

# Pandemic Flu Fact Sheet

## Pandemic Influenza

Pandemic influenza is an extreme, acute outbreak of influenza. Pandemics of influenza are explosive global events in which most, if not all, persons worldwide are at risk for infection and illness. In past pandemics, influenza viruses have spread worldwide within months. With globalization, a new pandemic can be expected to cross the globe in days not weeks. Pandemic viruses have historically infected one third or more of large populations and have led to tens of millions deaths.

One of the most important features about influenza viruses is that their structure changes slightly but frequently over time (a process known as "drift"), and that this process results in the appearance of different strains that circulate each year. The composition of the flu vaccine changes each year to help protect people from the strains of influenza virus that are expected to be the most common ones circulating during the coming flu season. By contrast to the more gradual process of drift, in some years, the influenza virus changes dramatically and unexpectedly through a process known as "shift." Shift results in the appearance of a new influenza virus to which few (if any) people are immune. If this new virus spreads easily from person to person, it could quickly travel around the world and cause increased levels of serious illness and death, affecting millions of people. This is known as pandemic influenza. Public health scientists predict that the risk of an influenza pandemic is greater than it has been in decades.

In addition to the ongoing threat of human influenza, avian influenza or "bird flu" has re-emerged in Asia. Outbreaks of avian influenza have been reported among chickens, ducks and other birds in China, Indonesia, Thailand and Vietnam. Experts believe that the virus is now endemic and likely to remain circulating in the animal population for the foreseeable future. This raises the possibility of an avian influenza virus combining with a human influenza virus to a novel pandemic strain.

## DHHS Activities

HHS is engaged in several efforts to enhance the nation's preparedness for such an outbreak. DHHS supports pandemic influenza activities in four key areas: surveillance, vaccine development and production, antiviral stockpiling, research, and public health preparedness.

### Surveillance

The first line of defense against pandemic influenza is worldwide surveillance. The WHO coordinates an international system that makes it possible for scientists to detect changes in circulating influenza viruses and the emergence of novel influenza A viruses as soon as possible. DHHS is collaborating with the Department of Agriculture and the Department of State to further enhance surveillance efforts in Asia, in both human and animal populations. Additional DHHS activities include:

- Strengthening U.S. surveillance by expanding to year-round surveillance for influenza disease and the viral strains that cause it.
- Developing hospital-based surveillance for severe respiratory illness (e.g., influenza and other infectious agents) and identifying methods to rapidly expand the current sentinel physician surveillance system during an influenza pandemic or other health emergency.
- Enhancing global surveillance activities in humans and animals.

### Vaccine Development

Because manufacturing cannot begin until the new virus has emerged and the vaccine strain is available, pandemic influenza vaccine cannot be stockpiled. DHHS has taken steps to ensure that once the virus is available, resources are in place to ramp up production and produce enough vaccine to protect the U.S. as quickly as possible. DHHS is

working closely with vaccine manufacturers to expand annual influenza vaccine capacity. Additional activities in vaccine development include:

- Finalizing contracts with an influenza vaccine manufacturer to ensure that they can dedicate their full influenza vaccine manufacturing capacity to produce a pandemic influenza vaccine at any time during the year.
- Supporting diversification of the influenza vaccine manufacturing base by accelerating the development of a technique that uses cell-culture instead of chicken eggs to produce the vaccine. This approach is more amenable to rapid scale-up (surge capacity) to meet the anticipated demand for vaccine in an influenza pandemic.
- Creating a stockpile of pandemic influenza vaccine against the virus that is currently circulating in Asia, to be used if the virus jumps to the human population and begins spreading from person-to-person. In addition, this vaccine will provide a level of defense against pandemic influenza and will provide vaccine manufacturers and our regulatory officials with experience dealing with a candidate pandemic vaccine.
- Enhancing capacity for rapid development and evaluation of a novel pandemic influenza vaccine by upgrading laboratories to Biosafety Level 3 requirements.
- Conducting research to develop new influenza vaccines that are highly efficacious, are easier to administer, or that are directed against a constant portion of the influenza virus and thus avoiding the need to develop a new vaccine every year to match the predominant viral strains that are most likely to cause disease. With this approach it may be possible to create an influenza vaccine stockpile in the future.

