

PANDEMIC INFLUENZA

A GUIDE TO RECENT INSTITUTE OF MEDICINE STUDIES AND WORKSHOPS

In April 2009, a novel strain of H1N1 (Swine Origin [SO]) came to world attention as the cause of many illnesses and deaths in Mexico. Air travel contributed to the spread of H1N1 (SO). Cases now span the globe, and pandemic response plans are being activated to meet a threat to public health that is of uncertain magnitude and severity but is increasingly of pandemic potential. Although much has changed since the 1918 pandemic, the current outbreak rightly raises concern and prompts action.

In the past several years, the Institute of Medicine has gathered experts to consider major policy issues related to pandemic influenza and other infectious disease threats. The products of these activities include reports and workshop summaries that discuss many dimensions of pandemic planning and response. This overview highlights action and information that could be useful for near-term implementation in the following areas:

- Communication with and engagement of the public
- Use of masks and personal protective equipment
- Use of antiviral drugs and vaccines
- Outbreak mitigation (e.g., social distancing, school closures)
- Surveillance, research, and evaluation during a pandemic

Two overarching themes emerge from this body of work. First, pandemic response occurs in conditions of uncertainty due both to gaps in the science (e.g., lack of complete information about routes of transmission) and limited experience with certain interventions (such as closure of public places). Second, the rapidly evolving nature of pandemics requires public health officials to anticipate a need for midcourse corrections in response to emerging information.

PERTINENT IOM REPORTS

- [*Antivirals for Pandemic Influenza: Guidance on Developing a Distribution and Dispensing Program*](#) (2008)
- [*Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers*](#) (2008)
- [*Reusability of Facemasks During an Influenza Pandemic*](#) (2006)
- [*Modeling Community Containment for Pandemic Influenza*](#) (2006)
- [*Ethical and Legal Considerations in Mitigating Pandemic Disease*](#) (2007)
- [*The Threat of Pandemic Influenza: Are We Ready?*](#) (2004)
- [*Dispensing Medical Countermeasures for Public Health Emergencies*](#) (2008)

See page 5 for other related IOM reports.



COMMUNICATION WITH AND ENGAGEMENT OF THE PUBLIC

IOM reports and workshop summaries repeatedly underscore the need for clear, evidence-based communication that transparently conveys uncertainty and unknowns as well as what is known and the reasons for the interventions being implemented.

A report on *Modeling Community Containment* recommends that “communications regarding possible community interventions [such as requiring sick people to stay home from work, closing schools] for pandemic influenza that flow from the federal government to communities and from community leaders to the public not overstate the level of confidence or certainty in the effectiveness of these measures. The communications should also not overstate the role that modeling or historical analyses play in supporting these interventions.”¹

Participants at the workshop on *Ethical and Legal Considerations in Mitigating Pandemic Disease* acknowledged both ethical and practical imperatives not simply for communicating with but for engaging the public in responding to a pandemic, for example, by seeking their input on strategies that are being considered to limit disease spread.

The committee of experts that examined the use of personal protective equipment (such as gowns and masks) concluded that “[a]ny public health effort aimed at extending the usefulness of existing devices must be delivered with clarity and truthfulness. The public is likely to forgive lack of knowledge but will not be willing to trust public health officials in the next instance if they have in any way been misinformed or misled.”²

Several IOM reports emphasize the importance of paying attention (e.g., in the areas of communication and implementation of interventions) to the needs of vulnerable populations such as the elderly, the disabled, non-English speakers, and others in all aspects of mounting pandemic response.^{3,4} For example, public announcements in multiple languages and through the appropriate communication channels (foreign language radio, newspaper, etc.) would ensure that people receive essential information as quickly as possible.

USE OF MASKS AND OTHER PERSONAL PROTECTIVE EQUIPMENT

Three IOM reports make recommendations pertaining either to use of facemasks or other personal protective equipment in health care settings. All emphasize the vital importance of meeting the needs of the health care workers and other front-line personnel who provide care for others during an influenza pandemic.

Our incomplete understanding of how influenza viruses spread—whether primarily through droplets from coughs and sneezes, tiny particles carried through the air, or contact with contaminated surfaces—complicates planning for which protective equipment will be most effective and needed in an outbreak.

