# supplement 1
# pandemic influenza surveillance

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# SUMMARY OF PUBLIC HEALTH ROLES AND RESPONSIBILITIES IN PANDEMIC INFLUENZA SURVEILLANCE

## INTERPANDEMIC AND PANDEMIC ALERT PERIODS

### State and local responsibilities:

- Continue to employ state influenza surveillance coordinators to oversee improvements in influenza surveillance (e.g., virologic, outpatient, hospitalization, and mortality surveillance).
- Conduct influenza surveillance year round, where possible.
- Implement enhanced surveillance for detection of the first U.S. cases of novel virus infection.

### State and large local public health laboratory responsibilities:

- Isolate and subtype influenza viruses year round.
- Improve capacity for rapid identification of unusual influenza strains (see also **Supplement 2**).

### HHS responsibilities:

- Coordinate and maintain all components of the National Influenza Surveillance System (Table 1).
- Help identify and characterize influenza strains collected by the U.S. WHO Collaborating Laboratory Network.
- Assist USDA, as requested, in monitoring new influenza strains in poultry and swine.
- Work with state and local partners to:
  - Implement enhancements to the National Influenza Surveillance System.
  - Explore options for additional enhancements to improve pandemic surveillance.

## PANDEMIC PERIOD

If an influenza pandemic begins in the United States or another country:

### State and local responsibilities:

- Implement enhanced surveillance for detection of the first cases.
- Enhance all influenza surveillance components (virologic, outpatient, hospitalization, and mortality).
- Communicate to all partners the heightened need for timely and complete surveillance data.

### HHS responsibilities:

- Provide technical support, as requested, to ministries of health and WHO to track the pandemic virus and gather epidemiologic data on risk factors for infection or severe illness.
- Issue updated case definitions and guidance for laboratory testing and enhanced surveillance.
- Assist state and local health departments, as requested.
- Analyze influenza surveillance data on a regular and timely basis.

## S1-I. RATIONALE

Pandemic influenza surveillance includes surveillance for influenza viruses (virologic surveillance) and surveillance for influenza-associated illness and deaths (disease surveillance).

The goals of virologic surveillance are to:

- Rapidly detect the introduction and early cases of a pandemic influenza virus in the United States.
- Track the virus' introduction into local areas.
- Monitor changes in the pandemic virus, including development of antiviral resistance.

The goals of disease surveillance are to:

- Serve as an early warning system to detect increases in influenza-like illness (ILI) in the community.
- Monitor the pandemic's impact on health (e.g., by tracking outpatient visits, hospitalizations, and deaths).
- Track trends in influenza disease activity and identify populations that are severely affected.

Virologic and disease surveillance data—supplemented by data from outbreak investigations and special studies—can help decision-makers identify effective control strategies and re-evaluate recommended priority groups for vaccination and antiviral therapy. They can also facilitate efforts to mathematically model disease spread during a pandemic. The national influenza surveillance system, which monitors seasonal influenza, will provide the virologic and disease surveillance data needed to guide response efforts during a pandemic (www.cdc.gov/flu/weekly/fluactivity.htm; Table 1). When a pandemic begins, some enhancements might be instituted to improve geographic and demographic coverage and increase the amount of detail captured by particular components of the national influenza surveillance system.

## S1-II. OVERVIEW

**Supplement 1** provides recommendations to state and local partners on surveillance for influenza viruses and on disease surveillance to monitor the health impact of influenza. The recommendations for the Interpandemic and Pandemic Alert Periods focus on disease surveillance during interpandemic influenza seasons, as well as on surveillance for human cases of infection with avian influenza A (H5N1) or other novel strains of influenza. They also address preparedness planning for enhanced disease surveillance during a pandemic. The recommendations for the Pandemic Period focus on surveillance activities that will be undertaken if a pandemic virus is reported outside the United States or if a pandemic virus emerges in or enters the United States.

Outbreak investigations and special studies (e.g., to address questions about viral transmission or the clinical course of disease) are described in Part 1. Efforts to monitor the effectiveness and safety of vaccines and antiviral drugs are addressed in **Supplement 6** and **Supplement 7**.

The U.S. Department of Agriculture (USDA), through its Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) program, works with the states and the agricultural industry to conduct influenza surveillance in domestic animals. USDA also monitors wild avian populations for highly pathogenic avian influenza (HPAI) and other diseases of concern through the APHIS Wildlife Services program. Active and passive surveillance for influenza A viruses in poultry in the United States have increased substantially since the outbreak of HPAI in Pennsylvania and surrounding states in 1983 and 1984.

## S1-III. RECOMMENDATIONS FOR THE INTERPANDEMIC AND PANDEMIC ALERT PERIODS

CDC maintains and coordinates a national influenza surveillance system that identifies circulating influenza viruses and monitors disease activity during interpandemic influenza seasons. The seven components of the national influenza surveillance system—whose participants include healthcare providers, vital statistics offices, and local and state health departments and

public health laboratories—are listed in Table 1 and described in detail in Appendix 1. Components address virologic surveillance to determine when, where, and which influenza viruses are circulating, details of the various types of disease surveillance, and an overall state-level assessment of influenza activity.

