

Influenza Surveillance Overview

Surveillance for influenza requires monitoring for both influenza viruses and disease activity at the local, state, national, and international levels. Disease surveillance is necessary to track the impact of circulating viruses on the human population. Each year, influenza virus infections can lead to a large number of illnesses, hospitalizations and deaths, but the intensity and timing of activity can vary from one season to the next. Looking at virus and disease surveillance data together is vital for selecting the optimal influenza vaccine components each year, for detecting potential pandemic viruses, and assisting health care providers, public health officials and policy makers in making critical influenza prevention and control decisions.

Information collected from influenza surveillance allows public health authorities to:

- Detect when and where influenza activity is occurring
- Track influenza-related illness
- Describe clinical infections, track epidemiologic changes, and determine groups at highest risk
- Monitor illness severity/intensity
- Detect unusual events or change in influenza viruses
- Monitor outbreaks of disease

Overview of Surveillance Conducted at the National Level

The Centers for Disease Control and Prevention (CDC) conducts and coordinates national influenza surveillance. 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 [FluView](#), a weekly influenza surveillance report, and [FluView Interactive](#), which allows for more in-depth exploration of influenza surveillance data. Much of the information used by CDC to assess influenza activity is collected by state, local and territorial health departments, public health and clinical laboratories, vital statistics offices, healthcare providers, clinics, and emergency departments.

Each state, including New Jersey, is an integral partner in reporting surveillance data to the CDC. Data from a few surveillance systems, managed by CDC and with limited scope, are not collected by every state. The bullets below provide details on these systems. Estimates produced from both of these systems are designed to provide information on the impact of influenza nationwide. While this information is often presented by CDC and used to describe influenza, these data are not available at the state level.

- **Influenza Hospitalization Surveillance Network ([FluSurv-NET](#))**
 - Tracks information on laboratory-confirmed influenza-related hospitalizations in children and adults.
 - The network covers over 70 counties in the 10 states with Emerging Infections Program (EIP) (CA, CO, CT, GA, MD, MN, NM, NY, OR, and TN) and three additional states (MI, OH, and UT).

- Data gathered are used to estimate age-specific hospitalization rates on a weekly basis during the influenza season and to describe characteristics of persons hospitalized with associated influenza illness.
- **Influenza Vaccine Effectiveness ([U.S. Flu VE Network](#))**
 - CDC conducts studies at five sites across the United States to estimate how well flu vaccine works by observing laboratory-confirmed flu cases and assessing their vaccination status.
 - To assess how well the vaccine works across different age groups, CDC's studies of flu vaccine effects have included people aged 6 months and older who are recommended for an annual flu vaccination.
 - CDC typically publishes preliminary seasonal vaccine estimates in February with final estimates when the season is over.

Seasonal Influenza Surveillance in New Jersey

The Infectious and Zoonotic Disease Program (IZDP) located within the New Jersey Department of Health (NJDOH), Communicable Disease Service (CDS) is responsible for conducting surveillance for influenza and other viral respiratory diseases. IZDP maintains a robust system that includes a number of different systems to track when and where influenza is circulating. These systems fall into two main categories: virologic (laboratory) surveillance and influenza-like illness (ILI) surveillance. These two categories and the information collected as part of these systems are described in more detail below.

Virologic (Laboratory) Surveillance

The goals of virologic surveillance systems are to identify and track when and where influenza is circulating and to detect the emergence of novel (new) influenza viruses. This is done by the collection of information on positive influenza laboratory reports. This information allows for monitoring of the match between vaccine strains and currently circulating viruses and is also used for the selection of optimal vaccine components for the following year.

