

Introduction and Background

Purpose

The *National Strategy for Pandemic Influenza*¹ guides our Nation's preparedness and response to an influenza pandemic and provides a framework for coordinating planning efforts consistent with the National Security Strategy and the National Strategy for Homeland Security. The *National Strategy for Pandemic Influenza: Implementation Plan*² directs Federal departments and agencies to undertake more than 300 actions in support of the *National Strategy for Pandemic Influenza*. Among these are two tasks assigned to the Department of Transportation (DOT), one with a focus on emergency medical services and one with a focus on 9-1-1. These tasks are:

- 6.1.13.6. DOT, in coordination with HHS, DHS, State, local, and tribal officials and other EMS stakeholders, shall develop suggested EMS pandemic influenza guidelines for statewide adoption that address: clinical standards, education, treatment protocols, decontamination procedures, medical direction, scope of practice, legal parameters, and other issues, within 12 months. *Measure of performance*: EMS pandemic influenza guidelines completed.
- 6.1.4.2. DOT, in cooperation with HHS, DHS, and DOC, shall develop model protocols for 9-1-1 call centers and public safety answering points that address the provision information to the public, facilitate caller screening, and assist with priority dispatch of limited emergency medical services, within 12 months. *Measure of performance*: model protocols developed and disseminated to 9-1-1 call centers and public safety answering points.

While two separate documents were developed to address each task, the documents are intended to be used in tandem.

How the document was developed

The document was developed based on existing Federal guidelines; international, national, State and regional pandemic influenza and disaster response plans; and relevant research, publications and expert interviews. In addition, two stakeholder meetings (October 12-13, 2006 and March 1-2, 2007) were convened by the National Association of State EMS Officials (NASEMSO) to address the tasks and gain stakeholder guidance, with funding from the National Highway Traffic Safety Administration. The meetings were attended by a wide variety of national stakeholder organizations within the EMS, 9-1-1 and public health communities. In addition, Federal agency representation and expertise was involved from the Department of Health and Human Services, Department of Homeland Security, Department of Commerce, Department of

¹ Homeland Security Council. ONLINE. 2005. *National Strategy for Pandemic Influenza*. The White House. Available: <http://www.pandemicflu.gov/plan/federal/index.html> [18 March 2007].

² Homeland Security Council. ONLINE. 2006. *National Strategy for Pandemic Influenza: Implementation Plan*. The White House. Available: <http://www.pandemicflu.gov/plan/federal/index.html> [20 March 2007].

Transportation, Department of Justice and others. The stakeholders provided input throughout the development of these guidelines. A list of the participating stakeholder organizations, as well as a list of participants in the development process, may be found in Appendix J.

Pandemic Influenza – Overview

An influenza pandemic may occur when a novel influenza virus emerges that infects humans, causes illness in humans, and can be efficiently transmitted between humans. Novel influenza viruses are newly identified influenza viruses to which the population has little or no immunity and that require close monitoring to determine whether they are capable of causing a pandemic.

To better understand the role of EMS before and during an influenza pandemic, it is useful to identify how the term “pandemic influenza,” commonly referred to as “pandemic flu,” is used to distinguish between an influenza pandemic and other influenza outbreaks.

- **Pandemic Influenza (or pandemic flu)** is virulent human influenza A virus that causes a global outbreak, or pandemic, of serious illness in humans. Because there is little natural immunity, the disease spreads easily and sustainably from person to person. At the time of publication of this document, there is no pandemic influenza.
- **Seasonal (or common) Influenza** is a respiratory illness caused by both human influenza A and B viruses that can be transmitted person to person. Most people have some immunity and a vaccine is available.
- **Avian (or bird) Influenza** is caused by influenza A viruses that occur naturally among wild birds. Low pathogenic avian influenza is common in birds and causes few problems. Highly pathogenic avian influenza A (H5N1), or HPAI H5N1, is deadly to domestic fowl and can be transmitted from birds to humans. There is no human immunity and at this point in time only one Food and Drug Administration (FDA) approved human vaccine has been approved. The FDA has approved this vaccine for individuals who may be at increased risk of exposure to the HPAI H5N1 virus, but it is not commercially available. This vaccine has been included within the Strategic National Stockpile (SNS).

Animals are the most likely reservoir for an emerging influenza virus. Avian influenza viruses played a role in the development of the human influenza viruses associated with the last three influenza pandemics. Two of these viruses remain in circulation among humans today and are responsible for the majority of seasonal influenza cases each year. .

