Texas Influenza Surveillance Handbook

Influenza Surveillance Team
Emerging and Acute Infectious Diseases Branch
Infectious Disease Control Unit
Texas Department of State Health Services

TEXAS
Health and Human Services

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Section VII: Influenza Outbreaks

Introduction

Influenza surveillance is a multi-component surveillance network with local, regional, state and national contributions. The majority of influenza surveillance activities are dependent upon healthcare professionals and laboratorians volunteering their time to collect and report data to public health. Influenza surveillance coordinators at local and regional health departments devote energy and time to maintaining these volunteer reporters and improving influenza surveillance activities. Influenza surveillance is often one of many competing responsibilities of the epidemiologist, surveillance investigator or nurse acting as the influenza surveillance coordinator in local and regional health departments.

The purpose of this handbook is to provide a centralized resource for influenza surveillance coordinators at the local and regional levels in Texas. This handbook is intended as a tool to help local and regional influenza surveillance coordinators with their surveillance activities. It is also intended as a starting point for public health staff new to influenza surveillance activities and as a reference for experienced influenza surveillance coordinators. Our hope is that this handbook will continue to grow over the years and highlight some of the best influenza surveillance practices in the state.

This handbook will be updated annually by the Texas Department of State Health Services (DSHS) Influenza Surveillance Team. If you have suggestions for improving this handbook, please let us know by sending an email to flutexas@dshs.texas.gov.

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Record of Revisions

Month / Year	Sections Revised
October 2010	First edition of handbook released
September 2011	Several minor editorial changes made primarily for clarity throughout the handbook. Combined reporting and surveillance information for each activity (section III and IV). Added information on IISP (section II, III, IVb), BISN (section II, IVg), reporting timeframes (section III), specimen collection instructions (section VI, appendix), Epi curves (section VII), line lists (section VII), case definitions (section VII), case confirmation (section VII), outbreak definitions (section VII) and references/links to investigation forms (appendix). Updated diagrams and tables throughout the handbook to reflect current year and processes.
May 2012	Several minor editorial changes made primarily for clarity throughout the handbook. Added information on antiviral treatment (section I and VII), the Texas Medical Board website (section V), recruiting process for ILINet (section V), commercial VTM (section VI), new CDC flu outbreak definition (section VII), and fever in the elderly (section VII). Updated diagrams, tables, phone numbers, web links and names throughout the handbook to reflect current year and processes. Changed references from nosocomial to healthcare-associated.
September 2013	Several minor editorial changes made primarily for clarity throughout the handbook. Added information on flu vaccine abbreviations and quadrivalent vaccine (Section I); novel flu as a reportable condition (Section II); reporting details for IISP in 2013-2014 (Section III); the ILINet recruiting plan, Microsoft Excel 2010 PivotTable instructions for ILINet and NREVSS, Right Size project, surveillance methods (Section IV); ILINet recruiting plans (Section V); testing information for outbreak specimens, instructions for the new G-2V form (Section VI); interaction with regulatory agencies, when to submit an outbreak summary

	form, outbreak specimens, school closures (Section VII); and acronyms (Section VIII). Updated diagrams, graphs, tables, phone numbers, web links and names throughout the handbook to reflect the current year and processes.
September 2014	Several minor editorial changes made primarily for clarity throughout the handbook. Updated DSHS Influenza Team members (Introduction); Renamed a subsection under the "Testing" section (Section I); Changed IISP to RVSP since DSHS is not participating in the CDC/CSTE IISP program for 2014-2015 (Section III); Added information about the Respiratory Virus Surveillance Project (RVSP), Updated the NREVSS Data Dictionary with new variables and deleted a variable, Updated Microsoft Excel 2010 Pivot Table instructions for NREVSS (Section IV); Added information about ILINet Extended Surveillance activity (Section V); Deleted Wichita Falls as a city with an LRN laboratory, Updated the G2-V submission form (Section VI); Changed the source for outbreak and cluster definitions, Updated school exclusion criteria (section VII); Added RVSP acronym (section VIII) . Updated graphs, tables, phone numbers, web links, references and names throughout the handbook to reflect the current year and processes.
September 2015	Several minor editorial changes made primarily for clarity throughout the handbook. Added information about peramivir, the acronym RIDT and updated information about rapid influenza testing of novel influenza (Section I); Added information about CHS Mortality Surveillance Data (Section II); Changed the deadline for submitting the Texas Influenza Activity Code to the CDC and added additional surveillance activities/data sources for the Viral and Mortality Surveillance Sections of the FluView Report (Section III); Updated ILINet information, added 2015-2016 RVSP season information, added coronavirus to the list of respiratory and enteric viruses reported into NREVSS, updated information about novel influenza testing, updated information about

	Google Flu Trends and added additional information about influenza surveillance along the Mexico border (Section IV); Updated ILINet information (Section V); Added DSHS recommendations for disposing of unused expired VTM and updated information about RVP assay test results (Section VI); Added infection prevention guidance for healthcare and other settings web addresses and added a recommendation on who should get chemoprophylaxis in long-term care facilities during an influenza outbreak (Section VII); Added CHS, PHL and RVP to the list of acronyms/abbreviations (Section VIII); Deleted Google Flu Trends as a source to find influenza data (Appendix). Updated graphs, tables, phone numbers, web links, "how-to" instructions, references and names throughout the handbook to reflect the current year and processes.
October 2016	Several minor editorial changes made primarily for clarity throughout the handbook. Added information about a new influenza type, added signs and symptoms information to the "Testing" subsection and updated information on who should or should not get the influenza vaccine (section I); Added that 122 Cities has been discontinued, updated information about ILINet and added that Texas is not participating in IISP for the 2016-17 flu season (section II); Deleted information regarding RVSP since RVSP was discontinued (section III); Updated information about ILINet, added that RVSP was discontinued, updated areas of Texas where more laboratory participation in NREVSS is needed, updated information about novel influenza virus testing results, added information about Flu Near You and deleted information that the DSHS Office of Border Health BIDS program received funding from the CDC for enhancing ILI and SARI surveillance (Section IV); Added coronaviruses to the list of viruses that laboratories may report in NREVSS (Section V); Added information that viral isolation will only by conducted for CDC purposes at the DSHS laboratory, added information about having an alternative

	approved secondary identifier if date of birth is not provided on the DSHS G-2V form and updated the instructions for completing the DSHS G-2V form for influenza laboratory surveillance (Section VI); Updated an example of a state that uses some of the CDC's former definitions for respiratory outbreaks and provided information on how a certain state's guidance defines an AFRI or ILI outbreak differently in different settings (Section VII). Updated graphs, tables, phone numbers, web links, "how-to" instructions, references and names throughout the handbook to reflect the current year and processes.
October 2017	Several minor editorial changes made primarily for clarity throughout the handbook; Updated email addresses throughout the handbook to reflect the new domain name for DSHS; Updated the DSHS logo; Updated IRID Team Lead and State Influenza Surveillance Coordinator positions; Updated information in the "Rapid Diagnostic Testing for Influenza: Information for Healthcare Professionals" and "Rapid Diagnostic Testing for Influenza: Information for Clinical Laboratory Directors subdivisions of the Testing" subsection; Updated information in the vaccinations section; Removed the title "New for the 2016-2017 Influenza Season!" under Subsection a) ILINet on the Table of Contents Page; Added information about reporting total patients by age group; Updated the table that indicates those counties that have a population over 100,000 where additional ILINet providers are needed; Revised instructions for How to Enter a Weekly Report; Deleted "New for the 2016-2017 Influenza Season!" information from the CDC; Updated the section Using the ILINet Website to download and summarize data using Excel Pivot Tables from Microsoft Excel 2010 to Microsoft Excel 2016; Updated US Outpatient Influenza-like Illness Surveillance Network (ILINet) Application Form; Separated the graph titled "Number and Percentage of Tests (Antigen, Culture, PCR) Positive for Influenza by Type and Subtype Reported by Texas

	Laboratories for the 2016-2017 Influenza Season" into two separate graphs, one for public health labs and one for private labs; Updated the Minimum weekly specimen submission to a Texas PHL required to meet Right Size objectives by HSR table for 2017-2018 season; Updated all subsections in Section VI to reflect the shift from DSHS prepared VTM to commercial VTM; Updated all subsections in Section VI to reflect the change in secondary container; Updated the G-2V form and the instructions for completing the G-2V submission form for influenza laboratory surveillance; Updated EAIDB Respiratory Team Lead and Influenza Surveillance Coordinator; Updated DSHS Laboratory Container Preparation Group Manager; Updated DSHS Regional Influenza Surveillance Coordinator contact information for Region 2/3, Region 7. Region 9/10 and Region 11; Updated LRN contact information for the Lubbock LRN; Updated references and links throughout the entire handbook.

Section I: Influenza 101

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What is Influenza?

Influenza, more commonly referred to as the flu, is a respiratory disease caused by influenza viruses. Influenza can range from mild to severe illness and even death (*1*). Symptoms of influenza may include fever or feeling feverish/chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches and fatigue. Among children, otitis media, nausea, vomiting and diarrhea are also commonly reported. Influenza is usually a self-limiting infection, but in people with chronic medical conditions such as heart or lung disease, it can lead to pneumonia and other life-threatening complications. Adults over 65 years of age account for approximately 90% of deaths attributed to pneumonia and influenza. An estimated 23,607 (range 3,349-48,614) deaths associated with influenza occur every year in the United States (*2*).

Influenza is an infectious disease that is easily transmitted from person to person (*1*). Transmission occurs via "droplet spread." After a person infected with influenza coughs, sneezes or talks, influenza viruses contained in the respiratory droplets travel through the air; other persons nearby can become infected if these droplets land in their noses or mouths. These droplets can also contaminate surfaces, and people can become infected when they touch an object or a surface on which these droplets have landed and then touch their noses or mouths. Transmission may also occur by direct contact, such as kissing. Symptoms of influenza usually come on suddenly, one to four days after the virus enters the body (*3*). Infected persons can start shedding virus up to 24 hours before the onset of symptoms (*1*). Additionally, some persons who become infected with influenza remain asymptomatic.

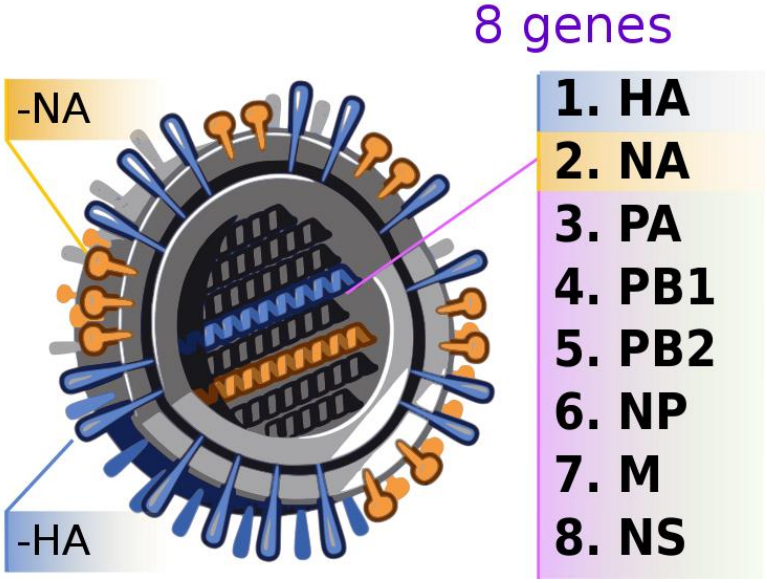
Some people are at higher risk of severe illness or complications from influenza, including people who (*1,4*):

- are less than 5 years of age
- are 65 years of age or older
- have chronic pulmonary (including asthma), cardiovascular (excluding hypertension), endocrine, renal, hepatic, neurologic, hematologic or metabolic disorders
- are immunosuppressed
- are or will become pregnant during the influenza season
- are younger than 19 years who are receiving long-term aspirin therapy
- are residents of nursing homes and other long-term care facilities
- are morbidly obese (body mass index $\geq$40)

Types of Influenza

Influenza viruses are single-stranded RNA viruses that belong to the family Orthomyxoviridae (*5*). There are four types of influenza viruses: Influenza A, B, C and D (*6*). Influenza A and B are the viruses seen during the regular influenza season in the United States. Influenza C is also present, but not very common. Influenza C causes a mild or subclinical illness and is not associated with epidemics. Influenza D viruses primarily affect cattle and are not known to infect or cause illness in people (*6*).

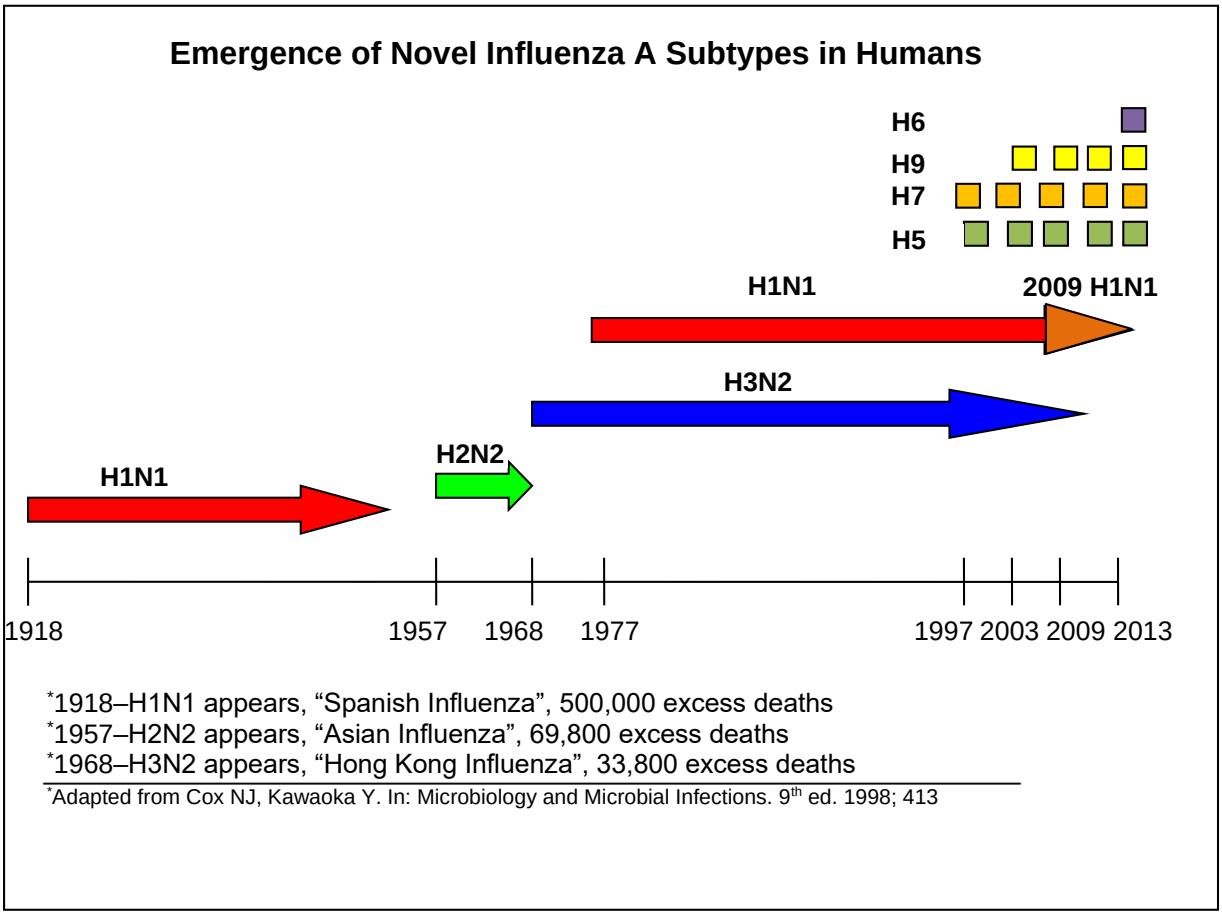
Influenza A viruses are further divided into subtypes based on differences in surface proteins. Influenza A has two surface proteins on the virus capsule called neuraminidase (11 variations) and hemagglutinin (18 variations), as seen in the diagram below. Different combinations of these surface proteins result in many subtypes of influenza A including H3N2 and H1N1, the subtypes currently circulating in humans. Influenza A viruses are unique in that they are able to cause infection in animal species as well as in humans. All known subtypes of influenza A viruses have been isolated from avian species except subtype H17N10 and H18N11 which have only been found in bats (*7*). Influenza A subtypes have also been found in pigs, horses, seals and whales, as well as many other animal species. Influenza B and C infections are primarily associated with illness in humans and are not often found in animals. Influenza B viruses are not subtyped; instead influenza B viruses are divided into lineages (i.e., Yamagata and Victoria) (*8*).



Source: http://commons.wikimedia.org/wiki/File:2009_H1N1_influenza_virus_genetic-num.svg

Influenza viruses undergo two different methods of antigenic change: antigenic drift and antigenic shift (*3,9*). Antigenic drift is the result of point mutations that occur during viral replication resulting in new virus strains. Antigenic drift is the reason that the influenza vaccine must be updated each year. Antigenic shift is a more dramatic change resulting in a novel subtype of influenza. Antigenic shift can lead to a pandemic because the majority of the population would have little or no immunity to novel subtypes created through reassortment. A pandemic could also occur through antigenic drift that allows an animal influenza virus to infect humans, followed by an "adaptive mutation" that allows the virus to spread readily within the human population (*10*).

The chart below demonstrates the changes in circulating subtypes of influenza A. New subtypes of influenza A may dramatically emerge as part of a pandemic such as in 1918. Sometimes the new subtypes will continue to circulate though the specific strains may vary, such as with H1N1. Other times the new subtypes eventually quit circulating, such as with H2N2.

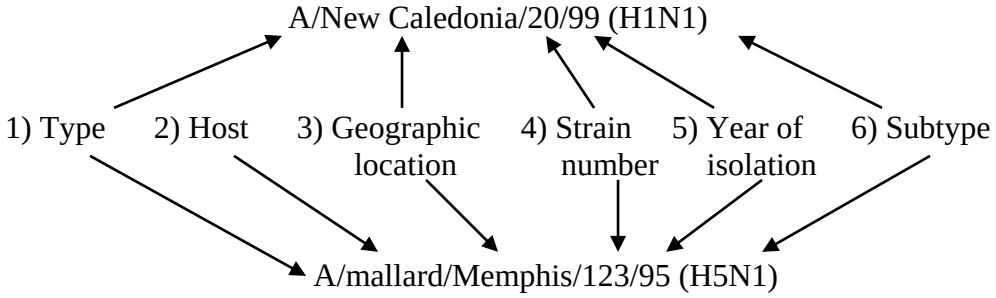


Influenza Naming Convention

Influenza viruses are often called by common names such as Spanish influenza, Hong Kong Flu or Russian Flu (*3*). These names are easily recognizable by the general public and usually refer to a specific strain of influenza associated with a large epidemic or pandemic. Referring to influenza viruses by their subtypes (e.g., H1N1, H3N2, etc.) is also becoming fairly mainstream. One challenge with referring to influenza viruses by subtype is that the general public does not understand that there are different strains of influenza associated with each subtype. One strain of H1N1 may be very different from another strain of H1N1, as seen with the 2009 pandemic strain of H1N1 compared with the "seasonal" strain of H1N1 that was circulating prior to 2009.

Terms like "swine flu" and "avian flu" are also used to describe influenza but are frequently misused. Both of those terms refer to influenza subtypes that normally circulate among pig and bird populations, respectively (*7*). While a person may become infected with an avian or swine strain of influenza, it is no longer considered to be avian or swine influenza once it has adapted to spread easily among humans.

It is important for public health professionals to be familiar with the technical names of influenza viruses to help distinguish between current and novel strains as well as between strains that are included in the vaccine and those that are not. Naming influenza viruses is a fairly simple procedure. First, the virus type is classified. Influenza A is indicated with an "A" and influenza B is indicated with "B" (*11*). Second, the host origin is identified. This is omitted if the virus has a human origin. Third, the geographic location in which the strain was first isolated is indicated. Fourth, the strain number is indicated; this is followed by the year the strain was isolated. The year is marked with two digits if isolated during the 1900s and four digits if isolated in or after the year 2000. Last, influenza A viruses will be followed with the virus subtype (H#N#). The number symbol indicates which of the 18 subtypes of hemagglutinin and the 11 subtypes of neuraminidase is present.



Human origin examples:

A/New Caledonia/20/99 (H1N1)
A/Perth/16/2009 (H3N2)
A/California/07/2009 (H1N1)
B/Brisbane/60/2008

Non-human origin example:

A/mallard/Memphis/123/95 (H5N1)

Testing

Note: Influenza Signs and Symptoms and the Role of Laboratory Diagnostics, Rapid Diagnostic Testing for Influenza: Information for Health Care Professionals and Rapid Diagnostic Testing for Influenza: Information for Clinical Laboratory Directors are from the *Resource Manual for Seasonal and Pandemic Influenza Testing in Texas*, Texas Department of State Health Services. Unless otherwise indicated, the material was taken from the Centers for Disease Control and Prevention (CDC) website:
http://www.cdc.gov/flu/professionals/diagnosis/labrolesprocedures.htm (*12*)
http://www.cdc.gov/flu/professionals/diagnosis/rapidclin.htm (*13*)
http://www.cdc.gov/flu/professionals/diagnosis/rapidlab.htm (*14*)

Influenza Signs and Symptoms and the Role of Laboratory Diagnostics
The signs and symptoms of influenza can vary by age, immune status, and presence of underlying medication conditions. Uncomplicated influenza can include any or all of these signs and symptoms: fever, muscle aches, headache, lack of energy, dry cough, sore throat, nasal congestion, and possibly runny nose. Fever is not always present, especially in elderly persons. The fever and body aches can last 3-5 days and the cough and lack of energy may last for 2 or more weeks, especially in elderly. Influenza can be difficult to diagnose based on clinical signs and symptoms alone because the signs and symptoms of influenza can be similar to those caused by other infectious agents including, but not limited to, *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, and *Legionella* spp.

Appropriate treatment of patients with respiratory illness depends on accurate and timely diagnosis. Early diagnosis of influenza can reduce the inappropriate use of antibiotics and provide the option of using antiviral therapy. However, because certain bacterial infections can produce signs and symptoms similar to influenza, bacterial infections should be considered and appropriately treated, if suspected. In addition, bacterial co-infection can occur as a complication of influenza.

Influenza surveillance information about the prevalence of circulating influenza viruses and diagnostic testing can aid clinical judgment and help guide treatment decisions. The accuracy of clinical diagnosis of influenza on the basis of signs and symptoms alone is limited because symptoms from illness caused by other pathogens can overlap considerably with influenza. Influenza surveillance by state and local health departments and CDC can provide information regarding the presence of influenza viruses in the community. Surveillance can also identify the predominant circulating types, influenza A subtypes, and strains of influenza viruses.

Diagnostic tests available for influenza include viral culture, serology, rapid antigen testing, reverse transcription polymerase chain reaction (RT-PCR), immunofluorescence assays, and rapid molecular assays. Sensitivity and specificity of any test for influenza might vary by the laboratory that performs the test, the type of test used, the time from illness onset to specimen collection, and the type of specimen tested. Among respiratory specimens for viral isolation or rapid detection of human influenza viruses, nasopharyngeal specimens typically have higher yield than nasal or throat swab specimens. As with any diagnostic test, results should be evaluated in the context of other clinical and epidemiologic information available to health-care

providers. Please see Table 1 on pages I.11-I.12 for basic descriptions of common influenza testing types.

Commercial rapid diagnostic tests are available that can detect influenza viruses within 20 minutes. Some tests are approved for use in any outpatient setting, whereas others must be used in a moderately complex clinical laboratory. These rapid tests differ in the types of influenza viruses they can detect and whether they can distinguish between influenza types. Different tests can detect 1) only influenza A viruses; 2) both influenza A and B viruses, but not distinguish between the two types; or 3) both influenza A and B and distinguish between the two types.

None of the rapid influenza diagnostic tests provide any information about influenza A virus subtypes. The types of specimens acceptable for use (i.e., throat, nasopharyngeal, or nasal aspirates, swabs, or washes) also vary by test. The specificity and, in particular, the sensitivity of rapid influenza diagnostic tests are lower than for viral culture and RT-PCR and vary by test. Because of the lower sensitivity of the rapid influenza diagnostic tests, physicians should consider confirming negative tests with RT-PCR, viral culture or other means, especially in hospitalized patients or during suspected institutional influenza outbreaks because of the possibility of false-negative rapid test results, especially during periods of peak community influenza activity. In contrast, false-positive rapid test results are less likely, but can occur during periods of low influenza activity. Therefore, when interpreting results of a rapid influenza diagnostic test, physicians should consider the positive and negative predictive values of the test in the context of the level of influenza activity in their community. Package inserts and the laboratory performing the test should be consulted for more details regarding use of rapid influenza diagnostic tests.

Despite the availability of rapid diagnostic tests, collecting clinical specimens for viral culture is critical, because only culture isolates can provide specific information regarding circulating strains and subtypes of influenza viruses. This information is needed to compare current circulating influenza strains with vaccine strains, to guide decisions regarding influenza treatment and chemoprophylaxis, and to formulate vaccine for the coming year. Virus isolates also are needed to monitor the emergence of antiviral resistance and of novel influenza A subtypes that might pose a pandemic threat.

Rapid Diagnostic Testing for Influenza: Information for Healthcare Professionals

Rapid diagnostic tests for influenza can provide timely results that may be helpful with patient management. It is important to understand how the conditions under which these tests are used affect their reliability. To minimize false results:

- Use rapid diagnostic tests with high sensitivity and specificity.
- Collect specimens as early in the illness as possible (within 3-4 days of illness onset).
- Follow manufacturer's instructions, including handling of specimens, as described in the device package insert.
- Consider sending respiratory specimens for RT-PCR to confirm results of rapid tests especially when community influenza activity is low and the rapid diagnostic test result is positive and when the rapid diagnostic test result is negative but influenza activity is high.

Rapid Diagnostic Testing for Influenza: Information for Clinical Laboratory Directors

The availability and use of influenza rapid diagnostic tests by laboratories and clinics have substantially increased in recent years.

- Rapid influenza diagnostic tests (RIDTs) are screening tests for influenza virus infection that can provide results within 15 minutes.
- More than 10 RIDTs have been approved by the U.S. Food and Drug Administration (FDA).
- RIDTs tests differ in some important respects:
    - Some tests identify influenza A and B viruses and distinguish between the two types.
    - Some tests identify influenza A and B viruses but cannot distinguish between the two types.
    - Some tests are waived from requirements under the Clinical Laboratory Improvement Amendments of 1988 (CLIA).
    - Most tests can be used with a variety of specimen types, but the accuracy of the tests can vary based on the type of specimen collected (for example, throat swab versus nasal swab).
- FDA approval is based upon specific specimen types.
- RIDTs vary in terms of sensitivity and specificity when compared with viral culture or RT-PCR. Product insert information and research publications indicate that:
    - Sensitivities are approximately 50-70%
    - Specificities are approximately 90-95%
- Specimens to be used with RIDTs generally should be collected as close as is possible to the start of symptoms (e.g., less than 4 days after illness onset). In very young children, influenza viruses can be shed for longer periods; therefore, in some instances, testing for a few days after this period may still detect influenza viruses. Immunosuppressed persons may have detectable influenza viruses in respiratory specimens for prolonged periods (weeks to months).

Predictive Value Depends Upon Prevalence

The positive and negative predictive values vary considerably depending upon the prevalence of influenza (level of influenza activity) in the patient population being tested.

- False-positive (and true-negative) influenza test results are more likely to occur when disease prevalence is low, which is generally at the beginning and end of the influenza season.
- False-negative (and true-positive) influenza test results are more likely to occur when disease prevalence is high, which is typically at the height of the influenza season.

Clinical Considerations of Testing When Influenza Prevalence is Low

When influenza prevalence is relatively low, the positive predictive value (PPV) is low and false-positive test results are more likely. By contrast, when influenza prevalence is low, the negative predictive value (NPV) is high, and negative results are more likely to be true.

If Flu Prevalence is…	And Specificity is…	Then PPV is…	False Pos. rate is…
VERY LOW (2.5%)	MODERATE (80%)	VERY LOW (6-12%)	VERY HIGH (88-94%)
VERY LOW (2.5%)	HIGH (98%)	LOW (39-56%)	HIGH (44-61%)
MODERATE (20%)	MODERATE (80%)	LOW (38-56%)	HIGH (44-62%)
MODERATE (20%)	HIGH (98%)	HIGH (86-93%)	LOW (7-14%)

The interpretation of positive results should take into account the clinical characteristics of the patient and the prevalence of influenza in the patient population being tested (e.g., level of influenza activity in the community). If an important clinical decision is affected by the test result, the rapid test result should be confirmed by another test, such as reverse transcription polymerase chain reaction (RT-PCR).

Clinical Considerations of Testing When Influenza Prevalence is High
When influenza prevalence is relatively high, the NPV is low and false-negative test results are more likely. When influenza prevalence is high, the PPV is high and positive results are more likely to be true.

If Flu Prevalence is…	And Sensitivity is…	Then NPV is…	False Neg. rate is…
MODERATE (20%)	LOW (50%)	MODERATE (86-89%)	MODERATE (11-14%)
MODERATE (20%)	HIGH (90%)	HIGH (97-99%)	LOW (2-3%)
HIGH (40%)	LOW (50%)	MODERATE (70-75%)	MODERATE (25-30%)
HIGH (40%)	HIGH (90%)	HIGH (93-94%)	LOW (6-7%)

The interpretation of negative results should take into account the clinical characteristics of the patient and the prevalence of influenza in the patient population being tested (e.g., level of influenza activity in the community). If an important clinical decision is affected by the test result and influenza is still suspected, then the rapid test result should be confirmed by another test, such as RT-PCR.

Selecting Tests
Many factors should be considered when selecting a test, including the following:

- Tests with high sensitivity and specificity will provide higher positive and negative predictive values.
- Types of specimens that provide the most accurate results.

Information about these characteristics can be found in product inserts and scientific articles, and by contacting the manufacturer.

Changes in Recommended Procedures Can Affect Test Results
Modification by the user can affect test performances and increase false-positive and/or false-negative rates. Such modifications include:

- Using specimens for which the test is not optimized
- Using swabs that did not come with the rapid test kits [unless recommended].

- Improper storage or prolonged storage before specimens are tested

When Is Use of Rapid Diagnostic Tests Beneficial?

- Testing during an outbreak of acute respiratory disease can determine if influenza is the cause.
- During influenza season, testing of selected patients presenting with acute respiratory illnesses compatible with influenza can help establish whether influenza is present in a specific patient population and help health-care providers determine how to use their clinical judgment for diagnosing and treating respiratory illness. (Testing need not be done for all patients.)
- Otherwise, rapid influenza diagnostic tests do not address the public health need for influenza virus isolates that can only be obtained through the collection of specimens for viral culture. Influenza virus isolates are essential for determining the match between circulating influenza virus strains and those virus strains contained in the vaccine and for aiding in the selection of new vaccine strains.

Rapid influenza antigen testing have unknown sensitivity and specificity to detect human infection with a novel influenza A virus in clinical specimens. Some studies suggest that antigen detection tests have low sensitivity to detect H5N1 viruses. Therefore, negative results from this type of testing does not exclude novel influenza virus infection. In addition, a rapid antigen test may give a positive influenza A result, but it cannot distinguish between seasonal and novel influenza A viruses (*15*).

Table 1. Descriptions of common influenza testing types (*14,16-17*)

Test Name	Test Description	Identifies*	Minimum Testing Time†	Notes
Viral culture‡§ (aka viral isolation)	The patient specimen is inoculated into cell culture in a laboratory in order to grow the influenza virus, if present in the patient sample. Following virus isolation, confirmation and identification tests--such as immunofluorescence and hemagglutination inhibition--are performed to further classify the virus.	Type Subtype Lineage	3-10 days**	• Traditionally considered the "gold standard" for influenza testing • Test requires that the virus be able to infect a host cell and multiply • Allows identification of viruses other than influenza if host cell line is sensitive to the specific virus
Real-time reverse transcription polymerase chain reaction (rRT-PCR)‡§	Portions of the influenza virus's genetic code, if present in the patient sample, are amplified and detected using sophisticated laboratory equipment.	Type Subtype	1-8 hours	• "The most sensitive and specific influenza diagnostic test" (*17*) • Can detect viruses no longer capable of causing infection as long as the target genetic sequences are present and intact • Can detect viruses present in a sample at low numbers
Serology	The patient's serum is tested for influenza-specific antibodies in a laboratory.	Type	≥ 2 weeks	• Requires paired acute and convalescent sera • Not recommended for routine patient diagnosis; special studies only (*14*)
Hemagglutination inhibition‡§	Antisera specific for either subtypes or strains and guinea pig blood are added to virus isolated in cell culture. The absence of agglutination (inhibition) indicates a positive result.	Subtype Lineage	3-6 hours	• Requires a cell culture isolate
Immunofluorescence‡§ [Direct Fluorescent Antibody (DFA) or Indirect Fluorescent Antibody (IFA) Staining]	An antibody with a fluorescent tag (direct method) recognizes and binds to influenza antigen in the patient sample, if present; the fluorescent antibody-antigen complex can be visualized under a laboratory microscope (*16*). IFA testing can be used to detect influenza antigen or specific antibody isotypes in the patient sample.	Type Subtype	1-4 hours	• "Sensitivity is usually higher than rapid tests but lower than culture or rRT-PCR" (*17*) • Specificity is high (*17*)

Test Name	Test Description	Identifies*	Minimum Testing Time†	Notes
Enzyme Immunoassay (EIA or ELISA)	There are two categories of EIA tests--the antigen detection method (direct or indirect) and the antibody detection method (competitive or noncompetitive) (*16*). The antigen detection testing method detects influenza antigens present in the patient sample when they bind to antibodies fixed to the test kit plate. The antibody detection testing method detects antibodies present in the patient sample when they bind to antigens fixed to the test kit plate. In both methods, another molecule that recognizes or competes with the target influenza antigen or antibody from the patient sample is added, along with an enzyme label. A chemical is added, it interacts with the enzyme label, and produces a signal (e.g., color, fluorescence, etc.) which can be measured using laboratory equipment; the intensity of the signal is compared to a standard cutoff value for the specific test to determine whether the sample is positive or negative.	Type	2 hours	• Indirect EIA antigen detection tests are more sensitive than direct versions of the test (*16*).
Rapid Diagnostic Tests	Monoclonal antibodies in the test kit are used to detect influenza antigens in the patient specimen, if present.	Type only; some tests cannot distinguish between influenza A and B	< 15 min.	• Point-of-care (CLIA-waived) tests can be performed in a doctor's office; moderately complex tests (not CLIA-waived) must be performed in a laboratory (*14*). • Specificity is 90-95% (*14*) • Sensitivity is 50-70%; however, reported sensitivities for 2009 pandemic influenza A H1N1 ranged from 10%-70% (*14*,*17*)

*Type = influenza A or B; Subtype = H1N1, H3N2, H5N1, or other subtype that can be detected by current diagnostic testing methods (for influenza A viruses only); Lineage = Victoria or Yamagata (for influenza B viruses only). Testing for other uncommon or novel influenza A subtypes is available at the CDC Influenza Laboratory.

†Minimum testing time does not include time to rerun a specimen, if necessary, or time to report the results to the submitter, and is a best case scenario where no other competing laboratory duties are present. Actual testing turnaround times vary by laboratory.

‡Testing performed in the DSHS Austin Laboratory; please see Section VI: Laboratory Support for more information on DSHS testing capabilities and testing turnaround times

§ Not all laboratories that can perform these tests have the capability to subtype and/or determine influenza B lineage.

**Time required for traditional viral culture; shell vial culture, if available, may produce a more rapid result (*14*)

Note: The CDC Influenza Laboratory can perform additional tests to further identify influenza strains and antiviral resistance markers.

Prevention

It is especially important for people who are at higher risk of severe illness or complications from influenza and for close contacts of higher risk individuals to take steps to prevent the spread of influenza. There are several actions that can be taken to protect oneself and to prevent the spread of influenza (*18*):

- Get vaccinated for influenza every year
- Wash hands frequently with soap and water, especially after coughing or sneezing
- Use alcohol-based hand sanitizers when facilities are not available for hand washing
- Cover coughs and sneezes with disposable tissues or your arm/sleeve
- Avoid touching your eyes, nose or mouth
- Avoid close contact with people who are sick
- When you are sick, limit contact with others and stay home until fever free for 24 hours without the use of fever-reducing medications
- Take antiviral medications if prescribed by your doctor

Educational materials for preventing the spread of influenza can be found at:

- http://texasflu.org/materials.htm
- http://www.cdc.gov/flu/freeresources/

Vaccinations

Vaccination is the primary method of preventing influenza infection. There are two ways a vaccine can be administered: injection or nasal spray (*19*). The "flu shot" contains a dead virus [known as inactivated influenza vaccine (IIV)] while the nasal spray contains a weakened virus [known as live, attenuated influenza vaccine (LAIV)]. The nasal spray (LAIV) should not be used for the 2017-2918 season. Although there are a few mild side effects, neither method of vaccination causes influenza illness in the vaccine recipient.

