healthcare professionals, as well as being an acrimonious topic in the political debate. The present article elaborates on some aspects of the United Kingdom (UK) primary reaction to SARS-CoV-2 pandemic; specifically, from February to July 2020. The fact that the UK showed the highest mortality rate in Western Europe following the first wave of COVID-19 certainly has many contributing causes; each deserves an accurate analysis. We focused on three specific points that have been insofar not fully discussed in the UK and not very well known outside the British border: clinical governance, access to hospital care or intensive care unit, and implementation of non-pharmaceutical interventions. The considerations herein presented on these fundamental matters will likely contribute to a wider and positive discussion on public health, in the context of an unprecedented crisis.

**Keywords:** SARS-CoV-2, COVID-19, coronavirus, pandemic, clinical governance, non-pharmaceutical intervention, modelling, public health

## INTRODUCTION

“*Salus populi suprema lex*”: the quote from Cicero had undoubtedly a wider meaning, embracing welfare, justice, economy; beyond the actual health of the people.

Since the World Health Organization (WHO) declared the Coronavirus Disease 2019 (COVID-19) a pandemic on 11th March 2020 (1), all governments across the globe have adopted emergency legislations aimed to contain the impact of the virus. However, in several countries, the legislative effort and the stringent measures implemented were not spared by criticism on their efficacy and timing. In particular, one of the most debatable initial response to SARS-CoV-2 in Western Europe has occurred in the United Kingdom (UK).

In this article, we discuss some relevant aspects of the initial response (from February to July 2020) to the COVID-19 pandemic in the UK. Such aspects were not fully considered by the scientific community, as much as by the British and international Main Stream Media (MSM).

The domains we have identified for our considerations are: clinical governance, access to hospital and intensive care unit (ICU), non-pharmaceutical intervention (NPI), and modelling.

## Clinical Governance

Governance is “*de facto*” engraved in the professional duties of any clinical or academic practice. We all know how inconceivable it is in modern medicine suggesting an intervention, a clinical protocol or a research trial that is not supported by substantial scientific evidence. The very basis of patient safety was built on “*Primum non nocere*”. This is not just a motto. It is a fundamental principle that protects who is vulnerable while guiding who is caring for them.

The unprecedented challenges posed by the first wave of COVID-19 found the global healthcare communities unprepared. In the UK, such unpreparedness revealed very deep fractures between the reality of the National Health Service (NHS) and the needs of both the population and healthcare professionals (2). Unexpectedly, the pandemic brought under public scrutiny the validity and the independence of the scientific advice received by the UK Government.

The regulations of medical practice are very clearly defined. Nevertheless, it appears that some crucial aspects of the medical profession, exercised through scientific advice, may not be accurately determined; thus revealing possible regulatory gaps. This vacuum seems to be more pronounced when a formal scientific advice is needed by the executive authority, designing the appropriate measures and strategies in the interests of the health of a nation.

Although, the specific advice offered to the UK Government may slip through the net of current regulations of the General Medical Council (GMC), it would be reasonable expecting that the advisors and advisory bodies to the Government would abide to the same rules followed by any clinician and researcher operating in the country. The concerns caused by the profoundly disturbing announcement of a herd immunity strategy in March 2020 (3) were worsened by the consideration that such medical strategy might have been shaped without peer review and adequate multidisciplinary input. This highly disputable decision supposedly was taken following the guidance of the Scientific Advisory Group for Emergency (SAGE). The legitimate concerns were accrued by the perceived lack of transparency as the members of the group remained secret for a considerable length of time, being publicly revealed only in April 2020 (4). Unsurprisingly, the quality of the scientific advice to the British Executive Authority has been openly criticized by numerous professionals holding international reputation; to the extent of being publicly challenged by the spontaneous constitution of an alternative and independent advisory group (5). Such events remain unique to the UK.

**TABLE 1 |** Descriptive comparison (median with interquartile range or percentage) between Intensive Care National Audit and Research Centre (ICNARC) and Tor Vergata University Hospital (TVUH) data on SARS-CoV-2 patients admitted to intensive care unit (ICU) during the first wave of COVID-19 pandemic.

Variables	ICNARC	TVUH
	Median (IQR) or %	
Age (years)	60 (52-68)	69.5 (59-78)
<b>Outcome at end of ICU stay</b>		
Discharge	51.4	42.3
Death	48.6	57.7
<b>Length of ICU stay (Days)</b>		
Survivor	6 (3-13)	10 (5-28)
Non-Survivor	7 (4-13)	10 (1-33)
Mechanically ventilated within 24 h of ICU admission	65.7	100*

\*All patients were mechanically ventilated within 24 h of ICU admission according to ICNARC criteria: Intubated = 69.2%; BPAP = 30.8%.

## Access to Hospital and Intensive Care

The analysis of the access to hospital and ICU has a pivotal importance in order to better understand the real impact that the COVID-19 had between February and July 2020 in the UK. Even though, almost every national healthcare providers have been admittedly overwhelmed by these unprecedented challenges, it has been suggested that this has not been the case for the NHS (6). For instance, in Italy, the Servizio Sanitario Nazionale (SSN) was clearly under remarkable strain despite a lower number of cases and more hospital beds per capita than UK (7, 8).

We have reviewed the SARS-CoV-2 report of the Intensive Care National Audit and Research Centre (ICNARC). The data presented by the ICNARC are highly reliable, following a rigorous and consolidated governance process (9). Our attention focused on demographic characteristics of COVID-19 patients, type of ventilatory support required on ICU admission, length of ICU stay, and final outcome. Given the fact that we could not find an equivalent source of information for national data as reliable as the ICNARC, with the aim of understanding whether our center would be comparable to UK average results, we decided to review the data from COVID-19 patients admitted to ICU at the Tor Vergata University Hospital (TVUH) in Rome, Italy (Table 1). This analysis showed that our COVID ICU had different patients' demographics and outcomes compared to UK averages. Specifically, the patients admitted to the TVUH COVID ICU appeared to be older and requiring more respiratory support on admission than their British counterpart. Probably, for such very reasons our patients might have suffered longer ICU hospitalisation associated with a higher mortality rate compared to those described in the ICNARC report. In this context, and bearing in mind the limitation of the above observations linked to different epidemiology, demographics, and healthcare organization, it may be highly relevant considering the activity of the NHS 111 telephone line that acted as “triage” system for patients with SARS-CoV-2 symptoms. It is rather worrying noticing that a number of concerns were raised regarding the

process of clinical decisions. Such decisions have been leading to hospital admission or, conversely, to home management of subjects with documented symptomatic COVID-19. Such concerns are currently being investigated (10). Furthermore, it remains unclear how the status of “do not attempt resuscitation” applied to the elderly and the most vulnerable members of our society, might have affected their access to hospital care. Also, this issue is under investigation (11).

The process through which the access to hospital care is determined inevitably reflects on the overall mortality (12) and specifically to the data accuracy on the impact from COVID-19. Currently, there are two official sources of mortality data related to COVID-19 in the UK: The Department of Health and Social Care (DHSC) and The Office of National Statistics (ONS). The first institution reports all deaths occurring within 28 days of a positive test for SARS-CoV-2 whilst the second, a non-governmental authority, considers all deaths linked to SARS-CoV-2 as declared by the death certificates. Remarkably, the mortality rate presented by the ONS is about 20% higher than DHSC with an out of hospital mortality representing approximately 40% of the overall mortality (5, 13).

Certainly, providing accurate real-time data on the ongoing pandemic to the population and to professionals proved of being an immensely difficult task in any country. However, the discrepancy of the mortality rates between official institutions, inevitably, leads to subjective evaluation of the real impact of the pandemic in the UK.

## Non-pharmaceutical Intervention and Modelling

The announcement from pharmaceutical companies and some governments of the discovery of effective vaccines against SARS-CoV-2 has raised hopes of an imminent end of the pandemic (14). Certainly, the necessary scientific validation and the implementation of a global mass vaccination program will require time. As such, the recent discoveries have not diminished the value of NPI or the emphasis on reliable modelling to respond to potential second or third waves of COVID-19.

The effects of NPI aimed to contain the pandemic have been evaluated in a mathematical modelling (15). In this study, the adherence of the population to NPI has been briefly addressed. However, it deserves further discussion. Particularly, because it seems that the conclusions of the study have represented an important part of the scientific advice offered to the UK Government.

Demonstrably, adequate awareness leads to diligent adherence. This depends on the quality of the information divulged by public health officials, the scientific community, and MSM. This concept applies to many health conditions, as much as to the ongoing pandemic (16). The effects of NPI are strongly influenced by the adherence generated by the collective responsibility and public behavior (17). It has been reported that adherence to NPI during the COVID-19 pandemic varied substantially, depending on the single measure analyzed (18). It raises further concern the observation that a considerable portion of the population in the UK may not be prepared to follow simple

