

PANDEMIC INFLUENZA

A primer and resource guide for physicians
and other health professionals

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File navigation and disclaimer

File navigation

This resource guide contains an educational primer on pandemic influenza written by American Medical Association (AMA) staff in the Center for Public Health Preparedness and Disaster Response, as well as a collection of public domain files and Web sites culled from myriad Internet sources. It is designed as a convenient, user-friendly reference, utilizing the benefits of the Adobe® Acrobat® format to uniformly present documents that can be reviewed rapidly or printed quickly, saving hours of tedious online or library searching and downloading. Throughout the files on this disk, you will find underlined hyperlinks providing rapid navigation to key pandemic management and emergency response information. Unfortunately, user software limitations may prevent some of these links from working correctly. At the time this product was in production in May 2009, all of the links on the disk were tested and working properly. If you encounter problems reading files from the CD-ROM or have suggestions for changes or additions, please e-mail the AMA staff directly (disastercd@ama-assn.org). Your comments are appreciated as we consider future revisions of this and similar products.

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A primer on pandemic influenza

Introduction and overview

In recent months, global attention has been fixated on the emergence and spread of a potentially serious H1N1 influenza virus in Mexico and other countries. As a consequence of confirmed cases of H1N1 disease in California, Texas, Kansas and New York, on April 26, 2009, Charles E. Johnson, acting secretary of the U.S. Department of Health and Human Services (HHS), declared the existence of a national public health emergency, recognizing that the H1N1 virus had significant potential to affect national security. On April 29, 2009, the World Health Organization (WHO) raised the pandemic alert level to Phase 5, signaling that a pandemic was imminent and that expedient efforts needed to be taken to finalize the organization, communication and implementation of planned mitigation measures. The WHO has declared the flu outbreak a “public health emergency of international concern” under the International Health Regulations. As of May 26, 2009, a total of 6,764 probable and confirmed cases of H1N1 influenza have been reported in the United States (affecting 47 states and the District of Columbia), with 10 deaths. In addition, as of May 26, the WHO confirmed disease outbreaks in 46 countries (12,954 cases, 92 deaths). Experts from around the world are watching this situation closely and are preparing for the possibility of a global pandemic. At this point, it is too early to know how far the virus will spread, how many people will be infected, or how virulent it will become.

Recent attention also has been focused on the spread of avian or “bird” flu across eastern Asia and other countries. This disease, caused by an H5N1 influenza virus, can infect humans and has resulted in more than 100 deaths in several countries. To date, those humans who have been infected were poultry workers or others who had contact with sick birds or surfaces contaminated by such birds. Health experts are concerned that the virus could change to a form that is spread easily from person to person.

Even though these two particular influenza viruses may never cause a pandemic, most experts agree that a global influenza pandemic will occur this century. Experts also agree that the best action that individuals and communities can take now is to prepare for this eventuality.

Influenza pandemics have occurred at intervals of 10 to 60 years, with three in the twentieth century (1918, 1957–1958, and 1967–1968). A pandemic is a disease that has spread across a large region, such as an entire continent or even around the world, creating a serious public health emergency. A pandemic can start when three conditions are met:

- A new disease emerges to which a population has little or no immunity
- The disease is infectious for humans
- The disease spreads easily among humans

Pandemic flu is usually more serious than a typical seasonal flu. For an influenza pandemic to occur, the flu virus must undergo a major change that essentially results in a new form of the virus. This “new” virus will not be recognized by the immune systems of most people, leaving



them with little to no natural resistance or immune protection. The large pool of susceptible people allows the virus to spread broadly and rapidly, thus creating the potential for a serious public health emergency. Pandemic flu is different from seasonal flu because the virus has the potential to infect populations of different ages all over the world.

In a pandemic, large numbers of infected people and those who believe they may be infected will overwhelm community health systems. There simply will not be enough resources to take care of everyone who thinks they need emergency care. Resources such as respiratory care equipment (ventilators) and antiviral medications will need to be rationed according to publicly accepted protocols. Difficult decisions will need to be made regarding who gets these resources, including vaccines (if available).

An important secondary impact is the disruption that might occur in society. Impacts can range from school and business closings to the interruption of basic services such as public transportation and food delivery. Institutions, such as schools and workplaces, may close because a large proportion of students or employees are ill. Essential services may be limited because workers are absent. Travel between cities and countries may be sharply reduced, not only due to fewer staff personnel available to operate transportation systems, but because fewer people will want to or be able to travel. An especially severe influenza pandemic could lead to serious illness and increased death rates (even among young and healthy people), social disorder and economic loss. Everyday life would be disrupted because large numbers of people in many places would become seriously ill at the same time.

In 1918, an influenza pandemic killed about 675,000 people in the United States and between 20 to 50 million people around the world. In 2003, the outbreak of severe acute respiratory syndrome (SARS) caused economic losses and social disruption far beyond the affected countries and far out of proportion to the number of cases and deaths. While influenza is distinctly different from SARS, it can be anticipated that a pandemic would have a similarly disruptive effect on societies and economies.

