

Data Management

Data Management Requirements: Report results to providers, epidemiologists and CDC.

1. Use electronic data systems that provide data in real time and utilize national standards (HL7, SNOMED, LOINC).
2. All data submitted should provide:
 - Specimen identifier and unique patient identifier,
 - The state where specimen was collected,
 - Date of birth of patient and/or age with unit (years, weeks, months, days),
 - Specimen collection date,
 - Specimen received date,
 - Test method performed,
 - Test result.
3. Laboratories that have established PHLIP capability should also provide the following data elements, if available:
 - Submitter Information,
 - Provider Identifier for the CDC Program (i.e., ILINet provider, EIP, other),
 - Current influenza vaccination status,
 - Antiviral treatment,
 - Travel information,
 - Patient death information,
 - Additional geographic information (e.g., county, city, zip),
 - Patient location at time of testing (inpatient, outpatient, long-term care facility),
 - Whether specimen was related to an outbreak,
 - Whether specimen was sent to CDC and if so, include specimen identifier,
 - Date of illness onset.
4. States should consider incorporating data from rapid test sites and/or clinical laboratories to supplement influenza surveillance state data.

Requirement Intent

Virologic surveillance in the US relies on a combination of data and specimens: data from laboratory tests performed at US WHO Collaborating Laboratories (WHO CLs) and National Respiratory and Enteric Virus Surveillance System (NREVSS) laboratories and specimens from patients with ILI that tested positive for influenza at PHLs are submitted to CDC for further characterization.⁹ There are approximately 85 US WHO CLs. The WHO CLs include 65 state and local PHLs supported by CDC, as well as several large tertiary care or academic medical centers.⁹ These laboratories have the capability to test for and report the type of influenza virus (A or B) and subtype of influenza A viruses (H1pdm2009, H3, and some novel subtypes), and provide both data and specimens/viruses to CDC.

The NREVSS system includes clinical, commercial, academic medical, and some PHLs. Most NREVSS laboratories that are not WHO CLs provide data on influenza laboratory test results by type and also subtype, when performed. According to the 2011 Right Size Virologic Surveillance Survey, those PHLs participating as a WHO CL submit non-influenza respiratory pathogen data into the NREVSS system.² The influenza data from the WHO collaborating laboratories and NREVSS play a large role in the weekly national reports generated by CDC in [FluView](#).

Additional influenza testing data from rapid influenza diagnostic testing sites and/or other clinical laboratories may be available to states and can help provide a fuller representation of influenza activity at the local level. These clinical sites have the capability to test for and report the type of influenza (A or B); some also utilize methods that can subtype influenza A (H1pdm2009, H3, H1).