There will be very little discussion of specifics regarding avian influenza in this document as it is impossible to predict whether an avian influenza virus will in fact be the cause of a future pandemic. Concern is high with the current circulating HPAI H5N1 virus due to its high mortality among reported human cases and its broad geographic distribution. Most cases of HPAI H5N1 virus infection in humans have resulted from direct or close contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces possibly contaminated from feces and/or respiratory secretions from infected birds. While there have been a few cases of probable person-to-person spread of HPAI H5N1, it has been limited, inefficient and unsustainable as of this point in time.

EMS planners should be able to distinguish among the following:

- **Endemic Levels** is the constant presence of a disease or infectious agent in a certain geographic area or population group.
- **Epidemic** is the rapid spread of a disease in a specific area or among a certain population group.
- **Pandemic** is a worldwide epidemic - an epidemic occurring over a wide geographic area and affecting a large number of people.

For example, the Severe Acute Respiratory Syndrome (SARS) epidemic from 2002-2003 never progressed to a pandemic even though SARS moved to Canada from its origins in Asia. Although SARS covered a wide geographic area, the number of people affected by the disease was limited.

Additional terms used in this document are defined in the Glossary (Appendix A).

Influenza – What is it and how is it transmitted?

Although it is recognized that a pandemic influenza virus may not present and/or affect patients in the same fashion as seasonal influenza, a general awareness of the clinical presentation and transmission of seasonal influenza may assist in planning and responding to an influenza pandemic. In addition, information about prior pandemics as well as the circulating HPAI H5N1 viruses is useful in establishing considerations for planning a response.

As described by the Department of Health and Human Services³, seasonal influenza typically has an abrupt onset, with symptoms of fever (usually high), headache, extreme tiredness, dry cough, sore throat, runny or stuffy nose, muscle aches. Stomach symptoms such as nausea, vomiting and diarrhea also can occur, but are more common in children than adults. . The time from exposure to illness onset is usually 1 to 4 days, with an average of 2 days. Most patients recover within 3 to 7 days. Most healthy adults may be able to infect others beginning 1 day before symptoms develop and up to 5 days after becoming sick. Children can be infectious for 10 or more days, and young children can shed the virus for several days before the onset of illness.

Influenza is primarily transmitted from person to person via large virus-laden droplets (particles >5 µm in diameter) that are generated when infected persons cough or sneeze; these large droplets can then settle on the mucosal surfaces of the upper respiratory tracts of susceptible persons who are near (e.g., within 3 feet of) infected persons. Transmission may also occur

³ US Department of Health and Human Services. ONLINE. 2005. *HHS Pandemic Influenza Plan*. Department of Health and Human Services. Available: <http://www.hhs.gov/pandemicflu/plan/> [3 April 2007]

through direct contact or indirect contact with respiratory secretions such as when touching surfaces contaminated with influenza virus and then touching the eyes, nose or mouth.⁴

Likelihood of an Influenza Pandemic

Three conditions must be met for a pandemic to begin:

- A new influenza virus must emerge for which there is little or no human immunity;
- It must infect humans and cause illness; and
- It must spread easily and sustainably (continue without interruption) among humans

Although these three conditions were met in previous pandemics, to date the first two conditions have been met with the HPAI H5N1 virus, but the third condition has not been met.

Global Perspective

Pandemics have occurred intermittently for centuries. The last three pandemics, in 1918, 1957 and 1968, killed approximately 50 million, 1-2 million and 700,000 people worldwide, respectively. Although neither timing nor severity can be predicted, history and science suggest that we will face one or more pandemics in this century.

The most concerning current pandemic threat stems from widespread and expanding outbreaks of HPAI H5N1 virus infection among birds in Asia, Europe, Middle East and Africa. HPAI H5N1 virus does not usually infect people, but infections with these viruses have occurred in humans. In fact, of the few avian influenza viruses that have crossed the species barrier to infect humans, HPAI H5N1 has caused the largest number of detected cases of severe disease and death in humans. However, at this time, the HPAI H5N1 virus has not shown an ability to transmit efficiently between humans as is seen with the seasonal influenza viruses. There is concern that the HPAI H5N1 virus may acquire this capability through genetic mutation or exchange of genetic material with a human influenza virus.

It is impossible to know whether the currently circulating HPAI H5N1 viruses will cause a human influenza pandemic. The widespread occurrence of HPAI H5N1 in birds and the likelihood of mutations over time raise concerns that the virus will become transmissible between humans, with potentially catastrophic consequences. Even if this does not happen with the current HPAI H5N1 viruses, history suggests that a different influenza virus will emerge and result in the next pandemic.