## A. Virologic surveillance during interpandemic influenza seasons

Public health goals for routine surveillance of influenza viruses are to identify and characterize circulating strains to inform annual vaccine formulation and to identify and characterize strains with pandemic potential. State and local public health laboratories, Department of Defense (DOD) laboratories, and clinical laboratories (including hospital and private commercial laboratories) should continue to participate in surveillance for influenza viruses through the U.S.-based collaborating laboratories of the World Health Organization (WHO) Global Influenza Surveillance Network and the National Respiratory and Enteric Virus Surveillance System (NREVSS) (see **Supplement 2)**. The aim of the network of WHO and NREVSS laboratories is to monitor influenza trends and compare seasonal differences, rather than to record all influenza tests performed in the United States. Network enhancements that might be useful during the Pandemic Period are discussed below (see S1-III.E).

## B. Disease surveillance during interpandemic influenza seasons

### 1. National influenza surveillance system

The public health goals of influenza disease surveillance are to serve as an early warning system and to detect increases in ILI at the local level, to monitor the impact of influenza on health (e.g., by tracking outpatient visits, hospitalizations, and deaths), and to track trends in influenza disease activity and identify populations that are severely affected. During the Interpandemic Period, these goals are accomplished through the components of the national influenza surveillance system (Table 1). Public health and healthcare partners should continue to participate in these components of the national influenza surveillance system, which address the following types of disease surveillance.

**a) Outpatient surveillance**

- Sentinel Provider Network (SPN). Approximately 2,300 healthcare providers nationwide report the number of weekly outpatient visits for ILI and submit specimens from a small subset of patients to state public health laboratories for influenza virus testing.

**b) Hospital surveillance**

- Emerging Infections Program (EIP) influenza project. Laboratory-confirmed influenza-associated hospitalizations of children aged <18 years are monitored in 11 communities and reported to CDC on a bi-weekly basis.
- New Vaccine Surveillance Network (NVSN). Laboratory-confirmed influenza-associated hospitalizations of children aged <5 years are monitored in three communities and reported to CDC on a bi-weekly basis.

**c) Mortality surveillance**

- 122 Cities Mortality Reporting System. Vital statistics offices in 122 U.S. cities report pneumonia and influenza (P&I)-related deaths on a weekly basis.
- National Notifiable Disease Surveillance System (NNDSS) pediatric deaths. State health departments report influenza-associated pediatric deaths to CDC.

**d) State-level assessments**

- State and territorial epidemiologists' reports. Health departments provide weekly reports on the overall level of influenza activity in their states/territories.

It is not possible to provide an absolute case count for influenza or to determine population-based rates of infection or illness on a national level because many infected persons are asymptomatic or experience only mild illness and do not seek medical care. Also, laboratory testing is rare in less severe cases, and testing late in the course of illness (e.g., in cases with severe complications) can yield false-negative results because the patient is no longer shedding virus. Nevertheless, weekly data on outpatient visits for ILI, hospitalizations, and deaths allow CDC to monitor regional disease trends and to compare the timing and intensity of the current season to that of previous seasons.

Influenza surveillance has traditionally been conducted from October through May. In recent years, however, increasing numbers of healthcare providers, laboratories, and health departments have conducted influenza surveillance year-round. This enhancement is an important part of surveillance for novel strains of influenza.

### 2. Influenza surveillance coordinators

Currently, health departments in all 50 states—as well as in Chicago, New York City, and Washington, DC—have dedicated influenza surveillance coordinators who work at least part-time on influenza surveillance. The roles of the coordinators are to:

- Maintain the current influenza Sentinel Provider Network
- Oversee the surveillance enhancements described below
- Promote year-round influenza surveillance
- Remain in close contact with the CDC Influenza Branch
- Maintain working relationships with the state public health laboratory

## C. Surveillance for novel strains of influenza during the Pandemic Alert Period

### 1. Monitoring for novel strains of influenza

During the Pandemic Alert Period, CDC will issue recommendations for enhanced surveillance to identify patients at increased risk for infection with a novel virus. Novel influenza strains might include avian influenza viruses that can infect humans, other animal influenza viruses (such as swine influenza viruses) that can infect humans, or new or re-emergent human influenza strains that cause cases or clusters of human disease.

The specific recommendations will depend on the epidemiology of the virus and the clinical characteristics of the human cases as they are known at the time, and will most likely focus on severely ill, hospitalized, or ambulatory patients who meet certain epidemiologic and clinical criteria. For example, since February 2004, CDC has recommended enhanced surveillance to identify patients potentially infected with avian influenza A (H5N1). The current recommendations are summarized in Appendix 2.

State and local health departments will be notified of current recommendations via the Health Alert Network (HAN) and Epi-X. Health departments should distribute the recommendations to healthcare providers and will be responsible for receiving initial reports of potential cases in their jurisdictions.

Once a novel strain detected abroad exhibits sustained human-to-human transmission (WHO Phase 6), recommendations for further intensified virologic and disease surveillance will be issued and might include recommendations for stepped-up disease surveillance at U.S. ports of entry (see **Supplement 8**).

### 2. Reporting novel strains of influenza

- Clinicians should immediately contact the health department when they suspect a human case of infection with an avian or animal strain of influenza or with any other novel human influenza strain. Clinical algorithms for managing patients with possible novel influenza infection are provided in **Supplement 5.**

- State and local health departments should in turn immediately report to CDC any influenza cases that:
  - Test positive for a novel influenza subtype, *or*
  - Meet the enhanced surveillance case definition in effect at that time, *and*
  - Cannot be subtyped in the state public health laboratory because appropriate reagents or biocontainment equipment is not available (see **Supplement 2**).