Preparation and planning

Prevention is the foundation for the entire spectrum of pandemic preparedness activities, including surveillance, detection, containment and response. Prevention requires pre-pandemic commitment to:

- Development and exercising of pandemic influenza preparedness and response plans
- Investment in pharmaceutical research and development to ensure capacity to produce, deliver, and stockpile vaccines and antiviral drugs
- Expansion of domestic and global public health, medical, veterinary, and scientific capacity to track illness patterns and respond to an outbreak
- Education of populations in the United States and abroad about high-risk practices that increase the likelihood of virus transmission
- Development of mechanisms to rapidly recruit and deploy large numbers of public health, clinical, veterinary, and other health professionals within or across jurisdictions to meet



health-related needs

- Ongoing communication of expectations and responsibilities with stakeholders and the public

A critical element of pandemic planning is to ensure that people and entities not accustomed to responding to a health crisis understand the actions and priorities required to prepare for and respond to a pandemic. Those groups include political leadership at all levels of government, nonhealth government agencies and nonhealth members of the private sector. Essential planning also includes coordination of efforts between human and veterinary health authorities.

Medical and public health pandemic preparedness activities largely involve assessing capacities and capabilities for dealing with the expected surge in demand for supplies and resources. In combination with traditional public health measures, vaccines and antiviral drugs are the foundation of the national infection control strategy. Attention must be given to establishing production capacity and stockpiles in support of national containment and response strategies. Pandemic planning requires that health authorities assess possible control measures; antiviral drug and vaccine inventories; emergency mechanisms to increase drug and vaccine supplies; legal and liability issues for mass prophylaxis; and research, development and production capacities for new antiviral drugs and vaccines.

State and local preparedness plans should contain clear guidelines on setting priorities for the use of scarce resources such as vaccines, drugs, ventilators and hospital beds. To avoid overwhelming hospitals, community pandemic plans must provide for the establishment of alternate care facilities (such as schools) to treat sick and exposed persons. Community plans also must address the great need for local volunteers to work in these facilities as most health care personnel will remain in hospitals treating critically ill patients.

Antiviral agents will be very important, particularly to limit spread in the early phases of a pandemic. Consideration must be given to the widespread use of antiviral drugs, which could cause drug-resistant strains to emerge and circulate, and thus limit drug effectiveness. Vaccines will be needed to provide long-term immunity. Each state and local community should have drug and vaccine distribution plans guided by federal recommendations. These plans should address:

- Antiviral stocks to treat patients in hospitals, clinics, nursing homes, alternate care facilities and other locations
- Antiviral stocks for post-exposure prophylaxis (e.g., for direct contacts of infected patients)
- Antiviral stocks for use in pre- and post-exposure prophylaxis (e.g., if recommended for health care workers, public safety workers and others)

Pandemic plans need to be specific, practical and have been practiced in tabletop and field exercises. State and local health authorities should review pandemic preparedness plans continually, including capacities and capabilities for disease surveillance, laboratory testing and communication. This includes efforts to ensure:



- Clear, effective and coordinated risk communication, domestically and globally, before and during a pandemic. Credible spokespersons should be identified at all levels of government to effectively coordinate and communicate helpful, informative messages in a timely manner
- Guidance to the private sector and critical infrastructure entities on their role(s) in the pandemic response, and considerations of what is necessary to maintain essential services and operations despite significant and sustained worker absenteeism
- Guidance to individuals on infection control behaviors that should be adopted pre-pandemic, and the specific actions they will need to take during a severe influenza season or pandemic, such as self-isolation and protection of others if they themselves are exposed or infected
- Guidance and support to poultry, swine and related industries on their role in responding to a pandemic, including ensuring the protection of animal workers and initiating or strengthening public education campaigns to minimize the risk of infection from animals and animal products

Surveillance and detection

Assessment of the rate of spread and outcome of a pandemic flu virus depends on effective and efficient public health surveillance systems. Physicians and other health professionals play an essential role in the detection of initial cases of seasonal flu as well as novel influenza viruses. If implemented early, identification and isolation of cases may help slow the spread of this communicable disease within a community.

Clinical awareness of the disease can also benefit individual patients, as rapid diagnosis and initiation of treatment can avert potentially severe complications. For influenza, detection may be complicated, however, by the lack of specific clinical findings and commercially available laboratory tests that can rapidly distinguish novel or pandemic influenza from seasonal influenza. In addition, neither the clinical characteristics of a novel or pandemic influenza virus strain nor the groups at highest risk for complications can necessarily be defined beforehand.

In a pandemic, physicians will continue to provide essential medical services. This includes identifying and triaging cases, beginning an efficient and comprehensive diagnostic workup, initiating specific treatment and other supportive therapy, and anticipating clinical complications. In addition, they have an important role in working with public health authorities to help promote community and individual measures to prevent or control the spread of the disease.