New information continues to emerge about the threat of an influenza pandemic and may be found online at www.pandemicflu.gov.

⁴ Centers for Disease Control and Prevention. ONLINE. 2007. *Guidelines and Recommendations Infection Control Guidance for the Prevention and Control of Influenza in Acute-Care Facilities*. CDC. Available: <http://www.cdc.gov/flu/professionals/infectioncontrol/healthcarefacilities.htm> [3 April 2007]

Potential Impacts of an Influenza Pandemic

The global impact of pandemic influenza could be severe in terms of lives lost and individual and community suffering, as well as severe negative impact upon social and economic systems.

The following are potential impacts of pandemic influenza:

- **Rapid Worldwide Spread:** When a pandemic influenza virus emerges, its global spread is likely inevitable. Preparedness activities should assume that the entire world population will be affected by the virus. Countries might, through measures such as border closures and travel restrictions, delay arrival of the virus, but would not be able to stop it.
- **Health Care Systems Overloaded:** Most people have little or no immunity to a pandemic virus. Infection and illness rates will be very high. A substantial percentage of the world's population will require some form of medical care. Nations are unlikely to have the staff, facilities, equipment and hospital beds needed to cope with large numbers of people who suddenly fall ill. Death rates may be high, depending on four factors: the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected populations and the effectiveness of preventive measures.
- **Medical Supplies Inadequate:** The need for vaccine and antiviral medications is likely to outstrip supply early in a pandemic period. In addition, a pandemic may create a shortage of hospital beds, ventilators and other supplies. Surge capacity at non-traditional sites such as schools may be created to cope with demand. Shortages may result in the need for difficult decisions regarding who should get antiviral drugs and vaccines.
- **Economic and Social Disruption:** Travel bans, closings of schools and businesses and cancellations of events could have major impact on communities and citizens. Care for sick family members and fear of exposure can result in significant worker absenteeism.

As part of the effort to prepare for pandemic influenza, State and local EMS and 9-1-1 planners will want to predict how such a disease outbreak might impact their community. The Centers for Disease Control and Prevention (CDC) offers a software program, FluAid, to assist planners in determining the impact that pandemic influenza may have in their community.

FluAid is a test version of software designed to assist State and local level planners by providing estimates of potential impact specific to their locality. FluAid provides only a range of estimates of impact in terms of deaths, hospitalizations and outpatient visits due to pandemic influenza.

The software cannot describe when or how people will become ill, or how a pandemic may spread through a society over time. FluAid is available at

<http://www.cdc.gov/flu/tools/fluaid/index.htm>

Pandemic Influenza in History

Historically, the 20th century has seen three pandemics of influenza:

- 1918 influenza pandemic caused at least 675,000 U.S. deaths and up to 50 million deaths worldwide
- 1957 influenza pandemic caused at least 70,000 U.S. deaths and 1-2 million deaths worldwide
- 1968 influenza pandemic caused about 34,000 U.S. deaths and 700,000 deaths worldwide

Source: www.pandemicflu.gov

Pandemic Influenza Phases

EMS and 9-1-1 planners should familiarize themselves with the phases of pandemic influenza identified by the World Health Organization (WHO) and the US Government pandemic stages. EMS and 9-1-1 planning for pandemic influenza should be done in the context of these phases.

The WHO recognizes six phases of pandemic influenza as well as specific objectives and strategic actions for each phase (See Appendix E-1a). In Figure 4, there are a list of suggested 9-1-1 and EMS activities and readiness steps that could be taken based on the different WHO pandemic phases.

Like WHO, the Federal Government also has developed a model that identifies various stages of pandemic influenza that correlates with the WHO phases, but further breaks down the pandemic period to allow for additional flexibility. (See Appendix E and E-1b.)

CDC has created the Pandemic Severity Index (Appendix F) which uses case fatality ratio as the critical driver for categorizing the severity of a pandemic. The index is designed to estimate the severity of a pandemic on a population level, allow better forecasting of the impact of a pandemic and enable recommendations on the use of mitigation interventions matched to the severity of influenza pandemics.

Pandemics will be assigned to one of five discrete categories of increasing severity (Category 1 to Category 5). The Pandemic Severity Index provides communities a tool for scenario-based contingency planning to guide local pre-pandemic preparedness efforts. Accordingly, communities facing the imminent arrival of pandemic disease will be able to use the pandemic severity assessment to define which pandemic mitigation interventions are indicated for implementation.⁵ This document uses the Pandemic Severity Index to guide planning of protocol development and alteration of response mechanisms.