Reference testing guidelines for potential pandemic strains of influenza are provided in **Supplement 2**.

- Health departments should call the CDC Emergency Response Hotline (770-488-7100) to report a suspected case of infection with avian influenza A (H5N1) or any other novel influenza virus. This number is available 24 hours a day, 7 days a week. Hotline staff will notify a member of the Influenza Branch who will contact the health department to answer questions and provide guidance.
- Following the initial telephone report, health department officials should complete a CDC case screening and report form (obtained from the Hotline or from Epi-X) that includes the CDC case ID number provided during the phone consultation. CDC staff will assist local and state health departments, as needed, in completing the form, which should be faxed to CDC at 888-232-1322 with a cover sheet that says: "ATTN: Influenza case reporting." The case screening and report form used to report suspected cases of human infection with influenza A (H5N1) is provided in Appendix 3.
- If infection with a novel influenza virus is confirmed, states may request CDC assistance with a case investigation to identify the source of infection and determine the course of illness. CDC will assist the state health department in monitoring the close contacts of the ill person.

## D. Veterinary surveillance

In the United States, surveillance for avian influenza is conducted by states, the poultry industry, and the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) (Appendix 4). Diagnostic testing is performed by state and industry laboratories, with confirmatory testing by USDA/APHIS Veterinary Services at the National Veterinary Services Laboratories in Ames, Iowa.

CDC and state health departments will continue to assist USDA and state veterinary diagnostic laboratories, as requested, in monitoring influenza strains among poultry and swine. Recent instances of human infection with avian influenza viruses are described in **Supplement 2**, Box 2.

## E. Preparedness planning for virologic and disease surveillance during a pandemic

Surveillance enhancements that will be needed during a pandemic should be developed during the Interpandemic and Pandemic Alert Periods so that baseline data for interpreting information gathered during the pandemic will be available and staff will have experience and familiarity with new methodologies.

### 1. Virologic surveillance

During an influenza pandemic, the volume of requests for laboratory testing is expected to increase dramatically. To meet these demands, laboratories should become proficient in methods that allow efficient testing of large numbers of specimens at a lower biosafety level than BSL 3 with enhancements—which is required for viral culture of avian influenza A (H5N1) viruses. To ensure adequate virologic surveillance during a pandemic, state public health laboratories should:

- Be equipped and trained to use RT-PCR for routine influenza testing and to detect novel influenza viruses by RT-PCR or by viral culture, using proper safety precautions
- Maintain reagents and supplies to allow influenza virus testing year-round

- Develop surge capacity to handle increased testing and reporting during a pandemic
- Assist CDC, if requested, in developing an electronic mechanism for reporting influenza testing and results

CDC is currently working with state and local partners to evaluate the utility and feasibility of reporting patient-level data (including zip code and/or county of residence) through an electronic mechanism other than the Public Health Laboratory Information System (PHLIS). Such a system would allow daily (rather than weekly) reporting during a pandemic and analysis of virus spread at the county or health district level. During a pandemic—as the burden of disease increases and state and local health departments face multiple, competing demands—it might be necessary to adjust surveillance strategies and reassess the need for frequent (or daily) reporting.

## 2. Outpatient surveillance

Surveillance for outpatient visits for ILI is conducted via the SPN, a collaborative effort among state health departments, healthcare providers, and CDC. State health departments recruit and maintain a local network of healthcare providers who report weekly the total number of patient visits and number of patients with ILI. SPN members may also send specimens from a subset of patients with ILI to the state public health laboratory for diagnostic testing at no cost. CDC develops and maintains reporting materials and systems, serves as a data repository, and provides feedback to the states. Each state should have at least one sentinel provider per 250,000 persons (or a minimum of 10 providers in states with smaller populations) that reports year-round.

CDC is exploring options for enhancing or supplementing ILI outpatient surveillance at the national, regional, and state levels, given that healthcare providers might not be able to report ILI in a timely manner when overwhelmed with patients during an emergency. Existing electronic data sources that might increase the geographic completeness, frequency of reporting, and sustainability of ILI data include:

- BioSense system, which includes ICD-9-coded outpatient visits at DOD ambulatory-care centers and Department of Veterans Affairs outpatient clinics. Studies are underway to determine if BioSense data can be combined with SPN data in a useful way and if they can be reported and analyzed daily.
- Existing emergency department "chief complaint" monitoring systems used by several states. Studies are underway to determine if these data can be added to SPN data and if they can be reported and analyzed daily.

CDC is also working with state and local partners to evaluate the need for and utility and feasibility of expanding SPN to allow analysis of ILI data at the county or health-district level and to provide data that are updated daily rather than weekly. Options for improving the analysis of ILI data include the use of:

- Outbreak detection algorithms that might identify aberrant increases in ILI activity at the individual provider/site level
- Daily analyses of SPN data for use by CDC and state health departments. CDC does not plan to ask sentinel providers to report more than once a week.

Some states are considering the use of systematic phone surveys to supplement SPN data during a pandemic by providing estimates of local cases and affected households. CDC will explore the utility and feasibility of conducting this type of survey on a national level.

## 3. Hospitalization surveillance

During a pandemic, hospitalization data will be needed on a frequent basis in all parts of the country to monitor disease severity and determine the most severely affected age groups. At present, however, surveillance for hospitalizations associated with influenza is limited to the collection of data on pediatric hospitalizations in 12 large metropolitan areas (see Table 1). In January 2006, the EIP influenza project will be expanded to include laboratory-confirmed influenza-associated hospitalizations of adults as well as children.