Early warning of a pandemic and the ability to closely track the spread of an influenza outbreak is critical to being able to rapidly employ resources to contain the spread of the virus. Effective surveillance and detection systems will help save lives by allowing states and localities to activate response plans before the arrival of a pandemic virus in their vicinity. To support the need for “situational awareness,” both domestically and globally, efforts should be directed at:



- Working through global, federal, state and local health authorities to ensure transparency, scientific cooperation and rapid reporting of human influenza cases
- Providing adequate and effective risk communication to the public
- Supporting the development of proper scientific and epidemiologic expertise in affected regions to ensure early recognition of changes in outbreak patterns and trends
- Supporting the development and sustainability of sufficient U.S. and host nation laboratory capacity and diagnostic reagents, in affected regions and domestically, to provide rapid confirmation of flu cases
- Advancing mechanisms for “real-time” clinical surveillance in domestic acute care settings such as emergency departments, intensive care units and laboratories to provide local, state, federal and global health officials with continuous awareness of the profile of the illness in communities
- Developing and deploying rapid diagnostics with greater sensitivity and reproducibility to allow onsite diagnosis of pandemic strains of influenza at home and abroad, in animals and in humans, to facilitate early warning, outbreak control and targeting of antiviral therapy
- Expanding domestic livestock and wildlife surveillance activities for screening and monitoring animals that may harbor viruses with pandemic potential

Surveillance includes documentation of patients by virologic testing who are hospitalized with pneumonia, acute respiratory distress syndrome or other respiratory illness with no alternative diagnosis. Physicians will be notified to ask all patients with fever and upper respiratory tract symptoms about recent travel history, as well as maintain close surveillance for suspicious cases of this disease. Novel influenza viruses can be confirmed by reverse transcriptase polymerase chain reaction (RT-PCR) or virus isolation from tissue cell culture with subtyping. RT-PCR testing of novel influenza viruses is not performed by most hospital laboratories and is available at state public health laboratories and the Centers for Disease Control and Prevention (CDC). Viral culture of specimens from suspected novel influenza cases should be attempted only in laboratories that meet the biocontainment conditions for biosafety level 3 with enhancements or higher.

Containment

The initial response to the emergence of a novel influenza virus that spreads among humans will focus on containing the virus at its source, if feasible, and preventing a pandemic. Once the virus spreads beyond the initial source of the outbreak, the focus of containment activities will be on individual- and population-based measures that can help slow viral transmission. Containment refers to the WHO plan to define and contain the outbreak in specific geographic regions. This is an aggressive, proactive plan to isolate individuals and communities that are infected with the virus to help prevent further transmission.

A pandemic virus does not respect geographic or political borders. Efforts to limit entry to and egress from affected areas represent opportunities to control, or at least slow, the spread of infection. Today, extensive international and domestic travel and the interdependence between countries and communities make it unlikely that strict movement restrictions could be imposed



effectively. Even if not fully successful, containment decisions can help slow the spread of the virus, allowing additional time for implementation of other control measures.

In a pandemic, the WHO will work closely with the CDC and health authorities from other countries to monitor the situation and take necessary action to limit the spread of the virus. Federal, state and local health authorities will monitor the situation closely in the United States and provide instructions for health professionals, citizens and communities. Federal authorities will work with state and local health officials to encourage and assist communities, businesses and organizations in preparing for a pandemic. Containment strategies aimed at controlling and slowing the spread of the virus might include measures that affect individuals (e.g., isolation and monitoring of contacts) as well as measures that affect groups or entire communities (e.g., cancellation of public gatherings; implementation of community-wide “snow days”). Evacuations will most likely have no meaningful effect on the spread of disease, and probably will be counter-productive (i.e., they will merely move a group of people likely to require services and health care to another site that is already overburdened or soon to be overburdened).

Guided by epidemiologic data, state and local public health authorities will implement the most appropriate measures to maximize impact on disease transmission and minimize impact on individual freedom of movement. Federal health officials will provide assistance to states and localities as requested, including sharing the experiences of others and providing advice on decision-making as the situation evolves. Although states and localities have primary responsibility for public health matters within their borders, including isolation and quarantine, under the authority of Section 361 of the Public Health Service Act (42 USC 264), the HHS secretary may make and enforce regulations necessary to prevent the introduction, transmission or spread of communicable diseases from foreign countries into the United States or from one state or possession into another.

Containment measures applied to individuals (e.g., isolation and quarantine) may have limited impact in preventing the transmission of pandemic influenza due to the short incubation period of the virus, the ability of persons with asymptomatic infection to transmit the disease, and the possibility that early symptoms among persons infected with a novel influenza strain may be nonspecific, delaying recognition and implementation of containment. Nevertheless, with a less efficiently transmitted virus, these measures may have great effectiveness, slowing disease spread, allowing time for targeted use of clinical interventions, and increasing time for vaccine production and implementation of other pandemic response activities. With widespread disease transmission, individual quarantine is less likely to have an impact and probably would not be feasible to implement. Community-based containment measures, such as closing schools or restricting public gatherings, and emphasizing what individuals can do to reduce their risk of infection (e.g., hand hygiene, cough etiquette) would be health priorities.

The most effective means to protect the U.S. population is to prevent the pandemic from reaching this country, as well as by slowing or limiting the spread of the outbreak once it infects the population. Containment strategies will be developed to:



- Encourage all levels of government, domestically and globally, to take appropriate and lawful action to contain an outbreak within the borders of their community, province, state or nation
- Where appropriate, use governmental authorities to limit non-essential movement of people, goods and services into and out of areas where an outbreak occurs. This includes the development of screening and monitoring mechanisms and agreements to appropriately control travel and shipping from affected regions if necessary to protect unaffected populations
- Provide guidance to all levels of government on the range of options for infection control and containment, including those circumstances where social distancing measures, limitations on gatherings or quarantine authority may be an appropriate public health intervention
- Emphasize the roles and responsibilities of the individual in preventing the spread of an outbreak and the risk to others if infection control practices are not followed
- Provide guidance for states, localities and industry on best practices to prevent the spread of the pandemic virus in commercial, domestic and wild animals
- Rapidly share information on travelers who may be carrying or may have been exposed to a pandemic strain of influenza for the purposes of contact tracing and outbreak investigation
- Implement mechanisms for active and passive surveillance during the outbreak, both within and beyond government borders