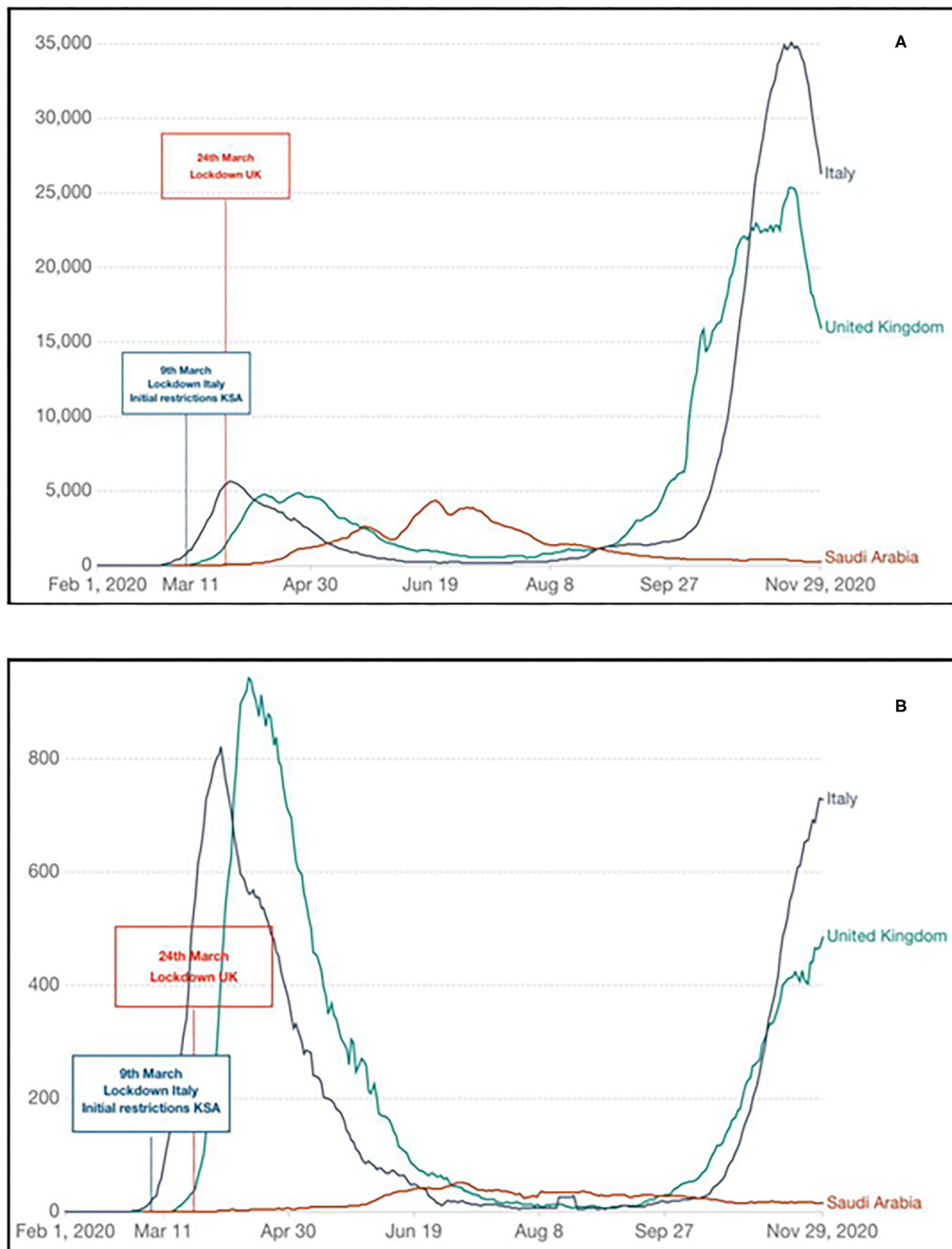
basic NPI, such as social distancing and wearing a mask (19). Davies and colleagues, in their mathematical modelling, have assumed a compliance of 95% of all the British population (15). This estimate sounds over optimistic when compared to current evidence (20–22). Notably, it is not supported by any qualitative analysis neither any historical data endorse such extraordinarily high expected adherence. Instead, adherence is described in the appendix of the paper only as a “county to county” variation, with a regional compensation of adherence to NPI. It should be highlighted that an inferior adherence of only 1% of the population may actually involve more than half million UK citizens. Hence, reasonably questioning the conclusion of the study on number of cases, mortality, and resources of healthcare. It is highly relevant that the authors indicate that their analysis was part of the advice offered to the UK Government.

## DISCUSSION

The extraordinary difficulties of shaping a response to the COVID-19 pandemic cannot be emphasised enough. The unprecedented medical and scientific challenges posed by an unknown virus have mercilessly exposed our vulnerabilities as individuals, together with the weaknesses of the healthcare services we dedicated our life. It is certainly strenuous identifying a country that flawlessly responded to SARS-CoV-2, conciliating the safeguard of the health of the nation with the scientific evidence and the inevitable increasing social pressures. On this regard, it is fundamental highlighting that major and even marginal socio-cultural and political differences between countries have substantially affected the governments responses as much as the compliance of populations. However, the peculiarities of the UK initial response to the pandemic deserve our attention for the consequences it had locally and outside the British borders.

It seems that the medical profession in the UK has witnessed during the first wave of COVID-19 what may be described as a continuous and progressive abandonment of the principles of best available evidence and safe practice, projected at national scale. Such withdrawal from the fundamental concepts of modern medicine, based on inclusiveness, multidisciplinary contribution, and transparency, has inevitably contributed to the highest mortality rate from SARS-CoV-2 in Europe, according to the ONS (5). The dereliction of clinical governance during the current healthcare crisis has implications beyond the tragic analysis we may perform today. Sadly, it represents a historical setback not only professionally, but also socially, contributing to solidarity failures (23).

Considering the magnitude of the professional advice to the Executive Authority, it would be appropriate that also the highest profile advice should follow the rigid processes of professional governance, in line with the processes that any individual clinician or institution regularly follows. Now more than ever, the GMC as a regulatory body independent from the Government and accountable to the Parliament may safeguard patients, doctors, and the health of the nation as stated by the GMC itself (24). The GMC could and should be involved by



**FIGURE 1 |** Evolution of COVID-19 first wave of pandemic in the United Kingdom (UK), Italy, and Kingdom of Saudi Arabia (KSA) indicating timing of initial response and impact: **(A)** new SARS-CoV-2 confirmed cases (seven rolling days average); **(B)** new SARS-CoV-2 confirmed deaths (seven rolling days average). Diagrams generated and adapted from Our World in Data (<https://ourworldindata.org>); Data source: CDC Europe (<https://www.ecdc.europa.eu/en>).



the UK Parliament to ascertain that “due diligence” has been applied to the process of advising the Government. Specifically, the GMC may be in the position to ensure that the principles of clinical governance would be applied to the whole process. This safety and governance processes may be implemented without interfering on the substance, merit, and confidentiality of the advice received by the Government. Unquestionably, the health of an entire country, as well as the credibility and public confidence on the medical profession have been put at risk. We all are conscious that Government policies may be disputed and opposed. It is inevitable and it does not represent a matter for our professional community. On the contrary, the professional advice to the Government from doctors registered in the GMC on public health issues of such relevance, must remain impeccable and untarnished. Certainly, the full understanding of the population on the magnitude of the pandemic has been influenced by the clarity of the information offered by the executive authorities, as much as their capacity of implementing restrictive measures.

A clear evaluation of hospital or ICU admission and related mortality between countries will be complex and lengthy. It will be even more difficult analyzing the out of hospital mortality, that in the UK it is particularly relevant. Also, attempting international comparisons would represent an extremely challenging task. Although our observation has numerous limitations, it is reasonable to postulate that the data from TVUH (one of the main COVID ICU of Central Italy) may actually reflect a national average; where the Northern regions were remarkably more afflicted by the pandemic compared to the Southern regions. The comparison between our local data and the report from ICNARC is merely indicative of possible different demographics and typology of admissions in the British ICUs. However, it certainly requires of being taken into account when an accurate assessment with a rigorous multivariate statistical model in the context of a properly designed study will be performed. An in-depth analysis including serological estimates in relation to hospitalizations and ICU admissions (25) will remain scientifically and socially necessary in order to better understand the evolution of the pandemic in the UK and elsewhere; thus implementing the adequate corrections to the healthcare services and increasing the compliance of the population to new stringent measures aimed to control further waves of the pandemic. More importantly, it would be a valid reassurance for the British population, clarifying whether any selection bias has been applied to prevent the overwhelming of the NHS as it seems that might have happened (26).

The behavior of the population is of extraordinary relevance in modelling the actual response to a healthcare crisis of the proportion of the COVID-19 pandemic. Including adherence variation in a mathematical modelling may be complex but crucially important. Undoubtedly, the level of health education of the population, associated with the level of trust on professional or institutional advice, have played an important role on the adherence to NPI across regions of the same country and between different nations. Therefore, considering parameters predictive of behavior of the population such as awareness, isolation fatigue, and trust will be required in order to corroborate the prediction of the effects of each NPI. In fact, stratifying the

expected adherence to specific NPI will enhance the reliability of mathematical modelling. Including also realistic adherence variables will contribute to shape effective strategies and efficient response at both national and regional level (27–29).

The awareness on the risks and effects of SARS-CoV-2 and consequently the adherence to the NPI is jeopardized by the presentation of dubious information such as those on mortality rate. Haphazardly, the general public in the UK has been left building its own knowledge on the impact of the pandemic, navigating between complacent official reports and tragically correct non-governmental data (5, 13). It would have been certainly beneficial if governments and MSM could have been referring to a much stronger guidance or code of conduct by the WHO on data analysis and a clearer standardized public presentation of the COVID-19 scenario.

A strong indicator of the benefit arising from prompt implementation and diligent use of NPI, associated with consistent and uncompromising information to the population, was observed in the Kingdom of Saudi Arabia (KSA) (30, 31). In the KSA, there was a gradual introduction of restrictions since the very early stages of the first wave of pandemic (6th March 2020), despite a limited number of cases, regionally confined. In this country, a second wave of SARS-CoV-2 was observed much earlier than Western Europe. It followed the Holy Month of Ramadan, coinciding with the easing of some restrictions and domestic flights resume on 31st May 2020 (32). The remarkable quick response of the Government linked with an excellent compliance to NPI has undoubtedly contributed to delay the first wave of pandemic; subsequently controlling the second wave effectively in less than two months, without reimposing strict public health measures. The national KSA strategy has also been rewarded with a lower incidence of cases and mortality as indicated in **Figures 1A,B**, respectively. Other countries, following the same principles, have succeeded in limiting the impact of COVID-19, New Zealand and South Korea are the most cited examples (33, 34).

Although the consideration on the implication of adherence in the study of Davies et al. may be of interest and debated, unequivocally, the authors indicate in their conclusions that the executive authority in the UK was fully aware of the risk posed by SARS-CoV-2, as much as of the unacceptable expected mortality of a “mitigation strategy”, very well before the UK lockdown date on 24th March 2020 (14). Crucially, it should be noted that on the 6th of March 2020, in Italy there was an average of 530 cases a week with 25 weekly deaths reported. In the UK, on the same date, there were 18 cases and no deaths reported. In the KSA, there were 17 cases and zero reported deaths on 16th March, which is a week after the NPI measures were implemented incrementally, reaching a complete lockdown with 24 h curfew on 9th April.