There are several categories of influenza vaccine available including inactivated influenza vaccine (IIV); recombinant influenza vaccine (RIV); and live attenuated influenza vaccine (LAIV) (*20*). Within the IIV category, there are the traditional egg-based trivalent inactivated influenza vaccines (IIV3), cell culture-based quadrivalent inactivated influenza vaccines (ccIIV4), and the egg-based quadrivalent inactivated influenza vaccines (IIV4). There are also several other vaccine options within the IIV3 category, including standard dose and high-dose formulations (the latter for adults 65 years and older), as well as an intradermal vaccine with a smaller needle. The RIV category currently contains a recombinant trivalent hemagglutinin influenza vaccine (RIV3) that is not produced using eggs and therefore can be given to individuals with egg allergies (*21*). The LAIV category contains the trivalent live, attenuated influenza vaccine (LAIV3) and the quadrivalent live, attenuated influenza vaccine (LAIV4); however, beginning in the 2013-2014 season, only the LAIV4 formulation will be manufactured. Vaccines are licensed for specific age groups and health statuses.

Every year a new influenza vaccine is developed for each hemisphere; strain recommendations for each vaccine are made using virologic data collected by World Health Organization (WHO) Collaborating Laboratories located throughout the world (*22*). Recommended strains for the Northern Hemisphere's influenza vaccine are chosen by the WHO each February; strains for the Southern Hemisphere's influenza vaccine are chosen each September. Until recently, the seasonal influenza vaccine has been available solely as a trivalent vaccine, containing three strains of the influenza virus—two influenza A components, usually an H1N1 and an H3N2, and one influenza B virus component. Beginning in the 2013-2014 influenza season, some influenza vaccines will be available in quadrivalent formulations, containing four strains of the influenza virus—two influenza A components, usually an H1N1 and an H3N2, and two influenza B components representing each influenza B lineage (*20*).

It has been recommended that all persons ≥ 6 months of age be vaccinated annually for influenza since 2010 (*20*). There are certain groups of people who have a higher risk of contracting influenza or developing severe, life-threatening illness from influenza. It is important for high risk individuals and their close contacts to protect themselves and others by getting vaccinated. The Advisory Committee on Immunizations Practices (ACIP) considers the following categories of people as high risk or close contacts of people at high risk:

- all children aged 6 months to 4 years (59 months);
- all persons aged ≥50 years;

- adults and children who have chronic pulmonary (including asthma), cardiovascular (except isolated hypertension), renal, hepatic, neurological, hematologic or metabolic disorders (including diabetes mellitus);
- persons who have weakened immune systems (including immunosuppression caused by medications or by HIV);
- women who are or will be pregnant during the influenza season;
- children and adolescents (aged 6 months to 18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye syndrome after influenza virus infection;
- residents of nursing homes and other long term care facilities;
- American Indians/Alaska Natives;
- persons who are morbidly obese (BMI ≥40);
- healthcare professionals (HCPs);
- household contacts and caregivers of children aged <5 years and adults aged ≥50 years, with particular emphasis on contacts of children aged <6 months; and
- household contacts and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza.

Some people should not be vaccinated for influenza (*23*). These include people who:

- are less than 6 months of age
- have severe, life-threatening allergies to flu vaccine or any ingredient in the vaccine

Some people should talk to their doctor before getting vaccinated for influenza (23). These include people who:

- have an allergy to eggs or any of the ingredients in the vaccine
- have ever had Guillain-Barré Syndrome (a severe paralyzing illness, also called GBS)
- are not feeling well (these people should talk to their doctor about their symptoms)

Influenza vaccines are not equally effective in all persons. Vaccine effectiveness varies depending on each person's age and general health; it also depends on how well circulating influenza strains match the current season's vaccine strains (*24-25*). Influenza vaccine efficacy may be reduced for some immunocompromised persons and persons over 65 years of age (*24*). However, even when influenza vaccine effectiveness is reduced, influenza vaccination provides protection against severe influenza-related complications, hospitalizations, and deaths, especially in the elderly (*24*).

Antivirals

Antiviral medications are prescription medications given to persons in order to treat an influenza illness or to prevent influenza illness from occurring; however, antiviral medications are not a replacement for the annual influenza vaccine.

Two classes of antiviral medications are currently available for clinical use—the adamantanes and the neuraminidase inhibitors. The adamantanes, amantadine and rimantadine, inhibit viral replication by interacting with the viral M2 protein (*3*). Influenza B viruses lack an M2 protein; therefore, the adamantanes are not effective against them.

The neuraminidase inhibitors, oseltamivir and zanamivir, interact with neuraminidase and eventually reduce the amount of virus released by host cells (*3,26*). During the 2009 influenza A (H1N1) pandemic, another neuraminidase inhibitor, intravenous peramivir, temporarily was made available by the FDA for emergency use in certain hospitalized patients (*27*). On December 19, 2014, the FDA approved intravenous peramivir to treat influenza infections in adults (*28*). Antiviral medications are typically available either in pill or liquid form for oral administration, an inhaled powder, or an intravenous solution (*29*).

An antiviral medication given within the first 48 hours of illness may shorten the duration and severity of illness (*29*). Antiviral medications also may be given for illness prevention to persons who were exposed to someone with an influenza illness and can be 70% to 90% effective in preventing illness (*30*). Antiviral medications are usually recommended only for those persons who have a severe illness or those who are at higher risk for developing serious illness or complications due to influenza (*29*). Antivirals also may be considered for chemoprophylaxis in settings where persons live in close proximity. First responders and public health workers involved in response to an investigation of very severe illnesses due to novel influenza A subtypes and strains may be given antivirals for illness prevention.

The CDC recommends influenza antiviral medications should be given to the following groups of people (*31*):

- Hospitalized patients with suspected or confirmed influenza;
- Persons with severe, complicated, or progressive illness;
- Outpatients who are at high risk for influenza complications (for example, young children, people 65 and older, pregnant women, and persons with certain underlying chronic medical conditions) (For a full list of people at high risk of influenza complications, see: http://www.cdc.gov/flu/about/disease/high_risk.htm); and
- Persons with uncomplicated influenza who are not in a high risk group and who present within 48 hours of illness onset. These persons can be treated with antiviral medications based upon clinical judgment, because reviews of RCTs and observational studies have found consistent clinical benefit of early oseltamivir treatment in reducing the risk of lower respiratory tract complications such as those requiring antibiotics.

An important reason for limiting the use of antiviral medications is the increasing development of antiviral resistance to currently available medications. A large percentage of circulating influenza A (H3N2) viruses and some influenza A (H1N1) viruses have been shown to be resistant to adamantanes; therefore, the CDC continues to recommend the use of neuraminidase inhibitors over adamantanes (*8*). In the 2007-2008 season, 10.9% of influenza A (H1N1) viruses from across the nation tested by the CDC demonstrated resistance to oseltamivir, compared to only 0.7% in the 2006-2007 influenza season. In the 2008-2009 season, oseltamivir resistance was observed in almost all (99.6%) of the seasonal influenza A (H1N1) viruses tested by CDC; additionally, a small percentage (0.5%) of 2009 pandemic influenza A (H1N1) viruses tested positive for resistance to oseltamivir (*32*). Throughout the 2009-2010 influenza season, the number of oseltamivir-resistant 2009 pandemic influenza A (H1N1) viruses detected by CDC remained low (1.3%); almost all of the 2009 pandemic influenza A (H1N1) viruses have shown resistance to the adamantanes (*33*). In the 2011-20012 season, a cluster of 2009 pandemic influenza A (H1N1) viruses with resistance to oseltamivir was detected through routine surveillance in Texas Health Service Region 11. Resistance trends will continue to be monitored.

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Section II: Influenza Surveillance Overview

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Goals of Influenza Surveillance

Influenza has a tremendous impact on the health of the public. Every year an influenza epidemic occurs in the United States. This epidemic occurs regularly between October and May, and therefore this time period is referred to as influenza season. An estimated 23,607 (range 3,349-48,614) deaths associated with influenza occur every year in the United States (*1*).

In addition to yearly epidemics, influenza pandemics may also occur. An influenza pandemic occurs when a new influenza virus strain begins circulating among people. The number of people impacted by influenza increases substantially during pandemics because there is little to no immunity against the new strain among the population. The severity of the pandemic depends on the actual strain. Some pandemics have high case fatality rates while others have low case fatality rates.

Influenza surveillance is performed in order to monitor yearly epidemics and detect possible introductions of new strains of influenza. The information collected from influenza surveillance is used to guide public health recommendations for prevention and control at local, state, national and international levels.

Texas goals of influenza surveillance

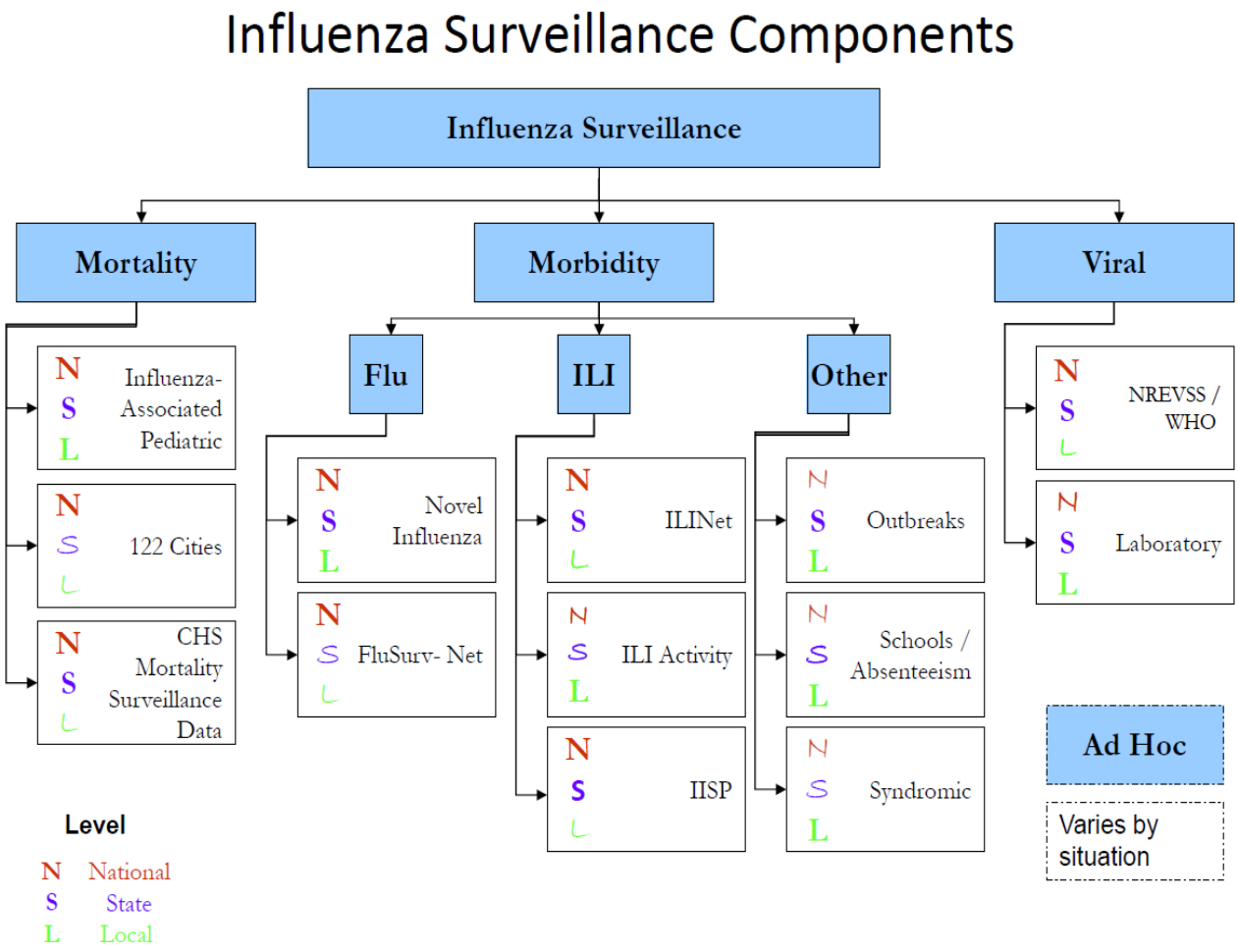
- Determine when and where influenza viruses are circulating
- Determine if circulating influenza viruses match the vaccine strains
- Detect changes in the influenza viruses
- Track influenza-like illness
- Determine the severity of influenza activity

The Texas goals align closely with the national goals:

- Determine 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

Components of Influenza Surveillance

Influenza surveillance in the United States has three major components: mortality, morbidity and viral surveillance. For each of these components, activities may be conducted at the national, state or local level. Texas has regional health departments that perform both state and local level surveillance activities.



The following pages provide a brief description of the most common influenza surveillance activities. For a more detailed description of the activities conducted in Texas, please refer to Section IV of this handbook.

Mortality Surveillance

Mortality surveillance focuses on tracking deaths associated with influenza. Mortality surveillance is used as one indicator of severity of influenza epidemics and pandemics.

The following table describes the main activities included in mortality surveillance:

Activity	Conducted at	Description
Influenza-Associated Pediatric Mortality *See Section IVf*	Local, state and national levels	Local and regional health departments investigate reports of influenza-associated pediatric deaths, a reportable condition. State health departments and the CDC track these deaths and monitor the data for trends. The data are used to support public health recommendations for influenza prevention. This surveillance occurs year-round.
Center for Health Statistics (CHS) Mortality Surveillance Data (*2*)	State and national levels	The Center for Health Statistics at the state and national level collect and maintain death certificate data. Data for this surveillance activity comes from death certificates for which pneumonia or influenza was listed as the underlying or contributing cause of death. At the national level, surveillance data is aggregated by the week of death occurrence and the percentage of all deaths due to pneumonia and influenza is compared with a seasonal baseline and an epidemic threshold value that is calculated for each week. This surveillance occurs year-round.
122 Cities Mortality Reporting System (*2*) Discontinued after week 39 (week ending Oct. 1, 2016) of the 2015-2016 influenza season	National level	Vital Statistics offices in 122 major cities in the United States reported directly to the CDC the total number of death certificates processed 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 was compared with a seasonal baseline and an epidemic threshold value that was calculated for each week. Seven cities in Texas participated by submitting data weekly. This surveillance occurred year-round.

Some health jurisdictions may conduct other surveillance activities to track influenza-related mortality. For example, health departments may receive reports from their local vital statistics office on the number of deaths attributable to pneumonia and influenza each week. Other health departments may work closely with local hospitals, medical examiners, and justices of the peace to obtain aggregate data on the number of deaths due to influenza each week.

Morbidity Surveillance

Morbidity surveillance focuses on tracking illness associated with influenza. The breadth of activities classified under morbidity surveillance reflects the wide spectrum of disease associated with influenza. Morbidity surveillance can be subdivided into surveillance activities related to laboratory confirmed influenza, influenza-like illness or a combination of the two. Morbidity surveillance can also focus on different spectrums of illness. For example, influenza data collected from hospitals reflect more severe cases of illness while influenza data collected from over-the-counter sales of cough and cold medicine reflect milder cases of illness.

The following table describes the main activities included in morbidity surveillance:

Activity	Conducted at	Description
Novel Influenza *See Section IVg*	Local, state and national levels	Local, regional and state health departments investigate reports of novel influenza to identify possible spread in the community. Novel influenza is a reportable disease in Texas. The first indication of novel influenza is often a specimen that is not able to be subtyped by a laboratory with subtyping capability. Initial confirmation of novel influenza can only be done by the CDC Laboratory. This surveillance occurs year-round.
FluSurv-NET (*2*)	National level	Laboratory confirmed cases of influenza in hospitalized children and adults from selected hospitals in 13 states are reported to the CDC. Cases are identified by reviewing hospital laboratory and admission databases and infection control logs for patients hospitalized during the influenza season 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]. Estimated hospitalization rates are reported each week during the influenza season by the CDC. This surveillance is not conducted in Texas. This is an expansion of the flu surveillance activities performed through the Emerging Infections Program (EIP).

Activity	Conducted at	Description
New Vaccine Surveillance Network (NVSN) (*3*) No longer an active system	National level	Hospitals in three counties (Hamilton County, OH; Davidson County, TN; and Monroe County, NY) reported laboratory confirmed influenza hospitalization rates for children <5 years of age. Children admitted to NVSN hospitals with fever or respiratory symptoms were prospectively enrolled and respiratory samples were collected and tested by viral culture and RT-PCR. NVSN estimated rates were reported every two weeks through 2011 during the influenza season by the CDC. This surveillance was not conducted in Texas.
U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) *See Section IVa*	Primarily supported at the state and national levels; local level participation varies	Healthcare providers report the total number of patients seen and the number of those patients with influenza-like illness (ILI) by age group to a CDC database that is accessible to state health departments. Starting with the 2016-2017 influenza season, providers will have the option to report the total number of patients seen by age group. This surveillance occurs year-round but not all participants enter data outside of the official influenza season.
Influenza Incidence Surveillance Project (IISP) *See Section IVb*	Primarily supported at the state and national levels; local level participation varies	Healthcare providers report the total number of patients seen by age group and the number of those patients with ILI by age group to the state health department. Healthcare providers also submit specimens with demographic and clinical information on the first ten patients seen each week with ILI. Participation is limited to five to eight healthcare providers in Texas. This surveillance occurs year-round. The 2012-2013 season was the last surveillance year for the full project. Texasdiscontinued participation in IISP or an IISP-like surveillance project in the 2016-2017 influenza season.

Activity	Conducted at	Description
ILI Activity *See Section IVc*	Primarily conducted at the local level; collected data contribute to state and national influenza reports	ILI activity surveillance is highly variable from one health department to another. In addition to or in lieu of having providers report through ILINet, health departments (HDs) have providers report directly to the HD. This enables the HD to tailor the information collected to their needs. HDs may collect more information than ILINet captures, such as rapid influenza test data. This activity also allows providers to report less information than ILINet (e.g., no age group information). ILI activity data can also be reported from non-traditional influenza reporters such as schools. ILI data from schools can include the number of students seen by the school nurse with ILI or the number of students who are absent with the parents reporting ILI as the reason. Some HDs have established electronic systems to collect reports from school nurses and administration. This surveillance can occur either year-round or seasonally.
Behavioral Risk Factor Surveillance System (BRFSS) (*4*)	National level	BRFSS is an on-going telephone health survey system, tracking health conditions and risk behaviors in the United States. The CDC added questions to assess ILI in BRFSS calls in 2009. It was thought that these questions would capture milder illnesses that may not have resulted in provider visits. The usefulness of this type of surveillance is still being explored by the CDC. This surveillance occurs year-round.
Outbreak Investigations *See Sections VII and IVi*	Primarily conducted at the local and state levels; collected data contribute to state and national influenza reports	Local, regional and state health departments investigate reports of outbreaks and implement immediate control measures to stop the outbreaks. This surveillance occurs year-round.

Activity	Conducted at	Description
Absenteeism Surveillance *See Section IVi*	Primarily conducted at the local level; collected data contribute to state and national influenza reports	Absenteeism surveillance activities vary widely. Absenteeism data specific to ILI are better for influenza surveillance than general absentee counts; however, broader absenteeism data can be beneficial for monitoring overall community health and detecting potential outbreaks. This surveillance can occur either year-round or seasonally.
Syndromic Surveillance *See Section IVi*	Primarily conducted at the local level; collected data contribute to state and national influenza reports	Automated data mining of healthcare facility databases allows flexible and timely analysis of trends in accessing care. The two most common uses of syndromic surveillance data for influenza surveillance include examining: • Percentage of total visits due to ILI and comparison of visits with historical trends • Percentage of cough medications sold by zip code and comparison of sales with historical trends This surveillance occurs year-round.
Border Influenza Surveillance Network (BISN) *See Section IVi*	Primarily conducted at the local level; collected data contribute to a multi-state report	The Border Influenza Surveillance Network is a multi-state collaboration to share influenza data from the border regions of Arizona, California, New Mexico, Texas and Mexico. The network uses data from existing influenza surveillance activities. This reporting is seasonal.

Viral Surveillance

Viral surveillance focuses on laboratory identification of circulating influenza strains and their characteristics. Viral surveillance is critical for detecting novel strains of influenza and helping public health monitor for antiviral resistance among all circulating strains of influenza.

The following table describes the main activities included in viral surveillance:

Activity	**Conducted at**	**Description**
National Respiratory and Enteric Virus Surveillance System (NREVSS) *See Section IVe*	Primarily supported at the state and national levels; local level participation varies	Laboratories report the total number of respiratory specimens tested and the number positive for influenza types A (categorized by subtype, if known) and B. Laboratory data for additional respiratory and enteric viruses are also collected through NREVSS. This surveillance occurs year-round.
World Health Organization (WHO) Collaborating Laboratories	National level	Many laboratories that participate in NREVSS surveillance also support WHO surveillance. The DSHS Virology Laboratory is a WHO Collaborating Laboratory. This surveillance occurs year-round.
Laboratory Surveillance *See Sections IVd and VI*	Primarily conducted at the local and state levels; collected data contribute to national influenza reports	Specimens from patients with symptoms compatible with influenza are submitted to the DSHS Laboratory or a Laboratory Response Network (LRN) Laboratory for influenza testing. Testing at the DSHS Laboratory may include culture, PCR and antiviral resistance testing. Several specimens are submitted to CDC for further testing and identification throughout the season. This surveillance occurs year-round with increased participation during the influenza season.

Ad Hoc Surveillance

Ad hoc surveillance includes any surveillance activities that are designed and implemented to respond to a specific situation and usually only occur for a specific time period. Ad hoc surveillance may be done to capture the same elements as mortality, morbidity or viral surveillance.

The following table describes the examples of ad hoc surveillance:

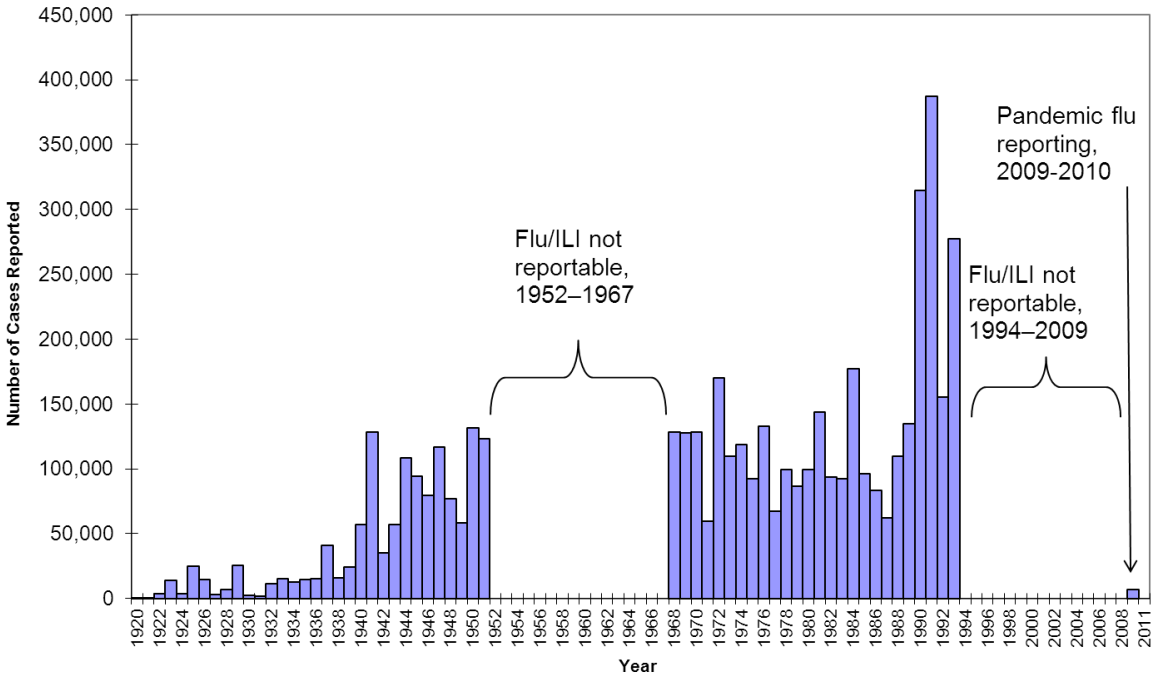
Activity	**Conducted at**	**Description**
Confirmed pH1N1 Hospitalization Surveillance	Conducted from June 2009 to May 2010	Hospitals were asked by the CDC and DSHS to voluntarily report the number of people that were hospitalized (admitted) who were confirmed as having pH1N1. Aggregate hospitalization counts were reported beginning in September 2009. This surveillance was created specifically as a response to the 2009 pandemic to help track severity.
Influenza-Associated Pregnant/Postpartum Mortality Surveillance *See Section IVh*	Conducted from August 2009 through 2010-2011 influenza season	Health departments were asked by the CDC to investigate reports of influenza-associated deaths in women who were pregnant or up to six weeks postpartum. This surveillance was created after reports were received of increased impact of pH1N1 on women who were pregnant during the 2009 pandemic. This surveillance was extended through the 2010-2011 influenza surveillance season.
Enhanced Surveillance for an Outbreak *See Sections VII and IVi*	Performed during an outbreak investigation and may extend for a week or more after the outbreak	A health department investigating an outbreak may conduct enhanced surveillance for influenza in the community to help determine if the outbreak is contained or has spread to the community. The extent of the surveillance, what data are collected and how frequently data are reported is determined by the lead epidemiologist/investigator of the outbreak.

A Brief History of Influenza Reporting in Texas

Influenza morbidity has been reported in Texas since at least 1920, although not continuously and not using the same case definition. Starting in 1920 and continuing through 1945, annual public health reports and summary tables included "influenza" case counts (*5*). The reports from 1946 to 1951 changed to "influenza/flu-like" cases. Influenza and influenza-like illnesses (ILI) reporting ceased from 1952 through 1967 and then resumed again from 1968 until 1993. We do not have a record of how influenza, influenza-like illness and ILI were defined during these time periods so the data may not reflect actual disease trends. It is clear that by the end of the 1970s, influenza and ILI were only reportable to the state health department as aggregate counts rather than individual reports. By 1994, influenza and ILI were again removed from the Texas Notifiable Conditions list since influenza data collected through surveillance were thought to vastly underestimate true morbidity (*6*).

After 1993, voluntary surveillance from "sentinel" sites became the main source of influenza surveillance data in Texas and continues to this day for influenza and ILI. In this type of surveillance, reports of influenza and ILI are received from a subset of healthcare providers rather than from all healthcare providers. In 2007, Texas expanded influenza surveillance by adding influenza-associated pediatric mortality to the list of notifiable conditions. From April 2009 through May 2010, human cases, hospitalizations, ICU admissions and deaths related to the pandemic influenza A (H1N1) virus were reportable under the "exotic disease" or "unusual group expression" portion of the Notifiable Conditions list (*7*). The case definitions for reporting changed frequently as the pandemic evolved; in particular, reporting of cases of 2009 influenza A (H1N1) in persons without more severe disease manifestations (i.e., hospitalizations or deaths) was discontinued early in the pandemic. In 2013, Novel Influenza was added to the Texas Notifiable Conditions list.

Influenza & ILI as Reportable Conditions in Texas, 1920–2011



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1. Thompson MG, Shay DK, Zhou H, Bridges CB, Cheng PY, Burns E, et al. Estimates of Deaths Associated with Seasonal Influenza – United States, 1976-2007. MMWR 2010; 59(33): 1057-1062.

2. Overview of Influenza Surveillance in the United States [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 18 Sept 2017. [20 Sept 2017]. Available from http://www.cdc.gov/flu/weekly/overview.htm.

3. New Vaccine Surveillance Network (NVSN) [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 26 Jun 2017. [20 Sept 2017]. Available from http://www.cdc.gov/surveillance/nvsn/index.html.

4. Behavioral Risk Factor Surveillance System [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 25 Aug 2017. [20 Sept 2017]. Available from http://www.cdc.gov/brfss/.

5. Texas Morbidity Reports 1920-1993. Texas Department of State Health Services. Available from http://www.dshs.texas.gov/idcu/Data/morbidity/Combined/.

6. Epidemiology in Texas 1993 Annual Report. Texas Department of State Health Services. Available from http://www.dshs.texas.gov/idcu/Data/annual/1990s/.

7. Notifiable Conditions [Internet]. Texas Department of State Health Services; 09 Feb 2017. [20 Sept 2017]. Available from http://www.dshs.texas.gov/idcu/investigation/conditions/.

Section III: Influenza Surveillance Reporting

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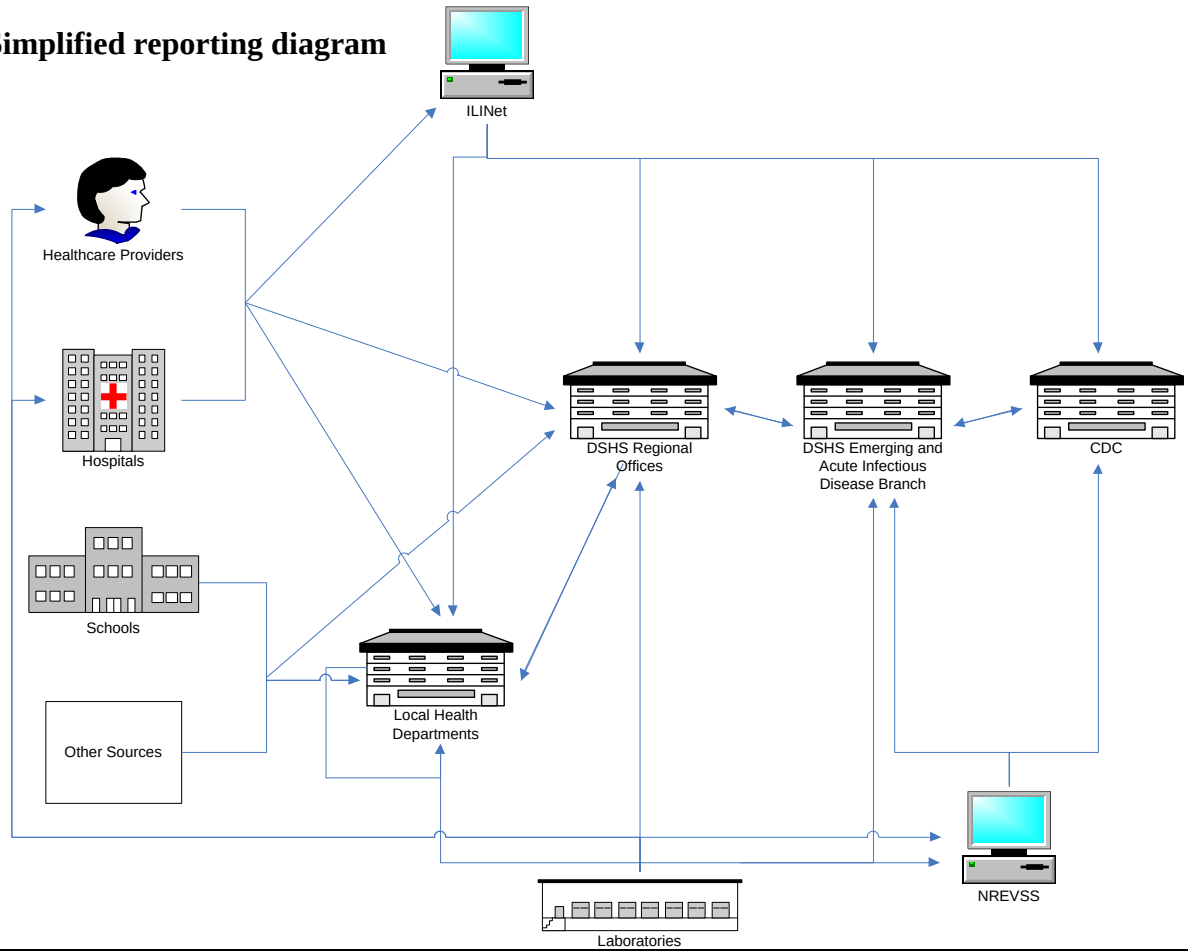
Background

Influenza surveillance occurs year-round. Seasonal influenza surveillance activities occur during the traditional influenza reporting period from Morbidity and Mortality Weekly Report (MMWR) week 40 of one year through week 20 of the next year (i.e., approximately the beginning of October through the third week of May). Week 40 to week 20 corresponds with the annual influenza reporting season in the United States.

Influenza surveillance data are collected and reported on a weekly basis. The reporting week starts on Sunday and ends on the following Saturday. This reporting week is equivalent to the CDC designated MMWR week. Reporting weeks are referred to by their week number or week ending date (e.g., 2010 MMWR week 32 or the week ending August 14, 2010).

Influenza surveillance reporting is a complex process. Healthcare providers and others who interact professionally with potentially ill people report data to their local or regional health departments. Healthcare professionals may also report data to the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet); these data are accessible to local, regional, state and national health departments. Laboratories report results to healthcare professionals and may also report data to health departments. Local, regional, state and national health departments also exchange data. The data collected from these multiple sources are compiled, analyzed and shared in weekly influenza surveillance reports. This section of the handbook presents more detail on the reporting process.

Simplified reporting diagram



Seasonal Influenza Surveillance

DSHS Reporting Process: MMWR Week 40 to MMWR Week 20

The DSHS Emerging and Infectious Disease Branch (EAIDB) requests that two reports—a preliminary report and a final report—be submitted each week by the DSHS Regional Health Departments (RHDs) for MMWR week 40 through MMWR week 20. Each week's report contains information on influenza activity from the previous week; therefore, influenza reports have an approximate 1 week delay.

The preliminary report deadline for the RHDs is by the close of business (COB) on Monday. All preliminary reports are needed by this deadline to determine the Texas Influenza Activity Code (submitted by DSHS EAIDB to CDC each Wednesday by noon). The report should contain answers to the following questions and can be sent via email to flutexas@dshs.texas.gov:

1. Is ILI occurring in your region(s)?
2. Are there rapid influenza test confirmed cases of influenza in your region(s)?
3. Are there culture or PCR confirmed cases of influenza in your region(s)?
4. Are there any school or institutional outbreaks of influenza or ILI in your region(s)?
5. Has influenza activity in your region(s) increased, decreased or remained the same compared to the previous week?

The final report deadline for the RHDs is by noon on Thursday. This ensures that the DSHS EAIDB Influenza Surveillance Coordinator at Central Office can process and compile all reports to generate the Texas Weekly Flu Report, which is posted on the web on Friday by the close of business. Final report updates sent by the close of business on Thursday will be incorporated into the Texas Weekly Flu Report if time allows. The DSHS EAIDB Influenza Surveillance Coordinator will evaluate the feasibility of incorporating changes for reports or updates sent after the close of business on Thursday. Final and amended reports should be sent to flutexas@dshs.texas.gov.

DSHS Reporting Process: MMWR Week 21 to MMWR Week 39

During the off season for influenza (MMWR week 21 to MMWR week 39), surveillance efforts continue but may be scaled back. All local and regional health departments are encouraged to continue influenza surveillance activities but may reduce the number of healthcare providers who submit data weekly. RHDs do not have to submit a preliminary report but should continue to submit the final report by noon on Thursday. With the exception of the preliminary report, the reporting time frames are the same.

Timeline for Voluntary Surveillance Reporting

Day	ILINet Reporters	Non-ILINet Reporters	LHD	RHD	CO
Monday		By 1pm*: Submit influenza or ILI activity reports for previous week to L/RHD	By 3pm*: Submit initial influenza activity report to RHD	By COB: Submit preliminary influenza activity report to DSHS EAIDB	
Tuesday	By noon: Enter ILI report for the previous week into ILINet or fax report form to CDC				
Wednesday			By COB*: Submit final influenza activity report to RHD		By noon: Texas Influenza Activity Code due to CDC
Thursday				By noon: Submit final influenza activity report to DSHS EAIDB	
Friday					By COB: Post state report on the DSHS website

* These are recommended submission deadlines. The actual deadline is set by each local health department or DSHS region.

Other Reporting Time Frames and Requirements

What	Required by law	Time frame	Mechanism for health departments to share reports with DSHS CO
Influenza-associated pediatric mortality *See Section IVf*	Yes	Providers should report cases to the health department within 1 working day by phone or fax.	1) Call RHD or DSHS EAIDB to give a preliminary summary when the case is first reported. 2) Fax completed influenza-associated pediatric mortality investigation form to RHD. RHD will forward to EAIDB. 3) Complete investigation in NBS.
Novel influenza *See Section IVg*	Yes	Providers should report suspected cases to the health department immediately. Laboratories with subtyping capabilities should forward unsubtypable influenza isolates to the DSHS laboratory as soon as possible.	1) Fax completed general influenza investigation form along with supplemental sections on travel history, animal exposures and contacts to RHD. RHD will forward to EAIDB.
Influenza or ILI outbreaks *See Sections IVi and VII*	Yes	Providers should report suspected outbreaks to the health department immediately.	1) Call RHD or DSHS EAIDB to give a preliminary summary when the outbreak is first reported. 2) Fax or email the respiratory outbreak summary report or a written summary of the outbreak investigation to RHD. RHD will forward to EAIDB.
Influenza-associated pregnant/postpartum mortality *See Section IVh*	No, voluntary	Discontinued in May 2011	1) Fax completed CDC influenza-associated pregnant/postpartum investigation form to RHD. RHD will forward to EAIDB.