CDC is exploring options for expanding hospitalization surveillance to obtain data from all age groups in all parts of the country and obtaining more detailed information from a small number of sites. Some options under review include:

- Continuing to work with the Council of State and Territorial Epidemiologists (CSTE) to make laboratory-confirmed influenza-associated hospitalizations nationally notifiable. A position statement to add influenza infection requiring hospitalization to the list of nationally notifiable diseases was rejected by CSTE members in June 2005 but will be resubmitted in June 2006.
- Obtaining timely hospital discharge data to estimate the number of influenza-associated hospitalizations across the country
- Adding a hospitalization surveillance component to the national BioSense system
- Developing protocols for active population-based hospitalization surveillance, including specimen collection and virologic testing from a subset of hospitalized patients in all age groups in a limited number of sites
- Developing protocols for reporting the number of influenza-associated hospitalizations

### 4. Mortality surveillance

The collection of mortality data can also help health departments monitor the severity of a pandemic and determine which age groups and areas are most affected. Although pediatric deaths due to laboratory-confirmed influenza are nationally notifiable (as of October 2004), timely data on influenza deaths in other age groups are limited to information provided by the 122 Cities Mortality Reporting System, which provides weekly reports of the total number of death certificates that list P&I as a cause of death and the total number of death certificates filed (Table 1). Although the National Center for Health Statistics (NCHS) also collects mortality data, these data are not available until 2-3 years after each influenza season.

During a pandemic, state and local policy-makers and public health officials will likely ask health departments to provide mortality data to guide decision-making on control and response measures. In addition, CDC will request mortality data from each state to help guide national response measures. To help ensure uniform data collection across jurisdictions, CDC will provide case definitions and reporting procedures via HAN and Epi-X.

CDC is also investigating the feasibility of obtaining mortality data through the Electronic Death Registration (EDR) Project (http://www.naphsis.org/projects/index.asp?bid=374) and the validity of estimating national mortality based on data from the 122 Cities Mortality Reporting System. State-specific mortality cannot be estimated from data provided by the 122 Cities system.

### 5. State influenza activity assessments

During the Interpandemic Period, state health departments provide weekly assessments of the overall level of influenza activity (i.e., none, sporadic, local, regional, widespread) in the state. These assessments are used to compare the extent of influenza activity from state to state, and are the only state-level influenza surveillance data that CDC makes publicly available during interpandemic influenza seasons. The state influenza activity assessments are used to generate the influenza activity map, which is the most frequently referenced component of national influenza surveillance (see www.cdc.gov/flu/weekly/usmap.htm). During a pandemic, CDC will recommend that these assessments be made year-round, rather than only October through May.

## S1-IV. RECOMMENDATIONS FOR THE PANDEMIC PERIOD

During a pandemic, more detailed information on age-specific, population-based rates of severe disease and patient outcomes will be needed than can be provided through routine national surveillance. This information will be obtained through enhanced national surveillance and carefully designed studies in a limited number of sites. These data will provide information to guide response and policy development during a pandemic. Outbreak investigations and special studies are described in Part 1.

## A. Enhanced surveillance

During an influenza pandemic, CDC will use data from the U.S. collaborating laboratories of the WHO Global Influenza Surveillance Network and the NREVSS to detect the introduction and early cases of a pandemic influenza virus in the United States, track the virus' introduction into local areas, and monitor changes in the pandemic virus, including development of antiviral resistance. States should conduct the following activities:

- Distribute to healthcare providers the current CDC recommendations for enhanced surveillance for the detection of the first cases of the pandemic virus in their jurisdictions.
- Facilitate the collection and testing of appropriate specimens as recommended for early detection of pandemic virus at the local level.
- Increase testing and the frequency of reporting of virologic data. The most intense testing will be necessary during the early stages of a pandemic, when detecting the introduction of the virus into a state or community is the primary goal.
- Once the virus has been identified throughout the state, the level of testing can be decreased to a level more like that of a non-pandemic influenza season. State health officials can determine the level of testing for their jurisdictions.
- As part of the effort to monitor antigenic and genetic changes and changes in antiviral resistance patterns in the pandemic virus, state public health laboratories should forward a subset of virus isolates to CDC. CDC will advise states on the number of and clinical criteria for these isolates. **Supplement 2** contains additional information on monitoring for antiviral resistance.

During an influenza pandemic, CDC will use data from SPN, hospitalization surveillance, state and territorial epidemiologists' assessments, the 122 Cities Mortality Reporting System, NNDSS, and other data systems to:

- Monitor the pandemic's impact on health
- Track trends in influenza disease activity and identify populations that are severely affected
- Serve as an early warning system to detect increases in ILI in the community

State health departments should:

- Communicate to all partners the heightened need for timely and complete surveillance data.
- Ensure that all sentinel provider surveillance sites are reporting weekly, regardless of the time of year.
- Ensure that EIP and NVSN hospitalization surveillance is active.
- Report state influenza activity level in a timely manner.
- Facilitate timely reporting of 122 Cities Mortality Reports and pediatric deaths.
- Implement state and local collection of influenza-associated mortality data and reporting of statewide mortality data to CDC, following CDC guidelines for uniform data collection and reporting.