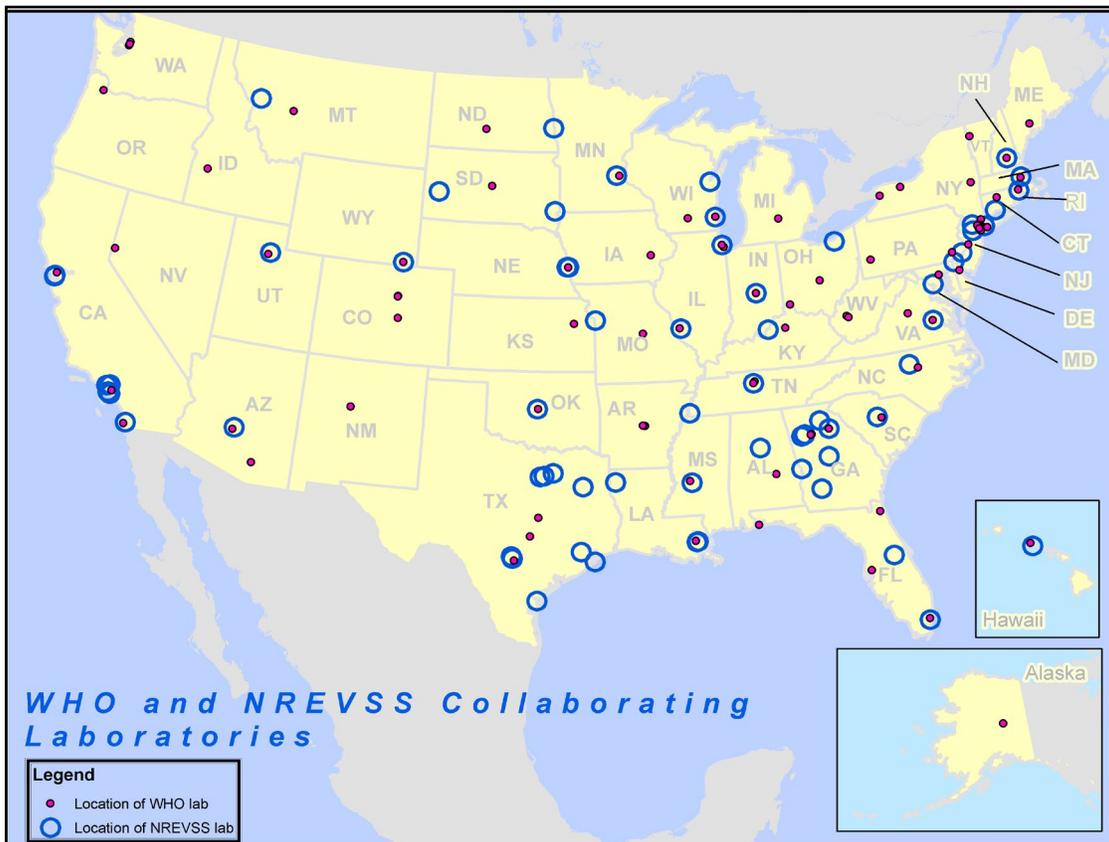


Figure 2. Representation of NREVSS Laboratories Across the US Source: CDC Unpublished Data.

Currently, influenza surveillance data is obtained both as aggregated data, using web entry methods, and as patient level data, using HL7 electronic laboratory reporting and comma delimited files. This dichotomy makes the data management, aggregation and linking of virologic and epidemiologic data challenging. However, this spectrum of reporting formats reflects a long history of virologic surveillance with varying technological solutions and capabilities of reporters.

The increasing availability of Laboratory Information Management Systems (LIMS) in PHLs makes it possible to establish automated electronic laboratory messaging of influenza test results to other public health entities (e.g., state epidemiology offices, other PHLs and CDC). The Public Health Laboratory Interoperability Project (PHLIP) provides PHLs with an electronic method to report laboratory test results to CDC using national standards such as HL7 Version 2.3.1 messaging, SNOMED vocabulary, and LOINC codes for laboratory tests. The PHLIP vision is to provide each state PHL (SPHL) with a viable option for electronic transmission of laboratory test data, in order to achieve interoperability between different systems and to exchange information in a useful and meaningful way. The PHLIP effort began in 2008, and the majority of state PHLs are now reporting influenza results electronically using PHLIP.

PHLIP is the preferred reporting mechanism to CDC for influenza and is considered a Right Size Influenza Virologic Surveillance requirement. It is understood that not all SPHLs have the same capabilities or resources to participate in PHLIP at present; however, PHLIP implementation should be the goal for all SPHLs and for county and local PHLs that participate in virologic surveillance. PHLIP offers many advantages, which include:

- Standardizes patient level reporting, improving data quality and simplifying data aggregation.
- Reports individual results in near “real-time.”
- Complies with other national electronic messaging solutions.
- Expands capability to report laboratory results for other pathogens using the same mechanisms for messaging.
- Reduces laboratory staff time required to collect and report laboratory results.
- Provides option for additional identifiers for type of specimen submitter (i.e., ILINet provider, EIP site, etc.) which is important to determine appropriate sample sizes.
- Supports use of shared services approaches among PHLs (i.e., PHLs specializing in influenza virus culture or antiviral resistance testing).

Electronic data messaging of specimen level data allows for more detailed analysis of the data and fuller understanding of potential biases in the data. Biases may include lack of population representativeness in the selection of patients for testing, screening of specimens before submission to PHLs and the quality of tests used for initial screening (refer to Sampling Requirements Intent and Implementation Guidance sections for more information).

Virologic Surveillance Data from Non-PHL Sources

The focus of virologic surveillance has been on data generated by the PHLs participating as WHO CLs in the US. However, influenza testing performed by clinical and commercial diagnostic laboratories may provide useful supplementary data, increasing the overall volume of testing and geographic representation. Existing virologic data from non-PHL sources, notably NREVSS, and some options for new sources of virologic data are discussed below.

NREVSS is managed by the CDC's Division of Viral Diseases. The system is the main source of national surveillance data for non-influenza respiratory viruses. Influenza laboratory testing data is also collected in NREVSS and shared with the Influenza Division for reporting as part of the national virologic surveillance report. Due to a rapid expansion of the reporting provider network in recent years, there were approximately 500 laboratories enrolled as NREVSS sites that reported influenza in the 2011-12 season. However, concerns about the sustainability of the expansion, along with a desire to maintain the historical number of reporters used in influenza virologic surveillance has resulted in use of only the data from 60 original participants. The reports submitted to NREVSS include laboratory-level information about the following: 1) number of specimens tested for influenza, 2) test method used (i.e., RIDT, culture, PCR) and 3) number of influenza positive specimens by influenza type and if available, by subtype.

Additional sources of influenza (NREVSS-like) clinical, hospital and/or commercial laboratory data can also be utilized and developed. For the same reasons that NREVSS data is useful at the national level, state laboratory networks can serve as a source of additional local level data for seasonal influenza situational awareness. Data from these sites may be transmitted electronically at the specimen level or in aggregate by a simpler method. Regardless of whether specimen level or aggregate data is received, necessary data elements would include:

- Date or week of specimen collection, receipt or test
- Total number of tests performed and influenza positives by:
 - Type,
 - Subtype (if available),
 - Age group.