Surveillance Roles: Local/Regional/State

Level	Person	Responsibility
Local Health Department	Local influenza surveillance coordinator	• Recruit and maintain influenza surveillance reporters • Collect influenza activity information from local surveillance partners • Summarize information • Share influenza reporting information with the Regional Influenza Surveillance Coordinator and local surveillance partners
Regional Health Department	Regional influenza surveillance coordinator	• Recruit and maintain influenza surveillance reporters • Collect influenza activity information from local health departments and regional surveillance partners • Consolidate and summarize local influenza activity reports • Review ILINet and NREVSS data for the Region • Share influenza reporting information with the State Influenza Surveillance Coordinator and regional surveillance partners • Provide guidance on influenza surveillance to local health departments
DSHS EAIDB Central Office	EAIDB influenza surveillance coordinator	• Consolidate and summarize regional influenza activity reports, CDC influenza testing results and other laboratory and agency specific data • Share influenza reporting information on the DSHS website • Facilitate shipping of influenza testing supplies (VTM, swabs and shipping materials) • Provide guidance to regional and local health departments on influenza surveillance and reporting
	ILINet Coordinator	• Coordinate ILINet surveillance and review ILINet data for the state • Lead recruitment efforts for ILINet
	Respiratory and invasive diseases epidemiology team lead	• Provide guidance to regional and local health departments on respiratory and invasive disease outbreak investigations • Provide guidance to regional and local health departments on influenza surveillance and reporting

National Influenza Surveillance Report

The Influenza Branch at CDC collects and reports information on influenza activity in the United States each week during the national reporting season. The weekly national influenza surveillance report, FluView, is posted each Friday at http://www.cdc.gov/flu/weekly/.

The FluView report is based upon data collected from five complementary surveillance sources:

1. Virologic surveillance
    a. World Health Organization (WHO) Collaborating Laboratories
    b. the National Respiratory and Enteric Virus Surveillance System (NREVSS) and
    c. Surveillance for Novel A Influenza Viruses
2. Outpatient illness surveillance
    a. U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)
3. Mortality surveillance
    a. 122 Cities Mortality Reporting System
        i. This surveillance system was discontinued after week 39 (week ending Oct. 1, 2016) of the 2015-2016 influenza season.
    b. National Center for Health Statistics (NCHS) mortality surveillance data and
    c. Influenza-Associated Pediatric Mortality Surveillance System
4. Hospitalization surveillance
    a. FluSurv-NET
5. Summary of Geographic Spread of Influenza
    a. State and Territorial Epidemiologists Reports

A brief description of these surveillance activities can be found in Section II of this handbook.

The reported information answers the questions of where, when and what influenza viruses are circulating. This information may also be used to determine if influenza activity is increasing or decreasing, but it cannot be used to ascertain how many people have become ill with influenza during the season.

Texas Influenza Surveillance Report

The DSHS Influenza Surveillance Team at Central Office collects and collates reports from the local and regional health departments, participating laboratories and ILINet to produce the Texas Weekly Flu Report. This report is posted each Friday at http://www.dshs.texas.gov/idcu/disease/influenza/surveillance/ under the link for "Current State Influenza Surveillance Report".

The Texas Influenza report is based upon data collected from the following sources:

1. The National Respiratory and Enteric Virus Surveillance System (NREVSS), the DSHS Austin Laboratory, and the Laboratory Response Network Laboratories (LRNs)
2. U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)
3. ILI activity reported directly to local and regional health departments
4. Influenza-associated Pediatric Mortality reports
5. Outbreak and school closure investigations and notifications
6. Novel influenza A case investigations
7. DSHS Center for Health Statistics mortality surveillance data

Descriptions of these surveillance activities can be found in Sections II and IV of this handbook.

As with the national influenza report, the surveillance information answers the questions of where, when and what influenza viruses are circulating. It may also be used to determine if influenza activity is increasing or decreasing, but it cannot be used to ascertain how many people have become ill with influenza during the season.

During the influenza off-season (MMWR week 21 to week 39), the Texas Influenza Surveillance Report continues to be posted weekly. However, the report is abbreviated and does not include a section for comprehensive testing results unless needed.

Regional/Local Influenza Surveillance Report

Influenza surveillance reports that are specific to a regional or local health jurisdiction are beneficial for multiple reasons. The reports can be used to encourage providers to continue reporting since they demonstrate that the information they provide is being utilized. The reports are also good mechanisms to share what is happening with influenza with local leadership, the medical community and the general public. Furthermore, archived reports are helpful for documenting historical influenza trends.

Regional/local influenza surveillance reports should reflect the data that are captured by influenza surveillance in the regional/local jurisdiction. These reports should also include information that is of interest to the local community. Regional/local influenza surveillance reports can range from simple, one-page reports and graphs to extensive reports mirroring information found in the CDC or DSHS influenza reports.

Here are examples of data sources that can be included in a report:

- ILI activity reported directly to health departments
- U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) data
- National Respiratory and Enteric Virus Surveillance System (NREVSS) data
- Other laboratory data
- Influenza-associated hospitalizations data
- Syndromic surveillance data
- School absenteeism data or influenza-like illness data
- Influenza-associated Pediatric Mortality reports
- Outbreak and school closure investigations and notifications
- Novel influenza A case investigations

Some health departments post influenza reports on their websites. Other health departments email or fax the reports to healthcare providers and other public health partners. See Section V of this handbook for an example of an influenza surveillance report that is emailed to stakeholders. Here are some examples of influenza reports that are posted on health department websites:

- http://www.elpasotexas.gov/health/epidemiology.asp
- http://www.dshs.texas.gov/region7/Epidemiology.shtm
- http://www.dallascounty.org/department/hhs/influenza.html
- http://access.tarrantcounty.com/en/public-health/epidemiology-and-health-information/influenza-surveillance/flu-reports.html

References

1. Bekka N., editor. Epi Case Criteria Guide, 2015 [Internet]. Infectious Disease Control Unit, Texas Department of State Health Services; Mar 2017 [20 Sept 2017]. Available from: http://www.dshs.texas.gov/WorkArea/DownloadAsset.aspx?id=12884908002.

2. Texas Administrative Code, Title 25, Part 1, Chapter 97, Subchapter A, Rule 97.3 (June 5, 2007).

Section IV: Influenza Surveillance Activities

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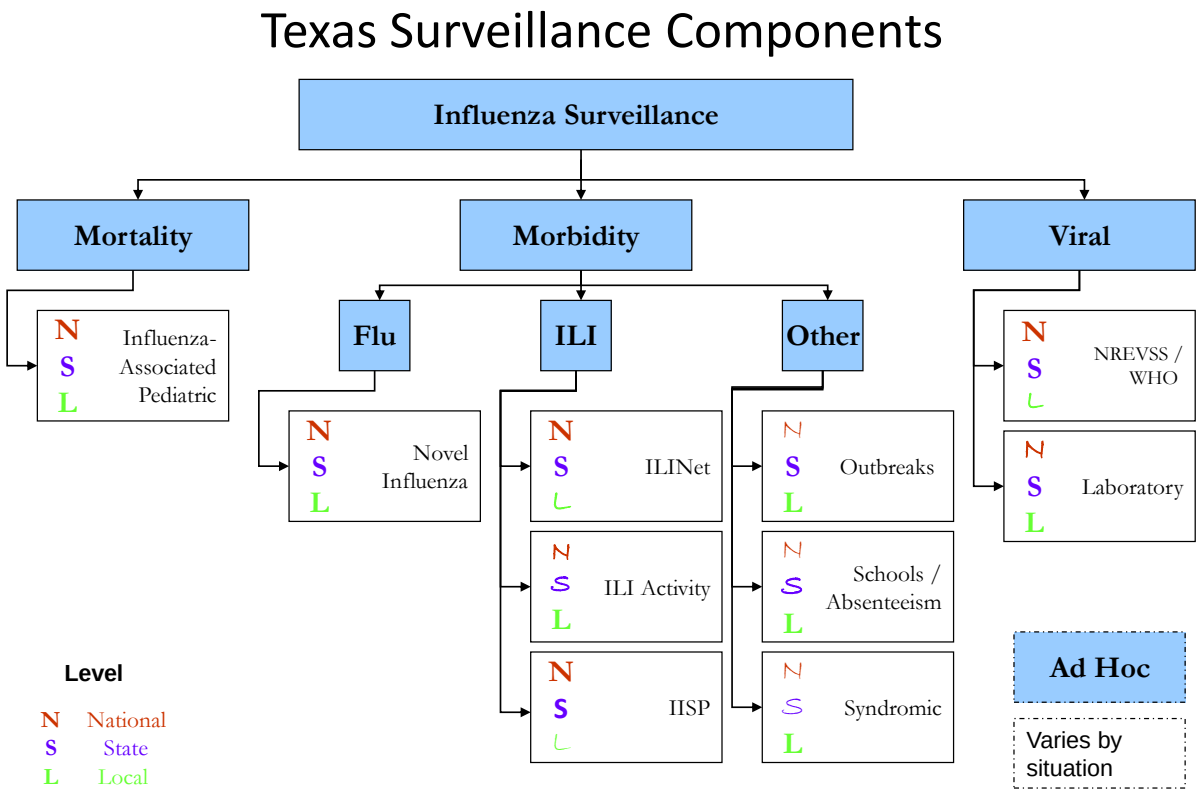
Key Texas Surveillance Activities

Section II of this handbook provided an overview of influenza surveillance at the national, state and local levels. This section provides technical information on the main influenza surveillance activities that are conducted in Texas. This section is meant to serve as a tool for influenza surveillance coordinators to build and maintain influenza surveillance.



Influenza Surveillance Activities - ILINet

ILINet Overview

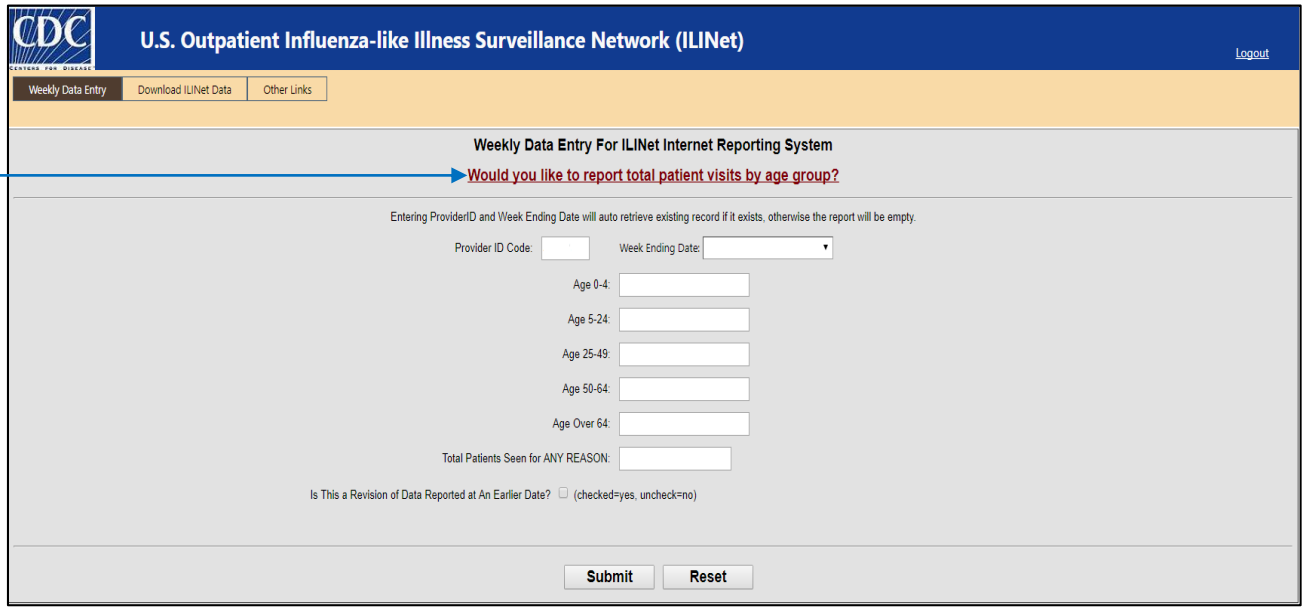
The U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) is an online reporting system maintained by the CDC that is designed to collect information on influenza-like illness (ILI). For the purposes of ILINet, ILI is defined as fever of at least 100˚F plus cough and/or sore throat with a KNOWN cause of influenza or unspecified. Volunteers report six numbers each week: the total number of patients seen with ILI by five age groups and the total number of patients seen for any reason.

Participation in ILINet is open to the following healthcare providers and settings: family practice, pediatricians, internal medicine, student health, infectious disease, hospital emergency departments, community clinics, urgent care, and OB/GYNs that screen for ILI as part of a patient visit.

Participants have the following choices when participating in ILINet:

1. Reporting during the official influenza season only (i.e., October through May) or reporting year-round, whichever is preferred.
2. Reporting the "Total Patients seen by age group" which is explained in the section titled "Reporting Total Patients seen by age groups" (see page IV.10).
3. Collecting and submitting patient specimens (up to five specimens per month) to the state laboratory for influenza surveillance laboratory testing. This is not required to participate in ILINet. Influenza testing for surveillance purposes is free of charge at the state laboratory. Supplies and shipping materials are provided.

Providers report data weekly by noon each Tuesday through the CDC's ILINet website or by fax. Upon approval from the DSHS ILINet Coordinator, data for multiple sites may be emailed as a spreadsheet to flutexas@dshs.texas.gov. An example of the CDC online reporting form is included below.

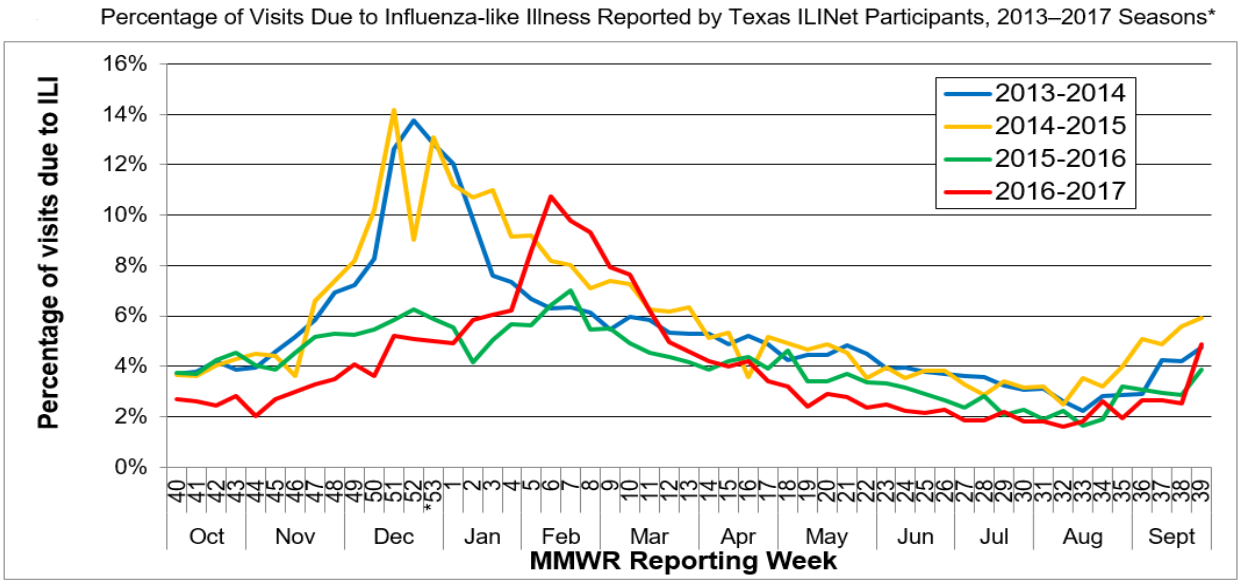


Data entered into ILINet are available for download to local, regional and state public health staff in Texas by requesting access through flutexas@dshs.texas.gov. The default download file is a Microsoft Excel file. An example of the downloaded data is included below.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Phys ID C	County	Date Code	Date Called	Time Called	Source	Revised R	Age 0-4	Age 5-24	Age 25-4	Age 50-6	Age 65 an	Total Patie	Total ILI	ILI Percent
2	48039	Travis	201739	10/2/2017	9:20:11 AM	Internet Physician - 10/2/2017	NO	0	20	0	0	0	1005	20	1.99%
3	48067	McLennan	201739	10/2/2017	9:44:01 AM	Internet Physician - 10/2/2017	NO	0	4	0	0	0	453	4	0.88%
4	48129	Denton	201739	9/29/2017	17:05:32 PM	Internet Physician - 9/29/2017	NO	0	0	0	0	0	135	0	0.00%
5	48205	El Paso	201739	10/2/2017	15:55:00 PM	Internet Physician - 10/2/2017	NO	1	1	0	0	0	60	2	3.33%
6	48256	Starr	201739	9/30/2017	21:28:16 PM	Internet Physician - 9/30/2017	NO	5	9	11	8	1	228	34	14.91%
7	48315	Webb	201739	10/2/2017	15:45:49 PM	Internet Physician - 10/2/2017	NO	1	2	0	0	0	218	3	1.38%

Data from ILINet are used to demonstrate where and when ILI activity is occurring. A published study conducted by the University of Texas on behalf of DSHS in 2010 demonstrated that Texas ILINet data correlate with hospitalizations and deaths from influenza and pneumonia.

The data from ILINet are included in the Texas Weekly Flu Report, incorporated in the determination of Texas's weekly influenza activity code report to CDC and used to monitor changes in ILI activity over time. An example ILINet data graph comparing multiple influenza seasons is shown below.



DSHS EAIDB has an ILINet Coordinator who recruits and enrolls providers, tracks reporting progress and sends reporting reminders to participants. The ILINet Coordinator also works with providers to correct data entry errors. Local and regional health departments in Texas assist the ILINet Coordinator with recruitment.

The CDC goal for participation in ILINet is 1 provider for every 250,000 in population; however, because not all enrolled providers report to the system every week, it may be beneficial to recruit more than the minimum required. DSHS recommends that each county with a population of 100,000 or more should have at least 1 regularly reporting ILINet provider. ILINet providers can be recruited from any county in Texas regardless of population.

The DSHS ILINet Coordinator has created a plan for systematic ILINet recruiting in each DSHS Region based on recent population estimates and study data from the University of Texas. These

recruitment plans are available upon request from flutexas@dshs.texas.gov.

The following table indicates those counties grouped by Health Service Regions that have a population over 100,000 where additional ILINet providers are needed based upon the current ILINet recruitment plan.

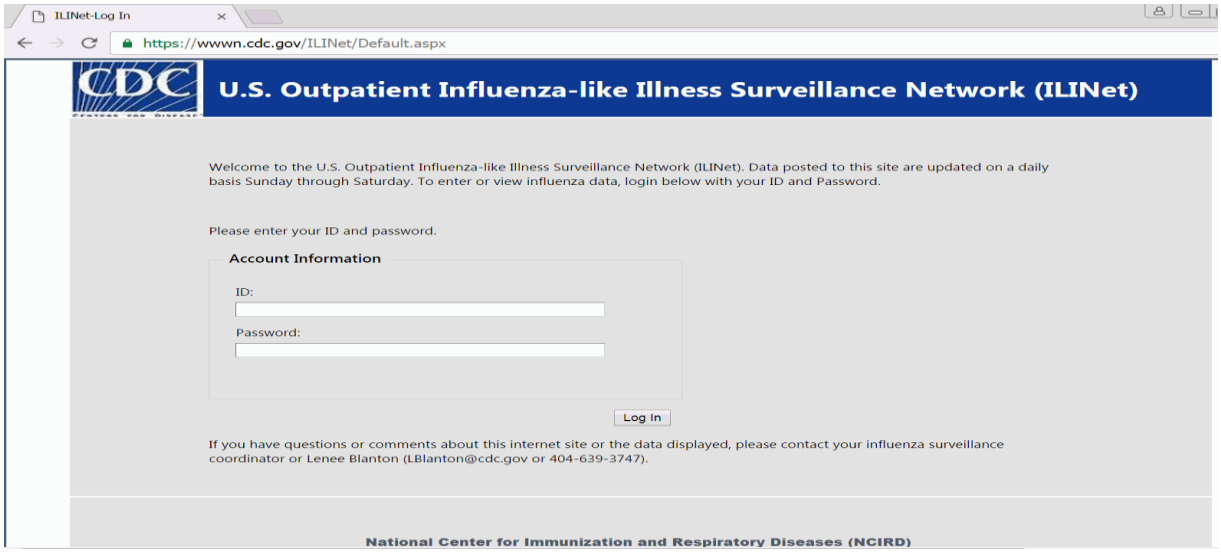
HSR	County	Pop. Estimate 2017	Providers Required	Providers Enrolled	Recruit additional providers
1	**LUBBOCK**	302,568	3	1	2
1	**RANDALL**	135,116	1	0	1
1	**POTTER**	130,334	1	0	1
2/3	**DALLAS**	2,552,920	26	3	23
2/3	**TARRANT**	2,023,985	20	1	19
2/3	**COLLIN**	1,025,618	10	1	9
2/3	**DENTON**	846,738	8	1	7
2/3	**ELLIS**	183,618	2	0	2
2/3	**JOHNSON**	175,030	2	0	2
2/3	**PARKER**	145,104	1	0	1
2/3	TAYLOR	136,730	1	2	Optional Recruitment
2/3	**KAUFMAN**	133,652	1	0	1
2/3	WICHITA	132,676	1	1	Optional Recruitment
2/3	**GRAYSON**	129,680	1	0	1
2/3	**ROCKWALL**	103,544	1	0	1
4/5N	**SMITH**	232,478	2	0	2
4/5N	**GREGG**	131,827	1	0	1
6/5S	**HARRIS**	4,633,511	47	16	31
6/5S	**FORT BEND**	786,948	8	3	5
6/5S	**MONTGOMERY**	590,851	6	2	4
6/5S	**BRAZORIA**	378,766	4	2	2
6/5S	GALVESTON	321,627	3	5	Optional Recruitment
6/5S	JEFFERSON	262,687	3	5	Optional Recruitment
7	**TRAVIS**	1,197,053	12	9	3
7	WILLIAMSON	562,337	6	14	Optional Recruitment
7	**BELL**	369,159	4	2	2
7	MCLENNAN	248,752	2	3	Optional Recruitment
7	**BRAZOS**	224,255	2	1	1
7	HAYS	215,576	2	3	Optional Recruitment
8	**BEXAR**	1,953,028	20	19	1
8	**GUADALUPE**	166,027	2	0	2
8	COMAL	136,927	1	2	Optional Recruitment

HSR	County	Pop. Estimate 2017	Providers Required	Providers Enrolled	Recruit additional providers
9/10	**EL PASO**	904,586	9	2	7
9/10	ECTOR	152,715	2	2	Optional Recruitment
9/10	**MIDLAND**	152,189	2	1	1
9/10	TOM GREEN	113,525	1	1	Optional Recruitment
11	**HIDALGO**	931,010	9	0	9
11	**CAMERON**	466,790	5	1	4
11	**NUECES**	365,275	4	0	4
11	**WEBB**	295,933	3	1	2

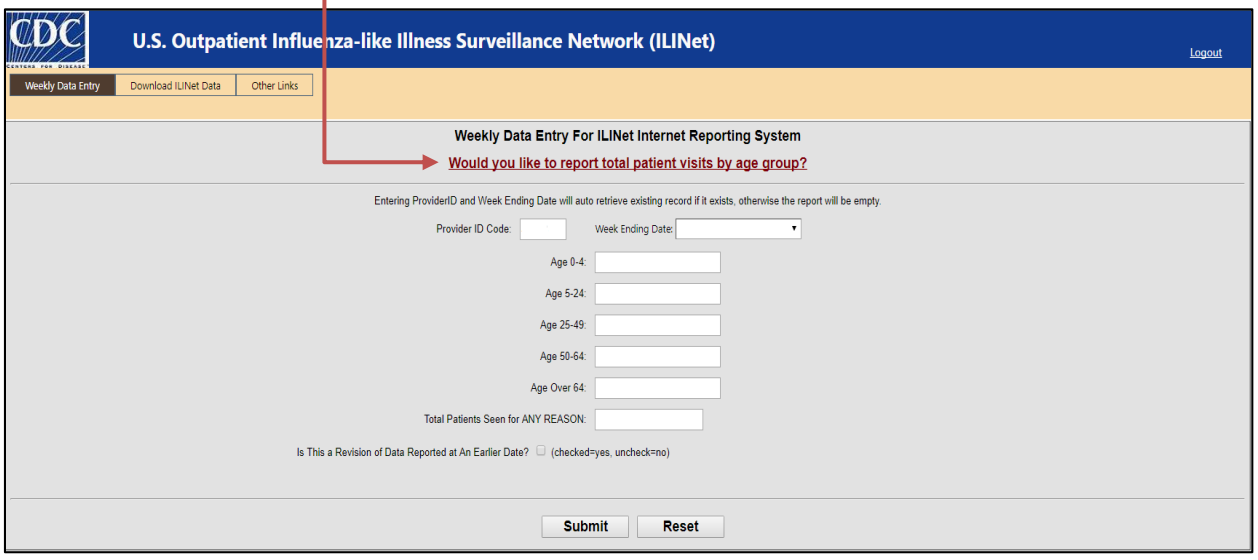
*Population data available from DSHS Center for Health Statistics, http://www.dshs.texas.gov/chs/popdat/

How to Log into the ILINet Portal

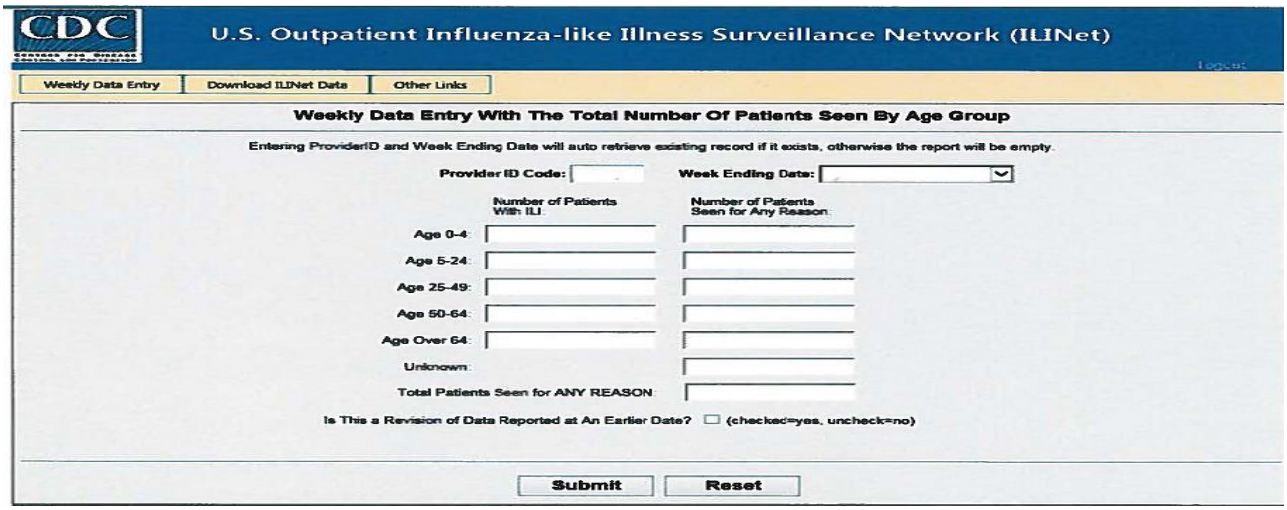
1. First obtain a User ID and Password by contacting flutexas@dshs.texas.gov.
    - Please identify the public health organization or potential ILINet data provider that you represent and briefly explain your purpose in making this request. You will be contacted and a User ID and Password assigned to you.
2. Open your Internet Browser, once you have a User ID and Password.
3. Type the following Internet address: https://wwwn.cdc.gov/ILINet in the address and press enter.



4. Type in your assigned User ID in the "ID" box
5. Type in your assigned Password in the "Password" box
6. Click on the "Log In" button.
    - This page is where ILI data can be entered by the healthcare provider or local health department if you do choose to report total patient visits by age group and click the link.



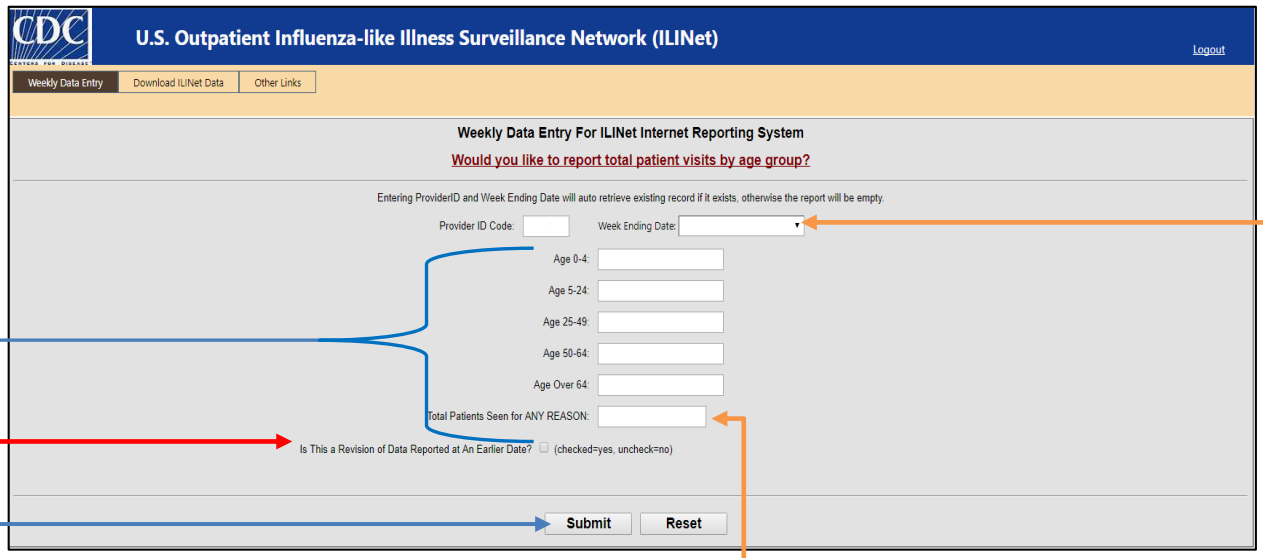
- If you do choose to report total patient visits by age group and click the link, the web page (below) should appear.



How to Enter a Weekly Report:

Data providers who do not chose to report total patient visits by age group enter their Weekly Report by completing steps 1-6 following the procedure below:

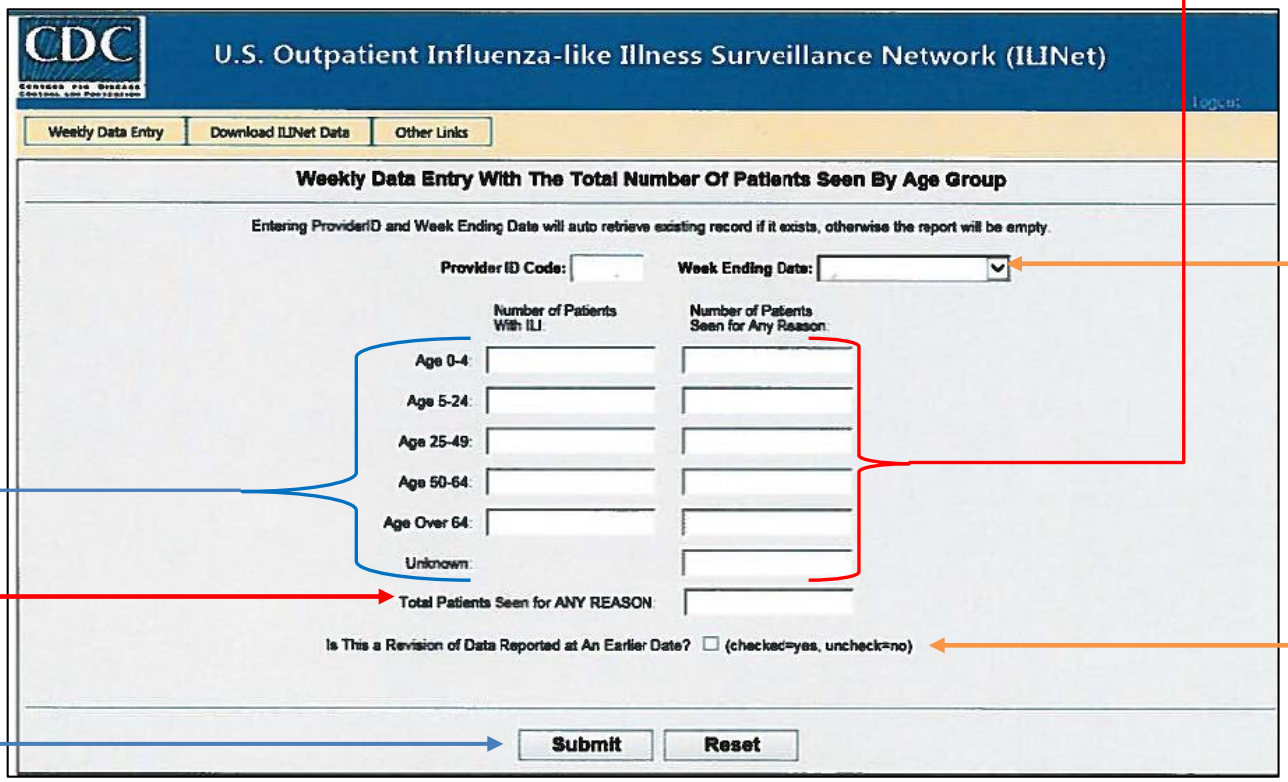
1. The Provider ID Code is preset for each data provider
2. Select the Week Ending Date from the drop down menu that appears when is selected
3. Enter the ILI counts for each age grouping



4. Enter Total Patients seen for any Reason
5. Check the box next to the question "Is This a Revision of Data Reported at An Earlier Date?" if the report revises a previous report
6. Press the Submit button to enter the data show into the ILINet database or press the Reset button to clear the entries made during steps: 1-5

Data providers who choose to report total patient visits by age group enter their Weekly Report by completing steps 7-14 following the procedure below:

7. The Provider ID Code is preset for each data provider
8. Select the Week Ending Date from the drop down menu that appears when is selected
9. Enter the ILI counts for each age grouping
10. Optional: Enter Number of Patients Seen for any Reason by Age Groups



11. Enter Total Patients seen for any Reason
12. Check the box next to the question "Is This a Revision of Data Reported at an Earlier Date?" if the report revises a previous report
13. Press the Submit button to enter the data show into the ILINet database or press the Reset button to clear the entries made during steps: 1-6

For Influenza Surveillance Coordinators

Using the ILINet Website to download and summarize data using Excel Pivot Tables

Note: These instructions were created using Microsoft Office Excel 2016. Other versions of Excel may vary slightly in the placement of the icons, menus and layouts, as well as in the wizard or PivotTable instructions.

What is a pivot table?

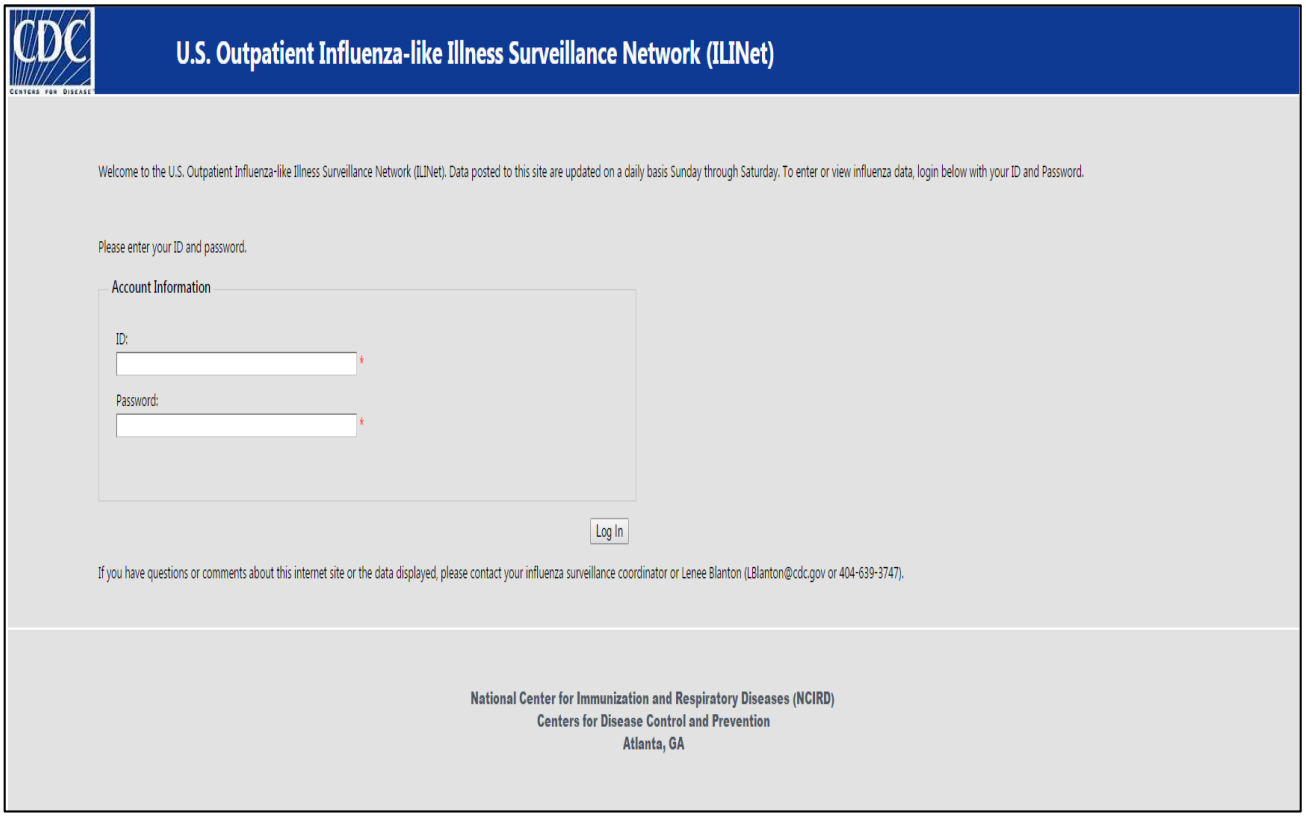
A pivot table is an easy and dynamic way to summarize and organize data. A pivot table allows the user to quickly filter, sort, group and perform mathematical calculations (e.g., count, sum, product, average, standard deviation, variance, etc.) on data. The data can be moved easily from one field to another, allowing the user to quickly change how and where the data are displayed. Also, data in a pivot table can be transformed easily into a dynamic graph called a PivotChart.

