

SPECIAL FOCUS

Medical Students' Participation in the 2009 Novel H1N1 Influenza Vaccination Administration: Policy Alternatives for Effective Student Utilization to Enhance Surge Capacity in Disasters

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ABSTRACT

As cases of 2009 novel H1N1 influenza became prevalent in Cincinnati, Ohio, Hamilton County Public Health called upon the University of Cincinnati College of Medicine to enhance its surge capacity in vaccination administration. Although the collaboration was well organized, it became evident that a system should exist for medical students' involvement in disaster response and recovery efforts in advance of a disaster. Therefore, 5 policy alternatives for effective utilization of medical students in disaster-response efforts have been examined: maintaining the status quo, enhancing the Medical Reserve Corps, creating medical school-based disaster-response units, using students within another selected disaster-response organization, or devising an entirely new plan for medical students' utilization. The intent of presenting these policy alternatives is to foster a policy dialogue around creating a more formalized approach for integrating medical students into disaster surge capacity-enhancement strategies. Using medical students to supplement the current and future workforce may help substantially in achieving goals related to workforce requirements. Discussions will be necessary to translate policy into practice.

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Key Words: medical student, surge capacity, 2009 H1N1 influenza, immunization, disaster workforce

As 1 of 8 vaccine and treatment evaluation units nationwide, Cincinnati Children's Hospital Medical Center participated in clinical trials to test experimental 2009 novel H1N1 influenza vaccinations.¹ Meanwhile, the University of Cincinnati moved to phase 3 of its pandemic influenza preparedness plan on August 24, 2009, after 2 on-campus cases of 2009 novel H1N1 influenza infection were confirmed (Dr J. Andrews and J. Corcoran, e-mail correspondence, August 2009). Phase 3, or the campus epidemic phase, focuses on medical treatment and isolation of affected university community members and maintenance of critical campus functions.

Beyond determining the safety and efficacy of the 2009 novel H1N1 influenza vaccine and amidst the initial diagnosis of 2009 novel H1N1 influenza infection at the University of Cincinnati, the question of who would administer the vaccine before the possibility of a 2009 novel H1N1 influenza resurgence remained unanswered. A total of 90 000 children in Hamilton County's public school system, which includes Cincinnati, were eligible to receive the vaccine (A.T.F., e-mail correspondence, August 2009) as recommended by the Centers for Disease Control and Prevention guidelines.² With sparse internal resources, Hamilton County Public Health sought to augment its limited immunization surge

capacity through potential utilization of the University of Cincinnati College of Medicine's (UCCOM) approximately 650 medical students. An introductory meeting was held on August 25, 2009, with the UCCOM senior associate dean for medical education, the director of nursing for Hamilton County Public Health, and a UCCOM medical student to discuss using the school's students to provide the 2009 novel H1N1 influenza vaccination (A.T.F., e-mail correspondence, August 2009).

The meeting attendees decided to focus on first- and second-year medical students for utilization in response efforts because of the clinical obligations and schedule inflexibility of most third- and fourth-year students. The possibility of student involvement was presented to the student body in early August, with more than 200 medical students providing their names and contact information to serve as student volunteers. Subsequently, UCCOM's Center for Competency Development and Assessment³ offered training on September 19, 2009, for 54 student volunteers who had yet to receive education on intramuscular injection administration. A total of 5 Center for Competency Development and Assessment staff members and 4 upperclass medical students volunteered as trainers for the 4-hour session in addition to 6 staff members from Hamilton County Public Health. Due to time constraints, the 1-day

training course was given without established curricular objectives or evaluation. In December 2009, Hamilton County and City of Cincinnati emergency response coordinators sent emails to UCCOM's student coordinator soliciting medical student participation in several immunization administration days held in various locations across Hamilton County.

Although the organization of this effort occurred without much difficulty, it was evident that a system should exist for medical student involvement before a disaster rather than organizing their participation while the disaster was occurring—in this example, 1 month before availability of the vaccine. Recent research has shown that medical students are willing to respond to disasters; however, the research concluded that despite their willingness, education and training in disaster medicine and public health preparedness in US medical schools is inadequate.⁴

Surge capacity, as defined by the Agency for Healthcare Research and Quality, is a "healthcare system's ability to expand quickly beyond normal services to meet an increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies."⁵ Strengthening medical surge and mass prophylaxis capabilities is one of the national priorities set forth by the Department of Homeland Security's 2007 *National Preparedness Guidelines*.⁶ Homeland Security Presidential Directive-21 states, "The United States has tremendous resources in both public and private sectors that could be used to prepare for and respond to a catastrophic health event. To exploit those resources fully, they must be organized in a rationally designed system that is incorporated into pre-event planning, deployed in a coordinated manner in response to an event, and guided by a constant and timely flow of relevant information during an event."⁷

