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Adequacy of the Supply and Factors Influencing Potential Shortages Among Emergency Medical Technicians and Emergency Medicine Physicians

Project Leads

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Statement of Problem

Emergency medical professionals play a crucial role in natural disasters and other catastrophic events. These individuals include medical first responders, such as emergency medical technicians (EMTs), and also emergency department clinicians (also called *first receivers*), such as emergency medicine physicians, physician assistants, and nurse practitioners. By responding rapidly to potential injury-creating events, triaging medical care needs, and initiating treatment, emergency medical professionals can substantially reduce mortality and morbidity.

Ensuring an adequate capacity of well-trained EMTs and emergency medicine physicians falls within the areas of interest of the U.S. Department of Homeland Security (DHS). DHS Secretary Janet Napolitano recently announced an action directive on first-responder health surge capacity that involves reviewing the capacity for communities to handle large-scale

health emergencies (DHS, 2009). This directive also affirmed that “DHS plays a critical role in enhancing emergency medical response capabilities at all levels of government.” Further, Homeland Security Presidential Directive 21: Public Health and Medical Preparedness states the following:

It is the policy of the United States to plan and enable provision for the public health and medical needs of the American people in the case of a catastrophic health event through continual and timely flow of information during such an event and rapid public health and medical response that marshals all available national capabilities and capacities in a rapid and coordinated manner. (DHS, 2007)

Despite the importance of ensuring an adequate supply of EMTs and emergency medicine physicians, only limited information is available on the supply of trained emergency medical professionals and the demand for their services during both normal conditions and following disasters or other similar events. Anecdotal information suggests that there may be substantial shortages among these professionals. This brief reviews available information on current and projected future shortages among emergency medical professionals, geographic disparities in shortages, and factors that contribute to these shortages.

Background

The emergency medicine system in the United States includes hospital-based emergency departments (EDs) and free-standing urgent care centers, as well as teams of emergency medical professionals dispatched by local, state, or federal government agencies and volunteer organizations (such as the Red Cross). Staffing of these facilities and emergency medical teams involves EMTs, emergency medicine physicians, and other health care professionals. Issues related to the supply of EMTs and emergency medicine physicians are discussed in the following paragraphs.

Emergency Medical Technicians

Differences in titles for EMTs are often based on certification from the National Registry of Emergency Medical Technicians (NREMT). Certification levels, in order of increased levels of training, include EMT-Basic, EMT-Intermediate, and EMT-Paramedic. EMTs with EMT-Basic training are at one end of the spectrum, with skills to assess patients' condition and manage respiratory, cardiac, and trauma emergencies. Paramedics are at the other end of the spectrum and can provide the most extensive prehospital care, including intravenous drug administration, endotracheal intubation, and use of complex medical equipment. Allowed activities among the different levels of EMTs vary by state (U.S. Bureau of Labor Statistics [BLS], 2010).

A majority of EMTs are in rural or other nonurban locations. Data collected from a sample of NREMT members in 2003 revealed that 21.6% of EMTs were employed in a rural

community, 32.5% in a small town, 16.4% in a medium-sized town, and only 9.9% in a large city (McGinnis, Moore, & Armstrong, 2006). Further, EMTs differ from other first responders in that a substantial number serve in a volunteer capacity. In the 2003 NREMT data, over one third of EMTs were volunteers. According to McGinnis et al. (2006), 75% of EMTs in rural areas were volunteers in 2003, compared with 7.5% in large cities.

For more than a decade, anecdotal reports have indicated shortages of EMTs, even in urban areas such as New York City (Stern, 1996). The size of the EMT population over time is based on three factors: the size of the current trained and active EMT population, the rate of active EMTs leaving the population (i.e., retention vs. job turnover), and the rate of new EMTs joining this population (i.e., recruitment). The adequacy of the EMT workforce over time is determined by comparing the EMT population with the number of EMTs needed. Approximately 210,000 EMTs were employed in the United States in 2008, and this number is expected to grow to 229,700 by 2018 (BLS, 2010). However, it is difficult to accurately assess the total number of active EMTs in the United States. The United States currently has no centralized licensing body for EMTs, no organization that collects data on EMT program graduates, and no single source that collects information from or on all EMTs. This lack of detailed information on the current EMT population makes it difficult to project the adequacy of the EMT supply. The mix of volunteer versus employed EMTs further complicates this issue because tracking EMTs only on the basis of EMT employment status would miss a substantial proportion of this workforce. In addition, the lack of information quantifying the need or demand for EMT services (e.g., determining the appropriate level of EMTs per 100,000 U.S. population in different geographic areas) makes determination of shortages extremely difficult.