Our critical analysis focuses on some relevant aspects of the initial UK response to the COVID-19 pandemic that have not been properly addressed despite being at the very core of highly controversial events and adverse outcomes. In particular, messaging variables and constituent response, lack of transparency on scientific advices and political choices associated with misinformation regarding the magnitude of the pandemic and the actual resources of the national healthcare provider,

deserve scientific attention. In an attempt to support our considerations improving the clarity of the message delivered, we arbitrarily decided to compare specific elements of the early British response to those of the KSA and Italy. Certainly, it may be argued that other countries could have been used for comparison. In this regard, the most frequent terms of comparison presented by MSM and professional publications have been South Korea and New Zealand that proved particularly successful in managing the first wave of pandemic. However, the two examples we made, regarding the typology of ICU patients in Italy and promptness of the response in the KSA, represent in our opinion a very pertinent choice as they gave us the opportunity to highlight and explain specific and remarkable differences without necessarily attempting a formal comparison on all aspects of the response to SARS-CoV-2. Importantly, we decided to restrict the analysis to those specific nations reflected by our affiliations and from where we could obtain meaningful comparable data. At present, there are very limited number of national studies and/or data sources describing the typology of patients admitted to COVID ICU and their course during COVID ICU stay. Therefore, we have chosen to use the most reliable information we could obtain comparing data extracted from the ICNARC report with the ones directly collected from our COVID ICU in Italy. On the other hand, the KSA data were analysed because of the striking difference with the UK in establishing the initial response. In fact, in the KSA the timing of the COVID response has mirrored the implementation of countrywide restrictions in some European Countries including Italy; this was despite a lower number of cases compared to the UK. As mentioned above, such observations and critical analysis were naturally done also because of the affiliations of the authors.

While remarking the perspective and narrative nature of our analysis, defending the genuine choices we made constructing it, we recognise that its greatest limitation is the lack of a formal discussion and in-depth analysis of the socio-cultural and political variables that distinguish the UK, Italy, and the KSA. Reasonably, such differences may represent a significant bias as they affect the strength of the restrictive measures endorsed by the authorities, the rights and freedom of the populations involved to criticise and resist the governments' choices, the way the pandemic-related messaging is conceptualised, packaged, and presented to the citizens, and the actual possibility of the people to understand and copy with scientific and technical information,

as well as their ability to adhere to NPI. Nevertheless, addressing these elements in this specific context would be extremely challenging and perhaps outside the primary objective of our considerations.

It may be strongly argued that the UK has suffered the highest mortality rate in Europe from the first wave of COVID-19 following a delayed response in implementing the adequate measures, despite witnessing the tragic evolution of the pandemic in other countries such as Italy and Spain. The public divulgation of the impact of a “mitigation strategy” on 16th March 2020 (35) has certainly contributed to a sudden change of direction of the British strategy. The modalities of such divulgation would deserve further reflection as to whether these modalities may reflect more a sense of urgency from a member of the SAGE rather than an academic contribution “per se” (35).

In the UK, beyond the organizational and medical complexities of the management of SARS-CoV-2, unique events influencing the scientific analysis and medical advice to the Government, the access to hospital care, and the implementation of the necessary NPI have affected the health of a nation. Sadly, it would suggest that in current extraordinary times, the “*Salus populi*” may not be a “*suprema lex*”.

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

EF and RC: conceptualization and writing—original draft preparation. FL, TM, RA, and YA: data collection. FL, TM, RA, and YA: data analysis. EF, RC, and CA: data interpretation. EF, RC, TM, RA, YA, and CA: literature review. EF, RC, and FL: writing—review and editing. RC and YA: supervision. All authors contributed to the article and approved the submitted version.

## REFERENCES

1. World Health Organization. WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 11 March 2020 (2020). <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-March-2020> (accessed December 8, 2020).
2. Horton R. Offline: COVID-19 and the NHS—“a national scandal”. *Lancet*. (2020) 28:1022. doi: 10.1016/S0140-6736(20)30727-3
3. The Guardian. *Coronavirus: Science Chief Defends UK Plan from Criticism*. (2020). <https://www.theguardian.com/world/2020/mar/13/coronavirus-science-chief-defends-uk-measures-criticism-herd-immunity> (accessed December 8, 2020).
4. The Guardian. *Who's Who on Secret Scientific Group Advising UK Government?* (2020). <https://www.theguardian.com/world/2020/apr/24/coronavirus-whos-who-on-secret-scientific-group-advising-uk-government-sage> (accessed December 8, 2020).
5. Office for National Statistics. *Latest Data and Analysis on Coronavirus (COVID-19) in the UK and Its Effect on the Economy and Society*. (2020). <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases> (accessed December 8, 2020).
6. UK Parliament - Hansard. *Covid-19 Update. Volume 675: Debated on Tuesday 5 May 2020*. (2020). <https://hansard.parliament.uk/commons/2020-05-05/debates/FEDF1F15-7728-4E4D-A66E-01F7CE658C46/Covid-19Update> (accessed December 11, 2020).

7. Eurostat. *Healthcare Resource Statistics - Beds*. (2020). [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthcare\\_resource\\_statistics\\_-\\_beds](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Healthcare_resource_statistics_-_beds) (accessed December 11, 2020).
8. Eurostat. (2020). *Healthcare Resources*. (2020). [https://stats.oecd.org/index.aspx?DataSetCode=HEALTH\\_REAC](https://stats.oecd.org/index.aspx?DataSetCode=HEALTH_REAC) (accessed December 11, 2020).
9. ICNARC. *COVID-19 Report*. (2020). <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports> (accessed December 12, 2020).
10. The Guardian. *Nurses Barred from NHS 111 Covid Clinical Division After 60% of Calls Unsafe*. (2020). <https://www.theguardian.com/world/2020/oct/01/nurses-barred-from-nhs-111-covid-clinical-service-after-60-of-calls-unsafe> (accessed December 12, 2020).
11. The Guardian. *Inquiry Begins Into blanket Use in England of Covid 'Do Not Resuscitate' Orders*. (2020). <https://www.theguardian.com/world/2020/oct/12/inquiry-begins-into-blanket-use-in-england-of-covid-do-not-resuscitate-orders> (accessed December 12, 2020).
12. Valley TS, Sjoding MW, Ryan AM, Iwashyna TJ, Cooke CR. Association of intensive care unit admission with mortality among older patients with pneumonia. *JAMA*. (2015) 314: 1272–9. doi: 10.1001/jama.2015.11068
13. GOV.UK. Coronavirus (COVID-19) (2020). <https://www.gov.uk/coronavirus> (accessed December 12, 2020).
14. Haque A, Pant AB. Efforts at COVID-19 vaccine development: challenges and successes. *Vaccines*. (2020) 8:E739. doi: 10.3390/vaccines8040739
15. Davies NG, Kucharski AJ, Eggo RM, Gimma A, Edmunds WJ, Centre for the mathematical modelling of infectious diseases COVID-19 working group. Effects of non-pharmaceutical interventions on COVID-19 cases, deaths, and demand for hospital services in the UK: a modelling study. *Lancet Public Health*. (2020) 5:e375–85. doi: 10.1101/2020.04.01.20049908
16. Monaco A, Manzia TM, Angelico R, Iaria G, Gazia C, Alawi AY, et al. Awareness and impact of non-pharmaceutical interventions during coronavirus disease 2019 pandemic in renal transplant recipients. *Transplant Proc*. (2020) 52:2607–13. doi: 10.1016/j.transproceed.2020.07.010
17. Cowling BJ, Ali ST, Ng TWY, Tsang TK, Li JCM, Fong MW, et al. Impact assessment of non-pharmaceutical interventions against coronavirus disease 2019 and influenza in Hong Kong: an observational study. *Lancet Public Health*. (2020) 5:e279–88. doi: 10.1016/S2468-2667(20)30090-6
18. Fricke LM, Glöckner S, Dreier M, Lange B. Impact of non-pharmaceutical interventions targeted at COVID-19 pandemic on influenza burden - a systematic review. *J Infect*. (2020) 2:S0163–4453. doi: 10.1016/j.jinf.2020.11.039
19. The Guardian. *Thousands March in London in Fourth Anti-lockdown Protest*. (2020). <https://www.theguardian.com/world/2020/oct/24/london-braces-for-fourth-protest-against-covid-19-restrictions> (accessed December 11, 2020).
20. Doogan C, Buntine W, Linger H, Brunt S. Public perceptions and attitudes toward COVID-19 nonpharmaceutical interventions across six countries: a topic modeling analysis of twitter data. *J Med Internet Res*. (2020) 22:e21419. doi: 10.2196/21419
21. Coroiu A, Moran C, Campbell T, Geller AC. Barriers and facilitators of adherence to social distancing recommendations during COVID-19 among a large international sample of adults. *PLoS ONE*. (2020) 15:e0239795. doi: 10.1371/journal.pone.0239795
22. Smith LE, Amlöt R, Lambert H, Oliver I, Robin C, Yardley L, et al. Factors associated with adherence to self-isolation and lockdown measures in the UK: a cross-sectional survey. *Public Health*. (2020) 187:41–52. doi: 10.1016/j.puhe.2020.07.024
23. West-Oram P. Solidarity is for other people: identifying derelictions of solidarity in responses to COVID-19. *J Med Ethics*. (2021) 47:65–8. doi: 10.1136/medethics-2020-106522
24. General Medical Council. (2020). <https://www.gmc-uk.org/> (accessed December 12, 2020).
25. Amirthalingam G, Whitaker H, Brooks T, Brown K, Hoschler K, Linley E, et al. Seroprevalence of SARS-CoV-2 among blood donors and changes after introduction of public health and social measures, London, UK. *Emerg Infect Dis*. (2021) 27:1795–801. doi: 10.3201/eid2707.203167
26. BBC. Covid: What is the Risk of the NHS Being Overwhelmed? (2020). <https://www.bbc.com/news/health-54440392> (accessed December 12, 2020).
27. Aravindakshan A, Boehnke J, Gholami E, Nayak A. Preparing for a future COVID-19 wave: insights and limitations from a data-driven evaluation of non-pharmaceutical interventions in Germany. *Sci Rep*. (2020) 10:20084. doi: 10.1038/s41598-020-76244-6
28. Kasting ML, Head KJ, Hartsock JA, Sturm L, Zimet GD. Public perceptions of the effectiveness of recommended non-pharmaceutical intervention behaviors to mitigate the spread of SARS-CoV-2. *PLoS ONE*. (2020) 15:e0241662. doi: 10.1371/journal.pone.0241662
29. Seale H, Heywood AE, Leask J, Sheel M, Thomas S, Durrheim DN, et al. COVID-19 is rapidly changing: examining public perceptions and behaviors in response to this evolving pandemic. *PLoS ONE*. (2020) 15:e0235112. doi: 10.1371/journal.pone.0235112
30. Youssef HM, Alghamdi NA, Ezzat MA, El-Bary AA, Shawky AM. A modified SEIR model applied to the data of COVID-19 spread in Saudi Arabia. *AIP Adv*. (2020) 10:125210. doi: 10.1063/1.50029698
31. Bazaid AS, Aldarhami A, Binsaleh NK, Sherwani S, Althomali OW. Knowledge and practice of personal protective measures during the COVID-19 pandemic: a cross-sectional study in Saudi Arabia. *PLoS ONE*. (2020) 15:e0243695. doi: 10.1371/journal.pone.0243695
32. Ministry of Health, Covid19 Command and Control Center CCC, The National Health Emergency Operation Center NHEOC (2020). <https://covid19.moh.gov.sa> (accessed December 12, 2020).
33. Huang QS, Wood T, Jelley L, Jennings T, Jefferies S, Daniells K, et al. Impact of the COVID-19 nonpharmaceutical interventions on influenza and other respiratory viral infections in New Zealand. *Nat Commun*. (2021) 12:1001. doi: 10.1038/s41467-021-21157-9
34. Min KD, Kang H, Lee JY, Jeon S, Cho SI. Estimating the effectiveness of non-pharmaceutical interventions on COVID-19 control in Korea. *J Korean Med Sci*. (2020) 35:e321. doi: 10.3346/jkms.2020.35.e321
35. Ferguson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, et al. *Impact of Non-Pharmaceutical Interventions (NPIs) to Reduce COVID-19 Mortality and Healthcare Demand*. Imperial College London. <https://spiral.imperial.ac.uk/handle/10044/1/77482> (accessed March 16, 2020).