The committee that examined the evidence about reusing face masks finds avoiding contamination will allow for limited reuse.⁵ No simple manufacturing changes will make disposable N95 filtering face-piece respirators reusable; no method of decontaminating a disposable N95 respirator or a medical mask met the necessary criteria to enable reuse; and no simple modification would enable N95 respirators to properly fit every wearer’s face. The more costly reusable elastomeric respirators available on the market may be cleaned and reused by one or more wearers and are an alternative to N95 respirators. The committee finds insufficient data on the effectiveness of woven cloth masks used and washed for reuse in clinical settings in some regions of the world. The committee cautions that these or similar measures may confer a false sense of protection that may diminish attention to adequate hygiene, such as hand washing. People wearing protective face coverings should be no less vigilant about frequent hand washing, which health experts consider one the most important ways to stop the spread of disease.

An IOM report on personal protective equipment (e.g., respirators, gowns, gloves, face shields, and eye protection) for healthcare workers emphasized the need for health care employers to promote, provide

training, and enforce compliance with the consistent, proper use of protective equipment. However, the committee found that knowledge of how flu viruses spread is incomplete and a variety of strategies are needed to protect workers.

The IOM report *Antivirals for Pandemic Influenza* recommends that in order to efficiently allocate limited supplies of antiviral drugs, other measures, such as consistent and proper use of personal protective equipment, should be taken to minimize the need for long-term preventive use of antiviral drugs among health care and emergency responders.

USE OF ANTIVIRAL DRUGS AND VACCINES

There are two kinds of medical products that may be used in responding to an influenza pandemic: antiviral drugs (such as oseltamivir, or Tamiflu® and zanamivir, or Relenza®) can be used to treat more serious cases and to prevent infection, and vaccines (similar to the influenza vaccines used every flu season) may be used to prevent disease. In recent years, the Institute of Medicine held a major scientific symposium on pandemic influenza-related research, including vaccine research⁶, and was also a contributing organization to a national public engagement activity to discuss how limited supplies of vaccines should be prioritized.⁷

A vaccine that matches the pandemic strain of influenza would take as long as six months to produce, and antiviral drugs may serve as a bridge—treating serious cases and preventing disease in specific situations—until vaccines become available. Quantities of these drugs are finite, and influenza viruses have the capacity to develop resistance to them, so public officials and health care providers have to make careful decisions about their use in a pandemic

Two IOM reports, one assessing models of and evidence about community containment strategies and another providing guidance on the distribution of antiviral drugs conclude that use of these drugs during a pandemic will require monitoring of resistance and adjusting the strategy accordingly. The report on antiviral distribution also notes that existing U.S. stockpiles of antivirals are not sufficient for all potential uses (including short-term prophylaxis for those in contact with infected individuals, long-term prophylaxis for health care workers and others routinely exposed to the disease, and treatment of infected people). There should be surveillance of both drug safety and effectiveness. The authoring committee offers preliminary advice for prioritization of antiviral supplies to protect front-line health care and emergency response workers.⁸

OUTBREAK MITIGATION

Given that vaccines and drugs could be in short supply during a pandemic, non-pharmaceutical strategies to help reduce the spread of illness (e.g., avoiding crowded public places, quarantine, and enhanced hygiene such as more frequent handwashing) may play important roles. An IOM report on such community containment interventions cautions that injudicious use of these strategies can lead to “intervention fatigue” marked by a decrease in people’s willingness to comply with facility closures, quarantines, and other measures. It recommends that planners consider both potential public health benefit and negative effects (e.g., economic and social costs, ethical concerns) of each intervention. The report also recommends that “policy guidance stress that interventions cannot be implemented in isolation. Key accompaniments to the policy guidance include a communication plan, plans for when to trigger the interventions and when to rescind them, and plans to help mitigate the adverse consequences of implementing some of the policies.”⁹

The IOM Forum on Medical and Public Health Preparedness for Catastrophic Events held a workshop on *Dispensing Medical Countermeasures for Public Health Emergencies*.¹⁰ Although the workshop used anthrax as its case study, and despite obvious and considerable differences in the type of agent and event, many of the existing gaps and challenges associated with dispensing medical countermeasures in a pandemic are

similar. The workshop summary offers examples of strategies to provide medication rapidly to large numbers of people. Contributors to the workshop commented on the importance of public-private partnerships and integration of government efforts at all levels. Also, they discussed existing and innovative modalities to rapid dispensing of drugs, classified in three categories, two of which are most applicable to the use of antivirals for pandemic influenza: “pull” approaches that bring people to points of dispensing, and “push” approaches that employ the postal service or commercial parcel delivery services to deliver drugs to households or other locations.