Laboratory Reporting - Communicable Disease Reporting and Surveillance System (CDRSS)

- ***Influenza test results:*** In New Jersey, influenza is a laboratory reportable condition per regulation (NJAC 8:57). This means that laboratories are required to report NJ residents who test positive for influenza into the CDRSS. CDRSS is disease tracking system used by public health authorities to investigate communicable diseases. The reporting of influenza includes tests for all methodologies including rapid diagnostic assay, molecular assay (e.g., PCR) and viral culture. Reporting is predominately done via electronic transfer of records directly from the laboratory into CDRSS.
- ***Rapid influenza testing:*** A select number of hospital laboratories in NJ report the total number of rapid influenza tests performed and the number of tests that were positive via a specially designed module located within CDRSS. This surveillance reports the percent positivity for influenza laboratory reporting in NJ.
- ***Respiratory Syncytial Virus (RSV):*** A select number of laboratories report the total number of rapid RSV tests performed and the number of tests that were positive via a specially designed module located within CDRSS. Surveillance for RSV is important as the symptoms associated with RSV are similar to influenza. RSV tends to circulate before the influenza season begins in the late fall and early winter. Knowing when RSV may be

circulating can help us better predict whether the influenza-like illness we are observing is associated with RSV or influenza.

NJDOH Public Health and Environmental Laboratory (PHEL)

- PHEL is the state public health laboratory for New Jersey and tests respiratory specimens for influenza using a CDC approved assay that can test for both seasonal and novel influenza viruses. A subset of specimens tested at PHEL are sent to CDC for additional testing which includes antiviral resistance testing and additional influenza typing. Information collected by CDC on the specimens submitted from each state is used to help identify the correct vaccine formulation for the following influenza season.
- In addition to testing for influenza, PHEL also conducts tests for non-influenza respiratory viruses on a subset of respiratory specimens received. Many viruses can cause symptoms which mimic influenza and if a person tests negative for influenza, this test can be run to determine if another virus is the cause of their illness.

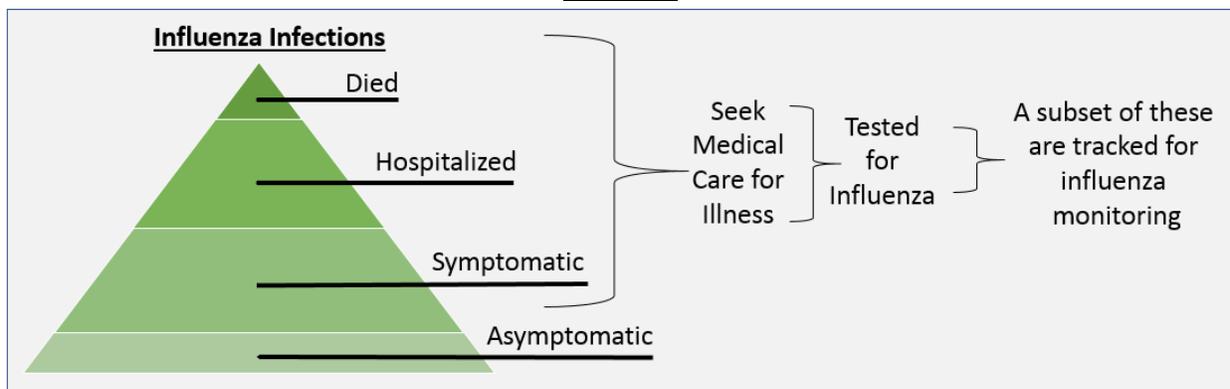
National Respiratory and Enteric Virus Surveillance System (NREVSS)

- NREVSS is a nationwide system which tracks seven different respiratory and enteric viruses including influenza. Laboratories in each state volunteer to report the total number of tests performed as well as the number positive results. New Jersey receives this information from 20 laboratories.

Influenza-like illness (ILI) Surveillance

The goal of ILI surveillance systems is to monitor when and where influenza is circulating. As shown in Figure 1 below, this is accomplished by identifying and tracking a subset of individuals who seek health care for ILI or are tested for influenza. It is not possible to count every case of influenza that occurs since some individuals will not seek medical care for their illness or are never tested making it impossible to count these individuals. In order to track ILI, a number of different surveillance systems (e.g., emergency departments, doctor's offices, urgent care) are used in combination to track trends in the disease. Additional details about these systems are detailed below.

Figure 1



Outpatient Influenza-Like Illness Surveillance (ILINet)

- NJDOH monitors influenza activity year-round throughout the state with the help of volunteer sentinel healthcare providers. We monitor influenza activity by calculating the percentage of provider visits associated with "influenza-like illness" (fever $\geq 100^{\circ}$ F AND cough and/or sore throat). When the percentage of provider visits for influenza-like illnesses begins to increase compared to background levels, we suspect that influenza is active in that area.
- In addition to weekly reporting, volunteer sentinel providers send specimens from patients for laboratory testing at PHEL. These specimens are tested at PHEL and data and isolates are shared with CDC to help determine which influenza strains will be included in next year's influenza vaccine.

