FACT SHEET

Overview of Influenza Surveillance in the United States

The Epidemiology and Prevention Branch in the Influenza Division at CDC collects, compiles and analyzes information on influenza activity year round in the United States and produces a weekly report from October through mid-May. The U.S. influenza surveillance system is a collaborative effort between CDC and its many partners in state and local health departments, public health and clinical laboratories, vital statistics offices, physicians, clinics and emergency departments, and the Departments of Defense and Veteran's Affairs. Information in five categories is collected from 10 different data sources that allow CDC to:

- Find out when and where influenza activity is occurring
- Track influenza-related illness
- Determine what influenza viruses are circulating
- Detect changes in influenza viruses
- Measure the impact influenza is having on deaths in the United States

The Five Categories of Influenza Surveillance

1. **Viral Surveillance** — About 80 **U.S. World Health Organization (WHO) Collaborating Laboratories** and 70 **National Respiratory and Enteric Virus Surveillance System (NREVSS)** laboratories located throughout the United States report the total number of respiratory specimens tested and the number positive for influenza types A and B each week. Most of the U.S. WHO collaborating laboratories also report the influenza A subtype (H1 or H3) of the viruses they have isolated and the ages of the persons from whom the specimens were collected. Some of the influenza viruses collected by laboratories are sent to CDC for further characterization, including gene sequencing, antiviral resistance testing and antigenic determination.

   Surveillance for Novel Influenza A Viruses — In 2007, human infection with a novel influenza A virus became a nationally notifiable condition. Novel influenza A virus infections include all human infections with influenza A viruses that are different from currently circulating human influenza H1 and H3 viruses. These viruses include those that are subtyped as nonhuman in origin and those that are unsubtypable with standard methods and reagents. Rapid reporting of human infections with novel influenza A viruses will facilitate prompt detection and characterization of influenza A viruses and accelerate the implementation of effective public health responses.

2. **Outpatient Illness Surveillance** — Information on patient visits to health care providers for influenza-like illness or acute respiratory infections are collected through two systems:

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- **U.S. Influenza Sentinel Providers Surveillance Network** — The Sentinel Providers Surveillance Network consists of about 2,400 healthcare providers in 50 states reporting approximately 12 million patient visits each year. Each week, approximately 1,300 outpatient care sites around the country report data to CDC on the total number of patients seen and the number of those patients with influenza-like illness (ILI) by age group. For this system, ILI is defined as fever (temperature of 100°F [37.8°C] or greater) and a cough and/or a sore throat in the absence of a KNOWN cause other than influenza. Sites with electronic records use an equivalent definition as determined by the state public health authorities. The percentage of patient visits to sentinel providers for ILI reported each week is weighted on the basis of state population. This percentage is compared each week with the national baseline of 2.2%. The baseline is the mean percentage of patient visits for ILI during non-influenza weeks for the previous three seasons plus two standard deviations. Due to wide variability in regional level data, it is not appropriate to apply the national baseline to regional data, therefore, region specific baselines are calculated. Regional baselines for the 2007-08 influenza season are:

New England Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island	1.4%
Mid-Atlantic New Jersey, New York City, Pennsylvania, Upstate New York	3.1%
East North Central Illinois, Indiana, Michigan, Ohio, Wisconsin	1.9%
West North Central Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota	1.5%
South Atlantic Delaware, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, Washington, D.C., West Virginia	2.1%
East South Central Alabama, Kentucky, Mississippi, Tennessee	2.4%
West South Central Arkansas, Louisiana, Oklahoma, Texas	4.3%
Mountain Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	1.6%
Pacific Alaska, California, Hawaii, Oregon, Washington	3.1%

- **BioSense Department of Veterans Affairs (VA) and Department of Defense (DoD) Outpatient Surveillance** — Approximately 350 DoD and 800 VA treatment facilities transmit information on outpatient visits by active military personnel and their dependents and veterans daily in the form of ICD-9 codes. The percentage of patient visits with any ICD-9 code for an acute respiratory infection (ARI) is calculated by age group each week and compared to age group-specific baselines. The ICD-9 codes used are 460 to 466 and 480 to 488.

3. **Mortality Surveillance** — Rapid tracking of influenza-associated deaths is done through two systems:

   - **122 Cities Mortality Reporting System** — Each week, the vital statistics offices of 122 cities report the total number of death certificates received and the number of those for which pneumonia or influenza was listed as the underlying or contributing cause of death by age group. The percentage of all deaths due to pneumonia and influenza (P&I) are compared with a seasonal baseline and epidemic threshold value calculated for each week. The seasonal baseline of P&I deaths is calculated using a periodic regression model that incorporates a robust regression procedure applied to data from the previous five years. An increase of 1.645 standard deviations above the seasonal baseline of P&I deaths is considered the "epidemic threshold," i.e., the point at which the observed proportion of deaths attributed to pneumonia or influenza was significantly higher than would be expected at that time of the year in the absence of substantial influenza-related mortality.