## B. Scaled-back surveillance

Enhanced surveillance will be conducted during the introduction, initial spread, and first waves of a pandemic. Over time, as more persons are exposed, the pandemic strain is likely to become a routinely circulating influenza A subtype. When that happens, the activities of the national influenza surveillance system will revert to the frequency and intensity typically seen during interpandemic influenza seasons. The return to interpandemic surveillance will occur as soon as feasible, and the change will be communicated to all surveillance partners.

## TABLE 1. COMPONENTS OF THE NATIONAL INFLUENZA SURVEILLANCE SYSTEM

| Activity | Surveillance type | Description |
|---|---|---|
| U.S. collaborating laboratories of the:<br>• WHO Global Influenza Surveillance Network<br>• National Respiratory and Enteric Virus Surveillance System (NREVSS) | Virologic surveillance | Collaborating laboratories report weekly to CDC the number of influenza tests performed and the number of positive results by type, and in some cases, subtype and age group. If non-subtypable viruses or unusual subtypes are detected, the specimens are sent to the state public health laboratory or to CDC for further testing. |
| Sentinel Provider Network (SPN) | Outpatient surveillance | Approximately 2,300 healthcare providers monitor outpatient visits for ILI (fever >100°F or 37.8°C AND sore throat and/or cough in the absence of a known cause other than influenza). Specimens from a small subset of patients are submitted to state public health laboratories for influenza virus testing. |
| Emerging Infections Program (EIP) influenza project | Hospital surveillance | Eleven EIP sites report to CDC cases of laboratory-confirmed influenza-related hospitalizations in children aged <18 years on a bi-weekly basis. |
| New Vaccine Surveillance Network (NVSN) pediatric hospitalizations | Hospital surveillance | NVSN enrolls a subset of patients aged <5 years who are hospitalized with fever or respiratory symptoms. Nose and throat swabs are obtained and tested for influenza by viral culture and RT-PCR. The rate of laboratory-confirmed influenza-related hospitalizations is reported to CDC on a bi-weekly basis. |
| 122 Cities Mortality Reporting System | Mortality surveillance | Municipal vital records offices transmit weekly data to CDC on the total number of death certificates filed and the number with pneumonia and/or influenza listed as a cause of death. |
| National Notifiable Disease Surveillance System (NNDSS) influenza-associated pediatric mortality | Mortality surveillance | Participating state health departments report to CDC all laboratory-confirmed influenza-related deaths among children <18 years. |
| State and territorial epidemiologists' reports | State-level assessments | Health departments report on a weekly basis the overall level of influenza activity as none, sporadic, local, regional, or widespread. |

# APPENDIX 1. TYPES OF INFLUENZA SURVEILLANCE

## A. Virologic surveillance

- A network of ~75 WHO collaborating laboratories and ~90 NREVSS collaborating laboratories report the total number of respiratory specimens tested and the number positive for influenza by type, subtype, and age group to CDC each week. (Because ~40 of the NREVSS laboratories are also WHO laboratories, the total number in the WHO/NREVSS network is ~125.) Data from the two networks are combined and analyzed together.
- WHO collaborating laboratory network
  - All 50 state health department laboratories, 4 large county public health laboratories, a DOD reference laboratory, and ~25 tertiary-care hospital and academic center laboratories participate.
  - State and county public health laboratories subtype (i.e., A/H1 vs. A/H3) ~80% of their influenza A isolates.
  - Laboratories report the number of tests performed and results by age group to CDC's Influenza Branch.
  - Approximately 30% of laboratories report specimen-level data electronically using PHLIS, ~40% report aggregate weekly data via the Internet, and ~30% report aggregate weekly data via fax.
- NREVSS collaborating laboratory network
  - Primarily hospital laboratories
  - Most do not subtype influenza viruses, and none report age-group data
  - Laboratories report aggregate weekly numbers of tests performed and results to CDC's Respiratory and Enteric Viruses Branch (REVB) by phone or Internet.
- Laboratories test for influenza viruses by viral culture, PCR, or antigen detection.
- Most laboratories maintain the ability to test for influenza year-round.
- Data are available to state health department influenza surveillance coordinators on a password-protected website that is updated once a week during October through May and periodically throughout the summer. National and regional data are made available to all states, and state-specific data (including a laboratory-specific line list) are available to the states from which the data were reported.

## B. Outpatient ILI surveillance (Sentinel Provider Network)

- Network of ~2,300 primary-care providers in all 50 states record the number of outpatients seen for any reason and the number with ILI by age group and report directly to CDC each week.
- ILI is defined as fever (>100°F or 37.8°C) AND sore throat and/or cough in the absence of a known cause other than influenza.
- All providers report from October through May, and approximately one third of the regular reporters report year-round.
- The network is a collaborative effort between CDC and state health departments.
  - State health department influenza surveillance coordinators recruit and maintain a network of providers and arrange for testing, free of charge, for a subset of specimens from providers.
  - CDC develops and maintains reporting materials and systems, serves as a data repository, and provides data feedback to the states.
- Providers collect two or three specimens from patients with ILI at the beginning, middle, and end of the season and from any unusual clinical cases, severe cases, outbreak-related cases, and patients with ILI during the summer.
- Providers report to CDC via a password-protected Internet site (75%), fax (13%), or phone (12%).

- Data are available to state health department influenza surveillance coordinators on a password-protected website. Data reported by providers on the Internet are available in real time, and data reported to CDC by fax are updated once each weekday. Regional data are available to all states, whereas state-specific data are available to the states from which the data were reported.