The Association of American Medical Colleges has recommended that future physicians acquire the practical ability to interact with multidisciplinary teams of other health practitioners, public health officials, emergency services, law enforcement, and the media in preparing for disasters.⁸ In examining medical student involvement in 2009 novel H1N1 influenza vaccination administration and the current organizational design of public health preparedness and disaster response, the working group selected 5 options to explore for more effective utilization of medical students in public health preparedness and disaster response efforts: maintaining the status quo, further incorporating medical students into the Medical Reserve Corps (MRC), developing medical school units similar to the MRC, incorporating medical students into a different selected organization that focuses on disaster, or creating a new organizational structure for medical student utilization.

Maintaining the status quo would be the most financially feasible endeavor, but it may fall short of surge capacity needs. Although medical schools may have individual collaborative agreements with organizations involved in public health preparedness or may have planned other creative ways to involve their stu-

dents in disaster response, a review of the literature reveals a pronounced gap in published articles describing these endeavors. One article described the development of a disaster reserve partner group at the New York College of Osteopathic Medicine (NYCOM).⁹ NYCOM students were driven to know how to respond appropriately in the potential face of recurrence of the September 11, 2001, terrorist attacks. NYCOM established the disaster reserve partner group to assist the American Red Cross by providing additional staffing assets for the operation of American Red Cross shelters. The American Red Cross offered a 2-day training course and upon completion of the course, students received certification from the American Red Cross that was valid nationwide.⁹

Another example of medical student involvement in disasters occurred after Hurricane Ike caused \$24 billion in damage to the University of Texas Medical Branch (UTMB) in Galveston and the surrounding city. The Texas Medical Association's (TMA) Medical Student Section worked in collaboration with the TMA Foundation to establish the TMA UTMB Medical Student Relief Program.¹⁰ The TMA Medical Student Section also called upon the American Medical Association Medical Student Section and the American Medical Student Association. In total, the program raised approximately \$70 000 to assist many of the 1000 medical students from UTMB, several of whom had to secure alternate housing or childcare services because of hurricane damage.¹⁰ Despite these efforts at both local and state-based levels, in assessing the literature, the status quo appears to be a disjointed approach of using medical students to supplement efforts on a disaster-by-disaster basis.

A second policy option for incorporating medical students in disaster response involves increasing federal funding allocation to the MRC to allow it to partner with medical schools from across the nation and thus promote medical students' involvement in the organization. The MRC was created after President George W. Bush's 2002 State of the Union address in response to the realization that no organized structure existed to manage and direct medical and public health personnel to assist in emergency operations during the terrorist attacks of September 11, 2001. There are 867 MRC units and 193 117 volunteers participate in the organization.¹¹ President Obama's fiscal year 2010 budget for the Department of Health and Human Services requested \$15 million for the MRC.¹²

Approximately 95 000 medical students are enrolled in either allopathic or osteopathic medical schools in the United States.^{13,14} Therefore, increasing medical student involvement within such an organization has the potential to increase personnel by >50%. This influx, however, may strain the organization and stall current MRC training programs without proper organizational infrastructure, an adequate number of staff and leadership personnel, and sufficient financial backing to accommodate such increases. An issue with medical students volunteering for the MRC also arises when these students enter clerkships and may be called upon by both the MRC and the

medical school or its affiliated hospital. Participation in an MRC call may also lead to a disruption in their ability to meet the requirements of their educational program.

A third policy alternative would be to create medical school-based units themselves, similar in design to the MRC. Individual medical school units thus may be deployed in an additive and synergistic effort with the MRC. Either a medical school or its affiliated hospital may provide authority and direction. Some medical schools have already initiated MRC units on campus.⁴ Four medical schools (Thomas Jefferson University Medical College, University of Massachusetts Medical School, Yale School of Medicine, and University of Minnesota Medical School) are formally associated with MRC units and 3 other medical schools (University of New Mexico School of Medicine, University of Miami Miller School of Medicine, and Nova Southeastern University College of Osteopathic Medicine) are known to have collaborated with MRC units (D. Burks, e-mail correspondence, June 2010). This may allow for a more continuous, cohesive system and facilitate the seamless integration of efforts of the unit with the duties of medical students at their affiliated hospitals during their clinically based years; however, financially, a medical school-specific unit approach may be more costly than working within the already defined MRC system.