Coordinated communication and information-sharing

Once health authorities have determined that sustained and efficient human-to-human spread of a pandemic virus has occurred, a cascade of response mechanisms will be initiated, from the site of the documented transmission to locations around the globe. At this point, health agencies and health care facilities should be well beyond the planning stage and would ideally have implemented or at least initiated many of the components of their pandemic influenza plans. Controlling a pandemic requires coordination among global, federal, state and local authorities, and all of these authorities will be communicating with the public. Public health officials will provide specific information to the health care community on identifying influenza cases. It is important to listen to trusted sources. Knowing the facts is the best preparation. If a pandemic occurs, having accurate and reliable information is critical. People need to be sure that their families, friends and neighbors stay informed.

A virus with pandemic potential represents a risk to populations everywhere. Success in controlling the outbreak depends on the availability of scarce resources and how well these resources are distributed. Timely, effective public information communication will be important. During the pandemic alert period, the CDC will issue case definitions for human infections. Once these definitions have been developed, state and local health departments will be notified via the CDC Health Alert Network. Federal, state and local health authorities also will consider implementation of containment strategies in coordination with CDC quarantine stations at U.S. entry ports.



For the 2009 H1N1 flu outbreak, the CDC is making announcements to advise health professionals and the public on the best course of action using television, radio, print and the Internet. People are being asked to stay tuned to local and national radio, watch news reports on television, and read newspapers and other sources of printed information. Local TV news and radio stations are broadcasting information daily about measures that have been put in place to try to control the spread of the disease, such as the closing of schools, sporting events and other public gatherings. Health messages stress the importance of prevention and personal hygiene as the most basic and most important way to prevent the spread of the virus. This includes frequent hand washing and proper cough etiquette (i.e., covering the mouth and nose with a tissue when coughing or sneezing), avoiding close contact with sick people and the appropriate use of personal protective equipment such as masks. Local health authorities are working with clinicians and community leaders to develop alternative health care sites, dedicated community hot lines and information systems. Persons who are ill or have been exposed to someone who is ill may be advised to call the hot line for information about the disease and treatment options.

Travel restrictions

In a pandemic or other serious public health emergency, public health officials have authority to implement various measures to control the spread of the disease. This includes issuance of travel advisories, imposing border restrictions and restricting domestic and global travel. Restrictions on international travel might be considered necessary, particularly travel by air. Limiting or canceling travel of U.S. residents and others from affected countries will depend on the properties of the pandemic virus that emerges and will be informed by the facts at the time. Voluntary limitations on travel, as individuals decide to limit their own personal risk by canceling nonessential trips, also will limit disease spread.

Once a pandemic is underway, exit screening of travelers from affected areas (“source control”) is likely to be more efficient than entry screening to identify ill travelers. Early in a pandemic, this intervention may decrease disease introductions into the United States. Later, however, as the pandemic spreads within the United States, ongoing indigenous transmission will likely exceed new introductions and, therefore, federal authorities might modify or discontinue this strategy. Because some persons infected with the pandemic virus will be in the incubation period, be shedding virus asymptotically, or have mild symptoms, it will not be possible to identify and isolate all arriving infected or ill passengers and quarantine their fellow passengers. If a sick passenger is identified after leaving an airport, it might not be possible to identify all people that the person may have contacted within the incubation period of the virus. If the pandemic begins in or spreads to the United States, health authorities will consider screening outbound travelers to decrease the risk of transmitting the disease to other countries. State and local health officials also may implement travel-related measures to slow disease spread within the United States.



Social distancing

To prepare for a pandemic, one key public health message should be learned by everyone: “Limiting social contact helps save lives.”

The pandemic influenza virus only spreads through human-to-human contact. To prevent infection, public health authorities will require communities to follow “social distancing” rules. Being around others who may be sick increases the likelihood of getting the disease. Until a vaccine is available, limiting contact among people will be the main strategy for helping to contain the disease and to prevent others from getting sick. Experience with past flu pandemics has shown that limiting contact among people during the outbreak can help slow the spread of the virus and save lives.

Social distancing is an important disease prevention strategy, in which a community imposes limitations on social (face-to-face) interactions to reduce exposure to and transmission of the virus. These limitations could include, but are not restricted to, facility closures, cancellation of public gatherings and shutting down mass transportation. Parents and caregivers need to prepare for the closing of schools (including public and private schools, as well as colleges and universities) and childcare programs and the canceling of school-based activities. Employers and employees need to plan for possible changes in work schedules and business operations to limit social interaction to the greatest extent possible without disrupting essential services.

In a flu pandemic, most sick people will be asked to stay home and will be given instructions for how to take care of themselves. By staying home, they will be less likely to expose others to the disease. Sick persons will be advised to avoid going to the hospital unless they have severe respiratory problems or other serious symptoms as defined by health authorities. During the pandemic, hospitals may only have room to treat the sickest patients and those who have special medical needs. Family members also may be asked to stay home if a person in the household is sick. Infected family members could spread the virus to others.