## C. Hospitalization surveillance

- Hospitalizations associated with laboratory-confirmed influenza in children are monitored in 12 metropolitan areas through two surveillance networks that report patient-level data to CDC every 2 weeks.
  - Emerging Infections Program (EIP) influenza project. Children aged <18 years are monitored in 11 metropolitan areas from October 1 through April 30; laboratory testing is part of routine patient care. The EIP influenza project will expand to include all age groups in January 2006.
  - New Vaccine Surveillance Network (NVSN). A sample of children aged <5 years is monitored in three metropolitan areas (two are EIP influenza project sites) from October 1 through March/April; all sampled children with fever and respiratory symptoms are tested on admission.

## D. Mortality surveillance

- Vital statistics offices in 122 cities covering between one-fourth and one-third of the U.S. population report weekly throughout the year the total number of death certificates filed and the number with pneumonia and/or influenza listed anywhere on the death certificate, by age group. No additional information (e.g., underlying medical condition, demographics) is available. On average, there is a 15-day lag from death to report to CDC.
- Weekly mortality data from the 122 cities are compared to a seasonal baseline calculated using a robust regression procedure run on the previous 5 years of data. If the proportion of P&I deaths for a given week exceeds the baseline value for that week by a statistically significant amount, P&I deaths are said to be above the epidemic threshold, and the proportion of deaths above threshold are considered attributable to influenza.
  - Data from all 122 cities are combined, and the percentage of all P&I deaths are calculated and compared to the expected percentage for that week.
  - Data can be analyzed by age group and geographic region, but interpretation of the data requires the development of a separate baseline for each data subset. It is not valid to compare data from a particular city or region to the national baseline.
- Detailed data (e.g., person-level data including multiple causes of death, underlying medical conditions, demographics) on ~99% of deaths in the United States are available from NCHS, but these data have a time lag of ~2-3 years.
- Pediatric deaths associated with laboratory-confirmed influenza were made nationally notifiable in October 2004. During the 2004-2005 season, the condition was reportable in 13 states; many others instituted voluntary reporting until the legal requirement was passed. CDC receives electronic, patient-level data on these deaths. The timeliness of these data cannot yet be assessed.

## E. State-level influenza activity assessments

State health departments report a weekly assessment of the overall level of influenza activity (none, sporadic, local, regional, or widespread) in the state (see box below). These assessments are used to compare the extent of influenza activity from state to state and represent the only state-level influenza surveillance data that CDC makes publicly available during the interpandemic influenza season.

## TABLE 2. COMPONENTS OF THE NATIONAL INFLUENZA SURVEILLANCE SYSTEM

| Activity level | ILI activity*/outbreaks | | Laboratory data |
|---|---|---|---|
| **No activity** | Low | **and** | No lab-confirmed cases† |
| **Sporadic** | Not increased | **and** | Isolated lab-confirmed cases |
| | **or** | | Lab-confirmed outbreak in one institution‡ |
| **Local** | Not increased | | Recent (within the past 3 weeks) lab evidence of influenza in region with increased ILI |
| **Regional** (doesn't apply to states with ≤4 regions) | Increased ILI in 1 region**; ILI activity in other regions is not increased | **and** | Recent (within the past 3 weeks) lab evidence of influenza in region with the outbreaks; virus activity is no greater than sporadic in other regions |
| | **or** | | |
| | 2 or more institutional outbreaks (ILI or lab confirmed) in 1 region; ILI activity in other regions is not increased | | Recent (within the past 3 weeks) lab-confirmed influenza in the affected regions |
| **Widespread** | Increased ILI in ≥2 but less than half of the regions | **and** | Recent (within the past 3 weeks) lab-confirmed influenza in the affected regions |
| | **or** | | |
| | Institutional outbreaks (ILI or lab confirmed) in ≥2 and less than half of the regions | **and** | Recent (within the past 3 weeks) lab-confirmed influenza in the state. |
| | Increased ILI and/or institutional outbreaks (ILI or lab confirmed) in at least half of the regions | | |

* ILI activity can be assessed using a variety of data sources, including Sentinel providers, school/workplace absenteeism, and other syndromic surveillance systems that monitor influenza-like illness.

† Lab-confirmed case = case confirmed by rapid diagnostic test, antigen detection, culture, or PCR. Care should be given when relying on results of point-of-care rapid diagnostic test kits during times when influenza is not circulating widely. The sensitivity and specificity of these tests vary, and the predicative value positive may be low outside of peak influenza activity. Therefore, a state may wish to obtain laboratory confirmation of influenza by testing methods other than point-of-care rapid tests for reporting the first laboratory-confirmed case of influenza of the season.

‡ Institution = nursing home, hospital, prison, school, etc.

** Region = population under surveillance in a defined geographical subdivision of a state. A region could be comprised of one or more counties and would be based on each state's specific circumstances. Depending on the size of the state, the number of regions could range from 2 to approximately 12. The definition of regions would be left to the state, but existing state health districts could be used in many states. Allowing states to define regions would avoid somewhat arbitrary county lines and allow states to establish divisions that make sense based on geographic population clusters. Focusing on regions larger than counties would also improve the likelihood that data needed for estimating activity would be available.