Instructions

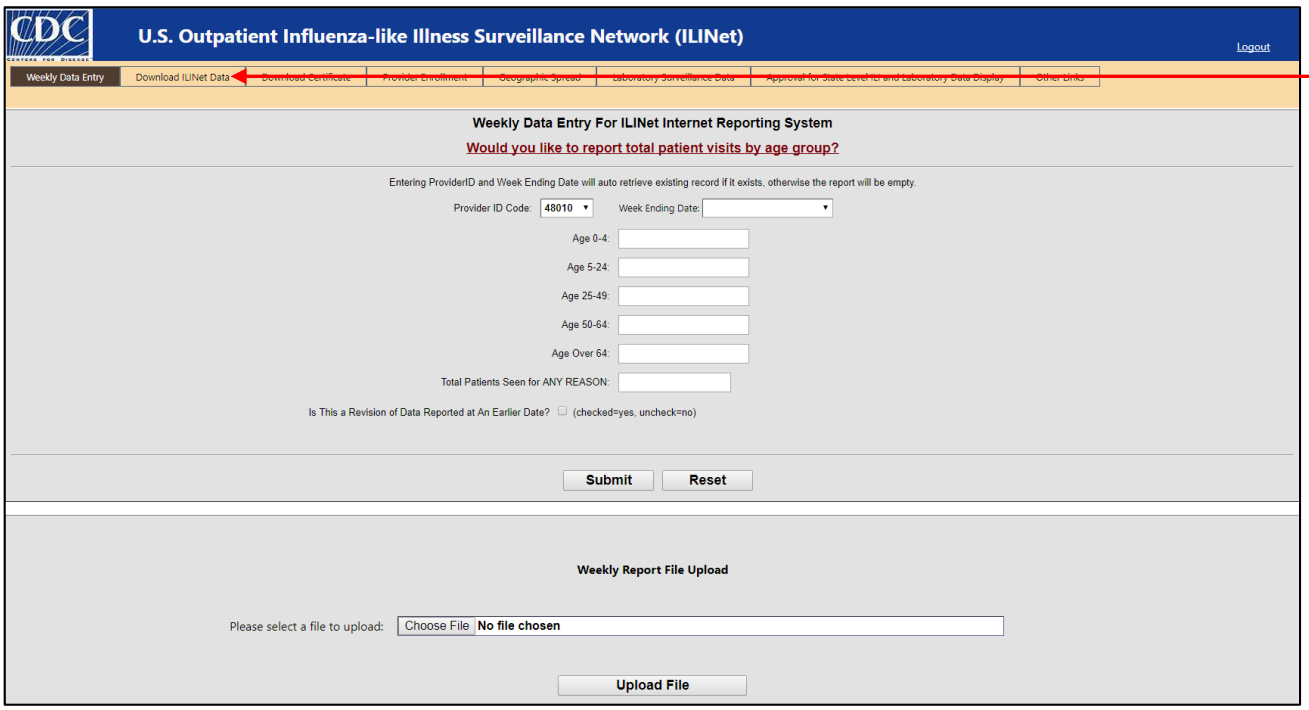
1. Log into the ILINet system

   Website: https://wwwn.cdc.gov/ILINet

   ID and password: Health departments can request the ID and password by emailing flutexas@dshs.texas.gov



2. The Home Page appears after successfully logging in
   Select "Download ILINet Data from the Menu Bar.

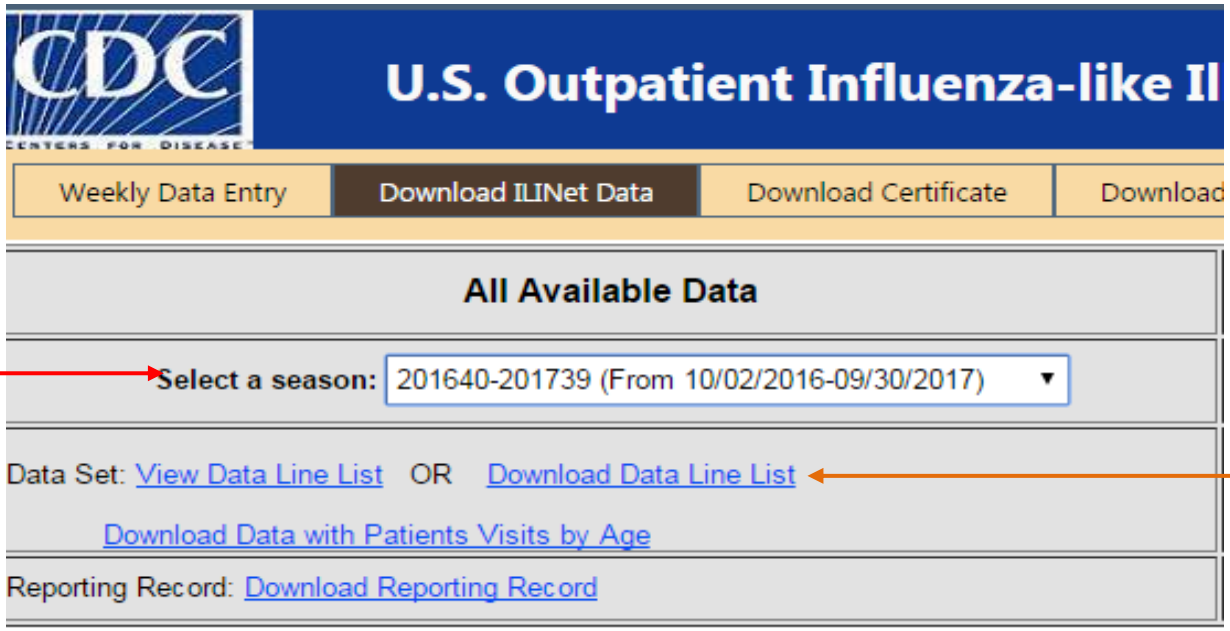


3. On the following "Download ILINet Data" webpage:

   a. Set Data Options for current or previous seasons

   b. Select Download Data Line Data

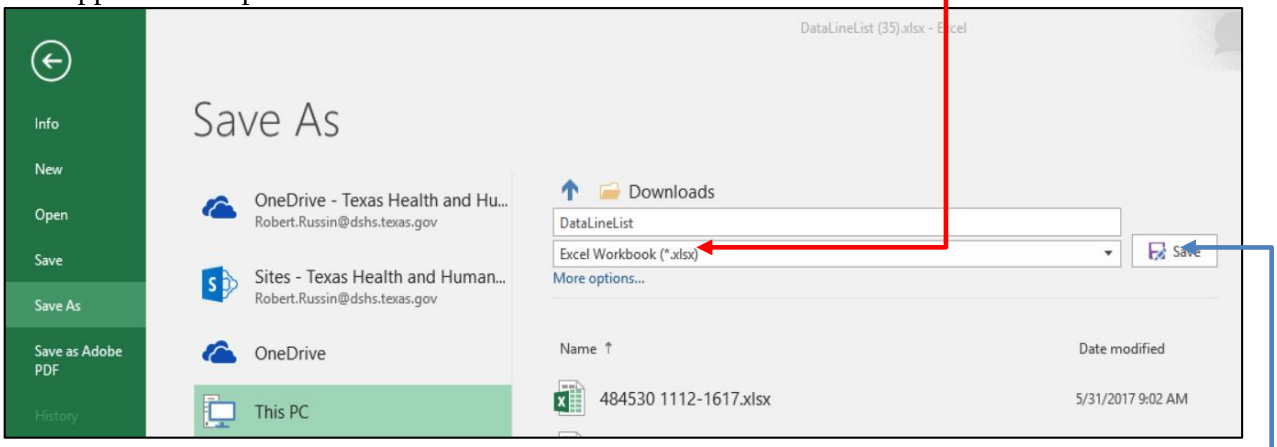
      - A message will appear at the bottom left corner of the web page indicating that your request is being processed.



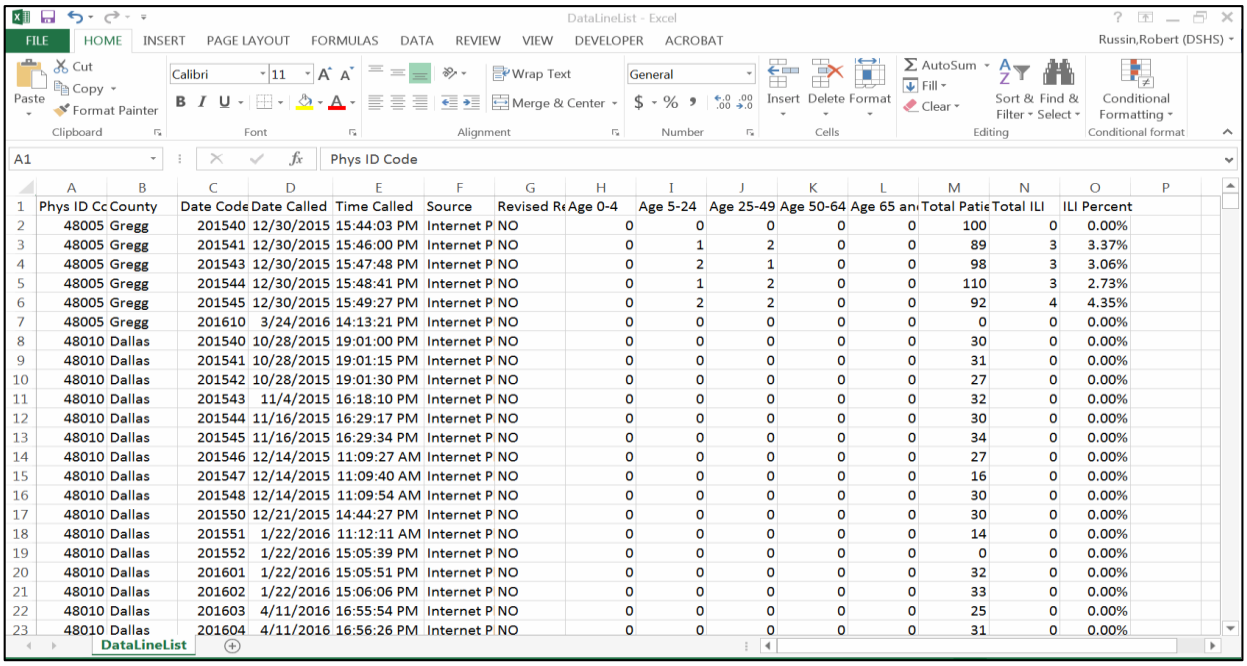
4. Once the Excel file appears

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Phys ID C	County	Date Code	Date Called	Time Called	Source	Revised R	Age 0-4	Age 5-24	Age 25-4	Age 50-6	Age 65 an	Total Patie	Total ILI	ILI Percent
2	48039	Travis	201739	10/2/2017	9:20:11 AM	Internet Physician - 10/2/2017	NO	0	20	0	0	0	1005	20	1.99%
3	48067	McLennan	201739	10/2/2017	9:44:01 AM	Internet Physician - 10/2/2017	NO	0	4	0	0	0	453	4	0.88%
4	48129	Denton	201739	9/29/2017	17:05:32 PM	Internet Physician - 9/29/2017	NO	0	0	0	0	0	135	0	0.00%
5	48205	El Paso	201739	10/2/2017	15:55:00 PM	Internet Physician - 10/2/2017	NO	1	1	0	0	0	60	2	3.33%
6	48256	Starr	201739	9/30/2017	21:28:16 PM	Internet Physician - 9/30/2017	NO	5	9	11	8	1	228	34	14.91%
7	48315	Webb	201739	10/2/2017	15:45:49 PM	Internet Physician - 10/2/2017	NO	1	2	0	0	0	218	3	1.38%

a. Click “File” in the Menu
b. Arrow down and double click “Save As”
c. Navigate to where you want to save the file on your computer.
d. Create a file name or click on an existing file name.
e. Remember the default file format will be Comma separated values (.CSV).
   You may want to change the file format to Excel workbook (.xlsx). The.xlsx format support a multiple worksheet and advanced Excel Commands.

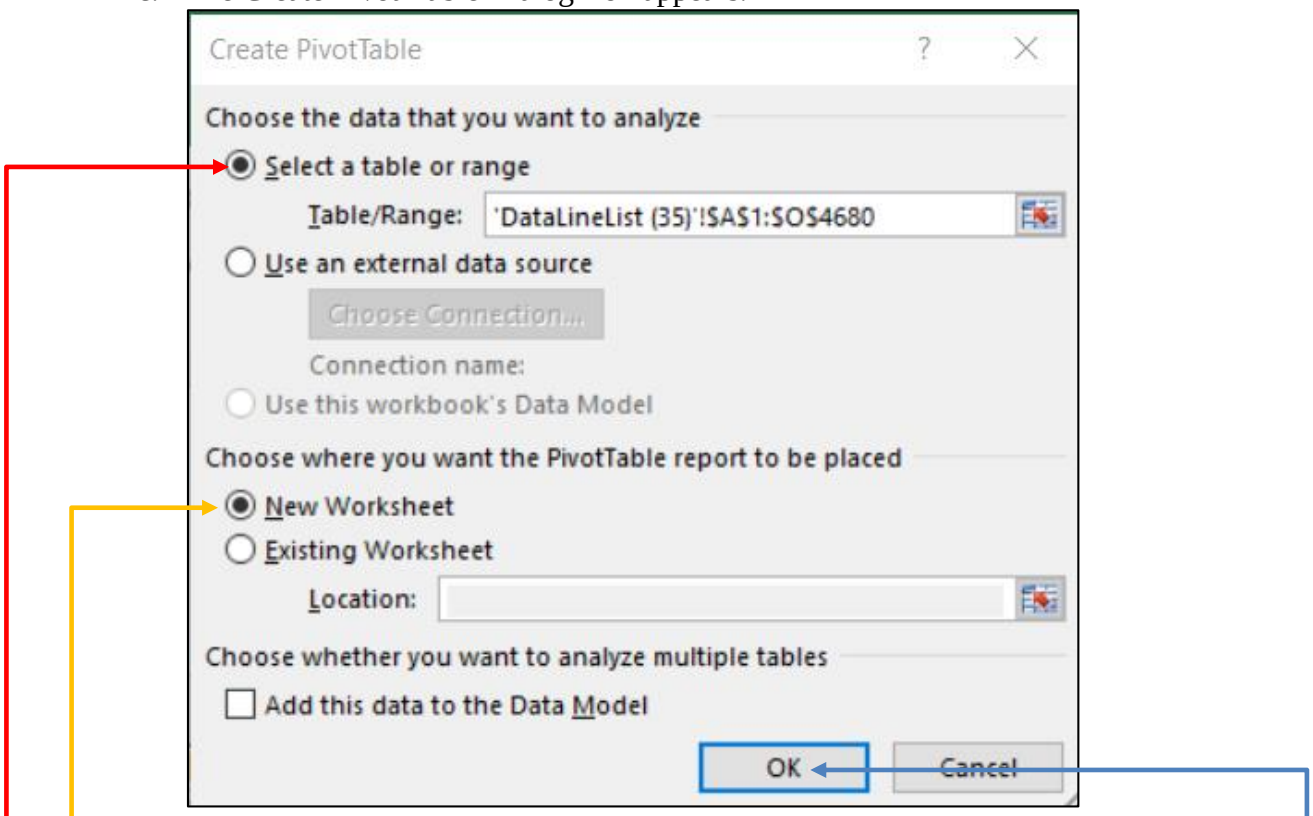


f. Press the “Save” button.
g. The file should return with the new name

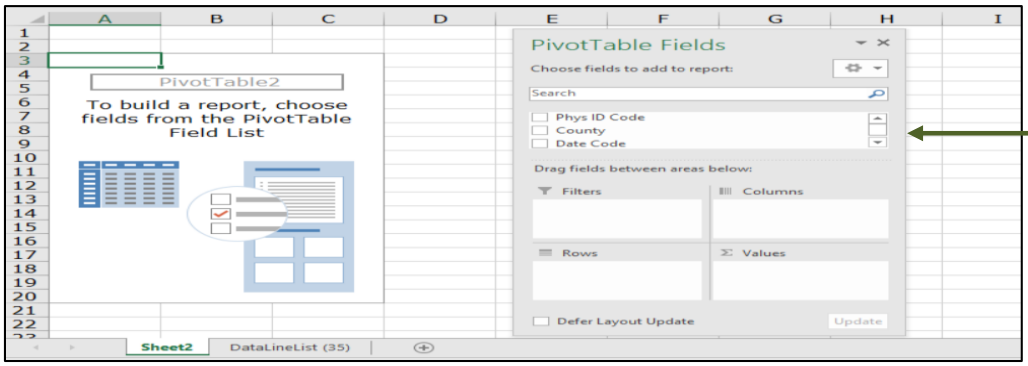


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Phys ID Cc	County	Date Code	Date Called	Time Called	Source	Revised R	Age 0-4	Age 5-24	Age 25-49	Age 50-64	Age 65 an	Total Patie	Total ILI	ILI Percent
2	48005	Gregg	201540	12/30/2015	15:44:03 PM	Internet P	NO	0	0	0	0	0	100	0	0.00%
3	48005	Gregg	201541	12/30/2015	15:46:00 PM	Internet P	NO	0	1	2	0	0	89	3	3.37%
4	48005	Gregg	201543	12/30/2015	15:47:48 PM	Internet P	NO	0	2	1	0	0	98	3	3.06%
5	48005	Gregg	201544	12/30/2015	15:48:41 PM	Internet P	NO	0	1	2	0	0	110	3	2.73%
6	48005	Gregg	201545	12/30/2015	15:49:27 PM	Internet P	NO	0	2	2	0	0	92	4	4.35%
7	48005	Gregg	201610	3/24/2016	14:13:21 PM	Internet P	NO	0	0	0	0	0	0	0	0.00%
8	48010	Dallas	201540	10/28/2015	19:01:00 PM	Internet P	NO	0	0	0	0	0	30	0	0.00%
9	48010	Dallas	201541	10/28/2015	19:01:15 PM	Internet P	NO	0	0	0	0	0	31	0	0.00%
10	48010	Dallas	201542	10/28/2015	19:01:30 PM	Internet P	NO	0	0	0	0	0	27	0	0.00%
11	48010	Dallas	201543	11/4/2015	16:18:10 PM	Internet P	NO	0	0	0	0	0	32	0	0.00%
12	48010	Dallas	201544	11/16/2015	16:29:17 PM	Internet P	NO	0	0	0	0	0	30	0	0.00%
13	48010	Dallas	201545	11/16/2015	16:29:34 PM	Internet P	NO	0	0	0	0	0	34	0	0.00%
14	48010	Dallas	201546	12/14/2015	11:09:27 AM	Internet P	NO	0	0	0	0	0	27	0	0.00%
15	48010	Dallas	201547	12/14/2015	11:09:40 AM	Internet P	NO	0	0	0	0	0	16	0	0.00%
16	48010	Dallas	201548	12/14/2015	11:09:54 AM	Internet P	NO	0	0	0	0	0	30	0	0.00%
17	48010	Dallas	201550	12/21/2015	14:44:27 PM	Internet P	NO	0	0	0	0	0	30	0	0.00%
18	48010	Dallas	201551	1/22/2016	11:12:11 AM	Internet P	NO	0	0	0	0	0	14	0	0.00%
19	48010	Dallas	201552	1/22/2016	15:05:39 PM	Internet P	NO	0	0	0	0	0	0	0	0.00%
20	48010	Dallas	201601	1/22/2016	15:05:51 PM	Internet P	NO	0	0	0	0	0	32	0	0.00%
21	48010	Dallas	201602	1/22/2016	15:06:06 PM	Internet P	NO	0	0	0	0	0	33	0	0.00%
22	48010	Dallas	201603	4/11/2016	16:55:54 PM	Internet P	NO	0	0	0	0	0	25	0	0.00%
23	48010	Dallas	201604	4/11/2016	16:56:26 PM	Internet P	NO	0	0	0	0	0	31	0	0.00%

5. Now you are ready to create a pivot table.
   The example looks for data for week 45 in year 2016f for ILINet providers in HSR 6
   a. To create a pivot table, click anywhere in the body of the data (not in the column headers line).
   b. Then go to the ribbon, select *Insert* and then select *PivotTable*.
   c. The Create Pivot Table Dialog Box appears.

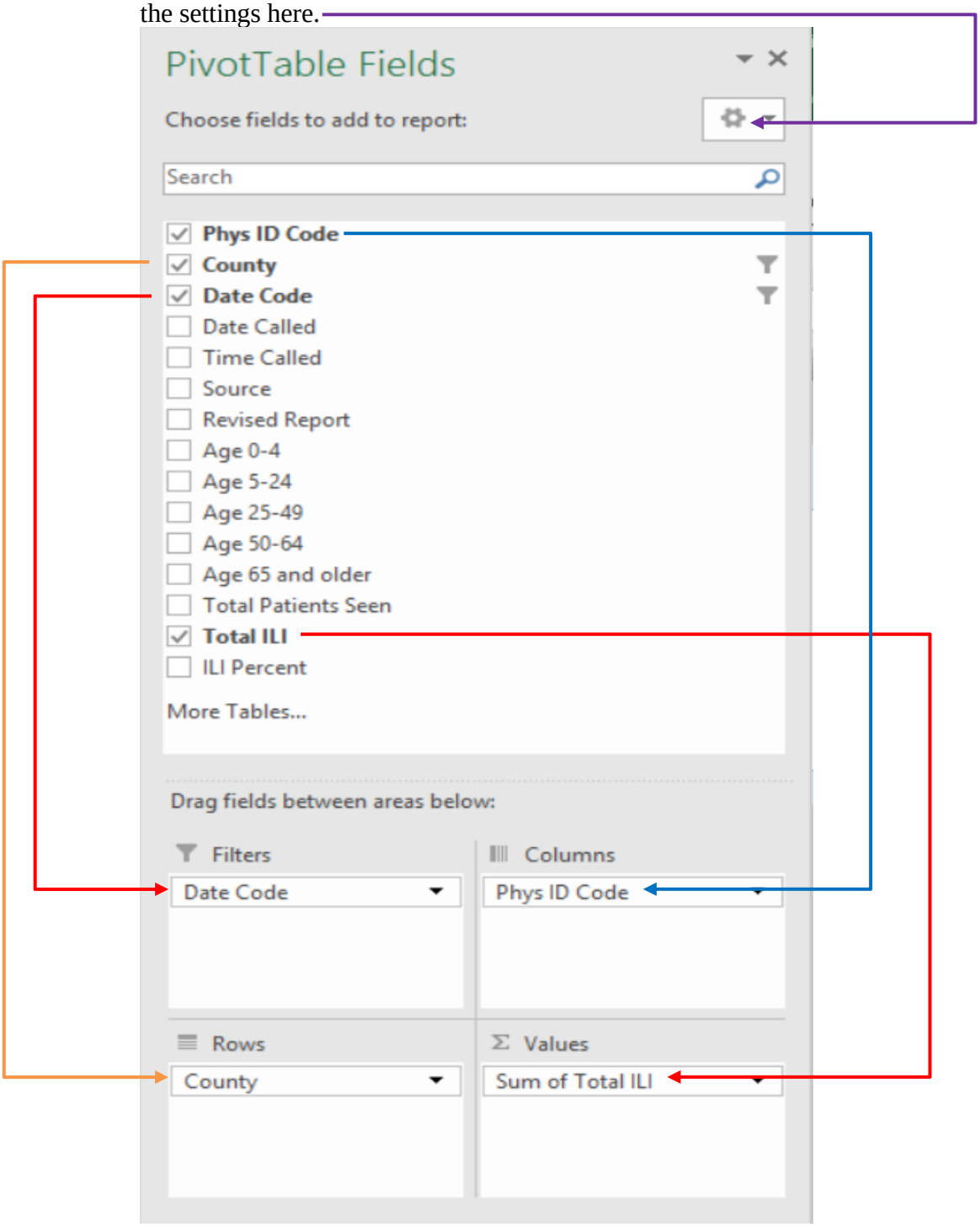


   d. Make sure the radio button next to "Select a table or range" is selected. Look at the blank next to "Table/Range" and make sure that the range includes all of the data and data headers for the data that you wish to pivot (in this case, it is all of the data and headers in the spreadsheet that you downloaded).
   e. For "Choose where you want the PivotTable to be placed", select the radio button next to "New Worksheet", if it is not already selected.
   f. Press "OK".
   g. Now you will have the shell of a PivotTable, and you should see a PivotTable field list on some part of your screen. If you do not see the field list, right click with your mouse on the PivotTable and select "Show Field List".

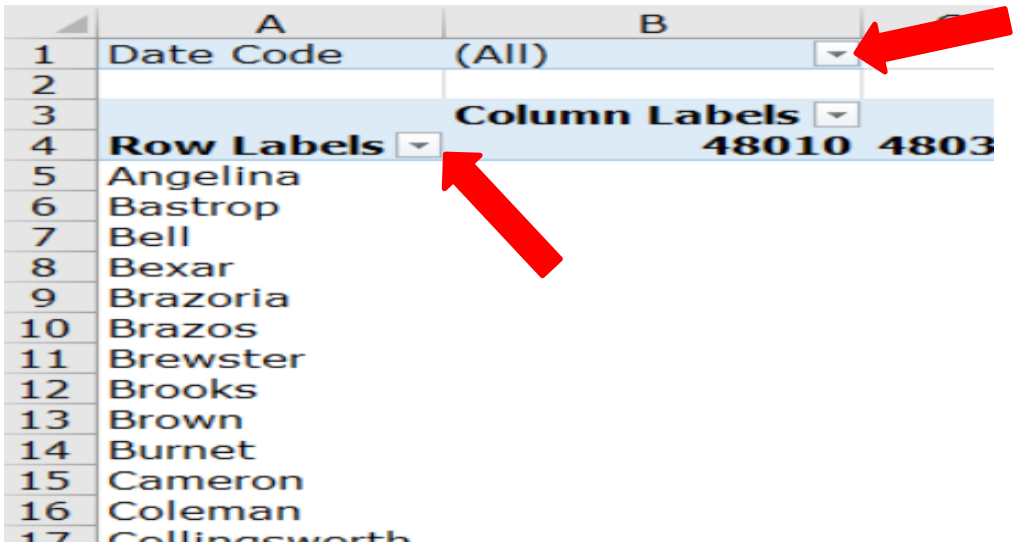


h. The next step is to create the layout of your PivotTable.

1. Drag "County" into the Row Labels field that is available below the field list.
2. Drag "Phys ID Code" into the Column Labels field.
3. Drag "Date Code" into the Report Filter field.
4. Finally, since we want to know which providers reported patients with ILI, drag "Total ILI" into the Values field. (Because we chose a field containing numerical data for the Values field, the pivot table automatically defaulted to sum the values in the Total ILI column. Note: Stacked arrange of the PivotTable Field can be with the settings here.



6. Now you should see your completed pivot table, but you still need to do a few things to answer your original question.
   a. In the dropdown menu next to "Date Code," select "201645" which stands for MMWR week 45 of 2016.
   b. In the dropdown menu next to "Row Labels" (these are the counties), select only the counties in HSR 6/5S (look for Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Matagorda, Montgomery, Orange, Walker, Waller and/or Wharton counties). Click the "Show All" button in the dropdown to uncheck or check all counties. Once you have selected the proper counties, click "OK" to close the dropdown.



	A	B	C
1	Date Code	(All)	
2			
3		Column Labels	
4	Row Labels	48010	4803
5	Angelina		
6	Bastrop		
7	Bell		
8	Bexar		
9	Brazoria		
10	Brazos		
11	Brewster		
12	Brooks		
13	Brown		
14	Burnet		
15	Cameron		
16	Coleman		

   c. The end result should be a pivot table that answers your original question.

	A	B	C	D	E	F
1	Date Code	201645				
2						
3	**Sum of Total ILI**	**Column Labels**				
4	**Row Labels**	**48126**	**48267**	**48375**	**48406**	**48407**
5	Brazoria	0				
6	Fort Bend					
7	Galveston					
8	Hardin					
9	Harris		8		4	2
10	Jefferson					
11	Montgomery			7		
12	Orange					
13	**Grand Total**	**0**	**8**	**7**	**4**	**2**
14						

During week 45 in HSR 6/5S:

- One provider with ID code 48126 in Brazoria County reported 0 patient with ILI.
- Three providers in Harris County reported a total of 14 patients with ILI.
- One provider in Montgomery County reported 7 patients with ILI.

If you don't like the layout, you can change it.

d. An additional feature of a pivot table is the ability to create line lists of specific information directly from the pivot table.

For example, let us say that now we want to see a line list with data from all of the Montgomery County providers. To do this, simply double-click on the number "10" under Montgomery County in cell H38 of your pivot table (the one created in step 6 c).

	A	B	C	D	E	F	G	H	I	J
1	Date Code	201645								
2										
3	**Sum of Total ILI**	**Column Labels**								
4	**Row Labels**	**Brazoria**	**Fort Bend**	**Galveston**	**Hardin**	**Harris**	**Jefferson**	**Montgomery**	**Orange**	**Grand Total**
5	48126	0								0
6	48267					8				8
7	48375							7		7
8	48406					4				4
9	48407					2				2
10	48408		2							2
11	48409					2				2
12	48410					0				0
13	48411					6				6
14	48412					1				1
15	48413					12				12
16	48414		0							0
17	48415					1				1
18	48416							3		3
19	48417					2				2
20	48419					2				2
21	48420			4						4
22	48421			2						2
23	48422		2							2
24	48423	0								0
25	48424					0				0
26	48425					5				5
27	48426						46			46
28	48427						42			42
29	48428						49			49
30	48429						51			51
31	48430								35	35
32	48464			2						2
33	48466			0						0
34	48468					1				1
35	48469			1						1
36	48470					5				5
37	48474				62					62
38	**Grand Total**	**0**	**4**	**9**	**62**	**51**	**188**	**10**	**35**	**359**

A new worksheet will appear with only these selected data lines listed.

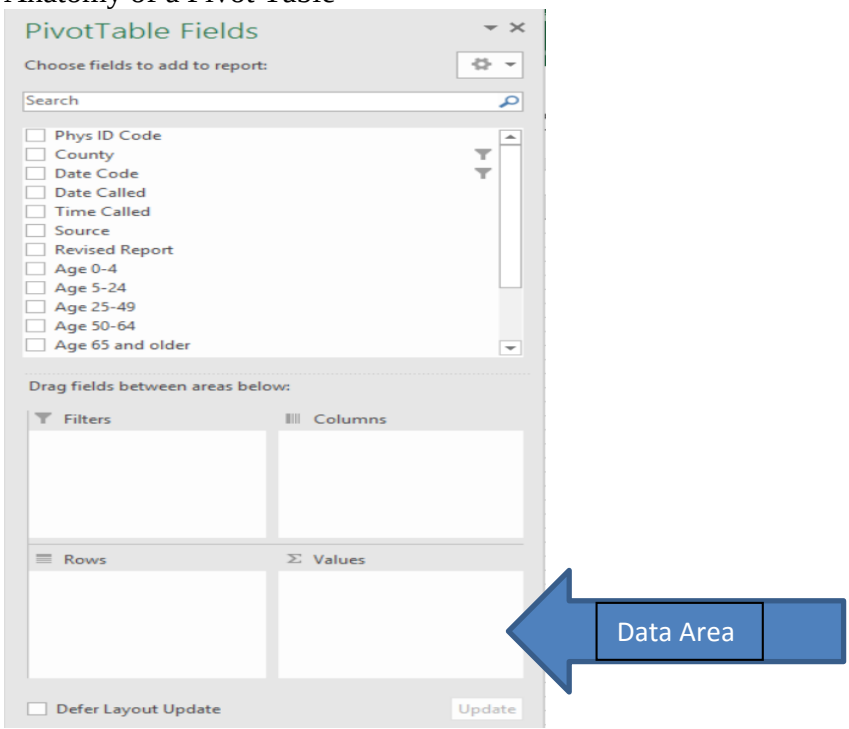
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Phys ID Code	County	Date Code	Date Called	Time Called	Source	Revised Report	Age 0-4	Age 5-24	Age 25-49	Age 50-64	Age 65 and older	Total Patients Seen	Total ILI	ILI Percent
2	48375	Montgome	201645	11/30/2016	10:44:36 AM	Internet P	NO	3	4	0	0	0	192	7	0.0365
3	48416	Montgome	201645	11/15/2016	15:04:59 PM	Upload CS	NO	0	2	0	1	0	209	3	0.0144
4															

Definitions for ILINet Data Fields

Phys ID Code: The unique number assigned to each provider enrolled in ILINet
County: The county where the provider's practice is located
Practice Type: Type of provider practice (options include Emergency Medicine, Family Practice, Infectious Disease, Internal Medicine, Pediatrician, Student Health, Urgent Care or Other)
Date Code: MMWR year and week that the data represent (format: YYYYWW)
Date Called: The date that the data were reported to the system
Time Called: The time that the data were reported to the system
Source: How the provider reported the data (options include Fax or Internet Physician)
Age 0-4: Number of patients aged 0-4 years that meet the definition of ILI
Age 5-24: Number of patients aged 5-24 years that meet the definition of ILI
Age 25-49: Number of patients aged 25-49 years that meet the definition of ILI
Age 50-64: Number of patients aged 50-64 years that meet the definition of ILI
Age 65 and older: Number of patients 65 years and older that meet the definition of ILI
Total Patients Seen: Total number of patients seen for any reason, including those seen with ILI
Total ILI: Sum of the number of patients with ILI reported in all age groups
ILI Percent: (Total ILI / Total Patients Seen) x 100

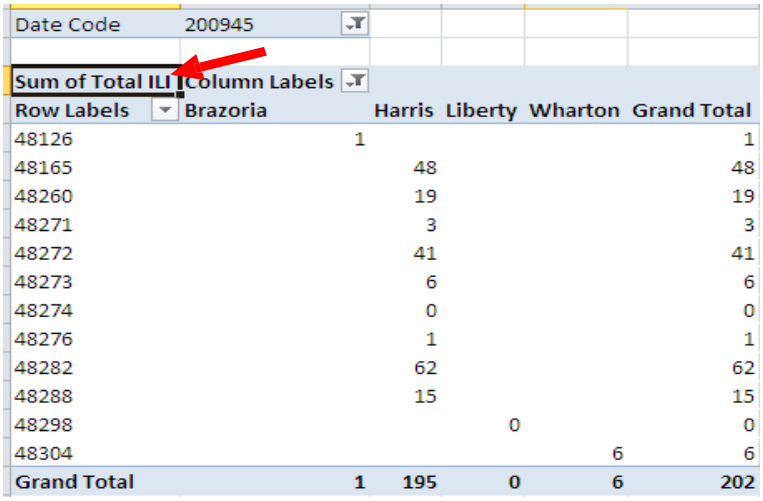
Quick Reference and Helpful Hints for Pivot Tables

1. Anatomy of a Pivot Table



2. Caveats of Pivot Tables
    a. The column that you select to drop in the Values field (previously known as the Data Area) of a pivot table must contain an entry for **each** line of data. If any lines in this selected column are blank, the pivot table will not summarize all rows in the original data set. In the ILINet data set, all columns are populated with data in all cells, so any of these columns would be a good choice for the Values field.

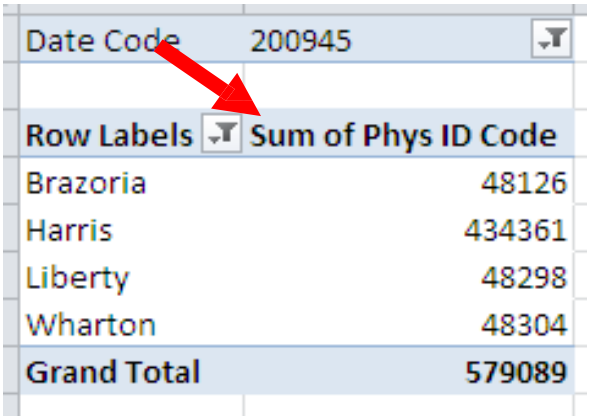
b. If your pivot table returns "unusual" results (e.g., very large numbers or very small numbers), check in the upper left corner (called the Data Field) between the Row Labels and Column Labels fields of the pivot table to determine what mathematical function (e.g., sum, count, etc.) the pivot table is using to summarize the data. (Note: If you do not have anything in the Column Labels field, the Data Field will appear in the usual place of the Column Labels field.)



Date Code	200945				
Sum of Total ILI	Column Labels				
Row Labels	Brazoria	Harris	Liberty	Wharton	Grand Total
48126	1				1
48165		48			48
48260		19			19
48271		3			3
48272		41			41
48273		6			6
48274		0			0
48276		1			1
48282		62			62
48288		15			15
48298			0		0
48304				6	6
Grand Total	1	195	0	6	202

c. If the choice is not appropriate, right click on the Data Field, choose "Value Field Settings" and change the "Summarize Values By" selection. See the example below.

i. For example, if you wanted to find out how many providers reported data from each of the HSR 6/5S counties, you would need a **Count** of the "Phys ID Code" field; however, the pivot table defaults to a Sum because the Phys ID Code contains numerical values (see below).