## **Antivirals**

Antiviral drugs are effective as therapy against susceptible influenza virus strains when used early in infection and can also prevent infection (prophylaxis). In 2003, the antiviral drug oseltamivir was added to the SNS. Analysis is ongoing to define optimal antiviral use strategies, potential health impacts, and cost-effectiveness of antiviral drugs in the setting of a pandemic. Results of these analyses will contribute to decisions regarding the appropriate type and quantity of antiviral drugs to maintain in the SNS. Additional activities include:

- Expanding the stockpile of the antiviral drug oseltamivir (Tamiflu®), the only medication that has been shown to have activity in the laboratory against the avian influenza virus that is circulating in Asia.
- Expanding research into next-generation antiviral drugs that show greater effectiveness against new influenza viruses.
- Conducting modeling studies to better understand how best to use limited supplies of antivirals in the event of a pandemic.

## **Research**

Basic research on influenza such as genomic studies and studies of influenza virulence factors are providing additional clues for fighting the virus. NIH is currently supporting several research projects aimed at developing vaccines that can be manufactured more rapidly, are more broadly protective, and/or are more effective. In particular research activities are focused on:

- Developing new influenza vaccines that are highly efficacious, are easier to administer. In addition grants are examining vaccines that are directed against a constant portion of the influenza virus, thus avoiding the need to develop a new vaccine every year. With this approach it may be possible to create an influenza vaccine stockpile in the future.
- Providing materials and reagents to the scientific community, including antibodies and reference antigens to a number of avian influenza viruses considered to be of high pandemic potential.

- Identifying new viral targets for drug development.
- Developing an Influenza Genomics Project to rapidly sequence the genes of human and avian influenza viruses

### **Preparedness Activities**

In the event of a pandemic, good surveillance, timely vaccine development and production, and the ability to administer vaccine to large numbers of people in a short amount of time will be very important. Several activities are helping to prepare for the next pandemic: Pandemic Plan -- Since 1993, Federal, State and local health officials have been working on several different preparedness efforts to reduce pandemic influenza-related deaths, sickness, and social disruption. One of the efforts is to develop a national plan that will cover many important aspects of responding to the next pandemic. The recently released draft Pandemic Influenza Response and Preparedness Plan describes a coordinated strategy to prepare for and respond to an influenza pandemic. It also provides guidance to state and local health departments and the health care delivery system on how to enhance planning and preparedness State Emergency Preparedness Grants -- Coordination in planning and consistency in implementation with other emergency response plans, such as those for bioterrorist threats and SARS, can further enhance and improve efficiency and effectiveness. Public health emergency programs such as the Health Resources and Services Administration (HRSA) Hospital Preparedness Program and the CDC Public Health Preparedness and Response Cooperative Agreements are providing states with resources to strengthen their ability to respond to bioterror attacks, infectious diseases and natural disaster. These resources will help states improve coordination of health care services and emergency response capacity and facilitate preparedness for influenza, as well as other public health emergencies. In FY04, HHS introduced a cross-cutting critical benchmark for state pandemic influenza preparedness planning as part of the Department's awards to states to improve hospitals' response to bioterrorism and other diseases. The goal of this planning activity is to assure implementation of an effective response including the delivery of quality medical care in the context of the anticipated increased demand for services in a pandemic ([www.hhs.gov/asphep/FY04benchmarks.html](http://www.hhs.gov/asphep/FY04benchmarks.html)). All totaled since September 11, 2001, HHS has invested more than \$3.7 billion in strengthening the Nation's public health infrastructure.

Biosense -- BioSense is a state-of-the-art, multi-jurisdictional data-sharing program to facilitate surveillance of unusual patterns or clusters around the country. It enhances the Nation's capabilities to rapidly detect and quantify public health emergencies by enabling rapid access to, and analysis of, diagnostic and pre-diagnostic health data. In addition, it allows for rapid, around-the-clock electronic transmission of data to local, state and federal public health agencies from national, regional and local health data sources.