Mass prophylaxis and care

In a pandemic, there is a real likelihood that health care systems, particularly hospitals, will be overwhelmed. The only method to mitigate such an impact is to have plans in place that effectively allocate scarce hospital-based resources among incoming patients. This will require incoming patients to be triaged according to need, availability of resources and expected outcomes caused by allocating given resources to a particular patient. Hospital staff and patients may have to accept a different standard of care during an influenza pandemic. For example, sick people may be asked to stay home or be treated at an alternate care facility; nurse-to-bed ratios may be decreased, meaning that each nurse will be responsible for more occupied beds.

Patients might not receive all indicated treatment, such as mechanical ventilation, that they and their physicians would normally expect. In a pandemic, physicians and other health professionals will likely need to shift their usual practice of devoting much attention to the most critically ill to: (a) helping those who are most likely to survive with the scarcity of resources available and (b) preventing others from being infected. This shift in medical decision-making will come from a central public health authority and will be implemented in all health facilities and hospital systems.



Public health authorities are responsible for developing community strategies for the care of sick, exposed and deceased persons. This includes:

- Issuing guidance for the diagnosis, care and reporting of sick persons. Health officials will provide guidelines for the distribution of scarce medical resources to those who need them most, and for the isolation and treatment of all persons with confirmed or probable pandemic influenza. Isolation of sick persons may occur in the home or health care setting, depending on the severity of the person's illness and/or the current capacity of the health care system to provide such care. Consideration will be given to providing sufficient quantities of effective medications, as appropriate, and ensuring that there is a feasible way of distributing these medications to homebound persons.
- Distributing medications to large numbers of the population, including determining the locations of mass vaccination and treatment clinics and how to staff such clinics. A basic part of pandemic planning is the need to establish dispensing sites for distributing antibiotics or providing vaccinations in various community settings. The number of sites should be scalable depending upon the anticipated need. While planning includes identifying and training site volunteers and staff prior to an event, there should also be refresher and "just-in-time" training available before administering prophylaxis to the public. There are roles for both medical and non-medical volunteers.
- Coordinating efforts to manage potentially large numbers of persons who die from the disease.

Early in the pandemic, a vaccine will probably not be available for the new influenza virus. While current seasonal flu vaccines may provide limited or no protection, people will still be advised to get immunized to protect them from other circulating flu viruses. Prescribed medications such as antivirals may be effective but there will certainly not be enough for everyone who wants a prescription. Public health officials will work to develop a national stockpile of antiviral drugs to help treat and control the spread of the disease and support the production and testing of possible vaccines, including finding more reliable and quicker ways to make large quantities of vaccines.

Health care professionals will need to maintain close contact with public health authorities to ensure proper treatment of confirmed ill patients, in accordance with established CDC guidelines. Hospital beds and mechanical ventilators will be necessary for many and likely will be in short supply. Patients who are not critically ill will require rest and recuperation. At-home care and over-the-counter medications may be helpful for some. A large number of fatalities may occur, requiring mortuary and burial services. These services may become over-extended, causing delays in funerals, which will increase the distress of bereaved families.

According to the HHS *Pandemic Influenza Plan*, when a patient meets both the clinical and epidemiologic criteria for a suspected case of novel influenza A, health care personnel should initiate the following activities:

- Implement infection control precautions, including respiratory hygiene/cough etiquette. Patients should be placed on droplet precautions for a minimum of 14 days, unless there is full resolution of illness or another etiology has been identified before that period has



elapsed. Health care personnel should wear surgical or procedure masks upon entering a patient's room, as per droplet precautions, as well as gloves and gowns, when indicated for standard precautions. Patients should be admitted to a single-patient room, and patient movement and transport within the hospital should be limited to medically necessary purposes.

- Notify the local and state health departments. Report each patient who meets the clinical and epidemiologic criteria for a suspected case of novel influenza to the state or local health department as quickly as possible to facilitate initiation of public health measures. Designate one person as a point of contact to update public health authorities on the patient's clinical status.
- Obtain clinical specimens for novel influenza A virus testing and notify the local and state health departments to arrange testing. Testing will likely be directed by public health authorities. Optimal specimens for detecting novel influenza virus infection may include nasopharyngeal swabs; nasal swabs, washes, or aspirates; throat swabs; and tracheal aspirates (for intubated patients). Acute (within seven days of illness onset) and convalescent serum specimens (two to three weeks after the acute specimen and at least three weeks after illness onset) should be obtained. Serological testing for novel influenza virus infection can be performed only at the CDC.
- Evaluate alternative diagnoses. An alternative diagnosis should be based only on laboratory tests with high positive-predictive value (e.g., blood culture, viral culture, pleural fluid culture, transthoracic aspirate culture). If an alternate etiology is identified, the possibility of co-infection with a novel influenza virus may still be considered if there is a strong epidemiologic link to exposure to novel influenza.
- Decide on inpatient or outpatient management. The decision to hospitalize a patient with suspected novel influenza will be based on the physician's clinical assessment and assessment of risk and whether adequate precautions can be taken at home to prevent the potential spread of infection. Patients cared for at home should be separated from other household members as much as possible. All household members should carefully follow recommendations for hand and cough hygiene, and tissues used by the ill patient should be placed in a bag and disposed with other household waste. Although no studies have assessed the use of masks at home to decrease the spread of infection, use of surgical or procedure masks by the patient and/or caregiver during interactions may be of benefit. Separation of eating utensils for use by a patient with influenza is not necessary, as long as they are washed with warm water and soap.
- Initiate antiviral treatment as soon as possible, even if laboratory results are not yet available. Clinical trials have shown that antiviral drugs can decrease the illness due to seasonal influenza duration by several days when they are initiated within 48 hours of illness onset. The clinical effectiveness of antiviral drugs for treatment of novel influenza may be unknown, but it is likely that the earlier treatment is initiated, the greater the benefit. During the pandemic alert period, available virus isolates from any case of novel influenza will be tested for resistance to currently licensed antiviral medications.
- Assist public health officials with identification of potentially exposed contacts. After consulting with state and local public health officials, clinicians might be asked to help identify persons exposed to the suspected novel influenza case-patient (particularly health