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2021 Favi, Leonadis, Manzia, Angelico, Alalawi, Alfieri and Cacciola. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.



# Accuracy and Timeliness of Knowledge Dissemination on COVID-19 Among People in Rural and Remote Regions of China at the Early Stage of Outbreak

Wen Zhou<sup>1†</sup>, Leshui He<sup>2†</sup>, Xuanhua Nie<sup>1</sup>, Taoketaohu Wuri<sup>3</sup>, Jinhai Piao<sup>4</sup>, Dunshan Chen<sup>5</sup>, Hui Gao<sup>6</sup>, Jianmin Liu<sup>7</sup>, Kyedrub Tubden<sup>8</sup>, Ming He<sup>1\*</sup> and Jun He<sup>1\*</sup>

## OPEN ACCESS

### Edited by:

Lara Lengel,  
Bowling Green State University,  
United States

### Reviewed by:

Yanbi Hong,  
Southeast University, China  
Cheng Yu,  
Sun Yat-sen University, China  
Shuanglong Li,  
Guangzhou University, China

### \*Correspondence:

Ming He  
kmheming@139.com  
Jun He  
jun.he@ynu.edu.cn

<sup>†</sup>These authors have contributed  
equally to this work

### Specialty section:

This article was submitted to  
Public Health Policy,  
a section of the journal  
Frontiers in Public Health

**Received:** 21 April 2020

**Accepted:** 14 December 2021

**Published:** 11 January 2022

### Citation:

Zhou W, He L, Nie X, Wuri T, Piao J,  
Chen D, Gao H, Liu J, Tubden K,  
He M and He J (2022) Accuracy and  
Timeliness of Knowledge  
Dissemination on COVID-19 Among  
People in Rural and Remote Regions  
of China at the Early Stage of  
Outbreak.  
Front. Public Health 9:554038.  
doi: 10.3389/fpubh.2021.554038

<sup>1</sup> School of Ethnology and Sociology, Yunnan University, Kunming, China, <sup>2</sup> Department of Economics, Bates College, Lewiston, ME, United States, <sup>3</sup> College of Ethnology and Anthropology, Inner Mongolia Normal University, Hohhot, China, <sup>4</sup> Institute of Ethnic Studies, Yanbian University, Yanbian, China, <sup>5</sup> Center for Collaborative Innovation in the Heritage and Development of Xizang Culture, Xizang Minzu University, Xianyang, China, <sup>6</sup> School of Political Science and Laws, Shihezi University, Shihezi, China, <sup>7</sup> College of Ethnology and Sociology, Guangxi University for Nationalities, Nanning, China, <sup>8</sup> Tibet's Economic and Cultural Research Center, Tibet University, Lhasa, China

Coronavirus disease 2019 (COVID-19) spread throughout China in January 2020. To contain the virus outbreak, the Chinese government took extraordinary measures in terms of public policy, wherein accurate and timely dissemination of information plays a crucial role. Despite all of the efforts toward studying this health emergency, little is known about the effectiveness of public policies that support health communication during such a crisis to disseminate knowledge for self-protection. Particularly, we focus on the accuracy and timeliness of knowledge dissemination on COVID-19 among people in remote regions—a topic largely omitted in existing research. In February 2020, at the early-stages of the COVID-19 outbreak, a questionnaire survey was carried out. In total, 8,520 participants from seven less economically developed provinces situated in the borderlands of China with large ethnic minority groups responded. We analyzed the data through poisson regression and logistic regression analyses. We found that (1) people in remote regions of China obtained accurate information on COVID-19. Further, they were able to take appropriate measures to protect themselves. (2) Result from both descriptive analysis and multivariable regression analysis revealed that there is no large difference in the accuracy of information among groups. (3) Older, less educated, and rural respondents received information with a significant delay, whereas highly educated, younger, urban residents and those who obtained information through online media were more likely to have received the news of the outbreak sooner and to be up to date on the information. This research provides evidence that disadvantage people in remote regions obtained accurate and essential information required to act in an appropriate manner in responses to the COVID-19 outbreak. However, they obtained knowledge on COVID-19 at a slower pace than other people; thus, further improvement in the timely dissemination of information among disadvantage people in remote regions is warranted.

**Keywords:** infectious diseases, COVID-19, communication inequality, risk communication, disadvantage groups



## INTRODUCTION

In the early 2020s, China encountered a serious public health emergency after coronavirus disease 2019 (COVID-19) was first diagnosed in Wuhan in December 2019 (1) and subsequently spread throughout the country in less than a month. In late February, cases of COVID-19 were confirmed in every province of China, including remote areas and mountainous regions. Only two month of COVID-19 outbreak, official news reported 80,924 confirmed cases, with 3,140 deaths in China (2). Since the person-to-person transmission of COVID-19 was scientifically confirmed (3, 4), the Chinese government has taken tremendous efforts to inform the public and control further transmission. These measures include putting cities on lockdown, restricting public transportation, limiting migration of labor and traveling, closing stores and other business operations, mandating the use of face masks in public, as well as various other measures of quarantine (5). The effectiveness of such measures, however, largely depends on public awareness on the risk and people's knowledge regarding self-protection. As such, it is a great challenge to ensure that scientific information is broadly received. In particular, it is additionally challenging to deliver information and knowledge regarding the virus outbreak to marginalized people in a timely manner, including ethnic minorities who are more likely to live in remote areas and suffer from poverty, thus potentially being more vulnerable to the risk of the disease because of the lack of local medical support and healthcare resources.

Globally, rapid reaction to the outbreak of infectious diseases is limited by the dissemination of accurate information among the public in a timely manner (6, 7). Existing research suggests that a better understanding of the health risks can lead to improved self-protection, which can significantly support transmission control, as in the case of SARS (8, 9), MERS (10), and Ebola (11, 12). The accessibility and quality of information disseminated during a public health emergency may vary substantially across groups with different socioeconomic statuses – a communication inequality was documented during public health emergencies like the H1N1 outbreak (13, 14), hurricane Katrina (15) and the Zika virus outbreak (16). The literature also highlights additional social factors underlying health inequalities that are associated with socioeconomic backgrounds, including ethnicity, poverty, education level, and geographic constraints (17–21). This study contributes to the literature with a timely and quantitative analysis during the current COVID-19 outbreak to evaluate whether marginalized people receive accurate and timely information, and in doing so, provides support for evidence-base policy making.

Since the outbreak of COVID-19, there has been a rapid growth in the literature on COVID-19, with studies predominantly conducted by medical and epidemiological scientists. Most current research focuses on modeling and predicting the potential population that might be infected (22, 23). Others explore the mechanisms of transmission (24). Numerous studies have also examined the originality and molecular structure of the virus (25). Whereas scientific research has improved the understanding of the transmission and control

of COVID-19, few studies from social sciences have examined the effects of information communication on transmission control, particular among people in remote regions.

To fill this gap, we carry out a large-scale survey focusing on the effects of health communication during the early stages of the COVID-19 outbreak in the beginning of February 2020. This is a critical point of time when the Chinese government officially implemented drastic measures under a state of emergency to contain the outbreak and formally disseminated information regarding the virus and self-protection. As such, this research aims to make three empirical contributions, as follows: (1) to contribute as one of first evidence focusing on the socioeconomic aspects of COVID-19 transmission control; (2) to provide evidence regarding communication inequality in COVID-19; (3) to provide information on the implications of timely policy implementation in China and other countries on the containment of COVID-19 and other related infectious diseases.

## METHODS

### Data Collection

This research focuses on the borderland area of China during the COVID-19 outbreak. We conducted our survey in seven different provinces of China—Guangxi, Yunnan, Tibet, Xinjiang, Inner Mongolia, Heilongjiang and Jilin—all of which are international-boarder provinces of China and are home to a significant proportion of the ethnic minority population. The results of the 6th census in 2010 showed that the ethnic minority populations in these 7 provinces account for 50.28% of the non-Han majority group in China. Most of these provinces are landlocked and less economically developed regions of China. National statistics have shown that these provinces ranked among the bottom 12 of the 31 provinces<sup>1</sup> in China by annual total GDP in 2018.

The survey was undertaken from the 5 February to 9 February 2020, the booming stage of the COVID-19 outbreak in China, following the World Bank survey approach applied for an Ebola study (26) and most updating COVID-19 studying (27). This survey was carried out through a questionnaire survey platform, wherein respondents participated online with smartphones to avoid physical contact among individuals. Through the cooperation of 7 universities in each of these 7 provinces, we used snowball sampling to collect our responses, which initially started through social networks of research teams in each university and later spread through social media networks to more respondents.