Federal Disease Containment Strategies

The *National Strategy for Pandemic Influenza: Implementation Plan*⁶ lists four primary strategies for preventing pandemic influenza:

- Early detection;
- Treatment with antiviral medications; and
- The use of infection control measures to prevent transmission.
- Vaccination;

⁵ US Department of Health and Human Services. ONLINE. 2007. *Community Strategy for Pandemic Influenza Mitigation*. Department of Health and Human Services. Available: <http://www.pandemicflu.gov/plan/community/commmitigation.html> [21 March 2007]

⁶ Homeland Security Council. ONLINE. 2006. *National Strategy for Pandemic Influenza: Implementation Plan*. The White House. Available: <http://www.pandemicflu.gov/plan/federal/index.html> [20 March 2007].

CDC's *Interim Pre-pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States*⁷, issued on February 1, 2007, advocates for a pandemic mitigation framework that is based upon an early, targeted, layered application of multiple partially effective non-pharmaceutical measures. The curve shown in Appendix E-1c demonstrates the overall goals of the community mitigation strategy in reducing the burdens of an influenza pandemic on a community. As shown, these include: (1) delaying the pandemic outbreak peak to allow for additional time to plan and respond, (2) decompressing the peak burden on the local infrastructure and (3) diminishing the overall number of cases and health impacts.

To accomplish these goals, the pandemic community mitigation interventions recommended by CDC, used in combination with individual infection control measures, such as hand-washing and cough etiquette, include:

- **Isolation and treatment (as appropriate) with influenza antiviral medications** of all persons with confirmed or probable pandemic influenza. Isolation may occur in the home or healthcare setting, depending on the severity of an individual's illness and /or the current capacity of the healthcare infrastructure.
- **Voluntary home quarantine** of members of households with confirmed or probable influenza case(s) and consideration of combining this intervention with the prophylactic use of antiviral medications, providing sufficient quantities of effective medications exist and that a feasible means of distributing them is in place.
- **Dismissal of students from school** (including public and private schools as well as colleges and universities) and school-based activities and closure of childcare programs, coupled with protecting children and teenagers through social distancing in the community to achieve reductions of out-of-school social contacts and community mixing.
- **Use of social distancing measures** to reduce contact between adults in the community and workplace, including, for example, cancellation of large public gatherings and alteration of workplace environments and schedules to decrease social density and preserve a healthy workplace to the greatest extent possible without disrupting essential services. Enable institution of workplace leave policies that align incentives and facilitate adherence with the non-pharmaceutical interventions (NPIs).

These community containment strategies, along with vaccination and the use of antiviral medications for prevention, should they be available, comprise the Targeted Layered Containment (TLC) strategy. The TLC strategy is based on the concept that when multiple methods of containment and treatment are appropriately coordinated at the community level, the effects of an influenza pandemic may be decreased.

⁷ US Department of Health and Human Services. ONLINE. 2007. *Community Strategy for Pandemic Influenza Mitigation*. Department of Health and Human Services. Available: <http://www.pandemicflu.gov/plan/community/commmitigation.html> [21 March 2007]

CDC recommends a strategy that initiates these measures based on the severity of pandemic influenza as defined in the Pandemic Severity Index (Appendix F).⁸

Federal Planning Assumptions

While history offers useful benchmarks, the characteristics of a pandemic influenza viral strain are not known before it emerges. However, to facilitate planning, the Federal planning efforts make the following assumptions, based on the *National Strategy for Pandemic Influenza: Implementation Plan*:

- Susceptibility to the pandemic influenza virus will be universal.
- Efficient and sustained person-to-person transmission signals an imminent pandemic.
- The clinical disease attack rate will be 30 percent in the overall population during the pandemic. Illness rates will be highest among school-aged children (about 40 percent) and decline with age. Among working adults, an average of 20 percent will become ill during a community outbreak.
- Some persons will become infected but not develop clinically significant symptoms. Asymptomatic or minimally symptomatic individuals can transmit infection and develop immunity to subsequent infection.
- While the number of patients seeking medical care cannot be predicted with certainty, in previous pandemics about half of those who became ill sought care. With the availability of effective antiviral medications for treatment, this proportion may be higher in the next pandemic.
- Rates of serious illness, hospitalization, and deaths will depend on the virulence of the pandemic virus and differ by an order of magnitude between more and less severe scenarios. Risk groups for severe and fatal infection cannot be predicted with certainty but are likely to include infants, the elderly, pregnant women, and persons with chronic or immunosuppressive medical conditions.
- Rates of absenteeism will depend on the severity of the pandemic. In a severe pandemic, absenteeism attributable to illness, the need to care for ill family members and fear of infection may reach 40 percent during the peak weeks of a community outbreak, with lower rates of absenteeism during the weeks before and after the peak. Certain public health measures (closing schools, quarantining household contacts of infected individuals) are likely to increase rates of absenteeism.
- The typical incubation period (interval between infection and onset of symptoms) for seasonal influenza is approximately 2 days.
- Persons who become ill may shed virus during and before the onset of illness. Viral shedding and the risk of transmission are likely to be greatest during the first 2 days. Children will play a major role in transmission of infection as their illness rates are likely to be higher, they shed more virus over a longer period of time, and they control their secretions less well.
- On average, infected persons will transmit infection to approximately two other people.

⁸ US Department of Health and Human Services. ONLINE. 2007. Community Strategy for Pandemic Influenza Mitigation. Department of Health and Human Services. Available: <http://www.pandemicflu.gov/plan/community/commmitigation.html> [21 March 2007]

- Epidemics will last 6 to 8 weeks in affected communities.
- Multiple waves (periods during which community outbreaks occur across the country) of illness are likely to occur with each wave lasting 2 to 3 months. Historically, the largest waves have occurred in the fall and winter, but the seasonality of a pandemic cannot be predicted with certainty.

Federal planning assumptions are subject to change as new information about pandemic influenza becomes available.

Federal Preparedness Documents

EMS and 9-1-1 planners may find the following documents useful to their Pandemic Influenza preparedness efforts:

*National Strategy for Pandemic Influenza*⁹

The *National Strategy for Pandemic Influenza* identifies responsibilities for Federal, State and local government as well as non-governmental organizations, businesses and individuals. It is built on three pillars: preparedness and communication, surveillance and detection, and response and containment.

- **Preparedness and Communication:** Activities that should be undertaken before a pandemic to ensure preparedness, and the communication and coordination of roles and responsibilities to all levels of government, segments of society and individuals.
- **Surveillance and Detection:** Domestic and international systems that provide continuous situational awareness to ensure the earliest warning possible to protect the population.
- **Response and Containment:** Actions to limit the spread of the outbreak and to mitigate the health, social and economic impacts of a pandemic.

*National Response Plan*¹⁰

Pandemic influenza in the United States may result in activation of the National Response Plan (NRP). The NRP is the primary mechanism for coordination of the Federal Government response to terrorist attacks, major disasters and other emergencies, and forms the basis of the Federal pandemic response. Management of a pandemic response during NRP activation will be driven by decisions at the State and local level.

⁹ Homeland Security Council. ONLINE. 2006. *National Strategy for Pandemic Influenza: Implementation Plan*. The White House. Available: <http://www.pandemicflu.gov/plan/federal/index.html> [20 March 2007].

¹⁰ US Department of Homeland Security. ONLINE. 2004. *National Response Plan*. Department of Homeland Security. Available: www.dhs.gov/xlibrary/assets/NRP_FullText.pdf [18 March 2007].

National Incident Management System (NIMS)¹¹

While most emergency situations are handled locally, a major incident may require help from other jurisdictions, the State and the Federal Government. The National Incident Management System (NIMS) was developed so that responders from different jurisdictions and disciplines can work together better to respond to natural disasters and emergencies, including acts of terrorism. NIMS benefits include a unified approach to incident management; standard command and management structures; and emphasis on preparedness, mutual aid and resource management. Additional information about NIMS requirements may be found in Appendix B. An influenza pandemic has the potential of affecting the entire country simultaneously. Therefore certain aspects of NIMS, such as mutual aid, may be less pertinent than during other location specific disasters. However, many of the other concepts within NIMS, such as the incident command system (ICS), will continue to be vital to pandemic influenza planning and response.

Guidelines published by other Federal agencies may also be useful to EMS and 9-1-1 planners. The EMS system and the 9-1-1 system must be dynamic and capable of responding quickly to new guidance and new or revised treatment modalities.

¹¹ US Department of Homeland Security. ONLINE. 2004. *National Incident Management System*. Department of Homeland Security. Available: www.fema.gov/pdf/emergency/nims/nims_doc_full.pdf [18 March 2007].