care workers). In general, persons in close contact with the case-patient at any time beginning one day before the onset of illness are considered at risk. Close contacts might include household and social contacts, family members, workplace or school contacts, travelers and/or health care professionals.



Critical pandemic preparedness steps for physicians and other health professionals

- Be knowledgeable of pandemic preparedness and response plans for your institution and community. Routinely review existing in-house emergency plans, policies and procedures.
- Work with local fire, police, emergency medical services, emergency management and public health agencies to coordinate pandemic response planning. Learn how your facility is integrated into community pandemic plans—know what is expected of you.
- Learn the incident command structure for your facility and community; know how to become involved, particularly when responding as a volunteer.
- Routinely participate in disaster drills and exercises to test pandemic plans; practice flexibility.
- Participate in continuing education and training programs to enhance your knowledge, competency and willingness to respond to an emergency or mass illness situation.
- Know the person in charge of pandemic planning at your facility and in the community (if these positions do not exist, advocate for such appointment).
- Learn your facility's emergency communications plan; identify the point person for working with the media.
- Know your roles and responsibilities in a pandemic response situation—and stay within them.
- Know how to contact local and state health and law enforcement agencies.
- Ensure inclusion of mental health support for affected individuals, families and responders.
- Ensure that pandemic preparedness and response plans address the unique health care needs of children and other vulnerable populations, particularly those with special health requirements.
- Enhance hospital preparedness by developing standard operating procedures for the management and treatment of infected and exposed persons.
- Maintain reference materials and create “quick reference guides” and algorithms to facilitate the emergency triage and treatment of all people that arrive at a medical facility during the pandemic. Training tools should be developed to facilitate the recognition and quick reaction of emergency personnel in assessing sick persons brought to the facility.
- For each medical facility, designate resource physicians who will ensure that other health care professionals designated to treat infected patients know how to use available “quick reference guides,” algorithms and treatment protocols.
- Know the requirements for laboratory support and confirmation.
- Equip emergency medical services personnel and response vehicles with pediatric-specific equipment and medications.
- Be aware of available professional and public resources and how to access them immediately and in various ways.



- Be aware of mechanisms for disseminating timely and accurate information to hospital employees, their families, and the public (e.g., one-button broadcast distribution lists, redundant communication plans).
- Ensure effective security systems (e.g., badge systems) that allow access to your site for key response personnel.



Resource guide

Federal resources

Administration on Aging

Pandemic Influenza and Diseases

Agency for Healthcare Research and Quality

Tools and Resources for Influenza Preparedness

Centers for Disease Control and Prevention

Stay informed of CDC emergency response actions and activities by joining the Clinician Outreach and Communication Activity listserv to receive regular updates. To do so, visit <http://emergency.cdc.gov/clinregistry/> or email coca@cdc.gov

Avian Influenza

Biosafety in Microbiological and Biomedical Laboratories, 5th Edition, 2007.

Crisis and Emergency Risk Communication: Pandemic Influenza

Directory of State Health Departments

Ethical Guidelines in Pandemic Influenza

Flu Images

- CDC Flickr site
- CDC Public Health Image Library

Flu Surge Software

Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007

H1N1 Flu

- Interim Guidance for Clinicians and Public Health Professionals
- Key Facts about H1N1 Influenza
- Reports and Publications

Pandemic Influenza Storybook

Seasonal Flu

Strategic National Stockpile



Federal Emergency Management Agency

Developing and Maintaining State, Territorial, Tribal, and Local Government Plans
(Comprehensive Preparedness Guide 101; March 2009)

Emergency Assistance for Human Influenza Pandemic

Food and Drug Administration

Flu Information

H1N1 Flu Virus

Medical Devices for Flu Diagnosis and Protection

Personal Protective Equipment and Influenza Outbreaks, including Bird Flu (Avian Influenza)

National Center for Biotechnology Information

Influenza Virus Resource: H1N1 (Swine) Flu 2009 Outbreak

National Highway Traffic Safety Administration

EMS.gov

National Institute of Allergy and Infectious Diseases

Influenza

National Institute for Occupational Safety and Health

Occupational Health Issues Associated with H1N1 Influenza Virus (Swine Flu)