Date Code	200945
Row Labels	Sum of Phys ID Code
Brazoria	48126
Harris	434361
Liberty	48298
Wharton	48304
Grand Total	579089

ii. To change this, right-click with your mouse on the Data Field and choose "Value Field Settings" from the list. On the "Summarize Values By" tab, change the selection to "Count" and click "OK".

iii. Now you see a count of the number of HSR 6/5S providers who reported to ILINet during this particular week.

	A	B
1	Date Code	200945
2		
3	**Row Labels**	**Count of Phys ID Code**
4	Brazoria	1
5	Harris	9
6	Liberty	1
7	Wharton	1
8	**Grand Total**	**12**

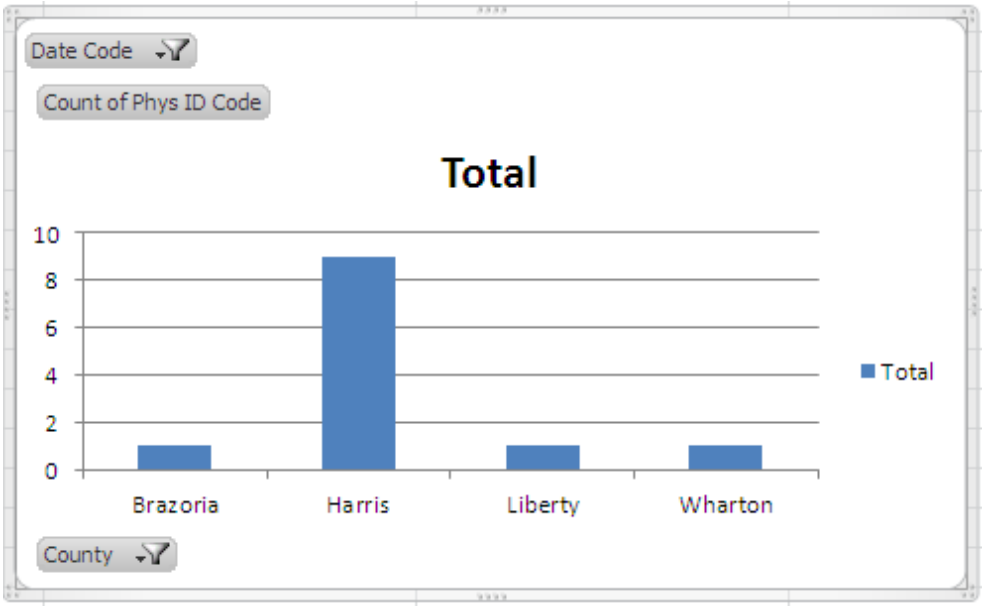
d. Always double check to make sure that your pivot table data seem reasonable. Before attempting any filtering in a pivot table, check that the grand total in the original spreadsheet matches the grand total in the pivot table.

3. Miscellaneous

a. If you close the Pivot Table Field List, you can reopen it by right-clicking with your mouse inside of the pivot table and then selecting "Show Field List".

b. If you change the original data set after you have created the pivot table, you must refresh the pivot table if you want to incorporate the changes. To do this, right click with your mouse on the PivotTable and select "Refresh".

c. To create a chart directly from your pivot table, go to the *Insert* tab on the ribbon and select one of the chart types (e.g., 2D column). The PivotChart is modifiable in the same way as the PivotTable to change the layout and the specific data that are displayed.



Data Quality Checks in ILINet

It is a good idea to perform a few quality checks on ILINet data each week. In the past, some data quality issues have been detected, particularly while examining data from newly recruited participants.

ILI Percent Column

Very High Values

The ILI Percent column should be examined each week for values of 100 percent ILI. In the past, follow-up with participants reporting 100 percent ILI (i.e., the number of total patients seen for any reason equal to the number of patients seen for ILI) has always revealed reporting errors and confusion about the definitions of the different data elements. If a participant is reporting 100 percent ILI, that participant should be contacted, questioned about the entry, and retrained on proper data entry if necessary.

Very Low Values

The ILI Percent column should also be examined each week for values that are consistently and unusually low. In particular, values of ILI under 1 percent consistently reported by a participant during peak influenza season are unusual and should be questioned. In the past, participants with this data characteristic were found to be including in their denominator patient visit totals from all physicians in their clinic system, regardless of whether or not certain specialty physician types were likely to ever see patients with ILI. Only provider types that actually see patients with ILI should be included in data reported to ILINet; other specialty provider types like orthopedists, urologists and others who would be very unlikely to see patients with ILI should not be included in the data reported to ILINet.

Total Patients Seen and Total ILI Columns

The Total Patients Seen and Total ILI columns should be examined for any unusual data, including rounding of the number of patient visits. Previously, data quality issues have been discovered in the form of patient visits rounded to the nearest 10 or 100; retraining is needed for participants whose data consistently appear rounded for convenience.

US Outpatient Influenza-like Illness Surveillance Network (ILINet) Application Form

TEXAS Health and Human Services | Texas Department of State Health Services

E-mail to: flutexas@dshs.texas.gov or fax to: 512-776-7616

Provider Information

Last Name		Degree (MD, PA, DO)	
First Name			
Practice Name (Name of facility)		Type of Practice (Pediatrics, Family Practice)	
Street Address			
City		Texas	Zip Code
Area Code/ Telephone Number			
Fax Number			
Contact Person			
Contact Person Telephone Number		Extension	
E-Mail Address			

A certificate is sent annually to regular participants submitting 50% or more of ILI data.

Name to appear on certificate	
Date	

Agreement

I understand that by voluntarily reporting outpatient influenza-like illness by age group to the CDC on a weekly basis the CDC and the Texas Department of State Health Services develops a national picture of influenza virus activity, the geographic distribution of influenza viruses, and the clinical impact of the circulating viruses. I understand that **Surveillance providers receive feedback on the data submitted, summaries of regional and national influenza data, and free subscriptions to CDC's Morbidity and Mortality Weekly Report and Emerging Infectious Diseases journal.** In addition, as a surveillance provider I can submit specimens from a subset of patients for virus isolation **free of charge**.

For additional information about the ILINet

www.dshs.state.tx.us/idcu/disease/influenza/surveillance/ILINet

Robert Russin or Hailey Rucas

Emerging and Acute Infectious Disease Branch
Phone: (512) 776-6242 or 776-6223
Fax: (512) 776-7616
E-mail: flutexas@dshs.texas.gov

Thank you for completing this application form and for your support of public health.

Influenza Surveillance Activities – RVSP/IISP

RVSP/IISP Overview

From 2009–2013, the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE) provided funding for twelve states or large local health departments to participate in the Influenza Incidence Surveillance Project (IISP). In 2011, the Texas Department of State Health Services was selected to participate in the project after a competitive application process. The project monitored the age-specific incidence of medically-attended ILI throughout the influenza season through voluntary reporting of influenza-like illness and specimen submission from selected healthcare providers.

Provider participation in IISP in Texas was available for up to eight healthcare providers in any of the following settings: family practice, pediatricians, internal medicine, student health, infectious disease, community clinics or urgent care. The providers had to have a moderate patient volume of 100-150 patient visits per week. The combined patient population of all participating providers should have represented all age groups. Providers committed to participate in the surveillance project for a full year.

Providers that participated in IISP sent weekly reports directly to the Influenza Surveillance Team at DSHS Central Office in Austin. Reports were due by noon on Tuesday. The reports included aggregate counts of total patients seen and the number of patients seen with ILI. Aggregate counts were reported in eight age group categories that were collapsible to ILINet age groups. ILI was defined differently for IISP compared to ILINet. For patients $\geq$ 2 years of age, ILI was defined as onset of fever AND cough AND/OR sore throat within 7 days of presenting to the clinic. In patients < 2 years of age, ILI was defined as onset of fever AND cough, sore throat, rhinorrhea, or nasal congestion within 7 days of presenting to the clinic.

In addition to aggregate reporting, IISP providers collected nasopharyngeal specimens on the first ten patients they saw each week with ILI. The specimens, along with patient demographic and clinical data, were submitted to DSHS. The specimens were tested for influenza, respiratory syncytial virus, adenovirus, parainfluenza viruses 1-3, human metapneumovirus and rhinovirus.

Data collected from this surveillance project was used to describe the incidence and presentation of influenza and other viruses associated with acute respiratory infections in Texas. Providers that participated in IISP received regular reports summarizing the data from the provider's clinic and comparing those data to the combined data from all the Texas IISP providers.

From 2013-2014, Texas participated in the IISP with an "Enhanced ILINet" program. The program was similar to the IISP program from 2011-2013, except that providers reported ILI data directly to ILINet instead of reporting the data to DSHS. To align with the data collection method for ILINet, the total patients seen each week was no longer reported by age group.

From 2014-2016, Texas continued to conduct an IISP-like program called the Respiratory Virus Surveillance Project (RVSP). The project was very similar to the IISP with an "Enhanced ILINet" program, except that age specific incidence of medically attended ILI was not calculated

for the 2014-2015 RVSP season. The Respiratory Virus Surveillance Project (RVSP) was discontinued at the conclusion of the 2015-2016 RVSP season.

An example of the RVSP aggregate count reporting tool is included below:

To: _____

Fax Number: _____

Date: _____ / _____ / _____ **Pages, including Cover Sheet:** 1

Re: Influenza-like Illness Weekly Report

RVSP/IISP Project: October 04, 2015-August 27, 2016
Weekly ILI Report

Clinic Name: _____

Report for the 7-day period ending on Saturday: _____/_____/_____

Comments: _____

Number of Patients Seen with ILI (Sunday through Saturday)					
Age (yrs)	**0-4**	**5-24**	**25-49**	**50-64**	**≥65**
# of patients with ILI					

Total Patient Visits for Any Reason (Sunday through Saturday)	
# of patients seen	

Influenza-like illness (ILI) definition:
Children < 2 years old: Within 7 days of presenting to the clinic, onset of fever AND cough, sore throat, rhinorrhea, or nasal congestion
Patients ≥ 2 years old: Within 7 days of presenting to the clinic, onset of fever AND cough AND/OR sore throat

Please report data directly to ILINet, or email or fax to your local health department, by **noon each Tuesday.** Please send a report even if no patients with ILI are seen. Indicate office closures or vacations in the comments line. Thank you!

TEXAS Department of State Health Services

Influenza Surveillance Activities – ILI Activity

ILI Activity Overview

The primary surveillance program for estimating influenza-like illness (ILI) at the state level in Texas is ILINet. However, regional and local health departments may want to supplement ILINet surveillance with additional ILI activity surveillance to better understand and track ILI in their own jurisdictions. Most health departments and regions collect data on test results, emergency room admissions and ILI activity reported by hospitals, clinics, provider offices or even schools as a way to monitor influenza activity. This provides a much more detailed picture of influenza activity in a community, county or region.

One advantage of ILINet is the statewide consistency in data collection. All providers who use ILINet report the total number of patients seen by the provider and the total number of patients seen with ILI by age group. Additionally, a published study conducted by the University of Texas on behalf of DSHS in 2010 demonstrated that Texas ILINet data correlated with hospitalizations and deaths from influenza and pneumonia (1). One disadvantage of ILINet is that the state, regional and local health departments cannot modify what variables are collected in the system. It also reduces local and regional health department interactions with providers, hospitals, infection control professionals and clinics within their own communities.

Many regional and local health departments in Texas have built their own ILI activity surveillance systems using volunteer providers and hospital staff who report data directly to local public health officials. Having reports sent directly to the local or regional health department has the advantage of flexibility, immediacy and the ability to respond quickly to events occurring within a local or regional jurisdiction; these events may include outbreaks or identification of unusual strains or perceived risk factors that may contribute to hospitalizations or deaths. Health departments can use their own criteria for recruiting reporters and can select what information they are interested in receiving. However, since regional offices and local health departments differ in their approaches to influenza surveillance, it can be difficult to compare an influenza report from one community to that from another community.

This section provides recommendations for the types of data that should be collected from influenza reporters that report directly to a health department.

Data Collection

There is a wealth of health and medical information that could potentially be used to assess influenza and ILI activity in a community. Influenza illness can range from mild to severe depending on an individual's health status and the strain of influenza. Increases in hospitalizations and deaths from pneumonia and influenza often correlate with increases in ILI activity among patients seen at private provider offices, clinics and hospitals. Public health professionals and organizations have been exploring other potential data sources to enhance the ability of public health to describe influenza and ILI activity and estimate the impact on the community.

Data may be collected from healthcare providers and from non-healthcare providers. Some health departments only collect the number of people seen with ILI each week or the number of tests that were positive for influenza each week. These data help provide a rough idea of the amount of ILI activity occurring during a reporting week; however, the data will be heavily influenced by the number of people who happen to see a healthcare provider and the number of reporters who actually report each week. Counts cannot be compared with data from another health jurisdiction because they lack information about the underlying population. A perceived peak in activity could be an artifact of adding a new reporter, having a reporter expand his practice or having more reporters participating in one week compared to other weeks. It is also difficult to make comparisons among weeks and influenza seasons since the numbers and types of reporters are so variable.

DSHS recommends that in addition to collecting reports on the number of people seen with ILI each week, the total number of people seen for any reason should also be collected from the healthcare provider. This additional variable allows the calculation of the proportion of people seen with ILI. Using the proportion of people seen with ILI instead of just the total number of people with ILI helps control for variation in the number and types of reporters. It also allows comparisons among other weeks, seasons and jurisdictions since both denominator and numerator data are captured.

If a provider is able to report the number of patients seen with ILI by age group categories and the total number of patients seen, this information could be used in ILINet in addition to local and regional surveillance systems. The provider can report through ILINet and to the health department or the provider can just report to the health department. In the latter case, the health department can then fax the information to DSHS or CDC for data entry into ILINet.

Providers, clinics and hospitals can also enhance the data collected by reporting influenza test results. Physicians may use rapid tests in their offices or submit specimens for influenza testing to commercial or public health laboratories. Obtaining the number of tests that were positive for influenza A, influenza B, undifferentiated influenza A/B or specific subtypes of influenza assists public health in determining which types of influenza are circulating around the state.

Some health departments use non-medical or quasi-medical entities to report ILI activity such as schools, large businesses and nursing homes. The data that can be collected from these entities

will vary slightly depending on the type of reporting facility. Examples of data that may be collected from these entities are included in the table below:

Entity	**Data**
Grade schools	• School closures from ILI-related absenteeism among students/staff • Total number of students and the number of students absent each week • Number of students absent that parents report as ILI • Total number of students seen by the school nurse and the number of those students with ILI
Large businesses	• Total number of employees and the number of employees who call in sick each week • Number of employees who self-report ILI
Nursing homes	• Total number of residents and the number with ILI each week • Total number of residents transferred to a hospital with ILI or pneumonia each week • Total number of staff and the number of staff that call in sick each week
First responders [may include Emergency Medical Services (EMS) or Fire]	• Total number of calls/incidents and the number of those calls/incidents that were ILI related • Total number of employees and the number of employees who call in sick each week

Deciding how many influenza/ILI reporters to recruit is important. The determination of the number of reporters to recruit for participation varies by jurisdiction and depends upon the types of influenza surveillance questions that the jurisdiction wants to be able to answer. Section IVa includes a table showing the counties that have a population over 100,000 where additional providers/reporters are needed. These recommendations are based upon CDC guidance and DSHS goals for representativeness in Texas. Health jurisdictions may want to have more reporters than recommended to increase awareness of ILI activity within their area. This may include having at least one medical care provider reporting from every major population area in the jurisdiction. If a medical care provider is not available, non-medical reporters such as schools or large businesses can provide information as well.

Example Influenza Surveillance Report Forms

FACSIMILE TRANSMITTAL SHEET

To:	**FAX NUMBER:**
Sandi Henley RN, CIC	254-899-0405
COMPANY:	**TOTAL NO. OF PAGES INCLUDING COVER:**
Texas Department of State Health Services	1
PHONE NUMBER:	**INFLUENZA REPORTING**
254-778-6744	

2010-11

CLINIC WEEKLY ILI/FLU REPORT

Submit by 3:00 each Monday for the week prior (Sunday – Saturday)

Name (Clinic):_____

Name of Reporter: _____

Phone Number:_____ **Email of Reporter:** _____

Week Ending :_____

Definitions:

- Flu case confirmed by rapid test, culture, antigen detection, or PCR (Flu A, Flu B, Not Differentiated Flu). **and/or**,
- Influenza-like illness activity (ILI): ILI is defined as fever over 100ºF and cough and/or sore throat in the *absence of another diagnosis*.

Please complete the table listing the number of flu and ILI cases seen in your facility

TOTAL NUMBER OF PATIENTS SEEN FOR THE WEEK	

County *(Residence of patient)*	ILI	Rapid flu A	Rapid flu B	Rapid flu ND*	Culture/ PCR+ flu A	Culture/ PCR+ flu B	'09 H1N1 Culture/ PCR+

*ND = Not Differentiated Flu

Please email report to: hsr7.epi@dshs.state.tx.us by 3 p.m. on Mondays. If Monday is a holiday, send ASAP. The report may also be faxed to **254-899-0405** (no cover sheet needed). You may call **254-778-6744** with questions or comments. If sending additional information for a previously submitted report, please highlight the changes being made. **Thank you!**

Reporting for Week:	_____ through _____

Tarrant County Public Health
Division of Epidemiology and Health Information

INFLUENZA SURVEILLANCE WEEKLY REPORT FORM

I. HOSPITALS / CLINICS / SENTINEL PHYSICIANS

Name of Organization	

Total Patients Seen	

Number of Patients with ILI* (by age group)	< 1	1-4	5-14	15-24	25-44	45-64	≥65

* *Influenza-like illness (ILI).* ILI is defined as fever ≥ 100ºF PLUS a cough or sore throat, in the absence of another known cause other than influenza.

Number of Flu Tests Performed		
Number of Positive Flu Results	Type A	
	Type B	
	Pos, no type given	

INSTRUCTIONS - INFLUENZA SURVEILLANCE

1. **All information requested is weekly, beginning Sunday and ending Saturday.**
   - Please report ALL the Influenza-Like Illness (ILI) seen in your ER and/or facility. ILI is defined as fever ≥ 100ºF PLUS a cough or sore throat in the absence of another known cause other than influenza.
     i. If your facility performs any influenza testing, include all positive and negative patients in determining the number of ILI seen in your facility.
     ii. If applicable, report the number of influenza tests performed at your facility including influenza type (A or B) detected.
2. Complete **Influenza Surveillance Questionnaire** for patient presenting with ILI **AND recent travel history to avian influenza endemic areas (Asia, Africa or Eastern Europe).**
3. **Clinical specimens MUST be submitted to TCPH** for any patient presenting with **ILI AND recent travel history to avian influenza endemic areas (Asia Africa or Eastern Europe).** Testing is for surveillance purposes only.
   - Notify TCPH public health personnel for clinical specimen pick-up and delivery to the North Texas Regional Laboratory.
4. **Fax (817) 321-5353 or email** (flu@tarrantcounty.com) the completed form **by 1:00 PM, Monday** of the following week. Information collected will be used to update your facility, other participating facilities, Tarrant County, The Texas Department of State Health Services (DSHS), Centers for Disease Control (CDC), and the World Health Organization (WHO).

If you have any questions regarding this form, please contact the Tarrant County Public Health, Epidemiology and Health Information Division **(817) 321-5350**.

TEXAS Department of State Health Services

HEALTH SERVICE REGION 2/3

Influenza Reporting Form – Healthcare Facilities

Date of Report: _____/_____/_____ Reporting Facility:_____ Phone: _____
Reporter: _____ Email: _____

Please include on this form each patient who presents to the emergency department / hospital / health care facility with symptoms consistent with influenza, which include fever≥100.4°F, malaise, muscle aches, cough, runny nose, sore throat, chills, and headache. If you have any questions, please call 817-264-4657.

SUMMARY: Influenza Activity level has: ☐ Increased ☐ Decreased ☐ Stayed the Same ☐Unsure

Patients have presented to this facility who have (check all that apply): ☐ No influenza-like illness
☐ Flu A (rapid test) ☐ Flu B (rapid test) ☐ Undifferentiated (positive A/B) ☐ Influenza-like illness

Fax/email forms each Monday to 817-264-4557 or HSR2-3.EpiReporting@dshs.state.tx.us

Patient Initials	Date Seen	City of Residence	Sex (M/F)	Age (check appropriate age range)							Vacc'd? (Y/N)	Test Result: Type A/B/U/NT[1]	ILI[2] (Y/N)
				<24 mos	2-4 yrs	5-14 yrs	15-24 yrs	25-39 yrs	40-64 yrs	65 +			

[1] A=Type A; B=Type B; U=Undifferentiated; NT=Not Tested [2] ILI= Influenza-Like Illness

Fax/email forms each Monday to 817-264-4557 or HSR2-3.EpiReporting@dshs.state.tx.us

F51-12361
August 2010

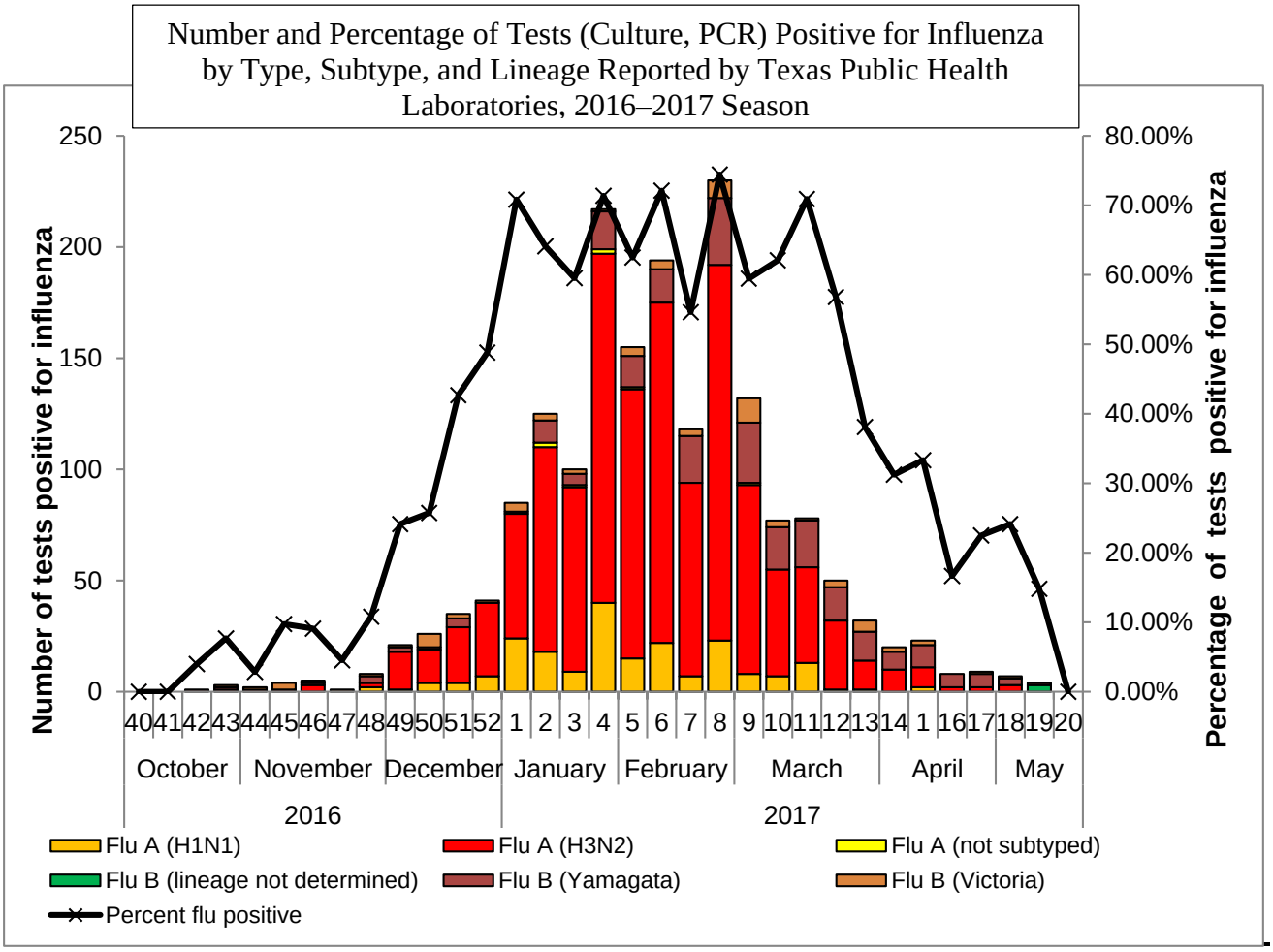
References

1. Scarpino SV, Dimitrov NB, Meyers LA. (2012). Optimizing provider recruitment for influenza surveillance networks. *PLoS Computational Biology, 8* (4). Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3325176/.

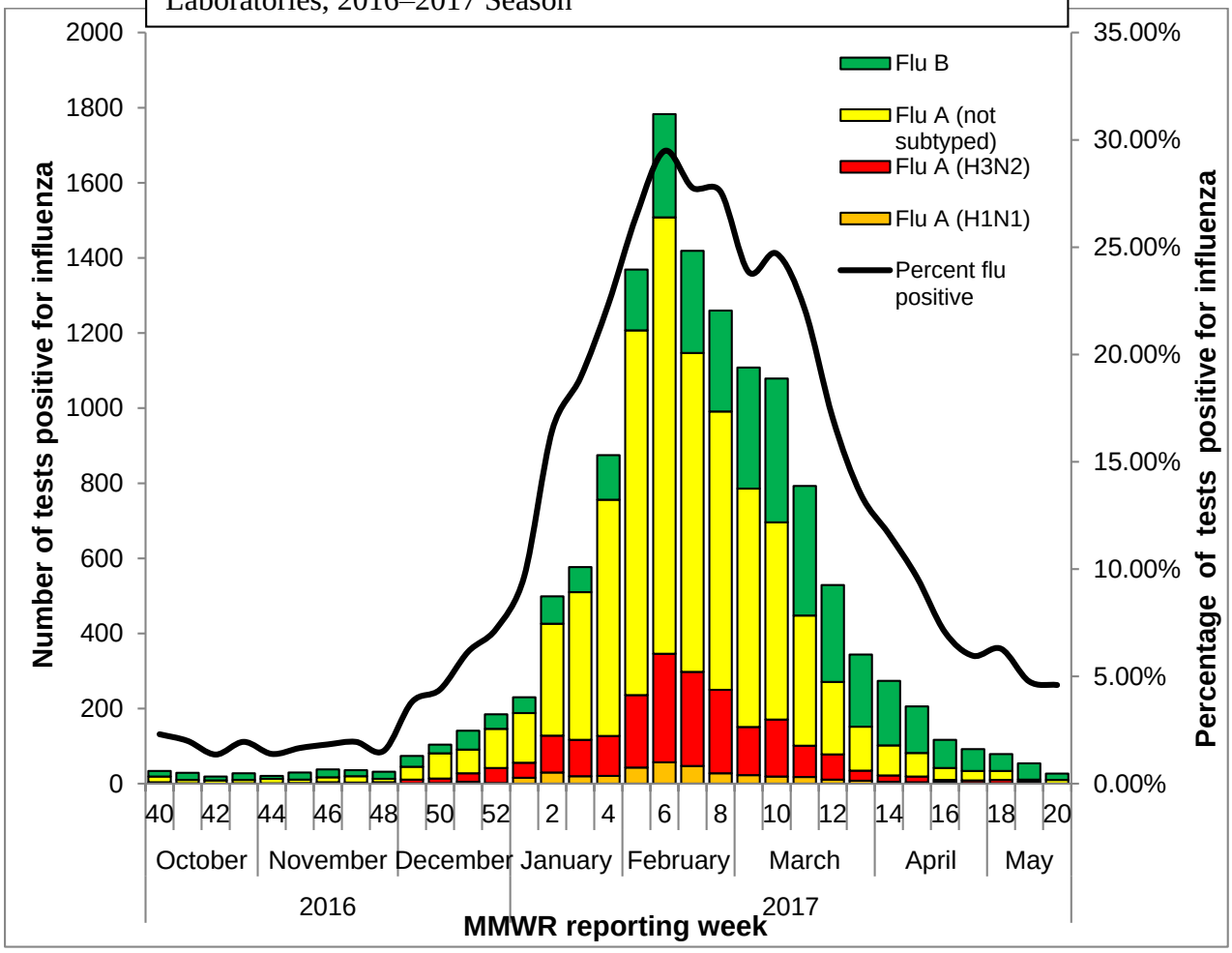
Influenza Surveillance Activities – Laboratory Surveillance

Laboratory Surveillance Overview

Laboratory surveillance for influenza is conducted year-round at the DSHS Austin and Laboratory Response Network (LRN) laboratories. The objectives of laboratory surveillance for influenza include detecting where viruses are circulating, which viruses are circulating, if circulating influenza viruses match the vaccine strains and if the influenza viruses are changing in any important ways (e.g., new strains or strains demonstrating antiviral resistance). Laboratory surveillance is an essential component of influenza surveillance. Volunteer healthcare providers at clinics and hospitals collect specimens from patients who have symptoms of influenza and ship those specimens to DSHS Austin and the LRN laboratories for testing. RT-PCR testing at Texas public health laboratories is the primary screening method for these specimens; a sample of these specimens is tested further by DSHS and CDC to determine strain characterization and antiviral resistance properties. Patient specimens are tested at DSHS Austin and the LRNs to determine if they are positive for influenza types and subtypes; RT-PCR results are reported to submitters and are available to epidemiologists through the DSHS laboratory information system, PHLIMS/LabWare. A graph displaying influenza data from public health laboratories and another graph displaying hospital data are included below.



Number and Percentage of Tests (Antigen, Culture, PCR) Positive for Influenza by Type and Subtype Reported by Texas Hospital Laboratories, 2016–2017 Season



Coordinating Laboratory Surveillance

The EAIDB Influenza Surveillance Coordinator at DSHS Austin coordinates the state's laboratory surveillance program, receives and processes viral transport medium (VTM) and supply orders and forwards these to the DSHS Container Preparation Group for completion, and monitors specimen submissions to the DSHS Austin Virology Laboratory throughout the season. Local and regional health departments recruit providers prior to and throughout the season to participate in laboratory surveillance by forwarding specimens to Texas public health laboratories. See the recruitment section of this handbook (Section V) for tips on encouraging providers to participate in laboratory surveillance. See the laboratory support section (Section VI) for details on surveillance conducted at the DSHS Austin and LRN laboratories.

Beginning with the 2013-2014 influenza season, each Health Service Region is asked to ensure submission of a minimum number of specimens per week to Texas public health laboratories (PHLs). The number of specimens required is determined by regional population and the number of specimens needed to maintain situational awareness for influenza at the state level as specified by the Influenza Virologic Surveillance Right Size guidelines. For the 2017-2018 season, the

minimum weekly number of specimens required from all submitters in each region is shown below:

HSR	Minimum <u>weekly</u> specimen submission to a Texas PHL for Right Size objectives
Region 1	**4**
Region 2/3	**40**
Region 4/5N	**8**
Region 6/5S	**36**
Region 7	**17**
Region 8	**14**
Region 9/10	**8**
Region 11	**12**
Texas	**138***

*Overall weekly Texas specimen submission required to maintain situational awareness for influenza at the state level with a 95% confidence level and 5% margin of error. Regional populations for specimen submission calculations are an average of the projected populations for each year in the influenza season

A surveillance protocol is sent to healthcare providers who agree to support DSHS influenza laboratory surveillance along with their first viral transport medium (VTM) order. The following items are included in this protocol:

- Storage of sterile viral transport medium vials
- Specimen collection
- Specimen storage
- Specimen labeling and DSHS G-2V laboratory submission form completion
- Packaging specimens for shipment
- Shipping specimens to DSHS

It is important to encourage participating providers to submit specimens throughout the entire influenza season.

- Pre-season specimens and early season specimens: These specimens can provide important information regarding circulation of strains as compared to the previous season, information on the match between vaccine and circulating strains and information necessary for the vaccine formulation for the next year.
- Representative number of specimens collected during peak activity: These specimens provide information on which strains are likely driving the peaks.
- Late season specimens collected after the majority of peak activity is finished: Occasionally secondary, smaller waves of influenza illness can occur. Late season specimens help identify if different strains of influenza are circulating.
- Specimens obtained during outbreaks: Outbreaks may occur in immunized populations or in non-immunized populations.

In addition to specimen submission for the aforementioned reasons, all healthcare providers should be encouraged to submit specimens from:

- Persons in which antiviral resistance is suspected such as anyone who did not recover from their influenza illness after receiving antiviral therapy and their close contacts who also become ill
- Persons with suspected animal-to-human transmission of influenza viruses
- Persons with extremely severe or unusual presentations of influenza-like illness

How to Obtain Laboratory Data

Laboratory data from the DSHS Austin Laboratory and most LRN laboratories are available through PHLIMS/LabWare. LabWare access is available to DSHS Austin and DSHS Health Service Region staff. Local health department staff can also access results for their jurisdiction in LabWare.

To gain access to LabWare or the Public Health Web Portal, please send an email requesting access to flutexas@dshs.texas.gov.

Users will have to fill out the following forms to access PHLIMS:

- Facility Security Agreement
- Web User Access Agreement for each user account

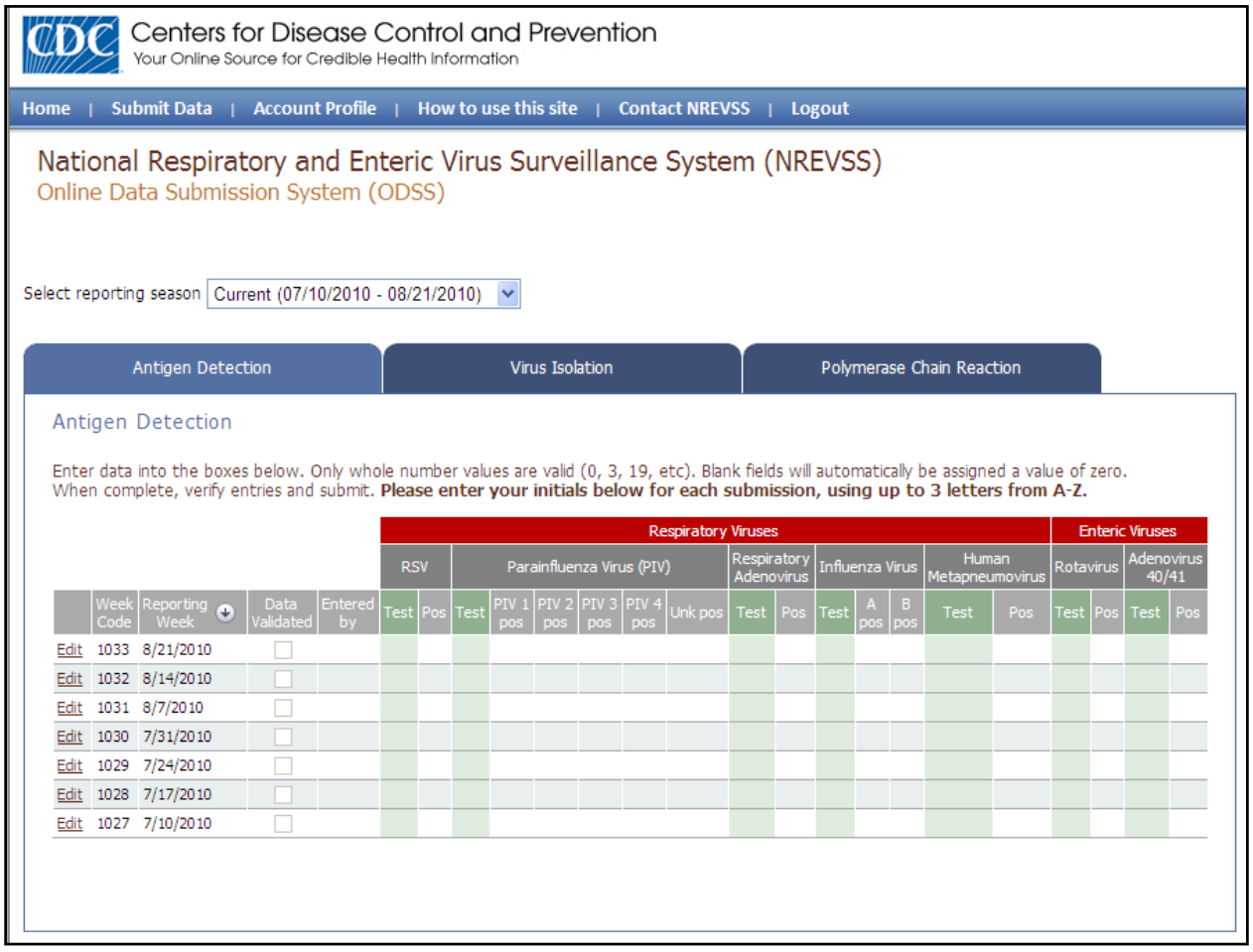
These forms are located at https://www.dshs.texas.gov/lab/remotedata.shtm under the heading "Forms to Apply for a Remote Data Systems Account". It also may be helpful to visit the frequently asked questions page at https://www.dshs.texas.gov/lab/rdsFAQ.shtm.

Please see https://www.dshs.texas.gov/lab/remotedata.shtm for more information on accessing PHLIMS.