Other sources of ILI data

- *EpiCenter Syndromic*: Emergency department visits are monitored by looking for certain key words (e.g., flu, fever) when a person is registered for their visit. This system can count the total number of visits, including the number of visits associated with ILI resulting in a percent ILI for that emergency department. This system can also count the number of these ILI visits that result in admission to the hospital.
- *Long term Care*: A subset of long term care facilities report their total census and the number of residents who have ILI. This information is reported for one day each week. This information is used to determine if influenza is impacting older populations and to determine if these facilities might be experiencing an outbreak that needs additional attention from public health authorities.
- *Schools*: A subset of schools report their total census and the number of children absent from that school. This information is used to determine when influenza might be impacting school-aged children and identify schools that might need additional attention from public health authorities.

Outbreaks

- State regulation (NJAC 8:57) requires all confirmed and suspected outbreaks of influenza to be reported to the local health department (LHD). The LHD is then required to report these outbreaks to NJDOH. These outbreaks are tracked and followed until the outbreak is over.
- Influenza outbreaks are most often reported from long term care facilities where there is a large susceptible population and congregate living. When these outbreaks occur, public health officials work closely with the facility to enact measures to prevent additional illness. When no new cases of illness occur after a week, the outbreak is considered over. Additional information on outbreak control in this setting can be found at: https://www.nj.gov/health/cd/documents/topics/outbreaks/outbreak_prevention.pdf
- Sporadic cases of influenza occurring in a school or day care setting is expected and is not necessarily indicative of an outbreak. An outbreak may be occurring if the school is experiencing clusters of ill students and/or staff that are in the same classroom, same grade or wing of the facility or have attended a common event. This might indicate that transmission of influenza is occurring in the school and public health measures should be implemented. Additional information on outbreak control in this setting can be found at: https://www.nj.gov/health/cd/documents/Guidelines%20for%20Outbreaks%20in%20School%20Settings_revised%207.10.2017.pdf

National Center for Health Statistics (NCHS)

- When a person dies, a healthcare provider must complete a death certificate indicating what health conditions contributed to the cause of death. Records of all deaths are maintained by state officials and are submitted to the National Center for Health Statistics (NCHS).
- NCHS collects death certificate data from all state vital statistics offices for all deaths occurring in the United States. Pneumonia and influenza (P&I) deaths are identified and compiled by the week of death occurrence and percent of P&I deaths is calculated. Pneumonia has been included in this statistic as it is one of the most common complications associated with influenza, however, pneumonia can be caused by many other illnesses besides influenza.
- Currently, this data does not provide deaths associated with influenza only and does not break down deaths by age group. There is also a 2-4 week lag period between the week the deaths have occurred and when the data for that week are reported. This occurs because there is often a delay in the completion of a death certificate and also delays associated with re-coding these death certificates at NCHS.

Severe and Fatal Pediatric Influenza

- Hospitals located in New Jersey report information on children who are admitted to intensive care units or who have died and who have tested positive for influenza. Tracking this information can help identify if younger children are being impacted by influenza more than other age populations

Respiratory Virus Surveillance Report

While influenza data collection and surveillance is conducted year round, a report containing information on the circulation of influenza is published from October to May. These reports can be accessed from the following website: <https://www.nj.gov/health/cd/statistics/flu-stats/>

In this report, a regional and statewide influenza activity level is provided each week. Influenza activity levels are used to describe how widespread influenza is in the state. It does not describe the impact (i.e., severity) of influenza that is circulating. NJDOH has divided the state into five regions (Northwest, Northeast, Central East, Central West, South East and South West). NJDOH evaluates the number of counties in a region which are seeing above average amounts of ILI and observes which of these counties have had positive test results for influenza in the past three weeks. The fewer the number of counties in a region to have both of these factors, the lower the activity level. The more counties in a region that have an increase in both ILI and laboratory confirmed tests, the greater the activity level assigned.