National Library of Medicine

Bird Flu – Medline Plus

H1N1 Flu – MedlinePlus

H1N1 Influenza

Occupational Safety and Health Administration

Safety and Health Topics in Pandemic Influenza

U.S. Agency for International Development

Avian and Pandemic Influenza: Preparedness and Response

U.S. Customs and Border Protection



U.S. Department of Agriculture

U.S. Department of Defense

Department of Defense Implementation Plan for Pandemic Influenza (August 2006)

Pandemic Influenza Watchboard

Pandemic Influenza: Clinical and Public Health Guidelines for the Military Health System (May 2007)

U.S. Department of Health and Human Services

HHS Pandemic Influenza Plan

National Vaccine Program Office

U.S. Department of Homeland Security

Ready.gov Campaign

H1N1 (Swine) Influenza

U.S. Department of State

U.S. Government Accountability Office

Topic Collection: Influenza

U.S. Government Pandemic Flu Site

Checklist for Faith-based and Community Organizations

Checklist for Individuals and Families

Federal Response Stages

Health Care Planning

National Strategy for Pandemic Influenza (Homeland Security Council; November 2005)

Planning Guide for Individuals and Families

State-by-State Pandemic Planning and Status

Use of Pneumococcal Vaccines for Influenza Pandemic Preparedness



Global resources

Pan American Health Organization

United Nations

World Association for Disaster and Emergency Medicine

World Health Organization

Avian Influenza

Confirmed Influenza A (H1N1) Case Count

Influenza A (H1N1 Influenza)

Pandemic Alert Phase





Pandemic Influenza Preparedness and Response (WHO Guidance Document)

AMA resources

H1N1 (Swine) Flu Web site

Center for Public Health Preparedness and Disaster Response

Disaster Medicine and Public Health Preparedness Journal

- Gebbie KM, Peterson CA, Subbarao I, White KM. Adapting standards of care under extreme conditions. *Disaster Med Public Health Preparedness*. 2009.  (280KB)
- Powell T, Christ KC, Birkhead GS. Allocation of ventilators in a public health disaster. *Disaster Med Public Health Preparedness*. 2008;2:20-26.  (268KB)
- Burkle Jr. FM, Hsu EB, Loehr M, Christian MD, Markenson D, Rubinson L, Archer FL. Definition and functions of health unified command and emergency operations centers for large-scale bioevent disasters within the existing ICS. *Disaster Med Public Health Preparedness*. 2007;1:135-141.  (312KB)
- Bostick NA, Subbarao I, Burkle Jr. FM, Hsu EB, Armstrong JH, James JJ. Disaster triage systems for large-scale catastrophic events. *Disaster Med Public Health Preparedness*. 2008;2(suppl 1):S35-S39.  (204KB)



Group on Medical Ethics

Ethics and public health preparedness Web site

From the Council on Ethical and Judicial Affairs

- The Use of Quarantine and Isolation as Public Health Interventions (E-2.25).  (380KB)

Also see: Bostick NA, Levine MA, Sade RM. Ethical obligations of physicians participating in public health quarantine and isolation measures. *Public Health Reports*. 2008;123:3-8. Abstract




- Guidelines to Prevent Malevolent Use of Biomedical Research (E-2.078)  (380KB)
- Physician Obligation in Disaster Preparedness and Response (E-9.067)  (380KB)

From *The Virtual Mentor*, AMA's Online Journal of Ethics

- Ethical Questions Posed by Emerging Epidemics (April 2006)
- Medicine's Response to Terrorism (May 2004)

Institute for Ethics

Suggested readings from AMA ethics staff

- Wynia MK. Ethics and public health emergencies: encouraging responsibility. *Am J Bioethics*. 2007;7:1-4.  (380KB)
- Wynia MK. Ethics and public health emergencies: rationing vaccines. *Am J Bioethics*. 2006;6:4-7.  (380KB)
- Wynia MK. Ethics and public health emergencies: restrictions on liberty. *Am J Bioethics*. 2007;7:1-5.  (380KB)

Journal of the American Medical Association (JAMA)

- Markel H, Lipman HB, Navarro JA, Sloan A, Michalsen JR, Minna Stern A, Cetron MS. Nonpharmaceutical interventions implemented by US cities during the 1918-1919 influenza pandemic. *JAMA*. 2007;298:644-654.
- Middaugh JP. Pandemic influenza preparedness and community resiliency. *JAMA*. 2008;299:566-568.
- Taubenberger JK, Morens DM, Fauci AS. The next influenza pandemic: can it be predicted? *JAMA*. 2007;297:2025-2027.



National Disaster Life Support™ (NDLS™) Program

Other non-government and professional association resources

American Academy of Child and Adolescent Psychiatry

Talking to Children About Swine Flu

American Academy of Family Physicians

H1N1 Flu

Hot Topic: Pandemic Flu

American Academy of Pediatrics

Children and Disasters

H1N1 (Swine Flu)

American College of Chest Physicians

Definitive Care for the Critically Ill During a Disaster. *Chest*. 2008;133(suppl):1-66S.