A fourth policy alternative may be to use students within another selected organization such as the American Red Cross. Since its founding in 1881, the American Red Cross has assisted in disaster relief efforts while playing an integral role in providing community services.¹⁵ After the 1918-1919 influenza pandemic, the Cincinnati, Ohio, health officer described in the *American Journal of Public Health* the city's recovery efforts organized collaboratively by the American Red Cross and the health department.¹⁶ Perhaps it would be worthwhile for an alternative emergency response organization with a slightly different purpose, such as the American Red Cross with its long-standing historical roots in disaster and its nongovernmental affiliation, to use medical students during a disaster.

A fifth option would be to devise an entirely new plan for medical student utilization. Such an approach may prove both time intensive and costly, but it would allow for creation and implementation of innovative ideas to enhance health care system surge capacity in disaster settings. As the level of medical education and training increases with each year of medical school, perhaps mobilizing these levels as hierarchical entities with increasing clinical expertise would prove beneficial. For example, perhaps first-year students with the least medical training would be best used by working hotlines. Then, as students become more clinically proficient, they may be best mobilized to perform more clinically relevant duties such as mass triage. This policy option would allow the exploration of many strategies to incorporate medical students into disaster efforts. One possibility would be to make disaster medicine a required element of medical schools' curricula to provide medical students

with disaster medicine-based training congruent with the respective stages of their medical education. For example, perhaps all first-year medical students could be required to learn how to give immunizations, with the stipulation that if community need arose as with the 2009 novel H1N1 influenza outbreak, students would need to participate in at least 1 community-based clinic. The issue then becomes whether it is legal and ethical to require student participation.

Another option for devising an entirely new plan for medical student utilization may be to involve medical student organizations such as the American Medical Association Medical Student Section and the American Medical Student Association. Involving these organizations may decrease the time needed to develop an organization anew; however, not all medical students are members of these organizations. Furthermore, using a national organization as a foundation to facilitate creation of a national disaster unit may contradict the current emphasis on focusing disaster management at the local level with secondary state- or federal-level involvement.¹⁷

These 5 policy alternatives for effective utilization of future physicians in public health preparedness and disaster response are only described in brief and are by no means an exhaustive list. Other options such as assigning medical students to National Guard units or emergency medical services may also prove favorable. The intent of their presentation in this format is to foster a critical and timely policy dialogue around creating a more formalized approach for integrating medical students into surge capacity enhancement strategies. The last 4 policy options would better define the role of a medical student in public health emergencies and allow for a more gradual transition when these medical students assume the roles of physicians in disaster efforts. Furthermore, proof of membership in an organization such as the MRC generally requires advance credentialing and licensing that helps to ensure the authenticity and quality of medical treatment and services provided.¹⁸ Previously identified problems in volunteerism during response and recovery efforts, such as liability and compensation for harm,¹⁸ will also exist for medical students, in addition to other possible issues such as responsibility for negligence and time apart from didactic education, and require careful consideration.

In a 2008 Institute of Medicine report, a recommendation for disaster-related research focused on creating and maintaining sustainable preparedness and response systems.¹⁹ Medical students are generally eager to learn and master skills to be adequately prepared for the consequences of a disaster and would not be involved merely for temporary enhancement of personnel. Rather, instilling a sense of duty at the beginning of one's medical career may prove more advantageous than waiting until a physician is more established; this may in turn assist in building a physician workforce that is rapid, flexible, scalable, sustainable, coordinated, and ethically appropriate to provide mass casualty care as called for by Homeland Security Presidential Directive-21.⁷

CONCLUSIONS

As described in the *Journal of the American Medical Association* in 1966, disaster medicine is "the art and science of patient care under circumstances of stress when the number of patients exceeds the normal capacities, 'a sudden concentration of casualties that overwhelms the existing medical facilities.'"²⁰ Involving medical students from UCCOM in the 2009 novel H1N1 influenza vaccination administration is one example of enhanced surge capacity and coordination between a public health agency and a medical school. Other health care professional schools across the country likely also had student participation in a similar capacity for the 2009 H1N1 influenza response. Ensuring that an infrastructure exists nationally for medical student involvement in public health preparedness and disaster response, which may be expanded to include all health care professional schools, may prove much more beneficial than individual approaches such as that in Cincinnati. Future discussions involving medical educators, practitioners, leaders of organizations involved in public health preparedness and disaster response, and government leaders will be necessary to translate policy into practice.

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