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Challenges and opportunities in pandemic influenza planning: lessons learned from recent infectious disease preparedness and response efforts

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Abstract. The impact of the next pandemic influenza is likely to be far greater, by orders of magnitude, than most bioterrorism (BT) scenarios. A written pandemic emergency plan and establishment of emergency management teams are critical to mounting a coordinated and effective response to what will be a catastrophic event. Members of these teams should include public health, medical, emergency response and public safety officials, organized at each local, state and federal level. The tragic events of September 11, 2001 and the subsequent anthrax attacks have substantially increased funding and support for bioterrorism planning in the United States. Thus, public health officials have an unprecedented opportunity to strengthen current systems' planning efforts by promoting dual use bioterrorism/pandemic influenza plans. Combining lessons learned from the 2001 terrorist incidents, recent preevent smallpox vaccine programs and the history of past influenza pandemics, more effective strategies can be developed. For example, enhanced influenza surveillance systems can provide data that will not only provide early identification of a novel influenza strain, but will provide more timely recognition of other outbreaks of infectious diseases, including public health threats that may initially present as an influenza-like illness (ILI). In recent years, we have witnessed emerging and reemerging infectious disease threats that have presented us with challenges similar to those posed by an influenza pandemic. Such events highlight the need for advance planning to ensure an optimal response to a health emergency that is certain to be unpredictable, complex, rapidly evolving and accompanied by considerable public alarm. While advance warning for a terrorist attack is unlikely, the warning already exists for a possible new influenza strain, as evidenced by the recent cases of H5N1 in Hong Kong and the rapid global spread of cases of Severe Acute Respiratory Syndrome. © 2004 Published by Elsevier B.V.

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Pandemic influenza, although not officially classified on the critical list of bioterrorist agents, will be considered catastrophic when detected. A bioterrorist attack cannot be predicted with any degree of accuracy but influenza virologists tell us that an influenza pandemic is inevitable and cannot be prevented. However, its timing is uncertain. Because

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influenza is transmitted readily from person to person, and because a novel influenza virus, by definition, is one to which the general population has little to no immunity, an influenza virus with pandemic potential has the potential to cause substantial morbidity, mortality, social disruption, and widespread panic.

Crosby's [1] book, "America's Forgotten Pandemic: Influenza 1918" notes that more Americans died of pandemic influenza than of war-related causalities throughout the entire history of this nation. Despite the extent of morbidity experienced, little attention was focused on this catastrophic health event.

In contrast, the tragic events of September 11, coupled with the use of *Bacillus anthracis* as a bioterrorist weapon of mass destruction, received considerable attention from the media, the public and the political leadership of this country. One of the greatest revelations in the aftermath of these unprecedented events was the realization that public health is a bona fide first responder.

In the current era of concern for bioterrorism (BT) disaster-type preparedness, the public health community needs to acknowledge the leadership position it has achieved through these recent events and to accept yet another challenge of thinking broadly and creatively to address the many needs posed by a catastrophic infectious disease disaster—be it an influenza pandemic, a bioterrorism event or an emerging/reemerging infectious disease threat that is yet to be identified. Planning for these events can no longer be postponed as advance planning and building of public health infrastructure can make a significant difference in our response.

National efforts to prepare for the next influenza pandemic require support and collaboration from multiple partners at the state, local and federal level. Establishing relationships with the medical community, law enforcement and public health agencies are not only critical in responding to a potential catastrophic event, but will enhance ongoing everyday work. The recent anthrax events demonstrated that public health's unfamiliarity with the emergency response system's incident command structure impeded investigative efforts. Cross-department planning will facilitate a more effective response to pandemic influenza, strengthen ties between public health and emergency response sectors and complement other planning efforts for not only pandemic influenza but for other emergencies including acts of terrorism. A written pandemic emergency plan and an established emergency management team, which includes public health, medical, emergency response and public safety officials, are needed to provide effective leadership, coordination and an effective response to the next influenza pandemic.

The planning and public health infrastructure needed to effectively address a bioterrorist event and an influenza pandemic overlap considerably. One such area of overlap is surveillance. Global and domestic laboratory and disease surveillance must be strengthened to increase the likelihood of early detection and tracking of pandemic influenza or a bioterrorist event. Improvements in state public health laboratory capacity through support of the Laboratory Response Network (LRN) has enhanced rapid testing for influenza. Because many potential bioterrorist agents initially cause symptoms that resemble an influenza-like illness (ILI), it is critical for every State to have rule-out influenza testing capabilities available on a year-round basis. Timely reporting of outbreaks and surveillance for influenza-like illness (ILI) are directly relevant to tracking the progression and intensity of influenza activity and may provide an early indication of a bioterrorist event.