## APPENDIX 2. INTERIM RECOMMENDATIONS: ENHANCED U.S. SURVEILLANCE AND DIAGNOSTIC EVALUATION TO IDENTIFY CASES OF HUMAN INFECTION WITH AVIAN INFLUENZA A (H5N1)

**NOTE:** This guidance pertains to the avian influenza A (H5N1) circulating as of October 2005 CDC will provide updated guidance for avian influenza A (H5N1) or for new situations, as needed, through the Health Alert Network.

Enhanced surveillance efforts by state and local health departments, hospitals, and clinicians are needed to identify patients at increased risk for influenza A (H5N1). Interim recommendations are as follows:

- Testing for avian influenza A (H5N1) is indicated for **hospitalized** patients with:
  - Radiographically confirmed pneumonia, acute respiratory distress syndrome (ARDS), or other severe respiratory illness for which an alternative diagnosis has not been established, **and**
  - History of travel within 10 days of symptom onset to a country with documented avian influenza A (H5N1) infections in poultry and/or humans. (For a regularly updated listing of H5N1-affected countries, see the World Organization for Animal Health [OIE] website at http://www.oie.int/eng/en_index.htm and the WHO website at http://www.who.int/en/).

**OR**

- Testing for avian influenza A (H5N1) should be considered on a case-by-case basis in consultation with state and local health departments for **hospitalized or ambulatory** patients with:
  - Documented temperature of >100.4°F (>38°C); **and**
  - One or more of the following: cough, sore throat, or shortness of breath; **and**
  - History of contact with poultry (e.g., visited a poultry farm, a household raising poultry, or a bird market) or a known or suspected human case of influenza A (H5N1) in an H5N1-affected country within 10 days prior to onset of symptoms.

# APPENDIX 3. CDC HUMAN INFLUENZA A(H5) CASE SCREENING AND REPORT FORM

## Human Influenza A (H5)

### Human Influenza A (H5) Domestic Case Screening Form

CDC Case ID:

**1. Reported By**

| | |
|---|---|
| Date reported to state or local health department: __ __ / __ __ / __ __ __ __ (m m d d y y y y) | State/ local Assigned Case ID: |
| Last Name: | First Name: |
| State: | Affiliation: | Email: |
| Phone 1: | Phone 2: | Fax: |

**2. Patient Information**

City of Residence: County: State:

Age at onset: _____ ☐ Year(s) ☐ Month(s)

Race: *(Choose One)*
☐ American Indian/Alaska Native ☐ White
☐ Asian ☐ Unknown
☐ Black
☐ Native Hawaiian/Other Pacific Islander

Sex: ☐ Male ☐ Female

Ethnicity: ☐ Non Hispanic ☐ Hispanic

**3. Optional Patient Information**

Last Name: First Name:

**4. Signs and Symptoms**

A. Date of symptom onset: __ __ / __ __ / __ __ __ __ (m m d d y y y y)

B. What symptoms and signs did the patient have during the course of illness? (check all that apply)

☐ Fever > 38° C (100.4° F) ☐ Feverish (temperature not taken) ☐ Conjunctivitis

☐ Cough ☐ Headache ☐ Shortness of breath

☐ Sore throat ☐ Other (specify): _____

C. Was a chest X-ray or chest CAT scan performed? ☐ Yes* ☐ No ☐ Unknown

If yes*, did the patient have radiographic evidence of pneumonia or respiratory distress syndrome (RDS)? ☐ Yes* ☐ No ☐ Unknown

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DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION
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## Epidemiologic Risk Factors

CDC Case ID:

**5. Travel/Exposures**

A. In the 10 days prior to illness onset, did the patient travel to any of the countries listed in the table below? If yes*, please fill in arrival and departure dates for all countries that apply. ☐ Yes* ☐ No** ☐ Unknown

****If patient did not travel outside U.S., skip to question 6.**

| Country | Arrival Date | Departure Date | Country | Arrival Date | Departure Date |
|---|---|---|---|---|---|
| ☐ Afghanistan | | | ☐ Myanmar (Burma) | | |
| ☐ Bangladesh | | | ☐ Nepal | | |
| ☐ Brunei | | | ☐ North Korea | | |
| ☐ Cambodia | | | ☐ Oman | | |
| ☐ China | | | ☐ Pakistan | | |
| ☐ Hong Kong | | | ☐ Papua New Guinea | | |
| ☐ India | | | ☐ Philippines | | |
| ☐ Indonesia | | | ☐ Saudi Arabia | | |
| ☐ Iran | | | ☐ Singapore | | |
| ☐ Iraq | | | ☐ South Korea | | |
| ☐ Israel | | | ☐ Syria | | |
| ☐ Japan | | | ☐ Taiwan | | |
| ☐ Jordan | | | ☐ Thailand | | |
| ☐ Laos | | | ☐ Turkey | | |
| ☐ Lebanon | | | ☐ Viet Nam | | |
| ☐ Macao | | | ☐ Yemen | | |
| ☐ Malaysia | | | | | |

For the questions 5B to 5E,
**In the 10 days prior to illness onset, <u>while in the countries</u> listed above . . . .**

B. Did the patient come within 1 meter (3 feet) of any live poultry or domesticated birds (e.g. visited a poultry farm, a household raising poultry, or a bird market)? ☐ Yes* ☐ No ☐ Unknown

If Yes*

C. Did patient touch any recently butchered poultry? ☐ Yes ☐ No ☐ Unknown

D. Did the patient visit or stay in the same household with anyone with pneumonia or severe flu-like illness? ☐ Yes ☐ No ☐ Unknown