The report **Antivirals for Pandemic Influenza** calls for the formation of a science-based advisory body to guide decision-making during a pandemic, including advising on all dimensions of antiviral dispensing, among other interventions.¹¹

SURVEILLANCE, RESEARCH, AND EVALUATION DURING A PANDEMIC

Surveillance—looking for and documenting cases of infection and paths of viral spread—is crucial during a pandemic. IOM’s *Modeling Community Containment* report calls for steps to boost our surveillance capacity and to link data to mathematical models that aid officials’ decision making to implement the most effective interventions.¹²

The report *DoD-GEIS¹³ Influenza Programs: Strengthening Global Surveillance and Response* offered recommendations for enhancing communication, coordination, funding, and other dimensions of the Defense Department’s programs and for strengthening the focus on public health activities and facilitating collaboration with relevant organizations in countries that host program sites. This and other IOM reports and workshop summaries with a global focus highlight the importance of global surveillance, global cooperation, high levels of scientific communication, and global capacity-building.¹⁴

One workshop summary from the *Forum on Microbial Threats¹⁵* suggests that conducting scientific (clinical, epidemiologic, and biological) research during a pandemic can help improve our knowledge as we respond to the pandemic, and can be valuable to preparing for future disease outbreaks. The IOM report on personal protective equipment needs of health care workers responding to an influenza pandemic recommends that the U.S. Department of Health and Human Services lead an international collaborative effort to “[d]evelop rigorous evidence-based research protocols and implementation plans for clinical studies during an influenza pandemic.”¹⁶ Similarly, the *Modeling Community Containment* report calls for development of a research agenda, and “a priority topic would be to answer fundamental questions about influenza virus transmission and epidemiology.”

Participants at a workshop on lessons learned from the SARS¹⁷ outbreak note that studying the comparative effectiveness of different interventions (e.g., containment efforts, communication strategies) would build an evidence base for responding to future pandemics.¹⁸

NOTES

¹ *Modeling Community Containment for Pandemic Influenza: A Letter Report* (2006)

² *Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers* (2008)
Reusability of Facemasks during an Influenza Pandemic: Facing the Flu (2006)

³ *Antivirals for Pandemic Influenza: Guidance on Developing a Distribution and Dispensing Program* (2008)

⁴ *Modeling Community Containment for Pandemic Influenza: A Letter Report* (2006)

⁵ Through placing a medical mask or cleanable faceshield over the respirator and appropriate storage and hand hygiene

⁶ John R. LaMontagne Symposium on Pandemic Influenza Research

⁷ [Citizen Voices on Pandemic Flu Choices A Report of the Public Engagement Pilot Project on Pandemic Influenza](#)

⁸ *Antivirals for Pandemic Influenza: Guidance on Developing a Distribution and Dispensing Program* (2008)

⁹ *Modeling Community Containment for Pandemic Influenza: A Letter Report* (2006)

¹⁰ *Dispensing Medical Countermeasures for Public Health Emergencies* (2008)

¹¹ *Antivirals for Pandemic Influenza: Guidance on Developing a Distribution and Dispensing Program* (2008)

¹² *Modeling Community Containment for Pandemic Influenza: A Letter Report* (2006)

¹³ DoD-GEIS is the Department of Defense-Global Emerging Infections Surveillance and Response System

¹⁴ For example, see the series of reports on pandemic influenza from the Forum on Microbial Threats

¹⁵ [Forum on Microbial Threats](#)

¹⁶ *Preparing for an Influenza Pandemic: Personal Protective Equipment for Healthcare Workers* (2008)

Reusability of Facemasks during an Influenza Pandemic: Facing the Flu (2006)

¹⁷ Severe Acute Respiratory Syndrome

¹⁸ *Learning from SARS: Preparing for the Next Disease Outbreak* (2004)

ADDITIONAL IOM REPORTS

- [Learning from SARS: Preparing for the Next Disease Outbreak](#) (2004)
- [Global Infectious Disease Surveillance and Detection](#) (2007)
- [Microbial Threats to Health: Emergence, Detection, and Response](#) (2005)
- [The Impact of Globalization on Infectious Disease Emergence and Control](#) (2006)
- [Vector-Borne Diseases: Understanding the Environmental, Human Health, and Ecological Connections](#) (2008)

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