   - **Surveillance for Influenza-associated Pediatric Mortality** — Influenza-associated deaths in children (persons less than 18 years) was added as nationally notifiable condition in 2004. Laboratory-confirmed influenza-associated deaths in children are reported through the Nationally Notifiable Disease Surveillance System.

4. **Hospitalization Surveillance** — Two systems monitor hospitalizations among children with laboratory confirmed influenza infections.

   - **Emerging Infections Program (EIP)** — The EIP Influenza Project conducts surveillance for laboratory-confirmed influenza related hospitalizations in persons less than 18 years of age in 60 counties covering 12 metropolitan areas of 10 states (San Francisco CA, Denver CO, New Haven CT, Atlanta GA, Baltimore MD, Minneapolis/St. Paul MN, Albuquerque NM, Las Cruces, NM, Albany NY, Rochester NY, Portland OR, and Nashville TN). Cases are identified by reviewing hospital laboratory and admission databases and infection control logs for children with a documented positive influenza test (viral culture, direct/indirect fluorescent antibody assay (DFA/IFA), reverse transcription-polymerase chain reaction (RT-PCR), or a commercial rapid antigen test) conducted as a part of routine patient care. EIP estimated hospitalization rates are reported every two weeks during the influenza season.

   - **New Vaccine Surveillance Network (NVSN)** — The New Vaccine Surveillance Network (NVSN) provides population-based estimates of laboratory-confirmed influenza hospitalization rates for children less than 5 years old residing in three counties: Hamilton County OH, Davidson County TN, and Monroe County NY. Children admitted to NVSN hospitals with fever or respiratory symptoms are prospectively enrolled and respiratory

samples are collected and tested by RT-PCR and viral culture. NVSN estimated rates are reported every two weeks during the influenza season.

5. **Summary of the Geographic Spread of Influenza —** State health departments report the estimated level of spread of influenza activity in their states each week through **the State and Territorial Epidemiologists Reports**. States report influenza activity as no activity, sporadic, local, regional, or widespread. These levels are defined as follows:

    - **No Activity**: No laboratory-confirmed cases of influenza and no reported increase in the number of cases of ILI.
    - **Sporadic**: Small numbers of laboratory-confirmed influenza cases or a single laboratory-confirmed influenza outbreak has been reported, but there is no increase in cases of ILI.
    - **Loca**l: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in a single region of the state.
    - **Regional**: Outbreaks of influenza or increases in ILI and recent laboratory confirmed influenza in at least 2 but less than half the regions of the state.
    - **Widespread**: Outbreaks of influenza or increases in ILI cases and recent laboratory-confirmed influenza in at least half the regions of the state.

Together, the five categories of influenza surveillance are designed to provide a national picture of influenza activity. Pneumonia and influenza mortality is reported on a national level only. Outpatient illness and laboratory data are reported on a national level and by influenza surveillance region. (http://www.cdc.gov/flu/images/usregmap.gif).

The state and territorial epidemiologists' reports of influenza activity are the only state-level information reported. Both the EIP and NVSN data provide population-based, laboratory-confirmed estimates of influenza-related pediatric hospitalizations but are reported from limited geographic areas.

It is important to maintain a comprehensive system for influenza surveillance for several reasons:

- Influenza viruses are constantly changing which requires ongoing collection and characterization of the strains.
- Influenza strains can rapidly undergo changes leading to pandemics of influenza; surveillance of viruses will detect these changes.
- Vaccines must be administered annually and are updated regularly based on surveillance findings.
- Treatment for influenza is guided by laboratory surveillance for antiviral resistance.
- National responses to emerging pandemic strains are triggered by surveillance data.
- Varying segments of the population are affected by influenza and may require targeted interventions. These groups are determined through influenza surveillance.

It is important to remember the following about influenza surveillance in the United States:

- All influenza activity reporting by states and health-care providers is voluntary.
- The reported information answers the questions of where, when, and what influenza viruses are circulating. It can be used to determine if influenza activity is increasing or decreasing, but cannot be used to ascertain how many people have become ill with influenza during the influenza season.
- The system consists of 10 complementary surveillance components in five categories. These components include reports from more than 120 laboratories, 2,400 outpatient care sites, vital statistics offices in 122 cities, research and health-care personnel at the NVSN and EIP sites, and influenza surveillance coordinators and state epidemiologists from all 50 state health departments, and the District of Columbia health department.
- Influenza surveillance data collection is based on a reporting week that starts on Sunday and ends on Saturday of each week. Each surveillance participant is requested to summarize weekly data and submit it to CDC by Tuesday afternoon of the following week. Those data are then downloaded, compiled, and analyzed at CDC. The report is distributed and posted on the CDC Web site (http://www.cdc.gov/flu/weekly/fluactivity.htm) each Friday from October through May.

For more information, visit www.cdc.gov/flu or call the CDC Flu Information Line at 800-CDC-INFO (English and Spanish) or 888-232-6358 (TTY).

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