Influenza Surveillance Activities - NREVSS

NREVSS Overview

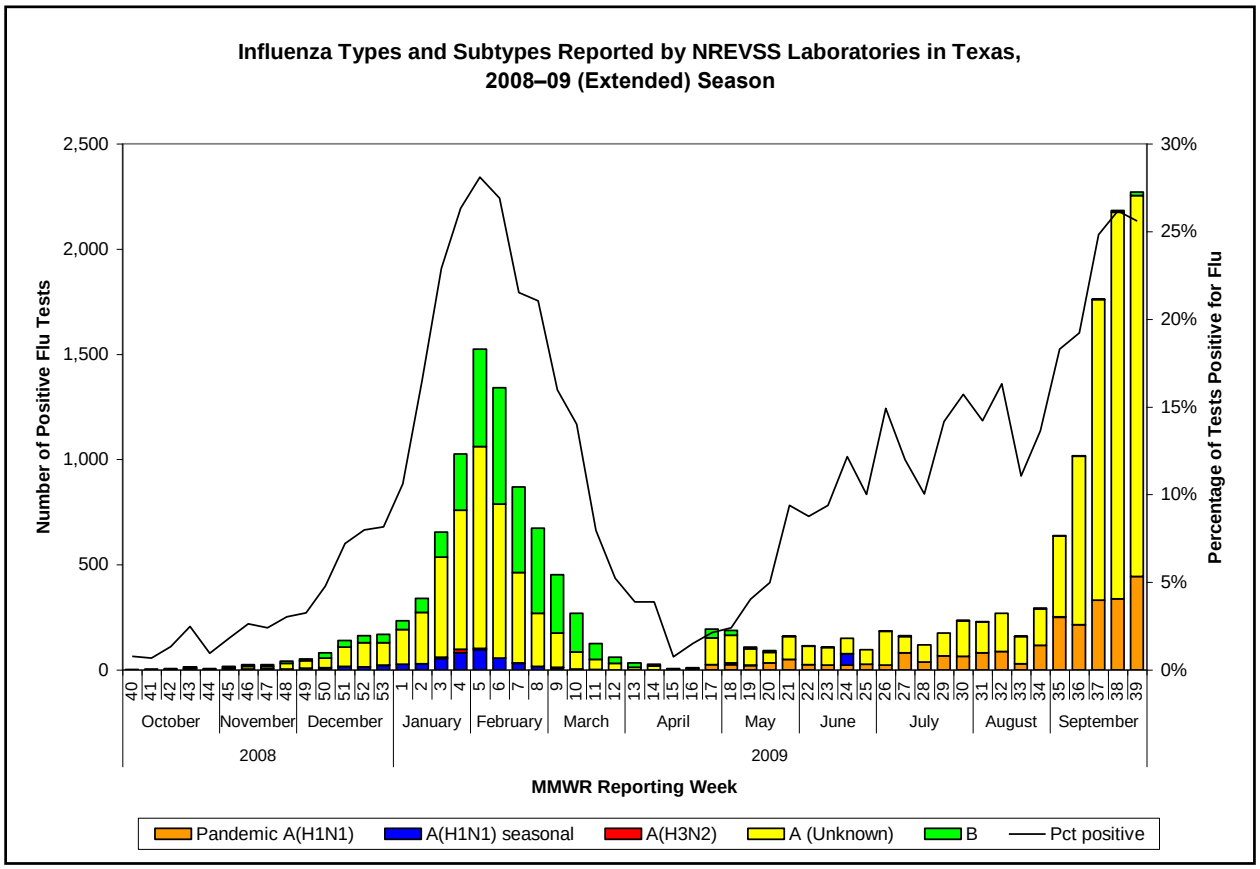
NREVSS is a CDC-maintained online reporting system for select respiratory and enteric viruses including influenza, parainfluenza, respiratory syncytial virus (RSV), rhinovirus, enterovirus, adenovirus, coronavirus, human metapneumovirus and rotavirus. NREVSS reporters are hospital or public health laboratories that voluntarily enter aggregated weekly laboratory testing results into the online reporting system. Laboratories report the number of tests performed and the number of tests positive—by type or subtype, if applicable—as well as the type of testing performed (i.e., antigen detection testing, viral isolation or PCR). Laboratories may choose to report data on any or all viruses for which the system captures information. The deadline for reporting the previous week's data is each Tuesday by noon. An example of the online reporting form is included below.



Every Tuesday afternoon, the DSHS EAIDB ILINet Coordinator downloads the Texas data spreadsheet from the system and forwards it to a distribution list of regional influenza coordinators and other interested public health entities. Health departments that wish to be added

to this distribution list should send an email to flutexas@dshs.texas.gov with the name and organization of a contact person and the email address to which the file should be sent.

NREVSS data are monitored to determine when and where respiratory and enteric viruses are circulating. The types and subtypes of influenza detected throughout the state can also be monitored when laboratories that have those testing capabilities enter their data in NREVSS. The data from the NREVSS system are included in the Texas Weekly Flu Report, incorporated in the determination of Texas' weekly influenza activity code report to CDC and used to monitor the influenza viruses seen across Texas throughout the year. Data from other NREVSS viruses are monitored and reported as necessary. Additionally, an RSV report is compiled each week during RSV season using NREVSS data and posted to the DSHS website at https://www.dshs.texas.gov/IDCU/disease/rsv/Data.doc. An example of a NREVSS data graph for influenza viruses for the 2008-2009 season is shown below.



NREVSS participants are recruited by the local, regional and state health departments and enrolled by the CDC NREVSS Program. There is always a need for more laboratories to participate in the NREVSS program. Currently, the greatest need is for the recruitment of reliable reporting laboratories in the northern "panhandle" area of Texas, far western Texas (especially El Paso) and eastern areas of Texas. Interested laboratories may contact flutexas@dshs.texas.gov for information. Information on recruiting laboratories can be found in section V.

How to Use NREVSS Data

The NREVSS file is a Microsoft Excel file that contains the most recent one to two years of data at a time. The data file is updated each week to include new data from laboratories reporting for the most recent MMWR week, as well as data from laboratories reporting "late" for previous MMWR weeks. The EAIDB ILINet Coordinator emails NREVSS data to regional influenza surveillance coordinators and other interested public health personnel every week.

One of the most useful ways to look at the data is to create a pivot table either in Microsoft Excel or Access. Pivot tables easily and dynamically organize and summarize data.

Note: These instructions were created using Microsoft Office Excel 2013.

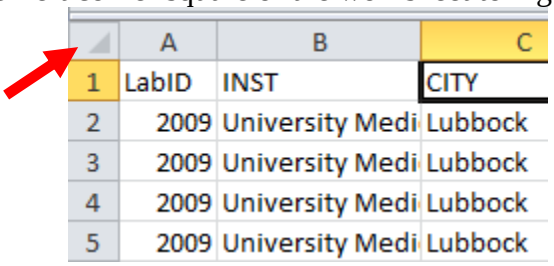
Note: These instructions were created using the NREVSS data file sent on 09-22-2015 without any sorting performed on the data. Later data files may show updated data and therefore totals may be different.

Example questions:

1. How many influenza tests were performed and reported from NREVSS participating laboratories in San Antonio during 2014 MMWR week 10?
2. How many of these influenza tests were positive?

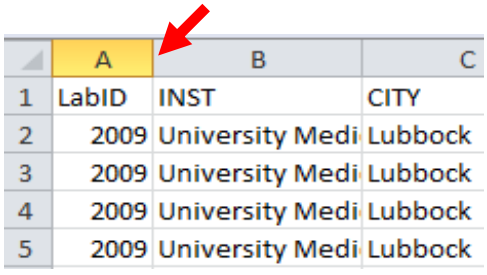
Question 1

1. Open the NREVSS data file that was forwarded to you from flutexas@dshs.texas.gov.
2. Click on the upper left corner square of the worksheet to highlight the entire worksheet.



	A	B	C
1	LabID	INST	CITY
2	2009	University Medi	Lubbock
3	2009	University Medi	Lubbock
4	2009	University Medi	Lubbock
5	2009	University Medi	Lubbock

3. With the worksheet highlighted, double-click with your mouse on the vertical line that separates columns A and B to expand all of the columns and rows so that the data can be viewed fully.

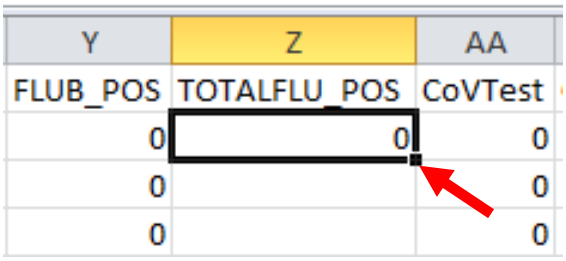


	A	B	C
1	LabID	INST	CITY
2	2009	University Medi	Lubbock
3	2009	University Medi	Lubbock
4	2009	University Medi	Lubbock
5	2009	University Medi	Lubbock

4. Spend some time familiarizing yourself with the data contained in the NREVSS columns and rows so that you will be prepared to pivot the data appropriately. Please refer to the NREVSS data dictionary at the end of this subsection for more information.

   a. The columns of interest are: CITY, WEEK, FLU_TEST, FluPanAH1N1pos , AH3N2POS, AUNK_POS, FLUB_POS

5. In order to make it a little easier to answer to Question 2 later, we need to add a new column to the NREVSS dataset that is the sum of all of the influenza positive columns.
   a. On the NREVSS data worksheet, insert a column between the columns "FLUB_POS" and "CoVTest". [to add a column: click on the column Z heading to highlight column Z (CovTest); right click with your mouse and select Insert]
   b. Name the column "TOTALFLU_POS"
   c. In cell Z2, type the following formula: =sum(V2:Y2)
   d. Press Enter to finish the formula. You should now have a zero in cell Z2.
   e. In order to populate the formula all the way down the worksheet to the end of the data lines, click on cell Z2 to make sure it is selected. Then, double-click on the fill handle (little black box at the lower right corner of the highlighted cell Z2).



Y	Z	AA
FLUB_POS	TOTALFLU_POS	CoVTest
0	0	0
0		0
0		0

6. Now you are ready to create a pivot table.
   a. To create a pivot table, click anywhere in the body of the data (<u>not</u> in the column headers line).
   b. Then go to the ribbon, select the *Insert* tab and then select *PivotTable* to start the PivotTable Wizard.
   c. A box with the title "Create PivotTable" will pop up.
      i. The radio button next to "Select a table or range" should be selected, and the appropriate range of your data set should be populated in the "Table/Range:". Check to see that all of your NREVSS data are selected, and correct the data selection if it is incorrect.
      ii. The radio button next to "Use an external data source" should not be selected.
      iii. Under the wording "Choose where you want the PivotTable to be placed", select the radio button for New Worksheet, and click OK.
   d. Now you should see a blank pivot table on a new worksheet.
      i. Drag "CITY" into the Rows field.
      ii. Drag "WEEK" into the Filters field.
      iii. Finally, since we want to know how many influenza tests were performed, drag "FLU_TEST" into the Values field. (Because we chose a field containing numbers for the Values field, the pivot table automatically defaulted to sum the values in the FLU_TEST column.)
   e. Now that you have data in your pivot table, you need to perform two additional steps to answer question #1.
      i. In the dropdown menu next to "WEEK", select "1410" which stands for MMWR week 10 of 2014.
      ii. Click on the dropdown menu next to "CITY".

1. Click on "(Select All)" to uncheck all selections.
2. Then scroll down the list and click on the box next to San Antonio to check the box.
3. Click OK.
4. Only the results for San Antonio are displayed.

	A	B
1	WEEK	1410
2		
3	Sum of FLU_TEST	
4	CITY	Total
5	San Antonio	270
6	Grand Total	270

5. During MMWR week 10 in 2014, NREVSS participants in San Antonio reported performing 270 tests for influenza.

f. If you want a little more information about which institutions reported those tests and which types of tests they performed, you can also get that information in just a few more steps.
   i. Click on your pivot table to reveal the Pivot Table Field List. If that doesn't work, right click on the pivot table, go down to the bottom of the dropdown and select "Show Field List".
   ii. Drag "INST" (short for institution) into the Rows field of the pivot table, to the left of CITY. Move CITY from the Rows field up to the Filters by dragging and dropping it there.
      1. The current view shows flu test subtotals by institution.
   iii. Now you can add the test type data.
      1. Click on your pivot table to reveal the Pivot Table Field List. If that doesn't work, right click on the pivot table, go down to the bottom of the dropdown and select "Show Field List".
      2. Drag "TestType" into the Columns field of the pivot table.
      3. Now you see the totals for influenza tests performed by institution and by test type reported by San Antonio NREVSS participants during 2014 MMWR week 10.

	A	B	C
1	WEEK	1410	
2	CITY	San Antonio	
3			
4	Sum of FLU_TEST	TestType	
5	INST	AG	Grand Total
6	Santa Rosa Health Care	270	270
7	Grand Total	270	270

Question 2

1. Continue to use the same pivot table to answer question 2.
2. Locate the gray box in the pivot table that says "Sum of FLU_TEST" (this box is called the Values field).
   i. Click on the Values field and drag "Sum of FLU_TEST" out of the bounds of the pivot table.
   ii. Your pivot table should now have a blank Values field.
3. Now you are ready to add another data item to your Data Area.
   i. Click on your pivot table to reveal the Pivot Table Field List. If that doesn't work, right click on the pivot table, go down to the bottom of the dropdown and select "Show Field List".
   ii. Drag "TOTALFLU_POS" into the Values field of the pivot table.
   iii. Your pivot table should now look like this:

	A	B	C
1	WEEK	1410	
2	CITY	San Antonio	
3			
4	Sum of TOTALFLU_POS	TestType	
5	INST	AG	Grand Total
6	Santa Rosa Health Care	21	21
7	Grand Total	21	21

   - During 2014 MMWR week 10, a San Antonio NREVSS participant reported 21 antigen tests positive for influenza.

4. If you wanted to determine which types or subtypes were identified, you could do that by removing TestType from the PivotTable and pulling each type or subtype field into the Values field.

NREVSS Data Dictionary

Field Name	Description
LabID	Six digit unique identification number for a lab
INST	Name of lab
CITY	City where the lab is located
STATE	State where the lab is located
Season	The 2 years included in a particular reporting season that runs from July to June
WEEK	First 2 digits represent the year; last 2 digits represent the week number of that year
WeekEnding	The Saturday marking the end of a particular reporting week (Sunday-Saturday)
TestType	AG= antigen detection; VI= virus isolation; PCR=Polymerase chain reaction test
RSV_TEST	Number of RSV tests performed by a lab during a given week for a given test type
RSVA_POS	Number of positive RSV A test results reported by a lab during a given week for a given test type
RSVB_POS	Number of positive RSV B test results reported by a lab during a given week for a given test type
RSVUNK_POS	Number of unknown positive RSV test results reported by a lab during a given week
PARATEST	Number of human parainfluenza tests performed by a lab during a given week for a given test type
PAR1_POS	Number of positive human parainfluenza type 1 test results reported by a lab during a given week for a given test type
PAR2_POS	Number of positive human parainfluenza type 2 test results reported by a lab during a given week for a given test type
PAR3_POS	Number of positive human parainfluenza type 3 test results reported by a lab during a given week for a given test type
PAR4_POS	Number of positive human parainfluenza type 4 test results reported by a lab during a given week for a given test type
PARX_POS	Number of positive human parainfluenza untyped test results reported by a lab during a given week for a given test type
ADERTEST	Number of respiratory adenovirus tests performed by a lab during a given week for a given test type
ADER_POS	Number of positive respiratory adenovirus test results reported by a lab during a given week for a given test type
FLU_TEST	Number of influenza tests performed by a lab during a given week for a given test type
FluPanAH1N1Pos	Number of positive influenza A 2009 (H1N1) test results reported by a lab during the given week for a given test type
AH3N2POS	Number of positive influenza A (H3N2) test results reported by a lab during a given week for a given test type

Field Name	Description
AUNK_POS	Number of positive influenza A (untyped) test results reported by a lab during a given week for a given test type
FLUB_POS	Number of positive influenza B test results reported by a lab during a given week for a given test type
CoVTest	Number of seasonal coronavirus (CoV) tests performed by a lab during a given week for a given test type
CoVHKU1POS	Number of positive seasonal coronavirus HKU1 tests reported by a lab during a given week for a given test type
CovNL63Pos	Number of positive seasonal coronavirus NL63 tests reported by a lab during a given week for a given test type
CovOC43Pos	Number of positive seasonal coronavirus OC43 tests reported by a lab during a given week for a given test type
CoV229EPos	Number of positive seasonal coronavirus 229E tests reported by a lab during a given week for a given test type
RotaTest	Number of rotavirus tests performed by a lab during a given week for a given test type
RotaPos	Number of positive rotavirus test results reported by a lab during a given week for a given test type
EAdenoTest	Number of enteric adenovirus tests performed by a lab during a given week for a given test type
EAdenoPos	Number of positive enteric adenovirus test results reported by a lab during a given week for a given test type
HMPVTEST	Number of human metapneumovirus tests performed by a lab during a given week for a given test type
HMPVPOS	Number of positive human metapneumovirus test results reported by a lab during a given week for a given test type
RhinoTest	Number of rhinovirus tests performed by a lab during a given week for a given test type
RhinoPos	Number of positive rhinovirus test results reported by a lab during a given week for a given test type
EnteroTest	Number of enterovirus tests performed by a lab during a given week for a given test type
EnteroPos	Number of positive enterovirus test results reported by a lab during a given week for a given test type
LabSubmitDate	Date the record was entered

Influenza Surveillance Activities – Pediatric Mortality

Influenza-Associated Pediatric Mortality Overview

Influenza-associated pediatric mortality surveillance
Influenza-associated pediatric deaths have been reportable in Texas since 2007. Surveillance for influenza-associated pediatric deaths is passive; however, providers who report influenza and ILI data should be reminded every year that pediatric deaths associated with influenza are reportable. If disease reporting training is conducted for healthcare providers in your jurisdiction, make sure that influenza-associated pediatric death reporting is covered.

Influenza-associated pediatric deaths can occur year-round even when influenza and ILI activity are at low levels. Healthcare providers should be encouraged to order influenza testing on any severe pediatric illness that is compatible with influenza regardless of the time of year. PCR and viral culture are the recommended testing types to confirm influenza-associated pediatric deaths. This testing is particularly important during the summer months when influenza typically circulates at low levels and rapid influenza tests are more likely to produce inaccurate results.

When summarizing influenza-associated pediatric deaths for influenza surveillance reports, vaccination status, age, underlying health conditions and type of influenza are important variables. All of this information is captured on the influenza-associated pediatric death report form.

Influenza-associated pediatric mortality investigations
The CDC investigation form for influenza-associated pediatric deaths is a valuable tool for investigating cases. The current investigation form is maintained on the DSHS website at http://www.dshs.texas.gov/idcu/investigation. The form specifies what information is required by the CDC for reporting and captures critical information to guide local responses. Deaths in children often result in intense public interest. The media and the general public will likely want to know why the child died and specifically if the death was preventable. It is important to keep the health department leadership and communications office apprised of the status of the investigation in order to effectively respond to concerns from the public and media inquiries.

When investigating a report of influenza-associated pediatric mortality, it is important to verify that the case meets the case definition. An influenza-associated pediatric death is defined for surveillance purposes as a death in a person less than 18 years of age resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. A death should not be reported if there is no laboratory confirmation of influenza virus infection; the influenza illness is followed by full recovery to baseline health status prior to death; the death occurs in a person 18 years or older; or after review and consultation there is an alternative agreed upon cause of death which is unrelated to an infectious process.

The following tests laboratory tests are acceptable:

- Influenza virus isolation in tissue cell culture from respiratory specimens

- Reverse-transcription polymerase chain reaction (RT-PCR) testing of respiratory specimens
- Immunofluorescent antibody staining (direct or indirect) of respiratory specimens
- Rapid influenza diagnostic testing of respiratory specimens
- Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens
- Four-fold rise in influenza hemagglutination inhibition (HI) antibody titer in paired acute and convalescent sera (*1*)

It is important to determine if the child died from a vaccine preventable strain of influenza. As soon as the case is reported, inquire about available respiratory specimens in order to maximize the possibility that healthcare facilities or clinical laboratories are still in possession of these specimens and can forward them to a public health laboratory. If influenza was confirmed by a hospital or commercial laboratory, request that the isolate be forwarded to the DSHS Laboratory in Austin or to your local LRN. If the only test done to confirm influenza was a rapid test, then request that any available respiratory specimens be sent to the DSHS Laboratory in Austin or to your local LRN. If specimens are not available, find out if and where an autopsy will be performed. On a case by case basis, the CDC may perform testing on tissue samples collected during an autopsy. Contact the DSHS EAIDB Influenza Surveillance Coordinator to obtain current information on CDC testing.

Another key aspect in the investigation is to determine if the case was vaccinated for influenza for the current season. A parent or guardian is the best source of information on the child's vaccination history. However, it can be difficult to reach or interview a grieving parent. The healthcare provider who reported the death may or may not have information on vaccination history but will often be able to provide the name of the primary healthcare provider. The primary healthcare provider will have information on any vaccinations given to the child by his office. The Texas Immunization Registry, ImmTrac, can also be a good source of information.

Influenza-associated pediatric mortality reporting

Influenza-associated pediatric deaths should be reported to the health department within one working day of identification. Healthcare providers, infection preventionists, medical examiners, justices of the peace or any other persons who determine that the death was associated with influenza should contact their local or regional health department by phone or by fax. Contact information for local and regional health departments is available on the DSHS website at http://www.dshs.texas.gov/regions/default.shtm.

The health department with jurisdiction will conduct an investigation and complete the CDC investigation form for influenza-associated pediatric deaths. The current investigation form is maintained on the DSHS website at http://www.dshs.texas.gov/idcu/investigation . This form should be faxed to DSHS EAIDB at 512-776-7616 as soon as possible. The case should also be entered into the National Electronic Disease Surveillance System (NEDSS) base system (NBS). Instructions for entering influenza-associated pediatric deaths are found in the NBS Data Entry Guide. The NBS Data Entry Guide is found under the documentation link on the log-in page for NBS. Upon first hearing of a death, a courtesy phone call from local and regional health departments to DSHS EAIDB with preliminary information would be greatly appreciated. If

there is a long delay (>30 days) between the date of death and the date that the case is reported to the health department, please document the reason for this delay (e.g., case not reported by hospital and found upon death certificate review, influenza test and death occurred in different locations, etc.).

DSHS EAIDB uses both NBS and a secure influenza-associated pediatric death reporting system to share reports with the CDC.

References

1. Bekka N., editor. Epi Case Criteria Guide, 2017 [Internet]. Infectious Disease Control Unit, Texas Department of State Health Services; Mar 2017 [09 Sept 2017]. Available from: http://www.dshs.texas.gov/idcu/investigation .

Influenza Surveillance Activities – Novel/Variant Influenza

Novel/Variant Influenza Overview

Novel/variant influenza is a reportable condition in Texas under the Texas Administrative Code. Novel/variant influenza is defined as a human case of infection with an influenza A virus subtype or strain that is different from circulating human influenza H1 and H3 viruses. A variant strain is designated with a 'v' following the subtype such as H3N2v. A healthcare provider may report a case of influenza that he suspects may be novel based on disease presentation, travel or exposure history. In this situation, please contact the DSHS EAIDB Influenza Surveillance Coordinator for specimen submission instructions.

Laboratory surveillance is essential for detecting novel influenza strains, especially because novel influenza may be clinically indistinguishable from seasonal influenza. Historically in Texas, cases of novel influenza have been identified through routine influenza laboratory surveillance. (See Section IVd of this handbook for information on laboratory surveillance.) In addition to laboratory surveillance, health departments can encourage healthcare providers to submit specimens for influenza testing when a patient with influenza-like illness has any of the following:

- An unexpected or unusually severe illness
- A history of international travel during the 10 days before onset
- A recent history of close contact with poultry, water fowl (ducks, geese, etc.) or swine
- A current vaccination for seasonal influenza

Cases meeting the above criteria may or may not be identified as novel influenza but are of public health interest. Although many hospital and commercial laboratories have the capability to perform PCR testing for influenza, their PCR tests may not be able to detect all types or subtypes of influenza, including novel strains. **Therefore, specimens suspected to contain a novel influenza virus should be tested at the DSHS Laboratory in Austin or at one of the Texas Laboratory Response Network (LRN) laboratories.** If an unsubtypeable strain of influenza A is identified by a Texas public health laboratory the result will be consider presumptive positive, it will be forwarded to the CDC for further identification and confirmatory testing. Confirmatory identification of novel strains can only be done by the CDC. Other laboratories in Texas that are capable of subtyping influenza A should notify the health department as soon as possible if an isolate cannot be subtyped.

A presumptive positive result for possible novel influenza should initiate an immediate public health investigation even if CDC confirmatory testing is not yet complete. DSHS EAIDB will work with the local and regional health departments to investigate the case. Because of the number of state, federal and local agencies involved, these investigations can quickly become high profile. The goals of the investigation are to identify the source of exposure, determine the extent of person-to-person spread and prevent future spread if possible. The identification of the 2009 influenza A (H1N1) pandemic started with an investigation into a novel strain of influenza identified by routine laboratory surveillance activities in both California and Texas. Guidance on

investigating novel or variant influenza cases is available in the Emerging and Acute Infectious Disease Branch Investigation Guidelines. The guidelines are found at http://www.dshs.texas.gov/IDCU/investigation/Investigation-Guidance.doc.

Influenza Surveillance Activities – Pregnant/Postpartum Mortality

Influenza-Associated Pregnant/Postpartum Mortality Overview

No longer an operative surveillance system – retained for historical perspective only

Reporting of influenza-associated deaths in women who were pregnant or up to six weeks postpartum was an ad hoc surveillance activity requested by the CDC during the 2009 pandemic and extended through the 2010-2011 influenza season.

This surveillance was discontinued at the end of May 2011. While the surveillance was occurring, influenza-associated pregnant/postpartum deaths were to be reported to the health department within one working day of identification. Healthcare providers, infection preventionists, medical examiners, justices of the peace or any other persons who determined that the death was associated with influenza should have contacted their local or regional health department by phone or by fax.

An influenza-associated pregnant/postpartum death was defined for surveillance purposes as a death in a person who was pregnant or up to six weeks postpartum resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. No period of complete recovery (return to baseline health) was allowed between the illness and death. The following tests were acceptable:

- Influenza virus isolation in tissue cell culture from respiratory specimens
- Reverse-transcription polymerase chain reaction (RT-PCR) testing of respiratory specimens
- Immunofluorescent antibody staining (direct or indirect) of respiratory specimens
- Rapid influenza diagnostic testing of respiratory specimens
- Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens
- Four-fold rise in influenza hemagglutination inhibition (HI) antibody

During the pandemic and throughout the 2010-2011 influenza season, the health department used the CDC investigation form for influenza-associated pregnant/postpartum deaths to investigate and report cases. If a health department chooses to continue investigating these cases, the health department can use the DSHS General Influenza Investigation Form and the section on pregnant/postpartum in the DSHS Influenza Investigation Form Supplemental Pages.

Influenza Surveillance Activities – Other Surveillance Activities

Other Surveillance Activities Overview

Outbreak Investigations
Influenza can cause outbreaks in long-term care facilities, correctional facilities, schools, summer camps and other settings where people congregate. The number of reported outbreaks is an indicator of the impact of disease on a community. Furthermore, if control measures are not successfully implemented facilities may be unable to operate because of lack of well staff which may have additional community impacts. For example, if too many teachers are absent then schools may be forced to close for a few days; when schools close, parents have to find alternative care for their children or may have to stay home from work. Refer to Section VII of this handbook for additional information on outbreak investigations.

Enhanced influenza surveillance
Standard influenza surveillance may be enhanced during outbreak investigations or during pandemic influenza responses. The nature of the enhancements will vary depending on the situation. Enhancements may include:

- Collecting data on individuals with ILI or influenza
- Conducting individual case investigations of influenza illnesses
- Collecting additional aggregate influenza-related data from reporters
- Increasing the frequency of reporting
- Actively calling reporters to obtain data
- Requesting submission of additional influenza specimens

During the 2009 influenza A (H1N1) pandemic, standard influenza surveillance was enhanced through a variety of surveillance activities conducted during different stages of the pandemic. Individual case investigations of ILI and influenza were conducted at the beginning of the pandemic. As the number of cases increased, individual case reporting for all pH1N1 influenza cases was replaced with aggregate reporting of confirmed pH1N1 hospitalizations, ICU admissions and deaths. In addition, the requirements for individual case investigations were limited to cases in which confirmed pH1N1-related ICU admission or death had occurred. Voluntary reporting of confirmed pH1N1 influenza-related deaths among pregnant or postpartum (up to 6 weeks) women continued throughout the pandemic.

Active influenza surveillance
Most influenza surveillance is passive. Public health relies on healthcare partners to report on their own initiative. Active surveillance occurs when public health directly contacts healthcare partners asking them to submit their reports. Active surveillance may consist of contacting healthcare providers on a monthly, weekly or even daily basis over a specified period of time. It is very labor intensive.

Absenteeism surveillance

Absenteeism data may provide insight into mild ILI and other illnesses among people who do not necessarily seek medical care. General absenteeism data on its own is not a useful tool because the factors affecting absenteeism are diverse and often are not associated with infectious diseases. However, absenteeism data can provide increased situational awareness when viewed in context with other surveillance systems. For example, if ILINet is showing a peak of ILI activity, absenteeism data can be used to help define geographical areas of increased activity and to estimate the impact on schools and businesses.

Absenteeism data can potentially be collected from schools, large businesses and first responder agencies. Substantial increases in absenteeism require follow-up to assess the likely cause(s) and rule out possible outbreaks. It is helpful, but not always feasible to collect the specific reason for absence (e.g., ill with ILI, ill with non-ILI, vacation, other).

Syndromic surveillance

The CDC defines syndromic surveillance as surveillance using health-related data that precede diagnosis and signal a sufficient probability of a case or an outbreak to warrant further public health response. For the purpose of this handbook, the definition of syndromic surveillance systems is further limited to those that use automated data feeds to collect health-related data to look for trends in syndrome categories. Most syndromic surveillance systems extract data from hospital emergency departments; however, syndromic surveillance systems can tap into any electronic system that stores health related information including medical clinics, pharmacies and EMS databases. DSHS does not endorse any one commercial syndromic surveillance system. The syndromic surveillance systems named here are ones that are commonly used in Texas and should not be viewed as recommendations or endorsements.

Hospital/emergency room visit-based syndromic surveillance systems

RODS and ESSENCE are two of the most common syndromic surveillance systems used by health departments in Texas. Both systems use automatic data feeds to mine data on hospital emergency room visits. The Texas Association of Local Health Officials (TALHO) and the Southwest Center for Advanced Public Health Practice (APC) in Tarrant County were both involved with developing and expanding this type of syndromic surveillance in Texas.

BioSense 2.0 is a CDC supported syndromic surveillance system using cloud-based computing technology. BioSense essentially provides a data repository of emergency room visits and hospitalizations from participating healthcare facilities and from health departments using other healthcare data mining systems such as RODS or ESSENCE.

Medication-based syndromic surveillance

Over-the-counter (OTC) sales of medications are used to estimate illness among people who do not routinely seek or who have not yet sought medical care. The University of Pittsburg runs the National Retail Data Monitor (NRDM) system which collects data on over-the-counter medication sales from pharmacies, grocery stores and mass merchandise

stores across the United States. NRDM provides a platform to analyze and interpret the data. There is a fee to access the system.

Health departments may develop agreements with pharmacies to report aggregate sales data for over-the-counter cough/cold/flu/anti-fever medications and prescription cough/cold/flu/anti-fever medications filled. These data can be difficult to interpret without advanced statistical trend analysis.

Internet search-based surveillance

Google estimates influenza activity by analyzing internet searches and shares the information through Google Flu Trends. Google searches for influenza and influenza-related terms increase when influenza-like illness increases. Google compared their trend lines with ILI trend lines released by the CDC from 2004 to 2009. During this time period, the peaks in both systems at the national level appeared to match.

Google Flu Trend information is available at the national and state levels. Some city-level data are also available, but it is unclear how well these data correlate to ILI activity. As of August 2010, city-level trends are available for 8 cities in Texas: Austin, Dallas, Fort Worth, Houston, Irving, Lubbock, Plano and San Antonio. Google Flu Trends is no longer publishing current estimates of flu, but historical data can be freely accessed at http://www.google.org/flutrends/about/#US.

Self-report surveillance

Flu Near You (FNY) is an initiative of the American Public Health Association to track self-reports of influenza-like illness by the general public. Any resident of the US or Canada over the age of 13 can sign up to participate. Every Monday, an email is sent to participants asking them to record any symptoms they had during the previous week through a web link or through a smart phone application. In addition to allowing people to report symptoms of influenza, the site allows users to search for locations providing vaccine and see how many people reported illness in their community. Beginning with the 2015-2016 influenza season, state health departments were invited to access aggregate FNY data for their jurisdiction, via a password protected dashboard portal, to complement existing surveillance systems. Flu Near You can be freely accessed at https://flunearyou.org.

Influenza Surveillance at the Border

The Border Influenza Surveillance Network (BISN) is a multi-state collaboration facilitated by the CDC US-Mexico Unit to share influenza data from the border regions of California, New Mexico, Texas and Mexico. The network uses data from existing influenza surveillance activities. Texas has 32 counties that qualify as border counties based upon their distance to the US–Mexico border. In Texas, Regions 8, 9/10 and 11 participate in BISN. The regional influenza surveillance coordinator or a regional employee working with the Early Warning Infectious Disease Surveillance (EWIDS) Program shares influenza data with the CDC US-Mexico Unit during influenza season.

Section V: Recruitment and Retention of Influenza Surveillance Reporters

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Recruitment and Retention of Influenza Surveillance Reporters Overview

Recruiting and retaining reporters is an important aspect of maintaining a comprehensive and cohesive influenza surveillance system. The following section outlines tips for identifying potential influenza reporters, recruiting them and encouraging them to continue reporting.

Before recruiting new reporters, it is a good idea to:

1. Identify who currently submits regular influenza reports to you.
   a. Where are your current reporters located? What types of entities do they represent (e.g., hospital, large clinic, private physician's office, school, etc.)? Do you have regular reporters in each of your counties and major population centers? Use the information to help prioritize your search for new reporters.

2. Consider geographic and population coverage in your jurisdiction
   a. You may want to consider how well and how often your reporters are reporting. Do they submit reports every week, most weeks or just some weeks? Use this information to identify which reporters may need encouragement or reminders that reports are due.

Section IVa provides the number of recommended ILINet providers for counties with a population over 100,000 in Texas. The DSHS ILINet Coordinator has created a plan for systematic ILINet recruiting in each DSHS Region based on recent population estimates and study data from the University of Texas. These recruitment plans are available upon request from flutexas@dshs.texas.gov.

Health jurisdictions are welcome to increase the number of ILI reporters in their jurisdiction above what is recommended for ILINet. If health jurisdictions want to increase representativeness, consider a minimum goal of one reporter for every major population center in addition to the number of ILINet providers recommended for the county. The additional reporters may be ILINet providers or may report ILI directly to the health department; however, it is important to communicate that ILINet data providers reports ILI counts for outpatients only by five age groupings with a figure for Total Patients Seen for any reason.

Reporters to Consider for Recruitment

Healthcare providers

In the context of influenza surveillance, a healthcare provider (HCP) is defined as a medical professional who delivers healthcare services that may include diagnosis of or treatment for influenza and ILI. Healthcare providers may be physicians, nurses, physician assistants or nurse practitioners. The following practices are the ones most likely to see persons with ILI:

- Primary care
- Family practice
- General practice
- Pediatrics
- Internal medicine
- Acute / Urgent care
- Student health centers

There are several opportunities for healthcare providers to contribute to influenza surveillance in Texas. The following table outlines the activities in which healthcare providers are eligible to participate.

Activity	Description of HCP participation
ILINet	HCPs report weekly on the total number of patients seen in their practice and the number of patients by age group seen with ILI. HCPs submit reports online or by fax directly to the CDC. Upon approval from the DSHS ILINet Coordinator, data for multiple sites may be emailed as spreadsheet to flutexas@dshs.texa.gov.
ILI Activity	This activity is more flexible as far as the types of data that are reported by the HCP. HCPs usually report rapid influenza test results, number of patients seen with ILI and total number of patients seen. The data are submitted by fax, email or phone directly to the health department.
Laboratory Surveillance	HCPs may submit nasopharyngeal swabs collected from patients with suspected influenza to the DSHS Laboratory in Austin or a participating LRN laboratory in Texas. Specimen collection supplies, testing and shipping are provided free of charge to the provider. Results are not for diagnostic purposes.
ILINet Extended	HCPs report weekly on the number of patients seen with ILI by age group and the total number of patients seen in their practice by age group. HCPs may also report rapid influenza test results and submit five specimens per week for influenza testing. HCPs submit reports weekly by fax or email directly to the DSHS ILINet Coordinator. Data for sites may be emailed in a spreadsheet to flutexas@dshs.texas.gov.

Hospitals

Hospitals are another good source of influenza data. Many hospitals are part of expansive medical systems in a community. The hospital may have access to information on patients seen in affiliated clinics as well as at the hospital. In these instances, one person may be able to submit influenza reports for multiple locations. Here is a list of possible elements from which a hospital could report influenza data:

- Patients seen in emergency room with ILI
- Outpatients with ILI seen at affiliated clinics co-located with hospital and away from the hospital
- Patients admitted to the hospital with ILI
- Tests ordered for influenza and test results

Hospitals can participate in the same activities for influenza surveillance as healthcare providers. The following table outlines the activities in which hospitals are eligible to participate.

