Specialty grand challenge: emergency health services

Theodore C. Chan*
Department of Emergency Medicine, Emergency Health Services, University of California, San Diego, La Jolla, CA, United States

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Introduction
Emergency health services encompass a wide-ranging, diverse, and overarching impact on the health and well-being of individuals, communities, and large populations everywhere. The recent COVID-19 pandemic, during which emergency care providers played a leading and often heroic role in the response, highlights the critical importance of emergency healthcare staff and infrastructure (1, 2). Emergency medicine is at the intersection of acute medical care at the individual level and public health at the population level. Moreover, the specialty is relatively new within the field of medicine, developing its specific training and areas of expertise only in the mid-to-late 20th century (3, 4). As such, the field of emergency health services faces both great challenges and unique opportunities as the specialty continues to grow and expand its impact.

Demographic challenges—aging populations
Improvements in living conditions and public health, as well as advances in medicine, have led to a remarkable increase in life expectancy over the past century. As a result, the world’s population over the age of 60 will nearly double by 2050 (5). This remarkable demographic shift will present significant challenges throughout society and in particular for healthcare delivery systems, with the UN World Health Organization declaring a “Decade of Healthy Ageing” (6, 7).

Increasing physical frailty, multiple chronic comorbidities, and cognitive and social challenges mean that older adults will need increasing levels of acute unscheduled care through emergency health services (8, 9). A number of initiatives are underway to address this coming so-called “silver tsunami” (10). In the United States, the American College of Emergency Physicians launched the Geriatric ED Accreditation program in 2018 to recognize and certify emergency departments (EDs) committed to delivering appropriate, quality emergency care to the senior population, with over 400 such EDs now accredited at three levels (11–13). Assessment of the impact of these efforts in emergency health services is needed to guide and develop future initiatives and efforts to improve the care and well-being of older adults.

Resource challenges—capacity limitations
Emergency health services are resource-intensive—where unscheduled care is available at all times for undifferentiated acute illness and injury, with the apt motto “Anyone, Anything, Anytime” (14, 15). Increasing reliance on EDs and emergency medical services (EMS) for essentially on-demand care now often exceeds the limited resources and capacity in many parts of the world, including developed countries with robust healthcare systems (16, 17).
Factors impacting this imbalance include the demographic changes and aging noted earlier; misaligned payment incentive systems, resulting in inefficient or inappropriate care; and overall insufficient capacity, particularly for inpatient care as demand grows (18, 19).

A conceptual model of emergency care patient flow and crowding developed by Asplin et al. (20) focuses on three key processes: input (or patient/care demand), throughput (care delivery, particularly in hospital EDs), and output (patient disposition—discharge, admission, or other; Figure 1) (21).

Despite efforts to address these processes in emergency health services, the problem has only worsened over the intervening decades (22). The result is long waits for care in overwhelmed hospitals and EDs, particularly for ED boarders—admitted inpatients waiting for patient beds—creating access issue challenges, and grave concerns regarding care quality when demand so greatly outpaces resources and capacity (23–25).

Another resource challenge is the shortage of healthcare workers and providers. Trends have accelerated following the COVID-19 pandemic, with significant impacts on staff wellness and burnout, as well as recruitment and attrition of critical personnel, particularly in emergency health services (26–29).

**Technology challenges—advances in medicine**

Like all fields, new technologies are rapidly advancing in medicine with both tremendous promise and risks. Rapid diagnostics that are both accurate and cost-effective have the potential to markedly improve the efficiency and quality of care in both high- and low-resourced communities. The widespread use of rapid diagnostic panels for gastrointestinal and respiratory pathogens is revolutionizing the evaluation and management of these conditions (30).

In addition, the advancement of new treatments for acute and chronic conditions, such as cancer, vascular diseases, and metabolic syndromes, is having an impact on emergency care in terms of both specific disease management and treatment complications (31). These medical advances will continue to provide great opportunities as well as challenges for emergency health service providers.

Similarly, the information technology revolution is having a profound impact on healthcare and emergency health services (32). The transition to electronic health records and the vast accumulation of personal health data will only accelerate this impact (33). Artificial intelligence, machine learning algorithms, and natural language processing are now readily being tested and adopted in healthcare. These advances have the potential to not only increase efficiency and reduce staff burden (like documentation) but also increase the risk of errors, bias, and overreliance on technology to deliver care (34). These risks are all the greater in the time-intensive emergency health services setting (35–37).

**Challenges in disaster response and resilience—climate change**

Over the last century, large-scale disasters have increased markedly in terms of both frequency and magnitude (38). Emergency health services are critical to the immediate response and resilience infrastructure and to mitigate the impact of these events on the health of humankind.

Climate change is accelerating disaster events, creating challenges for existing emergency care infrastructure and resources.
Extreme heat events, wildfires and smoke/particulate air pollution, and severe flooding are just a few climate-related impacts that result in mass injury and illnesses (41, 42). Current emergency health services are ill-prepared to handle this impact and must begin to prepare for a world in which these events are commonplace and frequent (43).

Expanding human development is also leading to new challenges, such as outbreaks of novel zoonotic infectious diseases in the human population. The worldwide COVID-19 pandemic is a reflection of the potential scale and devastating impact on an individual, community, and worldwide level, placing tremendous strain on our acute care infrastructure and emergency health services systems (44, 45).

Public and population health challenges

Emergency health services are at the nexus and intersection of individual patient care and community public health (46, 47). The remarkable reduction in trauma-related morbidity and mortality over the past several decades is the result of both improvements in acute trauma care and public health measures to prevent and reduce injury on a population level (48). Similar challenges and opportunities exist in other arenas including the immediate care of acute vascular diseases, metabolic syndromes, and cancer.

With its unique role within a community, emergency health services are vulnerable to the various social factors impacting health in a given region, the so-called social determinants of health. These include economic factors, access to shelter and nutrition, and critical equity issues that create underlying risks to certain individuals and specific communities (49).

These challenges represent a tremendous opportunity for emergency providers to play critical roles in not only providing acute care for communities but also addressing underlying issues and complexities on a public health and population health basis.

Emergency health services—the “Availabilists”

Emergency health services, focused on the core competency of acute care at any hour for those in need with critical illness or injury, are relatively new in the field of medicine. While traditionally based in hospital EDs and EMS prehospital systems, new opportunities and challenges are rising in the areas of on-demand medical care for a wide variety of healthcare needs in diverse settings. These include the rapid adoption of telemedicine and virtual care; express, urgent, and freestanding ED units outside of hospitals; progressive hospital at-home programs for post-acute care; and other remote virtual care settings (50–53).

Other innovations include social and psychiatric field teams for the prehospital setting, as well as community paramedicine programs now being adopted in many communities (54). All these opportunities leverage the so-called core competency of emergency providers—providing care across a wide range of specialties at any time in any setting—as Hollander and Sharma call it, being available, or “Availabilists” (55).

A significant challenge for emergency health services will be to demonstrate both the quality and value of these innovations. Emergency health services research efforts should focus on how these innovations improve emergency care for individuals in acute medical need and provide cost-effective, equitable care and access within communities and for public health.

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