E. Did the patient visit or stay in the same household with a suspected human influenza A(H5) case?* ☐ Yes ☐ No ☐ Unknown

F. Did the patient visit or stay in the same household with a known human influenza A(H5) case?* ☐ Yes ☐ No ☐ Unknown

** SEE Influenza A (H5): Interim U.S. Case Definitions*

(continued from previous page)

CDC ID:

| 6. Exposure for Non Travelers | |
|---|---|
| For patients whom did not travel outside the U.S., **in the 10 days prior to illness onset**, did the patient visit or stay in the same household with a traveler returning from one of the countries listed above who developed pneumonia or severe flu-like illness? | ☐ Yes* ☐ No ☐ Unknown |
| If yes*, was the contact a confirmed or suspected H5 case patient? | ☐ Yes* ☐ No ☐ Unknown |
| If yes*: CDC ID: _____ STATE ID: _____ | |

## Laboratory Evaluation

| 7. State and local level influenza test results | |
|---|---|
| **Specimen 1** | |
| ☐ NP swab ☐ Broncheoalveolar lavage specimen (BAL)<br>☐ NP aspirate ☐ OP swab ☐ Other _____ | Date Collected:<br>__ __ / __ __ / __ __ __ __<br>m m d d y y y y |
| Test Type:<br>☐ RT-PCR ☐ Direct fluorescent antibody (DFA)<br>☐ Viral Culture ☐ Rapid Antigen Test*<br>*Name of Rapid Test: | Result:<br>☐ Influenza A ☐ Influenza B<br>☐ Influenza (type unk)<br>☐ Negative ☐ Pending |
| **Specimen 2** | |
| ☐ NP swab ☐ Broncheoalveolar lavage specimen (BAL)<br>☐ NP aspirate ☐ OP swab ☐ Other _____ | Date Collected:<br>__ __ / __ __ / __ __ __ __<br>m m d d y y y y |
| Test Type:<br>☐ RT-PCR ☐ Direct fluorescent antibody (DFA)<br>☐ Viral Culture ☐ Rapid Antigen Test*<br>*Name of Rapid Test: | Result:<br>☐ Influenza A ☐ Influenza B<br>☐ Influenza (type unk)<br>☐ Negative ☐ Pending |
| **Specimen 3** | |
| ☐ NP swab ☐ Broncheoalveolar lavage specimen (BAL)<br>☐ NP aspirate ☐ OP swab ☐ Other _____ | Date Collected:<br>__ __ / __ __ / __ __ __ __<br>m m d d y y y y |
| Test Type:<br>☐ RT-PCR ☐ Direct fluorescent antibody (DFA)<br>☐ Viral Culture ☐ Rapid Antigen Test*<br>*Name of Rapid Test: | Result:<br>☐ Influenza A ☐ Influenza B<br>☐ Influenza (type unk)<br>☐ Negative ☐ Pending |

(continued from previous page)

CDC ID:

**8. List specimens sent to the CDC**

Select a SOURCE* from the following list for each specimen: Serum (acute), serum (convalescent), NP swab, NP aspirate, broncheoalveolar lavage specimen (BAL), OP swab, tracheal aspirate, or tissue

| | | |
|---|---|---|
| Specimen 1:<br>☐ Clinical Material<br>☐ Extracted RNA<br>☐ Virus Isolate | Source*:<br>---------- | Collected : __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Specimen 2:<br>☐ Clinical Material<br>☐ Extracted RNA<br>☐ Virus Isolate | Source*:<br>---------- | Collected : __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Specimen 3:<br>☐ Clinical Material<br>☐ Extracted RNA<br>☐ Virus Isolate | Source*:<br>---------- | Collected : __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Specimen 4:<br>☐ Clinical Material<br>☐ Extracted RNA<br>☐ Virus Isolate | Source*:<br>---------- | Collected : __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Specimen 5:<br>☐ Clinical Material<br>☐ Extracted RNA<br>☐ Virus Isolate | Source*:<br>---------- | Collected : __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Date Sent: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Carrier: | Tracking #: | |

**9. Case Notes:**

(continued from previous page)

CDC ID:

| CDC Contact Information (FOR CDC USE ONLY) | |
|---|---|
| Case status and date status applied:<br>☐ Clinical Case (lab results pending) __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>☐ Influenza A pos. Case (subtype pending) __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>☐ Confirmed Case __ __ / __ __ / __ __ __ __ (m m d d y y y y) | ☐ Ruled Out/Non-Case: __ __ / __ __ / __ __ __ __ (m m d d y y y y)<br>Reason:<br>☐ Influenza A neg. (by PCR, viral culture, or influenza A serology)<br>☐ Non-H5 Influenza Strain<br>☐ Other etiology*<br>☐ Did not meet case definition |
| Date Entered by CDC: __ __ / __ __ / __ __ __ __ (m m d d y y y y) | Contact Date: __ __ / __ __ / __ __ __ __ (m m d d y y y y) |
| Name of CDC Contact: | |

| *Alternative Diagnosis | | | |
|---|---|---|---|
| A. Was an alternative non-influenza respiratory pathogen detected?<br>If yes* specify: | ☐ Yes* | ☐ No | ☐ Unknown |
| B. Was there a diagnosis other than respiratory infection?<br>If yes* specify: | ☐ Yes* | ☐ No | ☐ Unknown |