Activity	**Description of hospital participation**
ILINet	Hospital Emergency Room or Outpatient Clinic report weekly on the total number of patients seen in their facility and the number of patients by age group seen with ILI. Hospital Emergency Room or Outpatient Clinic submit reports online.
ILI Activity	This activity is more flexible as far as the types of data that are reported by the hospital. Hospitals usually report rapid influenza test results, number of patients seen with ILI and total number of patients seen. The data are submitted by fax, email or phone directly to the health department.
Laboratory Surveillance	Hospitals may submit nasopharyngeal swabs collected from patients with suspected influenza to the DSHS Laboratory in Austin or a participating LRN laboratory in Texas. Specimen collection supplies, testing and shipping are provided free of charge to the hospital. Results are not for diagnostic purposes.

Laboratories

Laboratories are another potential source for influenza surveillance data. Laboratories may be independent commercial facilities or may be part of a hospital. Public health laboratories in Texas that are part of the Laboratory Response Network (LRN) already participate in influenza surveillance. Data from these laboratories tend to be shared directly with the affiliated health department.

Laboratories are not the best source of ILI data; however, they are a good source of influenza data. The number of influenza tests conducted can be an estimate of ILI. It is an imperfect estimate because laboratories usually do not have information on the symptoms of the patients, and therefore it is unknown if the patient symptoms meet a standard definition of ILI. The

strength of laboratories is identifying confirmed influenza. Laboratory data can also be used to calculate the percentage of tests positive for influenza.

The following table outlines the activities in which laboratories are eligible to participate.

Activity	Description of laboratory participation
ILI Activity	Laboratories may report the total number of influenza tests conducted and the number that are positive for influenza A, influenza B and/or a subtype of influenza A or lineage of influenza B. The data are submitted by fax, email or phone directly to the health department.
Laboratory Surveillance	Laboratories may submit nasopharyngeal swabs collected from patients with suspected influenza to the DSHS Laboratory in Austin or a participating LRN laboratory in Texas. Specimen collection supplies, testing and shipping are provided free of charge to the laboratory. Results are not for diagnostic purposes.
National Respiratory and Enteric Virus Surveillance System (NREVSS)	Laboratories that conduct testing for influenza and other respiratory and enteric viruses may submit weekly reports online to NREVSS. Laboratories report the type of test, the number of tests performed and the number of positive tests for influenza virus, parainfluenza viruses, coronaviruses, respiratory and enteric adenoviruses, rhinovirus, human metapneumovirus, respiratory syncytial virus, rotavirus and enterovirus.
Electronic Laboratory Reporting (ELR)	Laboratories can work with the DSHS NBS Project Office to submit electronic reports of notifiable conditions directly to NBS. However, since influenza is not a reportable condition, it is not routinely uploaded into NBS at this time.

Schools (primary and secondary)

Illness and absenteeism data from schools can be a good indicator of the impact of influenza in a community. Depending on how the school tracks absenteeism, it may be difficult for a school to report ILI activity. However, many schools are able to report good estimates of ILI.

Activity	Description of school participation
ILI Activity	Schools may be able to report the total number of students seen by the school nurse and the number of students seen by the school nurse with ILI. Some schools may also be able to report the total number of students absent and the number of students reported as absent with ILI (reported by parent). The data are submitted by fax, email or phone directly to the health department.

School Surveillance System (examples: TALHO's Roll Call, Tarrant County APC system, other school-specific online system)	Various school surveillance systems are in place throughout Texas. Each of these systems allows schools to log in to an online website to report data. The types of data collected may vary from system to system.

Steps for Recruiting

1. Identify potential reporters

There are several methods for identifying potential reporters in your jurisdiction. One of the best ways is to review which providers currently report notifiable conditions to your health department. These reporters already have an established relationship with public health and may be agreeable to supporting voluntary influenza surveillance as well.

Phone book and internet searches are also good tools to locate potential reporters in your jurisdiction. For example, internet searches may help you to locate large clinic networks in your area that may be able to assist with influenza surveillance by providing electronic data feeds from multiple providers who see patients with ILI.

The Texas Medical Board (TMB) website can be used to identify healthcare providers in your jurisdiction. You can search by city and specialty on the website. Alternatively, more extensive data is available for purchase. The TMB website is http://www.tmb.state.tx.us/.

Insurance company provider finders (example: Blue Cross Blue Shield) can also be used to identify healthcare providers in your jurisdiction. This resource only identifies providers who accept a particular type of insurance; however, the contact information is updated frequently and the user can sort by practice types.

Two resources for hospitals are the Texas Hospital Association website at http://www.tha.org/Services/Consumer-Information/Public-List-of-Texas-Hospitals and the "Find a License- Health Facilities" DSHS website at http://www.dshs.texas.gov/facilities/find-a-licensee.aspx#hosp.

To identify laboratories, check with local hospitals and healthcare providers to see which laboratories they typically use. Some hospital laboratories may act as reference laboratories for area clinics and smaller hospitals.

Searchable information on public schools is available on the Texas Education Agency website at http://tea.texas.gov/. Accredited private school information is available on the Texas Private School Accreditation Commission website at http://www.tepsac.org/.

2. Approach potential reporters

Once you have identified the provider or entity you would like to recruit, start by calling the provider's office. Identify yourself as calling from the health department. Ask if you can schedule a time to call and speak with someone about influenza surveillance.

The best contact at a private physician's office or clinic is usually the lead physician or lead nurse. For hospitals, the infection preventionist (IP) (formerly referred to as the

infection control practitioner) is a good first contact. The IP is typically the primary hospital staff member responsible for reporting notifiable conditions to health departments. The IP is familiar with the hospital setting and may be able to help assess the types of data that the hospital will be able to provide. Other potential contacts in a hospital are the laboratory director and the emergency department director. The school nurse is a good contact at grade schools. School nurses often already have established relationships with public health. You may also want to approach the school principal or superintendent to obtain administrative support from the school.

When you speak with your contact, review the purpose of influenza surveillance. Explain what amount and type of information is preferred from the reporter, the approximate amount of time the reporting activity is expected to take (if known) and what the health department does with the data. If the contact indicates interest in participating in influenza surveillance, identify who will be responsible for reporting.

Here are sample talking points:

- Purpose of influenza surveillance
    - Monitor influenza and ILI activity in our communities
- Information collected
    - We would like a weekly report with an aggregate count of patients you see with ILI.
    - We would also like a weekly aggregate count of any influenza testing results including rapid influenza test results and other influenza tests.
    - We do not collect patient identifiers.
- How information is used
    - To target recommendations for influenza prevention and control to communities
    - To target vaccination campaigns to communities that are seeing higher levels of influenza activity
    - To determine if circulating influenza viruses are covered by the current seasonal influenza vaccine
- Benefits to public health
    - Increased ability to determine when and where influenza activity is occurring
- Benefits to the reporter
    - Supporting public health activities that benefit the entire community
    - Establish communication channels between your practice and public health

Faxing or mailing a recruiting letter can be done in addition to or as an alternative to calling a potential reporter. See the sample letters at the end of this section.

3. Identify the best activity for the reporter's participation

During the initial conversation with your contact, you should be able to gauge what level of participation the reporter is willing to support. For healthcare providers and hospitals, it will be important to decide if they are better suited for ILINet or ILI activity reporting.

Use the decision tree on the following page to help select the best activity for healthcare providers and hospitals.

i	Is the provider willing to report the total number of patients seen for any reason and the number of patients seen with ILI each week? If yes, go to # ii If no, go to #iii
ii	Is the provider willing to break down the number of patients seen with ILI by age group? If yes, go to # iv If no, go to # v
iii	Thank the provider for his interest and explain that those are the minimum expectations for participating in influenza reporting. Remind the provider to contact you at any time in the future if he has questions about influenza or wants to report unusual increases in influenza activity at his practice. If the provider wants to submit specimens periodically for influenza testing, consider using the provider in laboratory surveillance.
iv	Consider recruiting the provider for participation in ILINet or have the provider report directly to you and share the data with the DSHS ILINet Coordinator so it can also be incorporated into ILINet. If the provider reports directly to you, you can ask for information that is not collected in ILINet such as rapid influenza test results. The DSHS ILINet Coordinator can assist with cross-jurisdictional recruitment for large clinic systems with centralized data administration. Go to # viii
v	Is the provider willing to report the number of rapid influenza tests performed and their results each week? If yes, go to # vi If no, go to # vii
vi	Provide a report template that includes rapid influenza test results Go to # viii
vii	Provide a report template that does not include rapid influenza test results Go to # viii
viii	Is the provider interested in submitting nasopharyngeal swabs on a subset of patients with suspected influenza for surveillance testing? If yes, go to # ix If no, go to # x
ix	Consider using this provider in laboratory surveillance if additional submissions are needed from the Health Service Region. Go to #x
x	Thank the provider for agreeing to participate and remind him to contact you at any time in the future if he has questions about influenza or wants to report unusual increases in influenza activity at his practice.

4. Provide the reporter with instructions and materials

Send appropriate reporting forms, a letter of appreciation and information on the reporting process and deadlines. Examples of report forms can be found in Section IVc of this handbook.

5. Initiate and monitor reporting

After a reporter agrees to participate, it is still necessary to monitor the reporter's participation. You should follow up with any new reporters after they submit their first reports to see if they have any questions or concerns about the process. Periodically monitor all of your reporters to see if they are submitting reports on a regular basis. If any provider misses more than 1 week, call the provider to follow up and address any reporting barriers.

ILINet Recruitment

Local health departments may recruit providers to report directly to the local health department or to report through ILINet. Identification and initial recruitment of providers is essentially the same process and is described in-depth under Steps for Recruiting. The overall process showing the responsibilities of the local health department and the recruited provider is below.

ILINet Recruitment Process

1) The local/regional health department identifies a provider who is interested in participating in ILINet surveillance.
    a. See section on Steps for Recruiting starting on page V.6.

2) The local/regional health department gives the provider information on ILINet and an ILINet application form.
    a. See example handout on ILINet on page V.13.
    b. The ILINet application form is available on the bottom of the page at http://www.dshs.texas.gov/idcu/disease/influenza/surveillance/ilinet/.

3) The provider submits the completed application to DSHS in Austin by fax (512-776-7616) or by email (flutexas@dshs.texas.gov).

4) DSHS EAIDB Influenza Surveillance Team coordinates with the CDC to get the provider a provider ID and password to access the ILINet website.

5) The provider ID and password are emailed to the provider. A work folder with instructions for reporting is also mailed to the provider.

6) The provider starts collecting data and reporting each Tuesday.

Retention of Influenza Surveillance Reporters

Retention of consistent reporters is a key facet of a strong influenza surveillance system. Most influenza surveillance is voluntary. Reporters take time out of their busy schedules to share information with public health because they believe the surveillance is worthwhile and they have a desire to support public health. As with any volunteer activity, if participants see value in the work they are doing, they are more likely to continue.

Retention efforts can be divided roughly into three major categories: feedback, recognition and incentives.

Feedback activities simultaneously inform the reporters that their data are being used by public health as well as provide them an indication of how they are performing. Examples of feedback include:

- Calling the reporter when a report is not submitted
- Calling the reporter to verify large increases or decreases in reporting numbers
- Providing midseason and end of season summary reports showing the number of weeks that reports were submitted by the provider

Recognition activities provide a mechanism for the health department to thank the reporter and highlight the importance of reporter participation. Examples of recognition include:

- Sending a formal letter of appreciation for agreeing to participate in influenza surveillance
- Sending a formal letter of appreciation for having submitted reports ___% of weeks during the previous influenza season

Incentives are methods to motivate reporting. Examples of incentives include:

- Providing free shipping and testing of some influenza specimens (through laboratory surveillance programs)
- Providing testing or shipping supplies that will help the providers in their practices

For example, current incentives for ILINet participants include:

- A certificate of appreciation signed by the State Epidemiologist of Texas for providers who report for at least half of the weeks during influenza season
- A subscription to the *Morbidity and Mortality Weekly Report*
- A subscription to *Emerging Infectious Diseases*
- Free specimen collection supplies, testing and shipping for a limited number of influenza surveillance specimens at the DSHS Austin Laboratory

One of the best methods to encourage continued reporting is to demonstrate to reporters how their work is benefiting public health. If reporters believe that the work they are doing is being used in a meaningful manner; then, they are more likely to continue doing it. One way to accomplish this is to provide the reporters a copy of the Texas Weekly Flu Report in a format they prefer. Reports may be emailed, faxed or mailed to their practice. Providers will appreciate a report highlighting influenza and ILI activity in their local areas in addition to the state report.

Sample Tools

Example influenza surveillance recruitment letter for a healthcare provider or hospital

Dear healthcare provider,

The [insert name of health department] is enhancing the surveillance for influenza morbidity in [insert jurisdiction]. Continually changing influenza viruses cause substantial disease in the United States, resulting in 200,000 hospital admissions and approximately 23,000 deaths every year.

As influenza illness is not a reportable condition in Texas, **your participation** in influenza surveillance is critical for monitoring the annual impact of influenza. The information obtained from influenza surveillance guides prevention and control activities, vaccine strain selection, patient care decisions and epidemic severity assessment. Influenza surveillance is also an important tool in the early detection of new viral strains that could have pandemic implications. Participating in influenza surveillance activities helps protect public health in our community, Texas and the nation.

Participants in influenza surveillance are asked to report once a week on the total number of patient visits and the number of patient visits for influenza-like illness (ILI). The information can be reported directly to the health department by fax, phone or email. Another option is to report via the internet using the Centers for Disease Control and Prevention's ILINet surveillance system. Most providers report that it takes them less than 30 minutes a week to compile and report their data; the reported data are made available to health departments for analysis.

The cost to you is less than 30 minutes of your time each week. Influenza reporters receive feedback on the data submitted and summaries of regional, state and national influenza data. **Providers may also submit some specimens for influenza testing to the Texas Department of State Health Services Laboratory at no charge**.

If you would like more information about participation in influenza surveillance, please contact me at (###) ###-####.

Thank you for your consideration to Help Protect Texas!

Sincerely,

[Insert contact person's information]

Now You Can Help With…

Influenza Surveillance

…In Only a Few Minutes a Week!

What is an ILINet provider?

An ILINet provider conducts surveillance for influenza-like illness (ILI) in collaboration with the state health department and the Centers for Disease Control and Prevention (CDC). Data reported by ILINet providers, in combination with other influenza surveillance data, provide a national picture of influenza virus and ILI activity in the U.S.

What data do ILINet providers collect? How and to whom are data reported?

ILINet providers report the total number of patient visits each week and the number of patient visits for influenza-like illness by age group (0-4 years, 5-24 years, 25-49 years, 50-64 years and ≥65 years). These data are transmitted once a week via the Internet or fax to a central data repository at CDC. Most providers report that it takes them **less than 30 minutes a week** to compile and report their data. In addition, ILINet providers can submit specimens from a subset of patients for influenza testing **free of charge**.

Who can be an ILINet Provider?

Healthcare providers of any specialty (e.g., family practice, internal medicine, pediatrics, infectious diseases) in any type of practice (e.g., private practice, public health clinic, urgent care center, emergency room, university student health center) are eligible to be ILINet providers. Practice settings that are **not eligible** are elementary, middle, or high school health centers, and any type of institutional setting such as nursing homes or prisons.

Why volunteer?

Influenza viruses are constantly evolving and cause substantial morbidity and mortality (approximately 23,000 deaths) almost every winter. Data from ILINet providers are critical for monitoring the impact of influenza and, in combination with other influenza surveillance data, can be used to guide prevention and control activities, vaccine strain selection, and patient care. ILINet providers receive feedback on the data submitted, summaries of state and national influenza data, and a free subscription to CDC's *Morbidity and Mortality Weekly Report* and *Emerging Infectious Diseases* journal. The most important consideration is that the data provided are critical for protecting the public's health.

For more information on influenza surveillance through ILINet, please contact the Texas Department of State Health Services Influenza Surveillance Team at flutexas@dshs.state.tx.us

CDC SAFER·HEALTHIER·PEOPLE

TEXAS Health and Human Services | Texas Department of State Health Services

NREVSS
National Respiratory and Enteric Virus Surveillance System

What is NREVSS?
NREVSS is an online laboratory reporting system created by the Centers for Disease Control and Prevention (CDC) for a variety of respiratory and enteric viruses, including influenza virus, parainfluenza viruses, respiratory and enteric adenoviruses, rhinovirus, human metapneumovirus, respiratory syncytial virus, rotavirus, and enterovirus. Data entered in NREVSS are used to track temporal and geographic patterns of these viruses and make public health decisions.

What kind of information is entered in NREVSS?
Weekly counts of the number of tests performed and the number of positive tests are entered for any or all of the viruses for which NREVSS collects data. The type of test (i.e., antigen detection test, viral culture, electron microscopy, or PCR) is also captured in the system. Reporting laboratories enter their data from the previous week by noon each Tuesday. The data reported weekly are a summary of the previous week's laboratory data, and the reporting weeks follow the CDC's MMWR week format.

Who can volunteer?
Volunteer laboratories must

- Perform acceptable testing types for any of the viruses for which NREVSS collects data AND
- Enter their data into the NREVSS system on a weekly basis, preferably year-round

In Texas, there is a great need for volunteer laboratories in the West Texas/Midland/El Paso area, in the northern "Panhandle" area and in the eastern/northeastern areas of the state. Laboratories from other areas of the state are also encouraged to volunteer.

Why volunteer?
Your laboratory's participation in NREVSS allows valuable data to be shared with public health partners across the state and the nation. Data entered in NREVSS are reviewed weekly by several epidemiologists throughout Texas and at the national level for use in weekly reports and to monitor virus trends in the state. In Texas, the RSV data also help inform the annual Medicaid coverage of palivizumab injections for high-risk children.

How do I sign up?
Contact the CDC NREVSS program coordinators for access to enter NREVSS data. The coordinators are:
Amber Haynes (vtj2@cdc.gov)
Mila Prill (gik8@cdc.gov)

Thank you for your contribution to influenza viral surveillance in Texas!

Example Influenza Reports

Links to additional influenza report examples can be found in Section III of this manual.

This influenza report was emailed out by Health Service Region 4/5N:

Health Service Region 4/5

Department of State Health Services

TEXAS FLU .ORG

Influenza Surveillance Weekly Summary Report

Start of School Year Sees "Quiet" Flu Activity

MMWR Week 34 (Aug 22-28)

The influenza (flu) activity for Health Service Region 4/5 for the "pre-flu season" week ending August 28, 2010 was "sporadic" with minimal flu activity. During week 34, we received 27 reports from healthcare professionals and 27 reports from schools and daycares. Reports were received from 18 of 35 counties in the health service region. Though flu season officially starts in October, Texas continues to collect flu data in order to detect problems as early as possible.

Reports from Healthcare Professionals

56% of facilities reported no flu activity, while 88% of healthcare facilities that previously reported activity reported that flu or influenza-like activity has either stayed the same or decreased since the last reporting week. Lab confirmed flu cases were reported in only one county (Angelina) which reported a case of influenza type B. Six counties reported influenza-like activity only. *[see "definitions" below]*

Disease Reporting Hotline
1-866-310-9698

Spotlight: Daycares

This year, the influenza surveillance program has included daycares in flu surveillance efforts. Daycares are encouraged to submit weekly reports. To submit the weekly daycare report, click HERE.

SENTINEL SITES WANTED
DSHS and CDC are looking for dedicated hospitals, clinics and providers to serve as Sentinel Surveillance Sites. Interested? Click HERE.

Please remember to submit your online flu reports on Mondays!!

Proper hygiene and hand washing is our greatest weapon

Reports from Schools and Daycares

Following the end of the first official week of public school, we received 27 school reports compared to an average of 89 reports during the peak of flu season in 2009-2010. Unlike 2009's "fast start flu season," flu-related absenteeism reported during the first week of school was minimal with a median rate of 5% compared to better than15% absenteeism at the start of the 2009 school year. 85% of schools reported no influenza or influenza-like activity. The median population for reporting schools was 410 students.

Influenza Definitions

ILI: [Influenza-Like Illness] is illness with fever >100° *AND* cough or sore throat

Confirmed Case: a person with ILI *AND* laboratory confirmed influenza by rapid test, PCR or viral culture.

Useful Web Links

Statewide Weekly Influenza Report
Prevention and Control of Influenza with Vaccines
Healthcare Professionals Online Report Form
Online Report Form for Schools
Daycare Online Report Form

To subscribe to the weekly flu surveillance newsletter click here.
Questions or Comments? Email us or call 1-866-310-9698

This influenza report was emailed out by Health Service Region 2/3:

Flu Report for HSR 2/3

CDC Week 38 (Sept. 19, 2010– Sept. 25, 2010) in 2009/2010 flu season

The "regular" influenza season ended on Week 20, week ending May 22, 2010. However, HSR 2/3 is still monitoring influenza from a few influenza reporting partners that have agreed or want to continue to report influenza activity throughout the summer months. At least 3 different influenza reporters from HSR 2 and HSR 3 have agreed to report influenza activity to DSHS HSR 2/3 Regional Office in Arlington.

The level of reported flu activity **increased** when compared to last week. The level of reported influenza-like illness and rapid flu tests (influenza A, B, or non-differentiated) **increased** when compared to last week. Influenza activity for week 38 of the 2009-2010 influenza season is **lower** when compared to the same time period last year. Influenza activity will be defined as having influenza-like illness symptoms, rapid test positive results or having positive flu cultures or PCR testing.

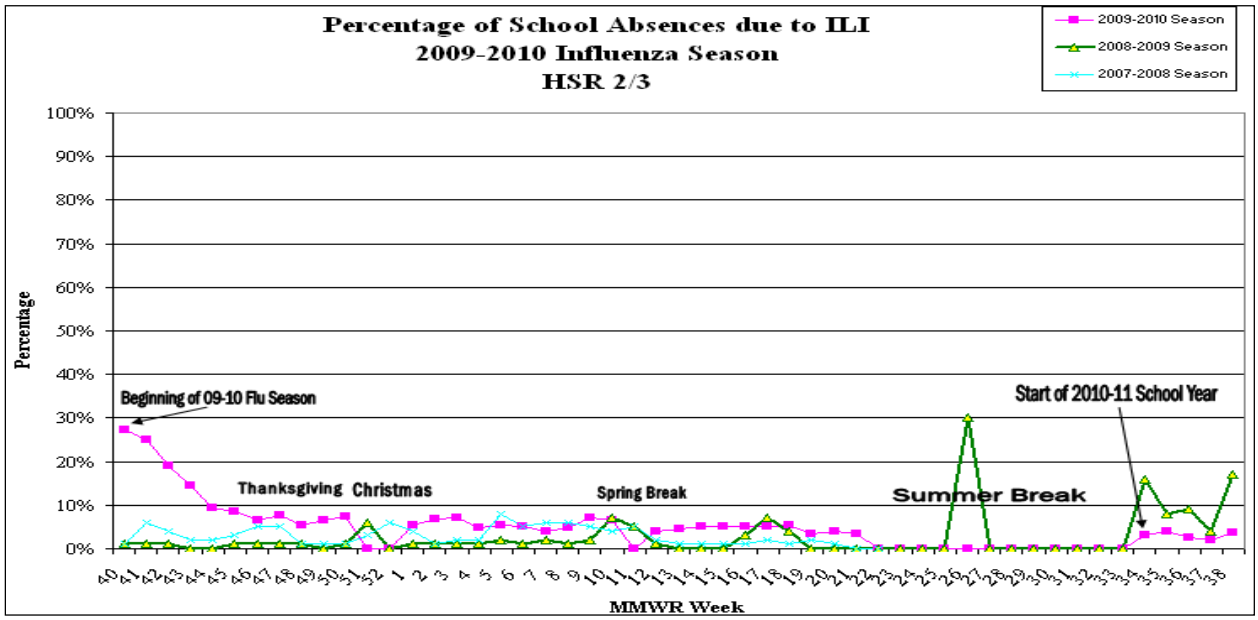
- 15 of 49 counties (31%) in the region reported influenza activity for CDC Week 38.
  - 6 of 30 counties (20%) in Region 2 reported influenza activity.
  - 9 of 19 counties (47%) in Region 3 reported influenza activity.
- Flu A was detected via rapid flu test in 3 counties in HSR 2/3.
  - Collin, Nolan and Tarrant Counties
- Flu B was detected via rapid flu test in 1 county in HSR 2/3.
  - Tarrant County
- Flu A was not detected via culture or PCR in HSR 2/3.
- Flu B was not detected via culture or PCR in HSR 2/3.
- ILI only was reported in 12 counties in HSR 2/3.
  - Coleman, Erath, Foard, Hood, Hunt, Jack, Knox, Mitchell, Palo Pinto, Parker, Somervell and Wise Counties
- Non-differentiated flu was not detected via rapid flu test in HSR 2/3.
- There were no reported institutional outbreaks or school closures in HSR 2/3 during Week 38.

Table 1. DSHS HSR 2/3 Flu Data Summary by Week

DSHS HSR 2/3 Flu Data Summary By Week						
2009-2010 Influenza Season						
CDC Week	**# of ILI**	**# of Flu A Rapid Positive**	**# of Flu B Rapid Positive**	**# Undifferentiated**	**# of Flu A Culture or PCR Positive**	**# of Flu B Culture or PCR Positive**
40 (Oct. 04-Oct. 10)	7563	5493	18	171	26	0
41 (Oct. 11-Oct. 17)	4834	4357	31	115	23	0
42 (Oct. 18-Oct. 24)	4490	1499	22	198	21	0
43 (Oct. 25-Oct. 31)	2958	1475	12	127	11	0
44 (Nov. 01-Nov. 07)	2685	606	20	68	10	0
45 (Nov. 08-Nov. 14)	1830	464	13	39	4	0

46 (Nov. 15-Nov. 21)	1366	153	2	93	0	0
47 (Nov. 22-Nov. 28)	1199	86	11	7	1	0
48 (Nov. 29-Dec. 05)	812	130	5	9	1	0
49 (Dec. 06-Dec. 12)	911	107	11	27	5	0
50 (Dec. 13-Dec. 19)	898	97	13	27	4	0
51 (Dec. 20-Dec. 26)	385	45	2	11	3	0
52 (Dec. 27-Jan. 02)	999	36	6	6	2	0
01 (Jan. 03-Jan. 09)	1077	65	9	6	3	0
02 (Jan. 10-Jan. 16)	1011	106	15	15	2	0
03 (Jan. 17-Jan. 23)	1032	83	6	22	3	0
04 (Jan. 24-Jan. 30)	858	57	16	12	3	0
05 (Jan. 31-Feb. 06)	1039	32	11	17	1	0
06 (Feb. 07-Feb. 13)	881	78	10	7	2	0
07 (Feb. 14-Feb. 20)	664	52	4	7	2	0
08 (Feb. 21-Feb. 27)	664	51	8	10	0	0
09 (Feb. 28-Mar. 06)	678	98	4	0	3	0
10 (Mar. 07-Mar. 13)	464	78	2	14	0	0
11 (Mar. 14-Mar. 20)	370	13	3	3	0	0
12 (Mar. 21-Mar. 27)	416	36	4	3	1	0
13 (Mar. 28-Apr. 03)	385	22	2	3	0	0
14 (Apr. 04-Apr. 10)	331	20	1	2	0	0
15 (Apr. 11-Apr. 17)	310	17	2	1	2	0
16 (Apr. 18-Apr. 24)	278	15	3	1	1	0
17 (Apr. 25-May 01)	324	2	0	1	0	0
18 (May 02-May 08)	303	7	0	0	0	0
19 (May 09-May 15)	272	1	0	1	0	0
20 (May 16-May 22)	321	1	0	1	0	0
21 (May 23- May 29)	184	1	1	0	0	0
22 (May 30-June 05)	197	0	1	0	1	0
23 (June 06-June 12)	202	0	1	0	0	0
24 (June 13-June 19)	137	0	0	0	0	0
25 (June 20-June 26)	116	0	0	0	0	0
26 (June 27-July 03)	107	0	0	0	0	0
27 (July 04-July 10)	111	0	0	0	0	0
28 (July 11-July 17)	117	1	0	0	0	0
29 (July 18-July 24)	105	0	0	0	0	0
30 (July 25-July 31)	99	0	0	0	0	0
31 (Aug. 01-Aug. 07)	106	0	1	0	0	0
32 (Aug. 08-Aug. 14)	83	1	1	0	0	0
33 (Aug. 15-Aug. 21)	71	2	0	0	0	0
34 (Aug. 22-Aug. 28)	99	1	0	1	0	0
35 (Aug. 29-Sept. 04)	137	1	0	0	0	0
36 (Sept. 05-Sept. 11)	164	2	0	1	0	0
37 (Sept. 12-Sept. 18)	158	1	0	0	0	0
38 (Sept. 19-Sept. 25)	190	8	2	0	0	0
Grand Total	44991	15400	273	1026	135	0

Table 2. Percentages of School Absences due to ILI 2009-2010 Influenza Season HSR 2/3. (Because this data is taken from only those counties that provide us both total absences as well as ILI absences it does not represent a complete total of all counties in Region 2/3.)



State of Texas

The abbreviated Week 38 state report from DSHS is not available at the time of this report. During week 37, week ending Sept. 18, 2010, in Texas:

- Two (0.99%) specimens tested by NREVSS laboratories in Texas were positive for influenza A; one of these was collected from a Texas resident returning from Germany and was identified as 2009 influenza A (H1N1) by PCR testing.
- Percentage of visits for influenza-like illness as reported by ILINet providers in Texas was below the regional baseline.
- Influenza reports were received from all Health Service Regions (HSRs) for week 37. For a map of Health Service Regions please visit the following website: http://www.dshs.state.tx.us/regions/state.shtm.
    - HSR 7 reported an increased level of flu activity compared to week 36.
    - HSRs 2/3, 4/5N, 6/5S, 8, 9/10, and 11 reported the same level of flu activity compared to week 36.
    - HSR 1 did not determine a flu activity level for week 37 compared to week 36.
    - Eight hospital laboratories and public health agencies across Texas reported conducting a total of 202 influenza tests (antigen, culture, and PCR) to the National Respiratory and Enteric Virus Surveillance System (NREVSS) sponsored by the Centers for Disease Control and Prevention (CDC).
    - Forty-seven percent of the influenza tests reported to NREVSS were antigen detection tests; these tests cannot identify the subtype of influenza detected.

The complete detailed weekly report for the state can be found at: http://www.dshs.state.tx.us/idcu/disease/influenza/surveillance/2010/.

United States

CDC is no longer publishing a weekly national flu report for the 2009-2010 Season. The first weekly influenza surveillance report of the 2010-2011 Season (week 40, week ending October 9, 2010) will be published on October 15, 2010.

For past reports, please visit: http://www.cdc.gov/flu/weekly/.

For questions or concerns relating to this report or flu surveillance in Region 2/3, please call or contact Johnathan Ledbetter, Epidemiologist, at 817-264-4512.

Section VI: Laboratory Support

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Viral Transport Medium (VTM)

Every year in September, prior to the beginning of the official influenza season, the DSHS Austin laboratory sends out orders of viral transport media (VTM). The media sent out is commercially-prepared VTM.

VTM is designed to maintain the stability and viability of viruses while outside of the host organism or laboratory tissue culture. Most VTM contains antibiotics to inhibit the overgrowth of viruses by bacteria that also may be present in clinical respiratory specimens.

For commercially-prepared VTM, refer to the package insert for approved uses. Because VTM contains antibiotics, it is not an appropriate medium to use for bacterial testing; this also applies in outbreak situations in which viral and bacterial testing will need to be performed on specimens from each patient.

Refer to the package insert for approved storage conditions and timeframes for commercially-prepared VTM.

Appropriate types of VTM for influenza surveillance include any commercially prepared VTM approved for general viral transport and universal transport medium (UTM). Inappropriate transport types for influenza surveillance specimens include dry swabs, swabs in saline and transport medium used for gonorrhea and Chlamydia testing.

Receiving and Storing VTM

1. DSHS sends the VTM to the surveillance sites overnight.

2. When received at the sites, the VTM should be stored according to the manufacturer's instructions. It is preferable to store the VTM in the upright position. The caps on the VTM may loosen and result in leakage if stored horizontally.

3. **Regularly check the expiration date on the VTM and discard expired media.** Unused expired VTM should be discarded according to your health department's policies and procedures. If your health department does not have policies and procedures for discarding expired VTM, DSHS recommends using the following procedure:
   a. Place unused expired media into a cardboard box.
   b. Tape the cardboard box shut.
   c. Write "Do Not Recycle" on the outside of the cardboard box.
   d. Throw the cardboard box containing the expired media into a trashcan.

   Expired media should not be returned to the DSHS Laboratory.

4. The plastic cylindrical tubes with black screw caps and the specimen boxes (if ordered) provided by DSHS should be used to ship influenza surveillance specimens back to DSHS. Do not use the DSHS-provided containers for other specimens, or to ship specimens to non-public health laboratories.

Ordering Supplies

Influenza surveillance related supplies should be ordered prior to the beginning of the official influenza season (referred to as an "initial" order) and throughout the season as needed (referred to as "replenishment" orders). Influenza surveillance supplies are maintained, packaged and shipped to submitters by the Container Preparation Group in the DSHS Austin Laboratory.

Typical influenza surveillance supplies that can be ordered from DSHS include the following:

- Nasopharyngeal (NP) swabs
- Viral transport medium (VTM)
- Plastic cylindrical tubes with black screw caps—labeled with a biohazard sticker—that serve as secondary containment for specimens
- Specimen shipping boxes (aka "cold boxes") of various sizes
- Cold packs, two per cold box supplied
- Current DSHS Influenza Laboratory Surveillance Protocol
- FedEx waybills (for DSHS Austin submitters who already have shipping boxes onsite)

Supply type	**Automatically included in "initial" preseason orders**	**Automatically included in all VTM replenishment orders**	**Included upon request**
Nasopharyngeal (NP) swabs	Yes	Yes	N/A
Viral transport medium (VTM)	Yes	Yes	N/A
Specimen shipping boxes* (various sizes)	No	No	Yes
Cold packs	No	No	Yes
Plastic cylindrical tubes with black screw caps (secondary containment)	Yes	Yes	N/A
Current DSHS influenza surveillance protocol	Yes	No	Yes
FedEx waybills**	No, unless shipping boxes ordered	No	Yes

*Please instruct submitters to reuse remaining shipping boxes from previous seasons if they still have them onsite.

**FedEx waybills are provided to DSHS Austin submitters when they order shipping boxes or upon request. LRNs are expected to cover shipping costs for their submitters.

Orders for VTM and supplies must include the following information:

- Name of ordering agency
- Shipping address of ordering agency
- Name of a contact person who will receive the order at the ordering agency
- Phone number and email address for the contact person at the ordering agency

- Number of VTM tubes requested
- Number of cold boxes requested
- If the bulk order will cover several agencies, the number of agencies to which the order will be distributed
- Whether the site is a high, medium or low volume submitter:
    - low = fewer than 8 specimens per shipment
    - medium = 9–25 specimens per shipment
    - high = more than 25 specimens per shipment

See page VI.20 for an example of the VTM and supplies order form.

Preseason or "initial" orders should be placed with the DSHS Emerging and Acute Infectious Disease Branch (EAIDB) Influenza Surveillance Coordinator prior to the beginning of influenza season, if possible. Regional health departments (RHDs) should collect orders from their RHD submitters as well as orders from their local health departments and forward those to flutexas@dshs.texas.gov. Initial orders are typically made in August.

Replenishment orders for influenza surveillance submitters, initial orders for new sites recruited during the season and special orders for respiratory outbreaks should also be forwarded to the DSHS EAIDB Influenza Surveillance Coordinator throughout the season at flutexas@dshs.texas.gov. DSHS Austin reserves the right to make changes to VTM and supply orders as needed. Please note that orders sent directly to the DSHS Laboratory's Container Preparation Group may be rerouted to the DSHS EAIDB Influenza Surveillance Coordinator for approval before being filled. Please double-check the shipping address for the submitter before placing the VTM or supply order. For all VTM and supply orders, the agency/site ordering the supplies needs to have a person onsite during normal business hours to receive the order. This person should be instructed to store the VTM in the refrigerator or freezer immediately upon arrival.

VTM orders shipped by the Container Preparation Section of the DSHS Laboratory are always shipped via overnight mail; other supplies (e.g., shipping boxes) may be shipped by overnight mail or another shipping method. VTM and supplies are shipped according to the following policy: VTM orders received by the Container Preparation Section on Monday through Wednesday are shipped out the same week they are received; orders received after Wednesday are shipped out the following week. Orders will not be shipped on Fridays except in an emergency. In an emergency situation, the receiving site will need to provide the name and phone number of the person who will be present at the shipping address to receive the shipment on Saturday. Please contact DSHS EAIDB and the DSHS Container Preparation Section in the case of an emergency order (see contact information in the appendix).

Testing Performed by DSHS Austin

The DSHS Austin Laboratory performs a real time RT-PCR (reverse transcription polymerase chain reaction) test on all influenza surveillance specimens using PCR kits supplied annually by CDC. Multiplex PCR respiratory virus panel testing and pyrosequencing are other tests available upon request when supplies are available at the DSHS Austin Laboratory.

Acceptable specimens for routine influenza surveillance include nasopharyngeal (NP) swabs (generally considered the best specimen for routine influenza surveillance), nasal swabs, nasal aspirates, nasal washes and throat swabs. Lower respiratory specimens may be submitted as needed and include bronchoalveolar lavages, bronchial washes, and tracheal aspirates. This is due to the requirements of the RT-PCR test kits supplied by CDC, which are the main screening tests used for influenza surveillance in Texas public health laboratories. Submission of influenza surveillance specimen types other than those listed above may result in the specimen being rejected as "unsatisfactory for testing."