Continued support for the Early Aberration Reporting System (E-ARS) and other innovative surveillance strategies will benefit the public during seasonal influenza epidemics, an influenza pandemic, and any other catastrophic disease event.

Another critical component of any catastrophic infectious disease plan and response is communication. A key lesson learned from the anthrax attacks was that the public demands up-to-date information on an ongoing basis throughout the emergency. Factual information presented by trusted public health officials can assist in minimizing fear and hysteria. Most health crises are similar to the recent anthrax attacks, where only a few cases are ultimately diagnosed, but the bulk of the populace seeks information on a rapidly unfolding scenario. Demand for factual information will only be heightened for a highly contagious disease entity such as pandemic influenza. Data generated as a result of a robust surveillance system can assist public health efforts in minimizing hysteria and preventing the dissemination of misinformation regarding the evolving pandemic: has the novel virus arrived; geographical areas of the country most severely affected; whether disease activity is increasing or decreasing and groups most severely affected.

Despite the many similarities between pandemic influenza and planning for other catastrophic infectious disease events, including an act of bioterrorism, critical differences do exist. Unlike the anthrax events of 2001 where there was no forewarning, surveillance should provide days to months of warning for a pandemic, while the pandemic itself will last for several months or years. There will be no “unaffected” areas, as the pandemic influenza virus will be present virtually simultaneously in all parts of the country. Mutual aid from either the federal government or other regions of the country will be unlikely, as all public health, medical and emergency resources will be dedicated to the disaster at hand locally. Support from the federal government will be limited in such a scenario; despite the fact, such assistance usually comes during other states of emergency. Resource deficiencies will exist for inpatient/outpatient medical services, biologic products, and key personnel. Absenteeism among essential first-line medical and emergency workers will impact services rendered, as no one will be immune to infections from the novel pandemic influenza virus. Vaccine will be the primary prevention tool, assuming that vaccine will be able to be developed in a timeframe that will be useful. Promoting adult immunization programs, including increasing the use of influenza and pneumococcal vaccine during interpandemic years will also strengthen the public health response.

The tragic events of September 11 and the subsequent anthrax attacks and other recent threats posed by Severe Acute Respiratory Syndrome and monkey pox have created considerable demand on the medical and public health communities nationwide. As a result, unprecedented resources for enhancing our public health preparedness and response infrastructure at all levels of government have been recently provided to all States by Congressional appropriations in the form of bioterrorism cooperative agreements administered by the Centers for Disease Control and Prevention (CDC). The request for proposals explicitly note that planning moneys may be used “. . . to upgrade state and local public health jurisdictions preparedness for and response to bioterrorism, other outbreaks of infectious disease, and other public health threats and emergencies. . .” [2]. Although these funds will be critical for strengthening this country’s preparedness and response to bioterrorism, there exists substantial overlap between the public health infrastructure

needed to address bioterrorism-related events and other potential public health threats including pandemic influenza. Hence, the current climate presents an opportune time to engage in pandemic preparedness planning.

Taking advantage of the current funding opportunities will not only optimize our response to such a catastrophe, but will help to limit the total burden of disease in terms of morbidity and mortality, economic loss and social disruption caused by an influenza pandemic. By reflecting upon the lessons learned from the 1918 influenza pandemic and recent emerging infectious disease catastrophic events, the public health and medical community can work together to develop an effective preparedness and response plan to strengthen our national readiness to respond to an influenza pandemic as well as to strengthen the health system on which the plan depends. The state and local guidelines developed by the state and federal working group [3] address the various essential components of an infectious disease catastrophic response: surveillance, communication, emergency preparedness, recommendations for distribution of limited biological products, and infection control/medical management.

Many lessons were learned through the events of September 11 and the aftermath of the attacks using anthrax through the postal service. Public health must assume a leadership position in planning effectively and utilizing newly generated resources to optimally prepare for the next public health catastrophe. Like the emerging diseases and recurring disease that have occurred over the past several years, we need to think of bioterrorism and the threat posed by influenza pandemic as an emerging and recurring threat, which will probably continue into the foreseeable future. Limiting our planning efforts narrowly focused on bioterrorism will be a lost opportunity.

In the highly interconnected and readily traversed ‘global village’ of our time, one nations’ problem soon becomes every nation’s problem. . . [4]

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