Because we aimed to collect timely responses during a fast-evolving health emergency across a diverse set of geographical areas while overcoming travel bans and quarantine, we were unable to organize a standard random sampling process. Despite this shortcoming, we made several efforts to reach a wide geographic coverage, while striving for representativeness. First, to ensure representation of respondents from a diverse set of regions in the sample, we relied on our existing field work networks to recruit respondents from targeted communities. Specifically, we chose 10 counties from each of the 7 provinces and two villages or communities from each county as targets. In

<sup>1</sup>See <http://data.stats.gov.cn/easyquery.htm?cn=E0103>.

each of these 20 villages<sup>2</sup>, one local investigator directly contacted the local village and community leaders via telephone to ensure that at least 15 respondents participated. These steps provided more coverage of non-urban residents in our sample (41.59%, see **Appendix Table 1**). Second, we explicitly encouraged our students from the 7 universities to spread our questionnaire to their senior relatives, family members, and residents in the same community, to mitigate the overrepresentation of university students in the sample (a sample average age of 32 years and 37.36% of participants >35 years; see **Appendix Table 1**). Third, to improve the efficacy, we excluded responses that were completed too fast or too slowly. Considering a baseline average completion time of 6 min during our pre-test, we excluded all responses that were completed under 3 min or over 50 min.

As a result, our effective sample included a total of 8,520 respondents (see **Appendix Table 1** for the descriptive statistics of our data), with 66.88% being female and 41.15% belonging to ethnic minorities. The average age of our sample was 32.43 years, with 46.63% between 21 and 35 years old and 37.36% older than 35 years. Of the participants, 29.53% were rural residents; 11.12%, suburban residents; and 59.35%, urban residents—slightly higher than the average urbanization rate of 7 provinces in 2019 (54.4%). The average completion time for the questionnaire was approximately 8 min (mean = 469.07 seconds, S.D. = 300.97). All thought we made several efforts to reach a non-urban and senior residents, Yunnan province is over-represented because we want to make the sample reach to more ethnic minority residents, urban and younger residents are a little bit over-represented in our sample (see **Appendix Table 2**). We analyze and evaluate these limitations in the last section of the article.

## Measurement

Gaps exist in information dissemination, particularly health-related information, during a state of emergency. One type of gap is the difference between what people need to know and what they already know, another type is the delay between when people need to know and when people actually receive information. We refer to the former type of gap as *information gap in accuracy* and the latter, as *information gap in timeliness*.

For information gap in accuracy, three indicators were developed: (1) accuracy of facts, which tested whether people were able to correctly identify rumors and scientifically reliable information about COVID-19. In the questionnaire, we listed 6 COVID-19-related statements, among which 4 statements were rumors and the other 2 were scientifically confirmed facts. The respondent was asked to check whether each statement was true or false, and the respondents received the full score of 6 if they correctly distinguished all of them. (2) Accuracy of methods tested whether the respondent knew of the effective preventative measures advocated by health professionals. In the

questionnaire, we use a multiple choices question asking what could be done to prevent infection. The options of this question included 4 effective measures and other ineffective confounders. If the respondent chose all four right answers, they receive full marks of 4 for this measure. (3) Accuracy of action tested whether a respondent had taken effective advocated measures to protect himself/herself. We used a multiple-choice question asking what measures the respondent had taken after they had learned about the COVID-19 outbreak. Five of the options were advocated effective measures, and the respondent received 1 point for each effective measure chosen, with the full score being 5.

To measure the information gap in timeliness, two indicators were developed: (1) early-known stands for whether people received information about the outbreak before 20 January 2020, which is the date on which person-to-person transmission of COVID-19 was officially confirmed and a state of public health emergency was declared nationally. (2) Newly known is an indicator to examine whether people learned the newly discovered transmission route of COVID-19, which is a fecal-oral path of transmission<sup>3</sup>, although it still needs more research to confirm. We used this indicator to measure whether the respondent was able to obtain up to date information in a timely manner—an essential feature in the fast-changing environment of a health emergency.

Existing research shows that mass media plays a key role in health communication (7, 31). In particular, compared with traditional media, online media may respond to news more quickly (8); however, it disproportionately serves younger, more highly educated, and urban demographics, thus leading to a communication inequality (32). To test the effect of media type to information gap, we distinguished two type of media. If respondents get the outbreak news at first through the newspaper, TV, or neighbors and friends, we define them as first informed by traditional media, if respondents get the outbreak news at first through WeChat, Weblog or online news App, we define them as first informed by online media.

## Data Analysis

First, we cross-tabulated our measures of information gap by group. Next, we presented evidence from poisson regression models and ordered logit regression models that measure the size and significance of information accuracy gap across different groups, while controlling for province fixed effects, self-evaluated health level, and whether the respondent knew of any confirmed and suspected cases nearby. Next, we used logit model to estimate the information gap in timeliness between different groups. In addition, we used mediation analysis to measure the intermediary effect of online media on information gap in timeliness.

## RESULTS

### Information Gap in Accuracy

**Table 1** presents summary statistics of the information gap in accuracy by sex, age group, educational background, rural-urban residence, and ethnicity. The means of all three indicators were

<sup>2</sup>According to previous research for government behavior and area development (28–30), we believe that the main difference of risk communication come from the county level, especially when it was led by government. To increase geographical coverage for the selection of sufficient districts and counties, while at the same time reducing the workload and costs of the cooperating agencies, we selected ten counties from all counties in every province and every county selected two villages to conduct our survey.

<sup>3</sup>See [https://www.thepaper.cn/newsDetail\\_forward\\_5734999](https://www.thepaper.cn/newsDetail_forward_5734999).

**TABLE 1** | Information gap in accuracy among groups.

		Accuracy of facts (full score = 6)		Accuracy of methods (full score = 4)		Accuracy of action (full score = 5)	
		Mean	Test	Mean	Test	Mean	Test
Sex	Female	5.13	$F = 3.22$	3.91	$F = 54.30$	4.69	$F = 3.22$
	Male	5.09	( $p = 0.07$ )	3.82	( $p = 0.00$ )	4.52	( $p = 0.07$ )
Age	10 to 20	5.01	$F = 10.72$	3.89	$F = 1.44$	4.60	$F = 2.95$
	21 to 35	5.14	( $p = 0.00$ )	3.89	( $p = 0.21$ )	4.62	( $p = 0.02$ )
	36 to 50	5.14		3.88		4.71	
	51 to 65	5.01		3.84		4.61	
	>65	5.04		3.82		4.59	
Education	Primary school	4.31	$F = 109.75$	3.60	$F = 20.86$	4.29	$F = 7.12$
	Middle school	4.69	( $p = 0.00$ )	3.78	( $p = 0.00$ )	4.61	( $p = 0.00$ )
	High school	4.81		3.86		4.69	
	College	5.14		3.89		4.65	
	Post-graduate	5.34		3.90		4.59	
Residential type	Rural	4.91	$F = 113.38$	3.84	$F = 19.28$	4.55	$F = 29.40$
	Suburban	5.14	( $p = 0.00$ )	3.90	( $p = 0.00$ )	4.67	( $p = 0.00$ )
	Urban	5.23		3.90		4.67	
Ethnicity	Minority	4.87	$F = 129.30$	3.84	$F = 11.71$	4.60	$F = 6.13$
	Han-Chinese	5.21	( $p = 0.00$ )	3.90	( $p = 0.00$ )	4.64	( $p = 0.01$ )

The test in the table is multiple-comparison test by analysis-of-variance (ANOVA) models. The numbers in parentheses are  $p$  values for the significant test.

found to be very close to the full scores. For example, the mean of accuracy in action is 4.7 out of a full score of 5, implying that most respondents took all 5 appropriate measures to protect themselves. These preliminary comparisons suggest that the information gap in accuracy is very small.

On analyzing the data by group, we found that the difference across groups by sex, education attainment, residential type, and ethnicity was clear for all three indicators—female, highly educated individuals, urban residents, and Han-Chinese respondents report more accurate information. Most of them are statistic significant by multiple-comparison test except the difference between female and male. These observations indicate that, during the COVID-19 outbreak, highly educated individuals, urban residents, and Han-Chinese residents in China were more likely to have better information on protecting themselves and taking appropriate actions. The difference across age groups is less clear. Overall, participants of the age group 36–50 years report more accurate information than those of other age groups.

Most of the differences we discussed above are quite small. For example, the accuracy of the methods score is 3.89 for participants aged 10–20 years and 3.82 for those aged >65 years, a difference of only 0.07 points. Similarly, the difference is only 0.06 points between rural and urban residences, ethnic minorities, and Han-Chinese participants. The greatest gap in estimates observed was between different education groups. The accuracy of fact scores for the primary-school-educated group was 4.31, whereas that for the post-graduate-educated group was 5.34—a sizable difference of 0.97 or 1 standard deviation. The accuracy of the methods score between these

two groups was 0.3 or approximately 0.4 standard deviations of the measure.

We use a multivariate linear regression model and an ordered logit model to measure and test the information gap in accuracy between groups. The three indicators of accuracy were the independent variables in each model. Our key explanatory variables were age group, sex, educational attainment, rural-urban residential type, and ethnicity. Our main control variables were self-evaluated health status and province indicators because health status affect people's reaction to virus and different province get different situation of virus infection and control policies. We also controlled for three additional variables on potential exposure to the virus to control for the underlying variation in respondents' local environment that could have intensified their interests and thus may have affected information accuracy, including whether the respondent knows of any suspected or confirmed cases in the family or among friends or classmates (SC-RFC), in the same village or community (SC-SV), or in the neighboring village or community (SC-NV).

**Table 2** reports estimates from the poisson regression models and ordered logit models, which are largely consistent with each other, showing the robustness of our results. Overall, these more precise estimates echo our previous observations—the differences across most groups are statistically significant. The respondents who are older, female, better educated and living in urban and sub-urban area were significantly better informed across two or all three measures. Although ethnicity considered to be a dominant feature of borderland area of China, the information gap between ethnic minority and ethnic Han is quite small and two of the three estimates are not statistically

**TABLE 2 |** Multivariate regression analysis of the information gap in accuracy among groups.

	Accuracy of facts		Accuracy of methods		Accuracy of action	
	Poisson	Ologit	Poisson	Ologit	Poisson	Ologit
Age	−0.001 (0.001)	−0.005 (0.020)	0.003** (0.001)	0.031** (0.010)	0.003*** (0.001)	0.056*** (0.013)
Age squared	0.000 (0.000)	−0.000 (0.000)	−0.000** (0.000)	−0.000** (0.000)	−0.000** (0.000)	−0.001*** (0.000)
Sex (female = 0)	−0.014*** (0.003)	−0.519*** (0.087)	0.007 (0.005)	0.096* (0.044)	−0.031*** (0.004)	−0.425*** (0.058)
Education (primary = 0)						
Middle school	0.016 (0.015)	0.294 (0.243)	0.019 (0.021)	0.143 (0.159)	0.029 (0.018)	0.421* (0.200)
High school	0.031* (0.015)	0.537* (0.238)	0.036 (0.020)	0.272 (0.153)	0.040* (0.017)	0.530** (0.191)
College	0.039** (0.014)	0.866*** (0.225)	0.096*** (0.019)	0.776*** (0.146)	0.037* (0.017)	0.456* (0.179)
Postgraduate	0.034* (0.014)	0.706** (0.242)	0.129*** (0.020)	1.152*** (0.152)	0.017 (0.017)	0.066 (0.187)
Ethnic minority	−0.004 (0.002)	−0.165 (0.093)	−0.022*** (0.004)	−0.220*** (0.044)	−0.003 (0.004)	−0.112 (0.060)
Area (rural=0)						
Suburban	0.011** (0.004)	0.341* (0.154)	0.036*** (0.008)	0.348*** (0.073)	0.020*** (0.006)	0.306** (0.098)
Urban	0.014*** (0.003)	0.448*** (0.108)	0.037*** (0.006)	0.357*** (0.052)	0.025*** (0.005)	0.387*** (0.070)
Observations	8520	8520	8520	8520	8520	8520
Log likelihood	−15638.07	−10516.05	−14009.01	−2598.37	−15049.64	−5772.79

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Coefficients (log odds from ordered logit models and log count from Poisson models) have been presented. The numbers in parentheses are standard errors. All regressions control for provinces fixed effects; self-reported health statuses; and SC-RFC, SC-SV, and SC-NV. Their estimates are omitted here but are available upon request.

significant. It means Han-Chinese respondents report more accurate information we show in table 1 may because they have different residential type and education attainment.