American College of Emergency Physicians

American College of Physicians

The Health Care Response to Pandemic Influenza (ACP Position Paper, 2006)

Swine Flu (H1N1) Health Tip Sheet

American Hospital Association

The Weill/Cornell Bioterrorism and Epidemic Outbreak Response Model (BERM)

American Lung Association

Flu Clinic Locator

American Nurses Association

Adapting Standards of Care under Extreme Conditions: Guidance for Professionals During Disasters, Pandemics, and Other Extreme Emergencies (prepared for the American Nurses Association by the Center for Health Policy, Columbia University School of Nursing)

H1N1 (Swine) Flu - Information for Nurses



American Psychiatric Association

Disaster Psychiatry

H1N1 Swine Flu Information

Psychological and Social Support for Essential Service Workers During an Influenza Pandemic

American Public Health Association

Get Ready Campaign

H1N1 (Swine Flu) and Influenza: Information and Resources

American Red Cross

Pandemic Flu

Preparedness Today

Preparing for a Swine Flu (H1N1) Pandemic: Coping and Emotional Well-Being

If you have been affected by a disaster or public health emergency, the American Red Cross “Safe and Well” Web site provides a way to register yourself as being “safe and well.” From a list of standard messages, you can select those that you want to communicate to family members, letting them know of your well-being.

American Society for Microbiology

Influenza A (H1N1)

Sentinel Guideline on Packing and Shipping Infectious Substances

Washup.org

American Society of Health System Pharmacists

ASHP Foundation Pandemic Influenza Resources for Health-System Pharmacy Departments

Influenza

Association of Professionals in Infection Control and Epidemiology

H1N1 (Swine) Flu

Reuse of Respiratory Protection in Prevention and Control of Epidemic- and Pandemic-prone Acute Respiratory Diseases (ARD) in Healthcare, (APIC Position Paper, 2008)

Association of Public Health Laboratories

Influenza



Novel H1N1 Flu

Association of State and Territorial Health Officials

At-Risk Populations and Pandemic Influenza

Directory of State Health Officials

H1N1 Flu Updates

Pandemic Influenza

Center for Biosecurity, University of Pittsburgh Medical Center

Avian/Pandemic Influenza

Hospitals “Full-Up”: The 1918 Influenza Pandemic Video

Center for Infectious Disease Research and Policy, University of Minnesota

General Influenza and Flu Vaccine Information

H1N1 (Swine) Influenza

Columbus Medical Association

Influenza Pandemic Guidelines for Independent Medical Practices in Ohio

Council of State and Territorial Epidemiologists

Infectious Diseases Society of America

Avian/Pandemic Flu

H1N1 (Swine) Influenza

Seasonal and Pandemic Influenza

Institute of Medicine

Pandemic Influenza: A Guide to Recent Institute of Medicine Studies and Workshops

Minnesota Department of Health, Office of Emergency Preparedness

Pandemic Recommended Actions for Healthcare Facilities by Event Stage

National Association of County and City Health Officials

H1N1 Influenza Response Index



Local Health Department Guide to Pandemic Influenza Planning

Local Health Department Index

National Disaster Life Support Foundation, Inc.

National Foundation for Infectious Diseases

Influenza

National Influenza Vaccine Summit

National Network for Immunization Information

Immunization Issues Regarding Pandemic Influenza

National Resource Center on Advancing Emergency Preparedness for Culturally Diverse Communities (developed by the Drexel University School of Public Health with support from the HHS Office of Minority Health)

New England Journal of Medicine

H1N1 Information Center

Refugee Health Information Network

Society of Critical Care Medicine

Current Threats: Flu Outbreak

Society for Healthcare Epidemiology of America

Pandemic Influenza

Trust for America's Health

Pandemic Flu

Public health legal preparedness resources

American Bar Association Health Law Section

Pandemic Flu/H1N1 (Swine Flu) Resources

American Health Lawyers Association

Community Pan-Flu Preparedness: A Checklist of Key Legal Issues for Healthcare Providers



CDC Public Health Law Program

2009 H1N1 Flu Legal Preparedness

Centers for Law and the Public's Health (a collaborative at Johns Hopkins and Georgetown Universities)

H1N1 (Swine Flu) Legal Preparedness and Response


Foreign Quarantine (from U.S. Code Annotated; Title 42; The Public Health & Welfare; Part 71)

International Health Regulations

Interstate Quarantine (from U.S. Code Annotated; Title 42; The Public Health & Welfare; Part 70)

Regulations to Control Communicable Diseases (from U.S. Code Annotated; Title 42; The Public Health & Welfare; Chapter 6a--Public Health Service; Subchapter Ii--General Powers & Duties.; Part G--Quarantine & Inspection)

Suggested Reading

- Cassens Weiss D. Will swine flu merit quarantines? If so, new law gives states authority. *ABA Journal Online*. April 27, 2009.
- Fidler DP. The swine flu outbreak and international law. *American Society of International Law Insights*. April 27, 2009.
- Gostin L. Medical countermeasures for pandemic influenza: ethics and the law. *JAMA*. 2006; 295:554 - 556.
- Gostin L. Public health strategies for pandemic influenza: ethics and the law. *JAMA*. 2006;295:1700-1704.
- Hoffman S, Goodman RA, Stier DD. Law, liability, and public health emergencies. *Disaster Med Public Health Preparedness*. 2009;3:1-9.  (380KB)

2009 Influenza A H1N1 case maps

American Public Health Association H1N1 Flu Map

Google Maps

H1N1 (Swine) Flu Map



HealthMap.org

H1N1 (Swine) Flu HealthMap

U.S. Government Pandemic Flu Site

World Health Organization Global Map