A number of recent studies have explored job turnover among EMTs. The rate of job turnover is greater among EMTs than that among many other health care professions. A 2008 survey of 1,008 EMTs in Montana found that 9% were considering leaving this profession in the next year and almost one quarter were considering leaving the profession in the next 5 years (Perkins, DeTienne, Fitzgerald, Hill, & Harwell, 2009). Further, those with the greatest experience were most likely to leave. The *Journal of Emergency Medical Services (JEMS)* 2008 salary and workplace survey found a similar attrition rate of 11% among full-time EMTs nationally (Williams, 2008).

A supplement to the 2007 Institute of Medicine report *Emergency Medical Services at the Crossroads* examined factors affecting job turnover among EMTs. EMTs often work under conditions of substantial emotional and psychological stress (McGinnis et al., 2006). EMTs frequently face physical dangers such as responding to unpredictable and uncontrolled situations with potential threats of violence or contraction of infectious diseases. Further compounding these issues are irregular working hours, low salaries (compared with other ancillary health care professionals, such as nurses), insufficient retirement benefits, and lack of a well-defined career ladder within this profession, leading EMTs to switch to other health professional positions to advance their careers (McGinnis et al., 2006).

Although little information is available on the number of new individuals who are training to become EMTs or factors influencing interest in becoming an EMT, data from a 2003 survey indicated that helping others by providing medical care is an important motivator for enrolling in EMT training (Patterson, Freeman, Moore, & Slifkin, 2007). Other factors important to individuals interested in becoming an EMT include desire for an exciting job, pay/benefits, and career opportunities. However, these other factors are more important among EMTs located in urban environments and are less likely to be expressed by rural EMTs—a finding that is consistent with the higher level of volunteer EMTs found in rural areas.

A further complication in assessing the adequacy of the EMT workforce, particularly in providing care during catastrophic events that may span multiple states, is variation in state-specific regulation of EMTs. Although physicians and many other health care providers have similarly defined scopes of practice (i.e., permitted medical care activities) among different states, both the levels of EMT training recognized and the scope of practice for EMTs of a given level vary across states (McGinnis et al., 2006).

Emergency Medicine Physicians

Since 1978, the American Board of Medical Specialties has recognized emergency medicine as a physician specialty. Emergency medicine physicians complete an emergency medicine residency program after medical school and are then certified in this specialty. However, particularly in more rural areas, primary care physicians (mainly internal medicine, family medicine, and pediatrics) without specific emergency medicine residency training may also staff EDs or urgent care centers. A review of 2008 data from the American Medical Association showed that 39,061 physicians in the United States had designated emergency medicine as a primary or secondary specialty. Of these, 22,314 (57%) were board certified in emergency medicine. An additional 12% (4,512 physicians) had completed an emergency medicine residency but were not certified in this specialty. Therefore, approximately one third had not completed emergency medicine residency training. Among the 39,061 physicians studied, the proportion with emergency medicine residency training was 58% in urban areas, 35% in large rural areas, and 21% in small rural areas (Ginde, Sullivan, & Camargo, 2009).

For more than a decade, reports have revealed shortages among emergency medicine physicians. In the mid-1990s, at least 22 states had fewer than five emergency medicine physicians per ED, the minimum ratio that allows 24-hour coverage (Holliman, Wuerz, & Hirshberg, 1997). On the basis of data from the mid-1990s, the demand for emergency medicine physicians was projected to continue to exceed the supply until 2020 if demand remained constant. However, assuming that demand for emergency medicine physicians increases, an adequate supply will not be available until after 2035 (Holliman, Wuerz, Chapman, & Hirshberg, 1997). More recently, data from the 2005 National Emergency Department Inventories-USA was used to estimate the number of ED visits per year, and information from the American Board of Medical Specialties was used to estimate the number

of emergency medicine physicians. Estimates from these data indicated that the supply of board-certified emergency medicine physicians was only 58% of the required full-time equivalents (FTEs) needed to staff all EDs in United States. By state, the supply of emergency medicine physician FTEs ranged from 10% of the number of FTEs that would be required to fully staff all EDs in South Dakota to 104% in Hawaii, which was the only state with an adequate supply of these professionals. Texas and Florida had the greatest shortages in terms of the absolute numbers of emergency medicine physician FTEs (Sullivan, Ginde, Espinola, & Camargo, 2009). Camargo et al. (2008) used similar data to project how long it would take to fully staff all U.S. EDs with emergency medicine physicians, assuming the number of medical school graduates completing emergency medicine residencies remained constant. The intermediate scenario projected that full staffing would not occur until 2038.