Although many estimates are statistically significant, the coefficients are relatively small, which means the information accuracy gap between groups are quite small. For example, compared with respondents in the primary school educated group, respondents in Postgraduate educated group get 3.4% increase ( $e^{0.034}-1$ ) in the count of Accuracy of Facts. Compared with rural residents, the count of Accuracy of Facts for the urban residents increased by 1.4% ( $e^{0.014}-1$ ) and for the sub-urban residents, by 1.1% ( $e^{0.011}-1$ ).

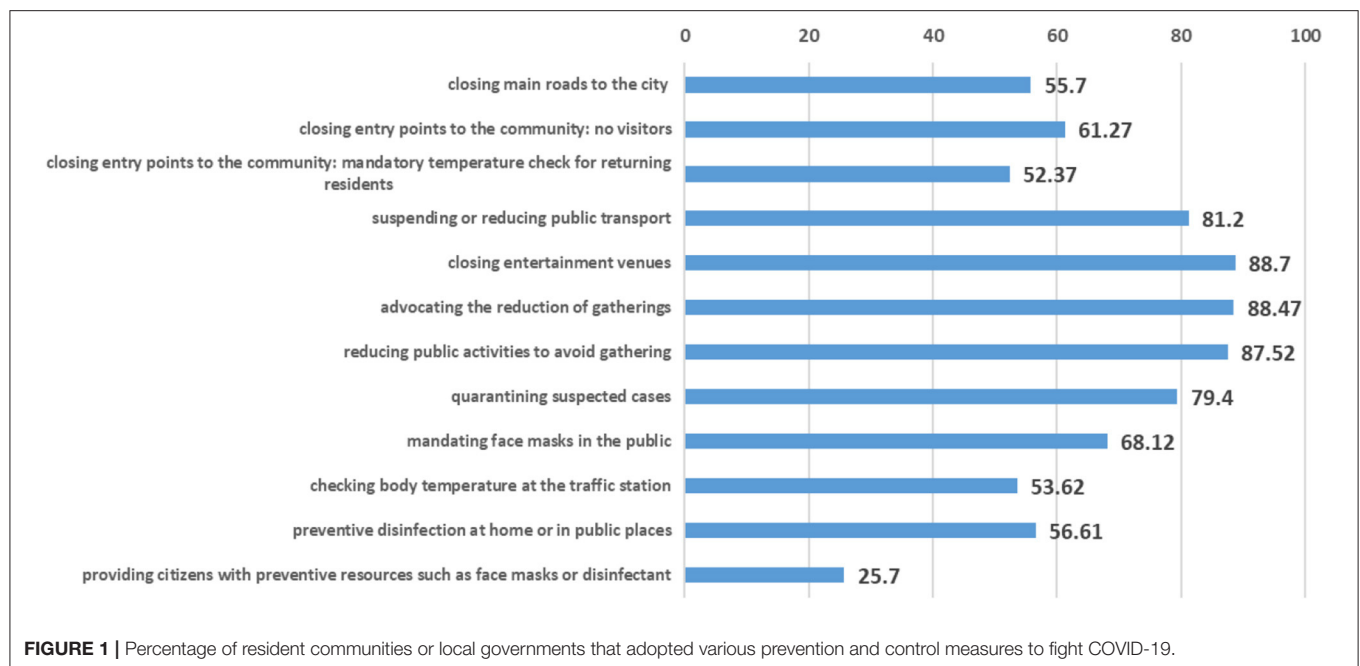
The small information gap in accuracy shows the comprehensive coverage of the virus outbreak in China since late January, with effective communication of essential information to a wide group of diverse residents in areas far from the epicenter of the outbreak. The evidence supporting the effective transmission of information is consistent with the slowdown of transmission in areas outside of the Hubei province in China since mid-February. We argue that the success in informing the public is instrumental in slowing the spread of the virus abroad. As the Director-General of the World Health Organization (WHO), Dr. Tedros Adhanom Ghebreyesus, noted

on 15 February 2020<sup>4</sup>: China has taken strong public health measures and efficiently utilized its resources to respond and manage the outbreak and spread of COVID-19 since mid-January. Propaganda machinery has been running on full steam to inform the public. National news has been covering daily press conferences by the government and educational videos, folk songs, banners, advertisements in buses and on billboards, etc. on COVID-19 have been used to inform and motivate people to isolate themselves and fight against the outbreak. All residents have been encouraged to work from home and stay indoors, and companies and shops have been encouraged to suspend business.

An effective information campaign is conducive to the marked quarantine measures that have disrupted the way of life among most Chinese people and have had a significant financial impact. Since late January, dramatic measures, such as school cancelation, store closure, and limited public transportation, have been imposed across China to contain the virus. Our survey also attempted to collect information on the extent to which such measures were taken by local communities and governments during the outbreak. In our sample, more than

<sup>4</sup>See <https://www.who.int/dg/speeches/detail/munich-security-conference> (access on 1 March, 2020).





98.82% of the respondents' communities or local governments had taken measures to stop the spread of the virus. Although the 7 broader provinces are far from Wuhan, more than 85% of the respondents reported that local communities had taken measures, such as closing entertainment venues, persuading residences to reduce gatherings, and reducing public activity to avoid gatherings. More than 79% of the respondents reported that public transportation facilities had been suspended or reduced and that suspected cases had been quarantined. More than 50% of the respondents reported that the main roads into or out of their cities and access routes to the villages or communities had been closed, preventive disinfection had been performed at home or in public areas, and that their temperature had been measured at bus and train stations. About 24.38% of the respondents reported that the residential communities or local government provided preventive resources, such as face masks and disinfectant, to the residents (see **Figure 1**).

### Information Gap in Timeliness

The elderly group and the low-educated group had a large information gap in timeliness compared with the other groups. **Table 3** (column 1) shows the proportion of early-known respondents by group. The differences were substantial, especially across different age group, educational attainment levels and across the rural-urban divide. The fraction of early-known in the 10–20-year group was 79.77%, but it was only 49.12% among those older than 65 years. Among the primary-school-educated group the fraction of early-know was 55.95%, whereas in the post-graduate-educated group, it was 68.33%.

Further, **Table 3** (column 2) also shows that younger, more educated, and urban respondents were much more likely to be informed of the updated route—showing a sizable gap in the latency of information updates across groups.

**TABLE 3 |** Information gap in timeliness among groups.

		Early-known		Newly known	
		Rate	Chi <sup>2</sup> test	Rate	Chi <sup>2</sup> test
Sex	Male	67.87	$\chi^2 = 3.15$	63.6	$\chi^2 = 66.97$
	Female	65.95	( $p = 0.07$ )	54.39	( $p = 0.00$ )
Age	10–20	79.77	$\chi^2 = 241.22$	53.96	$\chi^2 = 45.68$
	21–35	70.35	( $p = 0.00$ )	61.11	( $p = 0.00$ )
	36–50	58.36		64.31	
	51–65	57.27		56.38	
	>65	49.12		66.67	
Education	Primary school	55.95	$\chi^2 = 105.94$	39.88	$\chi^2 = 83.87$
	Middle school	55.14	( $p = 0.00$ )	52.78	( $p = 0.00$ )
	High school	58.86		56.17	
	College	70.44		60.79	
	Post-graduate	68.33		66.89	
Residential type	Rural	68.84	$\chi^2 = 5.43$	52.42	$\chi^2 = 98.76$
	Suburban	68.11	( $p = 0.05$ )	63.67	( $p = 0.00$ )
	Urban	66.26		64.01	
Ethnicity	Han-Chinese	66.19	$\chi^2 = 5.93$	63.72	$\chi^2 = 51.26$
	Minority	68.71	( $p = 0.01$ )	56.02	( $p = 0.00$ )

The numbers in column 1 and column 3 are the proportion of early-known and the proportion of newly-known. The numbers in parentheses are  $p$  values for the significant test.

We use a logit regression model to estimate the variations in these measures attributable to social demography variables (**Table 4**). Column 1 shows a significant negative association between age and the likelihood of early-known. Our estimates show that a one-year increase in age was associated with an 11.13% decrease ( $1 - e^{-0.118}$ ) in the odds of early-known. The

**TABLE 4 |** Regression analysis of the information gap in timeliness among groups.

	Early-known (1)	Newly known (2)	Media type (3)	Early-known (4)	Newly known (5)
Age	−0.118*** (0.012)	0.002 (0.011)	−0.123*** (0.004)	−0.022*** (0.002)	0.004 (0.002)
Sex (female = 0)	0.072 (0.051)	−0.347*** (0.049)	−0.867*** (0.071)	0.112** (0.052)	−0.332*** (0.049)
Education (primary = 0)					
Middle school	−0.017 (0.185)	0.205 (0.186)	1.556** (0.760)	−0.024 (0.184)	0.227 (0.185)
High school	0.049 (0.179)	0.293 (0.179)	1.745** (0.748)	0.092 (0.177)	0.282 (0.178)
College	0.341* (0.172)	0.473** (0.172)	2.756*** (0.740)	0.338** (0.170)	0.462*** (0.171)
Postgraduate	0.434* (0.178)	0.562** (0.178)	3.075*** (0.743)	0.331* (0.177)	0.624*** (0.177)
Ethnic minority	0.011 (0.052)	−0.150** (0.049)	0.063 (0.062)	0.006 (0.052)	−0.149*** (0.049)
Area (rural = 0)					
Suburban	0.144 (0.087)	0.315*** (0.082)	0.199** (0.101)	0.105 (0.087)	0.327*** (0.081)
Urban	0.184** (0.063)	0.235*** (0.058)	0.503*** (0.071)	0.120* (0.063)	0.254*** (0.058)
Media type (tradition = 0)				0.509*** (0.066)	0.041 (0.059)
Constant	2.334*** (0.326)	−0.791* (0.313)	0.864 (0.789)	0.649** (0.280)	0.076 (0.275)
Observations	8520	8520	8520	8520	8520
Pseudo-R <sup>2</sup>	0.037	0.030	0.220	0.037	0.027
Log likelihood	−5187.199	−5545.856	−3640.407	−5187.765	−5562.692

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Number (1)–(5) in the table means the number of regression models. Coefficients (log odds) from logit models are presented. The numbers in parentheses are standard errors. All regressions control for province fixed effects; self-reported health statuses; and SC-RFC, SC-SV, and SC-NV. Their estimates are omitted here but are available upon request.

coefficient of educational attainment was significantly positive for the college-educated and post-graduate-educated groups, compared with the primary-school-educated group. The odds of early-known for the college-educated group increased by 40.63% ( $e^{0.341}-1$ ) and for the post-graduate-group, by 54.34% ( $e^{0.434}-1$ ). Compared with rural residents, urban residents had significant advantages in terms of early-known. Compared to the obvious difference across groups by age, education attainment and residential type, the coefficient of ethnicity is not significant, which shows again that ethnicity may not be a major factor in risk information inequality.

Model 2 in **Table 4** shows that education level, ethnic identity, and residential type were significantly associated with the probability of learning of newly known transmission routes. We found that respondents with higher education levels, urban residents, and ethnic Han-Chinese were more likely to know of the updated routes compared with respondents with lower education levels, rural residents, and ethnic minorities. This result further supports that information gap in timeliness across groups is significantly large irrespective of the knowledge on the updated transmission route.

## Effect of Online Media on the Information Gap in Timeliness

In this subsection, we further explore the possible mechanisms of media type behind the differences across groups from different demographics. We used process analysis (33, 34) to assess the intermediary effect of online media on the information gap in timeliness between social groups.

**Table 4** (model 3) shows that the educational attainment level and residential type significant affected media type of first informed, which was consistent with the findings from early research. Models 4 (**Table 4**) shows that media type has a significant effect on early-known. Compared with respondents informed by traditional media, respondents informed by online media showed a 66.36% increase in the odds of early-known ( $e^{0.509}-1$ ). The intermediary effect of online media was also obvious when we compare the two model 1 and model 4. When we included media type in model 4, the coefficient for education level and residential type reduced obviously. This suggests that respondents with different education level and residential type choose different media types which lead some of them get the pandemic information earlier than others. In the other words,

**TABLE 5 |** The results of Sobel and Bootstrap intermediary effect test for media type.

Test methods	Variables	Early-known		Newly-known	
		Indirect effect	Proportion of total effect that is mediated	Indirect effect	Proportion of total effect that is mediated
Sobel	Age	−0.001***	18.80%	0.001	−44.7%
	Education	0.011***	22.90%	0.001	1.7%
	Residential type	0.001*	9.70%	0.001	0.5%
	Ethnic minority	0.003	12.80%	0.001	−0.8%
Bootstrap	Age	−0.001***	18.80%	−0.001**	−44.7%
	Education	0.011***	22.90%	0.001	1.7%
	Residential type	0.001+	9.70%	0.001	0.5%
	Ethnic minority	0.003	12.80%	0.001	−0.8%

+ $p < 0.10$ ,  $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . To estimate the total effect and make the result easy to understood, the categorical variables education, residential type and ethnicity are treated as continuous variable.

part of the information gap in timeliness between education level and residential type groups is attributed to differences in media type.

The coefficient of media type is not significant in terms of whether respondents know of the updated transmission routes (See model 5 in Table 4). This may be because online media helps people get information fast but does not help them distinguish whether the information is accurate, because of the circulation of rumors and fake news (35–37). Even if respondents knew of the new transmission routes, they did not choose them because these routes of transmission had not been confirmed.

While the power of the intermediary effect test with two-step or three-step process analysis is relatively weak (38, 39). To test the effect more rigorously, we present Sobel (40) test and Bootstrap (41) intermediary effect test for media type in Table 5. Both Sobel test and Bootstrap test show that the intermediary effect of media type between age and Early-known, education and Early-known, residential type and Early-known is statistically significant. Because of the higher probability of being informed by online media, younger, high educated and urban residents get higher odds of received information about the outbreak earlier than others. However, the intermediary effect of media type between all variables and Newly-known are not statistically significant, which is consistent with the result from process analysis. The results show that online media help people get the outbreak information earlier, but can't help them know of the updated transmission routes. We think the reason maybe is the rumors and fake news in the online media make them hard to distinguish whether the updated information is accurate.

## CONCLUDING REMARK

COVID-19 has challenged the global public health system in terms of developing effective control strategies to stop its spread. Effective health communication helps battle misinformation and reduce panic and its consequent health risks as well as plays a key role during public health emergencies. During such emergencies, less educated individuals, indigenous individuals, older individuals, and rural and remote-region residents do not

get accurate and timely health emergency information (14, 42). This kind of communication inequality is quite common, which causes marginalized social groups to be at a higher risk than estimated and to be less likely to follow recommended behaviors (13, 15, 16). Based on that knowledge, researchers argue that developing countries with weak health systems and regional, cultural, linguistic and ethnic diversity should pay more attention to the role of effective communication, without leaving anyone behind when communicating crisis and risk to the population to address the COVID-19 pandemic (43).

This research takes a quantitative approach toward examining possible communication inequalities among people in rural and remote regions. Differing from the existing literature, we evidence that the marginalized groups obtained accurate health information, which helped them adopt appropriate protective measures. This improved the effectiveness of government policy for transmission control, as evidenced by the current decrease in COVID-19 cases (5). However, the research also suggests that knowledge updates among disadvantage groups such as order, less educated and rural residents remain comparatively slow. Online media that are more accessible to urban, younger and educated residents may the disadvantage groups acquire information at a faster rate than others.

The policy implications from this research for China and other countries are two-fold: (1) it is critical for governments to broaden the channels of information dissemination, particular improving the use of online media, (2) there is a requirement for continuous investment by the government toward providing disadvantage people in remote regions with accessibility to up to date information and knowledge. As the first pandemic of the social media age, social media communication played a significant role in the pandemic of COVID-19. The extensive global penetration of social media provided a fertile ground for the spread of information, misinformation, and fake news (44). On the other hand, the COVID-19 crisis exacerbated the already existed “digital inequality” dramatically, worsen it within the population (45). How to face the rise of “digital inequality” as well as solve the problem of “infodemic”? Based on the results of this research and practical implications from other countries, we believe that

mobilizing local governments and social organizations is an effective strategy to reduce digital inequality. Both of them could serve as avenues for risk communication when social media is not accessible. In addition to this, the government should expand access to social media, make more people have the opportunity to access to internet. Research shows that health policy influences search behavior on the internet (46), and we believe that the government should leverage these the risk communication strategies in the social media age. To prevent information vacuums that get filled in by unreliable lay advice and rumors, the government should use both traditional broadcast media channels (media briefings and press releases) and more direct channels to provide scientific and reliable information to combat misinformation and disinformation (47).

Finally, differing from existing COVID-19 study done by Wang and others (34), we covered a wide geographic coverage to improve the sample representative by assigning 7 universities to particularly carry out survey in their province. But there is still limitation of this study. Restricted by the time frame and the unusually strict quarantine measures at the time of our data collection, the data collection process of this study was not able to follow a random selection process, similar as other COVID-19 study (27, 48). Our results are, therefore, inevitably subject to potential biases due to the sampling procedure. China has approximately 932 million mobile Internet users (67 percent of population)<sup>5</sup>, yet more than 360 million, who are more likely to be less educated and live in rural areas, do not have access to smart phone. Because our survey is conducted through a mobile app platform, such groups are inherently underrepresented in our data. This selection bias may lead to underestimation of the inequality in knowledge dissemination. It would prove productive to conduct retrospective studies with a more representative sample to compare against our findings. We leave that effort to future research.

<sup>5</sup>Statistical Report on Internet Development in China (September 2020), released by China Internet Network Information Center, See [https://www.cnnic.net.cn/hlwzjy/hlwzxbg/hlwztjbg/202009/t20200929\\_71257.htm](https://www.cnnic.net.cn/hlwzjy/hlwzxbg/hlwztjbg/202009/t20200929_71257.htm).

## REFERENCES

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. (2020) 382:727–33. doi: 10.1056/NEJMoa2001017
2. WHO. Coronavirus disease 2019 (COVID-19): situation report. 50. (2020). Available online at: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200310-sitrep-50-covid-19.pdf?sfvrsn=55e904fb\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200310-sitrep-50-covid-19.pdf?sfvrsn=55e904fb_2) (accessed Mar 10, 2020)
3. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. (2020) 395:497–506. doi: 10.1016/S0140-6736(20)30183-5
4. Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *New Engl J Med*. (2020) 382:1199–207. doi: 10.1056/NEJMoa2001316
5. Chen S, Yang J, Yang W, Wang C, Barnighausen T. COVID-19 control in China during mass population movements at New Year. *Lancet*. (2020) 395:764–6. doi: 10.1016/S0140-6736(20)30421-9

## DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Institutional committee of Yunnan University, School of Ethnology and Sociology. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

## AUTHOR CONTRIBUTIONS

WZ, LH, JH, and MH: conceptualization. JH, LH, WZ, TW, JP, DC, HG, JL, KT, XN, and MH: methodology, investigation, and writing—review and editing. JH, LH, and WZ: formal analysis and writing—original draft preparation. JH and MH: supervision, project administration, and funding acquisition.

## FUNDING

The research received financial support from various sources: WZ received financial support from the China Postdoctoral Science Foundation (No. 2019M663590); MH, from the National Social Sciences Foundation of China (No. 16ZDA151); JH, from the Ministry of Education of People's Republic of China (Project No. 16JJD850015).