No information was identified on factors associated with medical school graduates' choice to enter emergency medicine. Although little information is available indicating why emergency medicine physicians leave clinical practice, a 2008 survey of ED medical directors found that 12% of ED physicians were expected to leave their current position within the next 5 years, with geographic location and better pay cited as the most common reasons (Counselman et al., 2009). Job satisfaction is also likely to influence emergency medicine physician retention and turnover. A survey of Canadian emergency physicians indicated that job satisfaction was most strongly influenced by institutional resources, including access to hospital technology and financial resources (Rondeau & Francescutti, 2005).

Further, beyond the current and projected (future) numbers of emergency medicine physicians, the adequacy of this workforce with respect to potential catastrophic events is influenced by the willingness of ED personnel to work during such events. In a survey of ED physicians, nurses, and support staff, almost all (98%) were willing to come to work after an airplane crash. In contrast, fewer were willing to work in response to events involving a radioactive bomb (85.3%) or a biological agent (54.0%). These results were consistent across occupational groups (Masterson, Steffen, Brin, Kordick, & Christos, 2009). Similar results were obtained in a survey of employees at nine hospitals across five states: 87% were willing to work after a fire/rescue/collapse mass casualty event, whereas only 58% were willing to work after a biological or chemical event (Cone & Cummings, 2006). A survey of 47 health care facilities in New York City indicated that 86% of workers were willing to report to work during mass casualty incidents versus 68% during chemical events, 57% during radiological events, and 48% during a SARS outbreak. Willingness was influenced most by fear and concern for family and self (Qureshi et al., 2005).

Synthesis

Limited information is available on the current and future adequacy of the EMT workforce although more data are available regarding the emergency medicine physician workforce than

for the emergency medical technician workforce. The available information from both groups indicates that neither workforce is adequate for current demands.

EMT shortages appear to reflect high turnover rates and retention difficulties due to difficult work conditions, limited career opportunities, low salary, and poor benefits. EMT shortages will likely be more pronounced in rural areas, which have greater dependence on both paid and volunteer EMTs.

Clear shortages exist among emergency medicine physicians in almost all states, and current predictions likely underestimate these shortages, because the predictions are based on staffing of hospital-based EDs only. Emergency medicine physician shortages will be even greater during radiological, biological, or chemical events, because many physicians are unwilling to work at those times.

More data are needed for both groups of emergency medical professionals, particularly on factors that influence recruitment and retention and on their availability to provide optimal emergency medical care services. Limited data will hinder the development of programs and policies designed to address shortages and to enhance the adequacy of emergency medical professionals in responding to catastrophic events.

Future Directions

More data are needed to develop programs and policies that will ensure adequate EMT and emergency medicine physician workforce capabilities for both standard and surge scenarios. For EMTs, better information is needed on the number, level of training, and location of volunteer and paid professionals to accurately assess shortages. For both EMTs and emergency medicine physicians, well-designed surveys that collect information from representative samples of workforce members (including volunteers and inactive individuals) and incorporate collaborations with key professional societies (to encourage responses) are needed to assess factors associated with career choices, job satisfaction, and retention/turnover, including factors affecting willingness to work during potential terrorist events and other high-demand conditions. Other data collection activities are also needed to determine projected staffing needs for both groups of emergency medical professionals during catastrophic events.

Workforce models (i.e., computer projections of workforce size and adequacy based on available current data and expected trends) are an important tool to predict workforce shortages. These models can be developed quickly and inexpensively, incorporate data from a broad range of sources, and project workforce adequacy under differing conditions (e.g., standard vs. surge events) and varying assumptions. As discussed in this research brief, models have been used to estimate the adequacy of the emergency medicine physician workforce (Sullivan et al., 2009). However, essentially no information is available on the adequacy of the EMT or emergency medicine physician workforces to provide appropriate

medical care during catastrophic events. Updated modeling is needed to assess the adequacy of the EMT and emergency medicine physician workforces to respond to mass casualty incidents and biological, chemical, or radiological attacks, both now and in the future. This type of modeling can identify predicted shortages in personnel and equipment at local, state, regional, and national levels and suggest steps to prevent such shortages. These models can also explore the impact of emergency medical professionals' reluctance to work during terrorist or infectious disease events and evaluate the effects of programs, such as preferential receipt of medical prophylaxis or treatment, to encourage emergency medical professionals to work during these events. Combined with representative survey data, models can be used to develop new policies that will enhance preparedness and resilience by addressing shortages among emergency medical care workforces.

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