## ACKNOWLEDGMENTS

We acknowledge all 8,520 participants who volunteered to response to this survey.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2021.554038/full#supplementary-material>

6. Lundgren RE, McMakin AH. *Risk Communication: a Handbook for Communicating Environmental, Safety, and Health Risks*. John Wiley & Sons. Hoboken, New Jersey, USA. (2018)
7. Sandman PM, Lanard J. *Risk Communication Recommendations for Infectious Disease Outbreaks*. World Health Organization SARS Scientific Research Advisory Committee, Geneva, Switzerland. (2003).
8. Hsu YC, Chen YL, Wei HN, Yang YW, Chen YH. Risk and outbreak communication: lessons from Taiwan's experiences in the post-SARS era. *Health Secur*. (2017) 15:165–9. doi: 10.1089/hs.2016.0111
9. Ahmad A, Krumkamp R, Reintjes R. Controlling SARS: a review on China's response compared with other SARS-affected countries. *Trop Med Int Health*. (2009) 14:36–45. doi: 10.1111/j.1365-3156.2008.02146.x
10. Choi JW, Kim KH, Moon JM, Kim MS. Public health crisis response and establishment of a crisis communication system in South Korea: lessons learned from the MERS outbreak. *J Korean Med Assoc*. (2015) 58:624–34. doi: 10.5124/jkma.2015.58.7.624
11. Kpanake L, Gossou K, Sorum PC, Mullet E. Misconceptions about Ebola virus disease among lay people in Guinea: Lessons for community education. *J Public Health Policy*. (2016) 37:160–72. doi: 10.1057/jph.2016.1



12. Gesser-Edelsburg A, Shir-Raz Y, Hayek S, Sassoni-Bar Lev O. What does the public know about Ebola? The public's risk perceptions regarding the current Ebola outbreak in an as-yet unaffected country. *Am J Infect Control*. (2015) 43:669–75. doi: 10.1016/j.ajic.2015.03.005
13. Lin L, Jung M, McCloud RF, Viswanath K. Media use and communication inequalities in a public health emergency: a case study of 2009–2010 pandemic influenza A virus subtype H1N1. *Public Health Rep*. (2014) 129:49–60. doi: 10.1177/003335491412965408
14. Lin L, Savoia E, Agboola F, Viswanath K. What have we learned about communication inequalities during the H1N1 pandemic: a systematic review of the literature. *BMC Public Health*. (2014) 14:484. doi: 10.1186/1471-2458-14-484
15. Taylor-Clark KA, Viswanath K, Blendon RJ. Communication inequalities during Public Health disasters: Katrina's wake. *Health Commun*. (2010) 25:221–9. doi: 10.1080/10410231003698895
16. Ribeiro B, Hartley S, Nerlich B, Jaspal R. Media coverage of the Zika crisis in Brazil: the construction of a 'war' frame that masked social and gender inequalities. *Soc Sci Med*. (2018) 200:137–44. doi: 10.1016/j.socscimed.2018.01.023
17. Biggs B, King L, Basu S, Stuckler D. Is wealthier always healthier? The impact of national income level, inequality, and poverty on public health in Latin America. *Soc Sci Med*. (2010) 71:266–73. doi: 10.1016/j.socscimed.2010.04.002
18. Pampel FC, Krueger PM, Denney JT. Socioeconomic disparities in health behaviors. *Annu Rev Sociol*. (2010) 36:349–70. doi: 10.1146/annurev.soc.012809.102529
19. Mansyur C, Amick BC, Harrist RB, Franzini L. Social capital, income inequality, and self-rated health in 45 countries. *Soc Sci Med*. (2008) 66:43–56. doi: 10.1016/j.socscimed.2007.08.015
20. Fallah MP, Skrip LA, Gertler S, Yamin D, Galvani AP. Quantifying poverty as a driver of ebola transmission. *PLoS Negl Trop Dis*. (2015) 9:e0004260. doi: 10.1371/journal.pntd.0004260
21. Marmot M. Social determinants of health inequalities. *Lancet*. (2005) 365:1099–104. doi: 10.1016/S0140-6736(05)71146-6
22. Jung SM, Akhmetzhanov AR, Hayashi K, Linton NM, Yang Y, Yuan B, et al. Real-time estimation of the risk of death from novel coronavirus (COVID-19) infection: inference using exported cases. *J Clin Med*. (2020) 9:E523. doi: 10.3390/jcm9020523
23. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet*. (2020) 395:689–97. doi: 10.1016/S0140-6736(20)30260-9
24. Chan Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet*. (2020) 395:514–23. doi: 10.1016/S0140-6736(20)30154-9
25. Cohen, J. Wuhan seafood market may not be source of novel virus spreading globally. *Science*. (2020). Available online at: <https://www.sciencemag.org/news/2020/01/wuhan-seafood-market-may-not-be-source-novel-virus-spreading-globally#15/04/2020>. (accessed January 26, 2020) doi: 10.1126/science.abb0611
26. Himelein K. The socio-economic impacts of Ebola in Liberia: results from a high frequency cell phone survey. World Bank Group. (2014). Available online at: <http://documents.worldbank.org/curated/en/162381468179333776/The-socio-economic-impacts-of-Ebola-in-Liberia-results-from-a-high-frequency-cell-phone-survey-round-five>. (accessed Mar 10, 2020.)
27. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*. (2020) 17:1729. doi: 10.3390/ijerph17051729
28. Xiaoye, Z. New changes in the governance model of county-level governments (in Chinese). *Soc Sci*. (2014) 1:121–39.
29. Walder AG. Local governments as industrial firms: an organizational analysis of China's transitional economy. *Am J Sociol*. (1995) 101:263–301. doi: 10.1086/230725
30. Jinhua D. Research on county development and county sociology: the selection and transition of field research units in sociology. *Eval Chin Human Soc Sci*. (2020) 1:47–58.
31. Clayman ML, Manganello JA, Viswanath K, Hesse BW, Arora NK. Providing health messages to Hispanics/Latinos: understanding the importance of language, trust in health information sources, and media use. *J Health Commun*. (2010) 15:252–63. doi: 10.1080/10810730.2010.522697
32. Zheng Y, Walsham G. Inequality of what? Social exclusion in the e-society as capability deprivation. *Inf Technol People*. (2008) 21:222–43. doi: 10.1108/09593840810896000
33. Judd CM, Kenny DA. Process analysis: Estimating mediation in treatment evaluations. *Eval Rev*. (1981) 5:602–19. doi: 10.1177/0193841X8100500502
34. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Personal Soc Psychol*. (1986) 51:1173–82. doi: 10.1037/0022-3514.51.6.1173
35. Mowbray H. Letter from China: covid-19 on the grapevine, on the internet, and in commerce. *BMJ*. (2020) 368:m643. doi: 10.1136/bmj.m643
36. Shimizu K. 2019-nCoV, fake news, and racism. *Lancet*. (2020) 395:685–6. doi: 10.1016/S0140-6736(20)30357-3
37. Kittler AF, Hobbs J, Volk LA, Kreps GL, Bates DW. The Internet as a vehicle to communicate health information during a public health emergency: a survey analysis involving the anthrax scare of 2001. *J Med Internet Res*. (2004) 6:e8. doi: 10.2196/jmir.6.1.e8
38. MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychol Methods*. (2002) 7:83–104. doi: 10.1037/1082-989X.7.1.83
39. Hayes AF. Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Commun Monogr*. (2009) 76:408–20. doi: 10.1080/03637750903310360
40. Sobel ME. Asymptotic confidence intervals for indirect effects in structural equation models. *Sociol Methodol*. (1982) 13:290–312. doi: 10.2307/270723
41. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav Res Methods*. (2008) 40:879–91. doi: 10.3758/BRM.40.3.879
42. Glik DC. Risk communication for public health emergencies. *Annu Rev Public Health*. (2007) 28:33–54. doi: 10.1146/annurev.publhealth.28.021406.144123
43. Ataguba OA, Ataguba JE. Social determinants of health: the role of effective communication in the COVID-19 pandemic in developing countries. *Glob Health Action*. (2020) 13:1788263. doi: 10.1080/16549716.2020.1788263
44. Viswanath K, Lee EW. We need the lens of equity in COVID-19 communication. *Health Commun*. (2020) 35:1743–6. doi: 10.1080/10410236.2020.1837445
45. Beaunoyer E, Dupéré S. COVID-19 and digital inequalities: reciprocal impacts and mitigation strategies. *Comput Human Behav*. (2020) 111:106424. doi: 10.1016/j.chb.2020.106424
46. Muselli M, Cofini V, Desideri G. Coronavirus (Covid-19) pandemic: how may communication strategies influence our behaviours? *Int J Disaster Risk Reduc*. (2020) 53:101982. doi: 10.1016/j.ijdrr.2020.101982
47. Paek HJ. Communicating Uncertainties during the COVID-19 outbreak. *Health Commun*. (2020) 35:1729–31. doi: 10.1080/10410236.2020.1838092
48. He JH. Discrimination and Social Exclusion in the Outbreak of COVID-19. *Int J Environ Res Public Health*. (2020) 17:2933. doi: 10.3390/ijerph17082933

**Conflict of Interest:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

**Publisher's Note:** All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Zhou, He, Nie, Wuri, Piao, Chen, Gao, Liu, Tubden, He and He. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

# Advantages of publishing in Frontiers



## OPEN ACCESS

Articles are free to read  
for greatest visibility  
and readership



## FAST PUBLICATION

Around 90 days  
from submission  
to decision



## HIGH QUALITY PEER-REVIEW

Rigorous, collaborative,  
and constructive  
peer-review



## TRANSPARENT PEER-REVIEW

Editors and reviewers  
acknowledged by name  
on published articles

## Frontiers

Avenue du Tribunal-Fédéral 34  
1005 Lausanne | Switzerland

Visit us: [www.frontiersin.org](http://www.frontiersin.org)

Contact us: [frontiersin.org/about/contact](http://frontiersin.org/about/contact)



## REPRODUCIBILITY OF RESEARCH

Support open data  
and methods to enhance  
research reproducibility



## DIGITAL PUBLISHING

Articles designed  
for optimal readership  
across devices



## FOLLOW US

@frontiersin



## IMPACT METRICS

Advanced article metrics  
track visibility across  
digital media



## EXTENSIVE PROMOTION

Marketing  
and promotion  
of impactful research



## LOOP RESEARCH NETWORK

Our network  
increases your  
article's readership