Specimens tested for influenza virus via RT-PCR at Texas public health laboratories are identified by type (i.e., A or B) and subtype [i.e., 2009 A (H1N1), seasonal A (H1N1) or A (H3N2)], if applicable. Specimens found to be positive for unsubtypeable influenza A are forwarded to CDC for identification and confirmation. The DSHS Austin Laboratory can also perform PCR testing for influenza A (H5N1) and (H7N9) upon request. If you wish to request testing for non-seasonal influenza A viruses, please contact the DSHS EAIDB Influenza Surveillance Team at 512-776-7676.

Beginning in the 2010-2011 influenza season, the DSHS Austin Laboratory began testing a subset of influenza positive specimens via pyrosequencing for mutations that confer antiviral resistance. Currently the only testing capability is for oseltamivir resistance of H1N1 subtypes and results will only be released to public health.

The DSHS Laboratory also has the capability to run a multiplex PCR respiratory virus panel (RVP) assay. The RVP assay testing of influenza surveillance or other respiratory virus specimens is usually performed on a monthly basis as testing depends upon the number of specimens submitted to the DSHS Laboratory for testing, availability of time, supplies and reagents. Beginning in the 2013-2014 season, nasopharyngeal specimens collected during outbreak investigations will be tested on the respiratory virus panel.

In general, RT-PCR testing results should be available within 1–4 business days from the date the specimen is received at the laboratory. Pyrosequencing results are available 1–2 weeks after the specimen is received; these results are not reported to the submitter. Multiplex PCR RVP assay testing results for respiratory virus specimens are usually available 2-4 weeks after the specimens are received. However, RVP assay testing results could be available 5 business days after the specimen is received if pre-approval is obtained from an epidemiologist in EAIDB. The multiplex PCR RVP assay test used by the DSHS Laboratory has been fully validated. Situations and factors that may cause a turnaround time to fall outside of these ranges include having to rerun a test for various reasons, extremely high numbers of influenza specimens received at the laboratory, staffing shortages or other unforeseen laboratory or public health emergencies.

The DSHS Laboratory sends a representative sample of influenza viruses to the CDC throughout the influenza season. This sample includes a variety of specimens from different geographic areas in Texas, different types and subtypes of influenza detected by Texas public health laboratories, cases of apparent vaccine failure, isolates possibly resistant to antiviral agents and other isolates from unusual cases. The CDC influenza laboratory performs additional tests on these influenza isolates such as antigenic characterization and antiviral resistance. Antigenic characterization identifies the specific influenza strain; data from this test are used to monitor circulating viruses and inform the decision of which viruses are recommended for inclusion in the vaccine for the upcoming year. CDC typically characterizes from 50–100 influenza isolates sent from DSHS each season.

Antiviral resistance testing determines whether or not an influenza isolate is resistant to the neuraminidase inhibitors—oseltamivir, zanamivir and peramivir—or the adamantanes (rimantadine and amantadine). Influenza A viruses are tested for resistance to both classes of antiviral agents, and the majority of currently circulating influenza A viruses are typically resistant to the adamantanes. Because influenza B viruses lack an M2 protein, adamantanes are ineffective against them; therefore, influenza B viruses are only tested for resistance to the neuraminidase inhibitors.

Both antigenic characterization and antiviral resistance results can be found in the Texas Weekly Flu Report during the official influenza season. The typical turnaround time for results from CDC's antigenic characterization testing or antiviral resistance testing is 1–3 months; however, resistant viruses are reported to the state health departments immediately for investigation. Antigenic characterization and antiviral resistance testing results are not reported to submitters.

Summary of DSHS Influenza Testing Methods

Testing Method	Also known as	Tests for	Notes
Real-time Reverse Transcription Polymerase Chain Reaction	rRT-PCR or PCR	Influenza A and B; influenza A subtypes 2009 H1, seasonal H1, H3 (H5 and H7 upon request)	Primary surveillance test at DSHS and LRN laboratories
Multiplex PCR assay	Multiplex PCR respiratory virus panel (RVP) assay	Parainfluenza viruses 1, 2 and 3; respiratory syncytial viruses A and B; influenza A unspecified, H1, 2009 H1, H3, influenza B; rhinovirus; adenoviruses B/E and C; and human metapneumovirus	This is an expensive test and supplies are limited. This test is fully validated and results on individual patients may be released.
Pyrosequencing	Antiviral resistance testing	Resistance to oseltamivir only for seasonal H1N1 and 2009 H1N1	Performed on a subset of specimens that are positive for 2009 H1N1 influenza by PCR; PCR positive influenza specimens are sent to CDC regularly for full antiviral resistance testing according to the CDC sampling protocol

Specimen Collection

Nasopharyngeal (NP) specimens are the preferred specimen type for influenza surveillance. NP specimens are the only acceptable specimens for multiplex PCR RVP assay testing. Limited influenza testing can be performed on other respiratory specimen types but prior approval is required. Non-nasal/non-NP swab specimens should only be submitted if no other specimens are available and there is a strong public health need for the results (such as confirming influenza in a pediatric death investigation).

For seasonal influenza surveillance, collect specimens from patients who present with clinical symptoms resembling acute influenza infection or an influenza-like illness (one swab per patient). Please do not include patients with allergy symptoms, strep throat, or any other confirmed diagnosis that explains the symptoms. Typical symptoms of influenza infection generally include fever (typically $\geq$ 100 ºF), malaise, myalgia (muscle aches), cough, rhinorrhea (runny nose), sore throat, chills and headache. Select patients who present with recent onset (i.e., patients whose symptom onset was within 3–4 days of presenting to the clinic).

Texas public health laboratories are also interested in receiving the following priority specimens and specimens of interest for influenza surveillance:

- Patients with an extremely severe or unusual illness presentation
- Patients who received an influenza vaccine at least 2 weeks prior to illness onset
- Patients not responding to antiviral treatment
- Patients with a history of animal contact (avian/swine)
- Patients with a history of international travel
- Early and late season specimens
- Outbreak specimens
- Specimens from influenza-associated pediatric deaths
- Unsubtypeable influenza A specimens detected in a laboratory that can perform subtyping

Use sterile, polyester-tipped, plastic shaft nasopharyngeal swabs and viral transport media (VTM) for specimen collection. Dacron or rayon-tipped swabs with a plastic shaft or any other commercially available sterile collection system intended for virus isolation also may be used. Cotton-tipped or calcium alginate swabs are not acceptable because they can inhibit the PCR test. After specimen collection, insert the fiber tip of the swab into the VTM (be sure to fully submerge the fiber tip inside the VTM) in the specimen tube and break off the shaft so that the swab fits completely within the tube. Please tighten the cap securely.

Nasopharyngeal specimen collection

Basic instructions for collecting NP specimens are available in the appendix of this handbook. A video demonstrating proper technique for nasopharyngeal collection for pertussis testing can be found on the CDC website at http://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection.html. Though the video demonstrates specimen collection for pertussis, the basic technique for collecting a specimen for influenza testing is the same. Two swabs are recommended for pertussis testing but only one swab is needed for influenza testing.

Additional videos are also available on the COPAN website at http://www.copanusa.com/index.php/education/videos/. DSHS recommends that providers wear appropriate personal protective equipment including gloves, a mask and eye protection when collecting nasopharyngeal specimens.

How to Submit Influenza Specimens

Specimen Storage
At a minimum, all influenza surveillance specimens must be kept cold (2–8˚C) from the time of collection until testing. Specimens may also be stored frozen (-70˚C) after collection. Avoid multiple freeze/thaw cycles as this may inhibit recovery of virus in culture. Specimens should be stored in an upright position with caps tightened. Ship specimens to a Texas public health laboratory as soon as possible after collection. Timely transport to the laboratory will increase the likelihood of recovering the influenza virus from specimens.

Specimen Shipping
Specimens maintained at refrigerated temperatures (2–8˚C) before and during shipping must be received at the laboratory no more than 72 hours after the specimen collection time. Please include a sufficient number of cold packs to keep the specimen at the appropriate temperature until it is received at a Texas public health laboratory. For the DSHS Austin lab, if no collection time is specified on the G-2V Specimen Submission Form, the assumption will be made that the specimen was collected at 12:01am on the date of collection specified on the G-2V form. Specimens maintained in a frozen (-70˚C) state before and during shipping and shipped on dry ice are not subject to these time requirements. Please include a sufficient amount of dry ice to keep frozen specimens frozen until they are received at a Texas public health laboratory.

Each specimen should be submitted to the laboratory using the DSHS G-2V Specimen Submission Form or the appropriate specimen submission form for the local LRN laboratory. For the DSHS Austin Lab, each submitter must have a submitter identification number on file with the DSHS Austin Laboratory and must submit specimens using copies of the personalized, master G-2V form. The submitter identification number and contact information are pre-filled on each submitter's personalized G-2V form. For help obtaining a submitter ID or a personalized G-2V form for the DSHS Austin Laboratory, please contact Laboratory Reporting at 512-776-7578. For more information, see http://www.dshs.texas.gov/lab/MRS_forms.shtm.

Please complete the following sections of the DSHS G-2V Specimen Submission Form for **each** influenza surveillance specimen sent to the DSHS Laboratory:

- Section 1, Submitter Information:
  - Submitter/TPI Number
  - NPI Number
  - Submitter name, address and contact information

- Section 2, Patient Information:
  - Patient name, date of birth, sex, and full address
    - If date of birth is not provided, an alternate approved secondary identifier must be provided
      - Alternate approved secondary identifiers include: medical record number, social security number, Medicaid number, or CDC number
  - Date and **time** of specimen collection
  - ICD diagnosis code(s)

- Section 3, Specimen Source or Type (please check appropriate box)

- Section 4, Virology
  - Check the box labeled "Influenza surveillance {Influenza real-time RT-PCR}"
  - Please indicate if the patient received the current season's influenza vaccine and the date it was received
  - Please indicate if the patient has recent travel (especially international)
  - Please indicate if the patient has had animal contact (i.e., avian or swine) by writing "Animal contact" and the type of animal with which the patient had contact within the blank space on the G-2V form, section 4.

- Section 5, Ordering Physician Information
  - Ordering Physician's Name and NPI Number

- Section 6, Payor Source
  - Check with your Regional Influenza Surveillance Coordinator for instructions on completing payor source. See the appendix for contact information.

    Note: Submitters who do not complete the form correctly and are billed will not be reimbursed.

See the example G-2V form on page VI.17. The patient and specimen identifiers must match between the specimen tube and the G-2V form.

Effective September 1, 2016: All specimens must be labeled with at least two patient specific identifiers; both a primary and a secondary identifier. The identifiers must appear on both the primary container and the associated submission form. Please see the specimen acceptance criteria update letter at www.dshs.texas.gov/lab/PDF/SpecAcceptCriteria-TwoPatientIdentifiers-072516.pdf for additional details and acceptable patient identifiers.

Specimens must be packed in triple containment. When using influenza surveillance shipping supplies provided by DSHS, the VTM tube is the primary container, the plastic cylindrical tube with a black screw cap (labeled with a biohazard sticker) in which the VTM tube is placed is the secondary container, and the Styrofoam cold box is the tertiary container. Non-DSHS shipping supplies must meet IATA and other shipping regulations. Place enough paper towels or other absorbent material in the secondary container to absorb the entire contents of the VTM tube if leakage or breakage should occur. Be sure to tighten caps on the primary and secondary containers. Then place the Styrofoam box in a corrugated cardboard box (provided), and tape it for shipping. **Do not seal the Styrofoam lid.** (The cardboard shipping boxes provided by DSHS have a Styrofoam liner inside. Please keep these two units together; do not separate the Styrofoam box from the outer cardboard box.) Place a completed G-2V laboratory form for **each** specimen in the shipment on top of the Styrofoam box inside the cardboard box. If dry ice is used, do not tape the Styrofoam box; this allows venting of the carbon dioxide as the dry ice melts.

Influenza surveillance specimens fall under Category B shipping regulations; a specimen submitter must be familiar with the regulations for Category B in order to ship specimens in this category. For Category B shipments, the shipping box must be labeled with the following:

- UN 3373/Category B Biological Substances label
- Directional arrows label
- Submitter's address and contact person's information
- Shipping address and contact person's information
- Dry ice label (if applicable)

Do not place a biohazard sticker on the outer mailing container. Category B shipments are accepted by FedEx and Lone Star Overnight. If it can be avoided, try not to use more than 5 pounds of dry ice in a shipping container because of limits for some of the shipping companies. It is the responsibility of the shipper to make sure that all packaging and labeling meet the current criteria.

Specimens should be shipped as soon as possible after collection and should arrive at the laboratory within 72 hours of collection (unless they are maintained frozen throughout shipping). It is recommended to collect specimens Monday through Wednesday and to ship Monday through Thursday. Please do not ship specimens to the DSHS or LRN laboratories on Friday unless it is an emergency and you have received approval from the appropriate laboratory, the DSHS Emerging and Acute Infectious Disease Branch (see the appendix for contact information) and the local health department (if applicable). Specimens should always be shipped using overnight mail.

The shipping address is:

Texas Department of State Health Services
Walter Douglass (512) 776-7569
Laboratory - MC 1947
1100 West 49th Street
Austin, TX 78756-3194

Specimen Rejection

Please be aware of the most common reasons for specimen rejection:

- Unfrozen specimens received at the laboratory more than 72 hours after specimen collection
- Submission of specimen types other than those listed on page VI.6
- Specimens arriving at ambient temperature
- Specimens collected with calcium alginate or wooden shaft swabs
- Specimens submitted in expired medium
- Broken or leaking specimen tubes
- Absence of patient identifiers on the specimen and/or the laboratory submission form
- Mismatch of patient identifiers between the specimen and the laboratory submission form
- No date of collection on submission form
- No specimen included with the submission form

Overview of the Texas Laboratory Response Network (LRN)

The Laboratory Response Network (LRN) was established in 1999 by the Department of Health and Human Services Centers for Disease Control and Prevention (CDC), in response to Presidential Decision Directive 39.

This network is comprised of state and local public health, federal, military and international laboratories. The main function of the LRN is to ensure that these laboratories have the capacity to respond to biological and chemical threats as well as other public health emergencies.

The LRN laboratories are categorized as either national, reference or sentinel laboratories based on their respective testing capabilities. National laboratories, such as the CDC, perform definitive testing of specimens that cannot be tested or confirmed by a reference laboratory due to its Biosafety Level rating. Reference laboratories, which include state public health, veterinary and international laboratories, provide confirmatory testing for many select agents. The sentinel laboratory category contains the largest number of laboratories and is composed of hospital, clinical and commercial diagnostic laboratories that perform routine diagnostic and rule-out testing in addition to referring specimens to reference laboratories.

In Texas there are ten LRN laboratories, one in each of the following cities: Corpus Christi, Dallas, El Paso, Fort Worth, Harlingen, Houston, Lubbock, San Antonio and Tyler. The DSHS Laboratory in Austin also functions as an LRN. The primary function of these laboratories is to respond to biological threats, emerging infectious disease and other public health emergencies; additionally, since 2008 the LRNs have performed influenza surveillance testing for select providers in their local areas.

The LRN laboratories perform a real time RT-PCR test to identify influenza types (A or B) and subtypes [2009 H1N1, seasonal A (H1N1), A (H3N2)], if applicable. The LRN laboratories also have the capability to test for influenza A (H5N1) and (H7N9) by RT-PCR. The typical turnaround time for influenza surveillance RT-PCR testing is 2–5 business days. Viral isolation and other testing for influenza is not available through the LRNs or the DSHS Laboratory in Austin.

The LRN laboratories have different testing capacities and most assist in the recruiting of their influenza surveillance submitters. Please contact the local LRN laboratory for more information about its testing capacity, role in influenza surveillance and LRN-specific laboratory specimen submission form. Contact information for the LRNs is located in the appendix.

Frequently Asked Questions

General

Q1: Are supplies, shipping and testing provided free of charge for influenza surveillance specimens?

A1: Yes. Supplies (e.g., VTM and swabs) are available at no cost to influenza surveillance specimen submitters identified by the regional and local health departments; shipping (via FedEx) for influenza surveillance specimens is also free from designated submitters to the DSHS Laboratory in Austin. Influenza surveillance testing is provided free of charge as long as the approved submitter fills out the billing information correctly on the G-2V Specimen Submission Form.

Viral Transport Medium (VTM)

Q1: If I have expired VTM on hand that has not been used, what should I do with it?

A1: Unused expired VTM should be discarded according to your health department's policies and procedures. If your health department does not have policies and procedures for discarding expired VTM, DSHS recommends using the following procedure:

a. Place unused expired media into a cardboard box.
b. Tape the cardboard box shut.
c. Write "Do Not Recycle" on the outside of the cardboard box.
d. Throw the cardboard box containing the expired media into a trashcan.

Please do not send the expired VTM back to DSHS Austin.

Q2: If I don't have any VTM, can I submit an influenza specimen in saline?

A2: No. Influenza surveillance specimens must be submitted in medium suitable for viral transport like FTM, VTM or UTM.

Rapid Influenza Tests

Q1: The patient had a negative rapid influenza test result. Should I still submit a specimen from this person for influenza surveillance testing?

A1: Rapid influenza tests are less reliable than viral culture and PCR testing. If the rapid influenza test is negative but the physician strongly suspects influenza based on the clinical presentation, then we highly recommend submitting a nasopharyngeal specimen for confirmatory laboratory testing.

Swabs

Q1: Can I use a throat swab as a NP swab?

A1: NP swabs are typically smaller and more flexible than throat swabs and are more comfortable for patients.

Q2: Why can't I use a calcium alginate swab or a swab with a wooden shaft?

A2: The testing protocol for the rRT-PCR test performed in the DSHS Laboratory prohibits use of these types of swabs because they can inhibit the test.

Shipping

Q1: It is Friday and I want to submit an influenza specimen on a patient. Can I ship it today?

A1: It is better to freeze the specimen and ship it frozen on dry ice on Monday. Some shipping companies do not deliver on Saturday, and there are no laboratory staff members on duty during the weekend to ensure that the specimen is stored properly over the weekend. If there is an urgent need for testing, contact the Influenza Surveillance Team to coordinate shipping.

Instructions for Completing the G-2V Specimen Submission Form* for Influenza Laboratory Surveillance

*Note: Instructions in this document refer to the DSHS G-2V Specimen Submission Form (SEPT 2017).

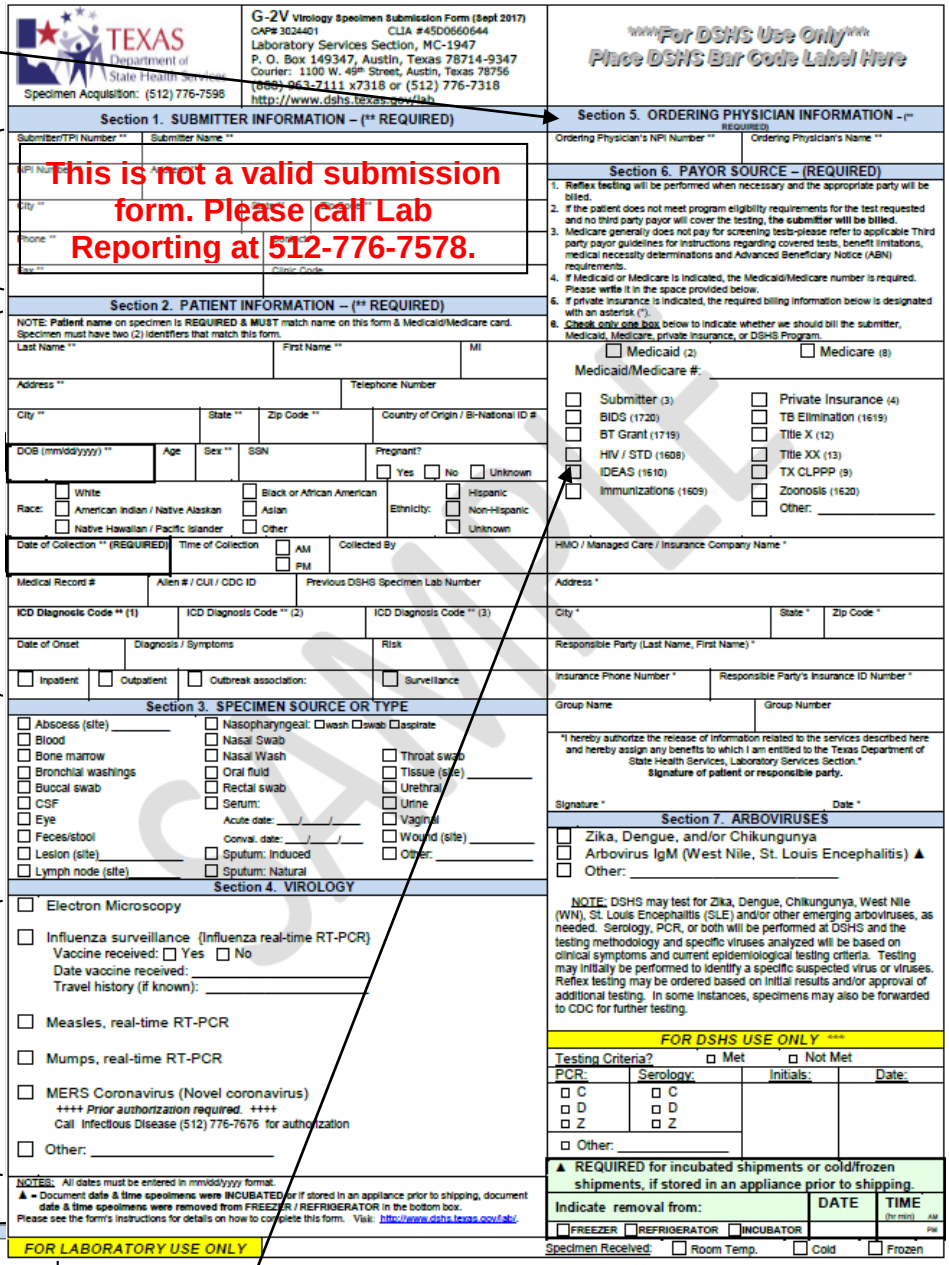
Complete Section 5, "Ordering Physician Information," by providing the physician's name and NPI number.

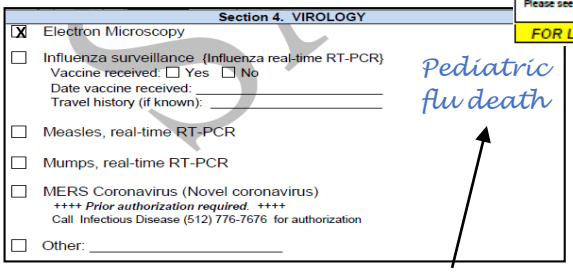
Ensure Section 1, "Submitter Information," has the correct submitter name, address, phone, and contact information. This section should be pre-populated on your master form**.

Complete Section 2, "Patient Information," with **date and time** of specimen collection, **patient name**, address, **date of birth (or other approved secondary identifier** [see page VI.11]), and any other pertinent information (e.g., diagnosis or symptoms).

Complete Section 3, "Specimen Source or Type," by checking the appropriate box or boxes.

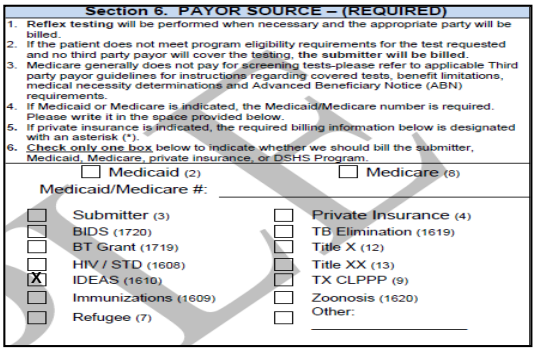
Complete Section 4, "Virology," by selecting the box marked "Influenza surveillance {Influenza real-time RT-PCR}". Indicate patient's flu vaccination status for the current season and date of vaccination, if known. If applicable, indicate patient travel history. If applicable, in the blank space write "Animal contact" and the type of animal with which the patient had contact.





When submitting priority specimens, indicate reason for submission in blank space to the right of the Influenza Surveillance information in Section 4 (e.g., "pediatric flu death", "severe illness", "travel to China", etc.).

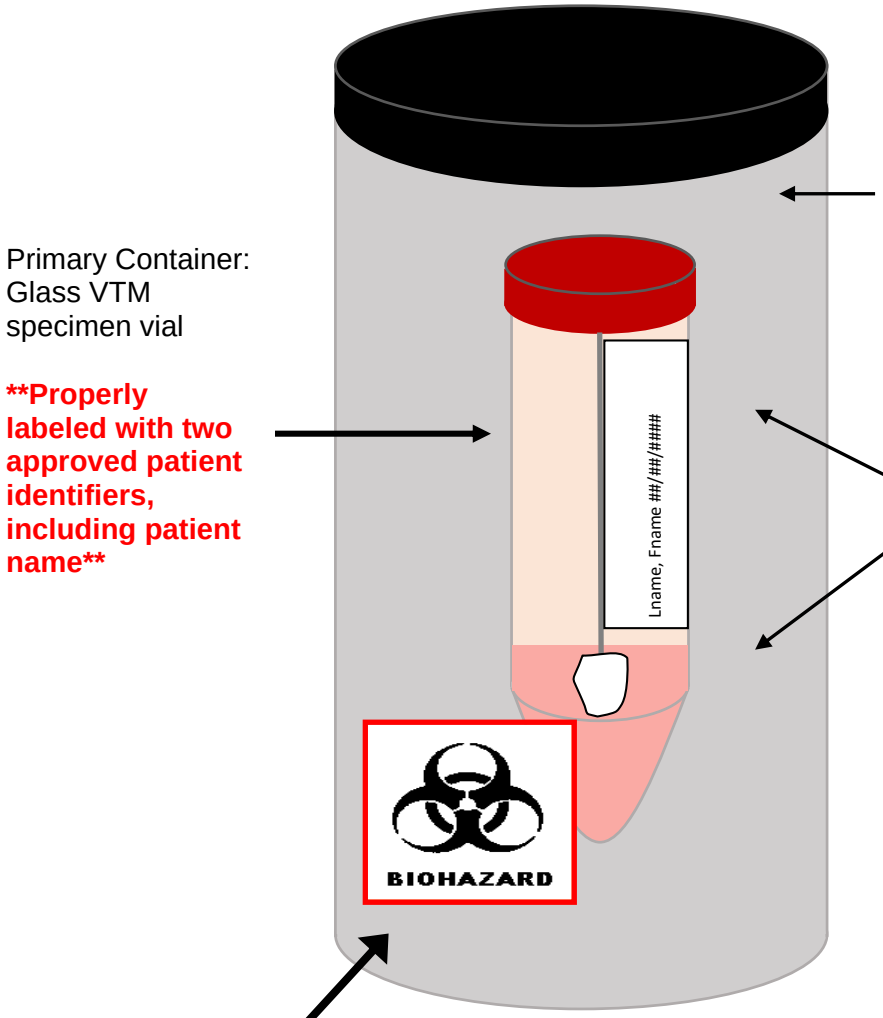
Complete Section 6, "Payor Source," by selecting the box marked "IDEAS". **The submitter will be billed if the box is**



Packaging Diagram 1

Packaging and Labeling of Biological Substances, Category B

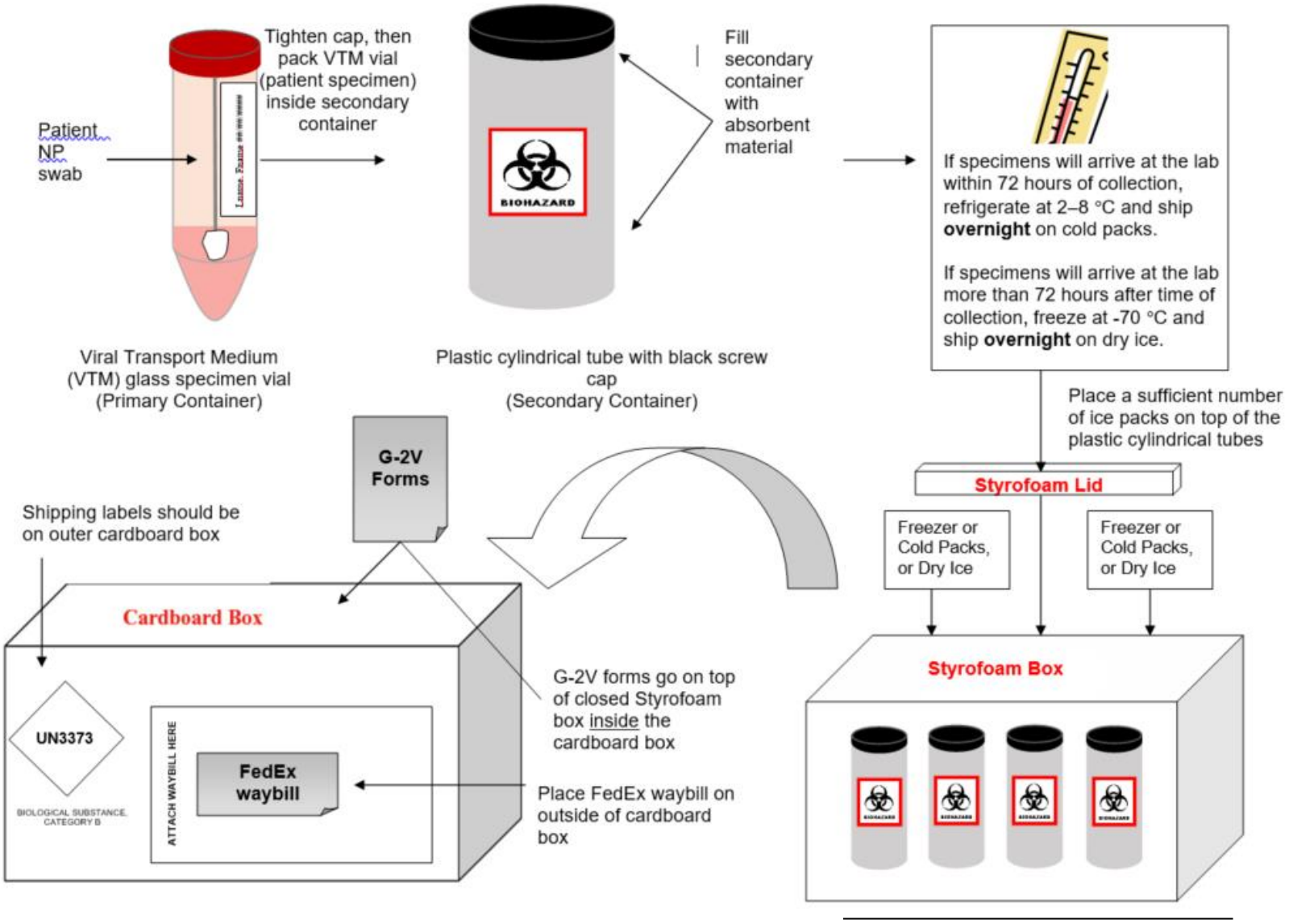
Do not put any patient information on outer or secondary containers or lids



Biohazard Label should already be on outside of secondary container

DO NOT put biohazard label on outer container

Packaging Diagram 2



VTM Order Form Example

Information for site that will receive the VTM							Information on person ordering VTM (if different from person receiving VTM)			VTM Order--Initial Shipment			
Facility/Culture Surveillance Site Name	Shipping Address	City	Zip	Name of person receiving order	Phone number of person receiving order	E-mail for Person receiving order	Name of person placing order	Phone Number of person placing order	E-mail of person placing order	Number of VTM tubes requested	If this order is for multiple sites, how many sites?	Large or small volume site? (small is <8 specimens submitted to lab weekly; large is >8 specimens	Number of specimen shipping boxes (aka cold boxes) requested
Health Clinic A	111 Any Street	Austin	78758	Mary Smith	512-299-1111	mary.smith@healthclinic.com	Jake Doe	512-678-9999	jake.doe@dshs.state.tx.us	20	n/a	small	2

Section VII: Influenza Outbreaks

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Outbreaks Overview

Respiratory illness clusters are challenging to investigate because infectious respiratory diseases are sometimes difficult to distinguish from non-infectious causes of respiratory symptoms. Local testing capacity is also limited for many respiratory pathogens. Another challenge is just deciding what is and is not an outbreak. It is important to determine if the reported number of cases is greater than the expected number of cases for a location for a particular time of year. An investigator must also determine if cases are related (by contact, relationship, physical location or pathogen) to each other. Some outbreaks require more investigative work than others depending on how many people are or could be impacted, the health status of the potentially exposed population, the severity of the illness, how widespread the outbreak is or how quickly the outbreak is spreading. At a minimum, all reported outbreaks should be documented and basic control measures should be provided or reviewed. See page VII.3 for indicators of when more intensive investigations should be performed.

Every epidemiologist develops his or her own style of investigating outbreaks. Experience is crucial to honing good investigative intuition. This section is meant to help new outbreak investigators get started as well as to serve as a basic reference for more experienced investigators.

Why Conduct an Outbreak Investigation? (*1*)

1. To determine the likely sources of exposure and mechanisms of transmission in order to eliminate them and prevent new exposures

2. To determine risk factors for illness in order to mitigate those risks in the specific setting/location

3. To identify the cause of the outbreak to help guide treatment and care for the remaining cases that have not fully recovered

4. To document what occurred before and during the outbreak to decrease the time it takes to control or to prevent future outbreaks

Which Outbreaks Should Be Investigated? (*2*)

According to the Centers for Disease Control and Prevention (CDC) website, when deciding how to respond to a respiratory disease outbreak, public health agencies must take into consideration many factors such as the availability of resources and competing agency priorities. While each agency needs to determine the level of public health response appropriate for each outbreak, several characteristics of respiratory outbreaks typically warrant further investigation of the outbreak and an urgent response. The characteristics below should not be viewed as a comprehensive or definitive list, but should serve as a general guide to determine which outbreaks merit further investigation.

- Outbreaks of unknown etiology
- Outbreaks associated with severe disease outcomes, such as death or hospitalization
- Outbreaks for which identification of the causative agent or potential dual infections is needed, determined *a priori*
- Outbreaks which may be useful to answer epidemiologic, laboratory or infection control questions
- Outbreaks of possible vaccine-preventable diseases
- Outbreaks associated with institutional settings or with a likely (controllable) environmental source
- Clusters of respiratory infection potentially caused by a bioterrorism agent
- Outbreaks among a vulnerable population
- Outbreaks which have generated excessive public anxiety
- Outbreaks which are either very large or rapidly progressing

The list above, which is taken directly from the CDC website, can be used for any infectious respiratory disease outbreak. In addition to the above list, DSHS has defined what respiratory clusters and outbreaks health departments should investigate and those outbreaks for which summary reports are requested. See page VII.4 for operational definitions on outbreaks requiring summary reports.

What is an Outbreak?

An outbreak is a localized increase in a disease, symptom or syndrome that clearly exceeds the expected level. For rare diseases (e.g., measles, anthrax), a single case may be considered an outbreak. Several public health, medical and regulatory agencies and organizations provide definitions of what constitutes an outbreak.

The Centers for Medicaid and Medicare Services (CMS) defines an outbreak in healthcare facilities as "the occurrence of more cases of a particular infection than is normally expected, the occurrence of an unusual organism, or the occurrence of unusual antibiotic resistance patterns." CMS further elaborates on what constitutes an outbreak by describing the following scenarios as outbreak indicators (*3*):

- one case of an infection that is highly communicable
- trends that are 10 percent higher than the historical rate of infection for the facility that may reflect an outbreak or seasonal variation and therefore warrant further investigation
- occurrence of three or more cases of the same infection over a specified length of time on the same unit or other defined area

The American Medical Directors Association expands on the three or more cases indicator by specifying that three or more cases must occur within the same 24 hour period (*4*).

Some states, like Arizona, utilize some of CDC's former definitions for respiratory outbreaks. Arizona guidance defines an acute febrile respiratory illness (AFRI) or influenza-like illness (ILI) outbreak differently in different settings (*5*):

- Hospitals or medical facilities: An outbreak of AFRI or ILI in an acute-care hospital is one or more *health care facility-associated* case(s) of confirmed influenza in patient(s), OR three or more *health care facility-associated* cases of AFRI or ILI among health care workers and patients of a facility on the same unit within 72 hours.
- Assisted living facility: An outbreak of AFRI or ILI in an assisted living home (10 or fewer residents) is three or more cases occurring within 72 hours, OR a sudden increase of cases over the normal background rate. In assisted living centers (11 or more residents), an outbreak is three or more cases of AFRI or ILI occurring within 72 hours in residents who are in close proximity to each other (e.g., in the same area of the facility), OR a sudden increase of cases over the normal background rate. **One case of confirmed influenza by any testing method along with other cases of respiratory infection in an assisted living facility resident is also an outbreak**.
- Long-term care facility (LTCF): An outbreak of AFRI or ILI in a long-term care facility is three or more cases occurring within 72 hours in residents who are in close proximity to each other (e.g., in the same area of the facility), OR a sudden increase of cases over the normal background rate. **One case of confirmed influenza by any testing method along with other cases of respiratory infection in a long-term care facility resident is also an outbreak**.

The latter part of Arizona's outbreak definition for assisted living facilities and LTCFs is the same as CDC's current outbreak definition for long-term care facilities (*6*).

The Infectious Diseases Society of America recommends facilities implement facility wide influenza outbreak control measures when two or more people have ILI and one person tests positive for influenza (*7*).

All medical or long-term care facilities should be aware of definitions used by their regulatory agencies and adhere to those standards for notifying their regulators. Schools should also be aware of reporting requirements as established by the Texas Education Association. Any suspected outbreak reported to a regulatory agency should also be reported to the local health department. Any facility or entity with a concern about increases of specific infectious disease occurrences should contact their local or regional health department.

Health departments in Texas can use the following operational definitions for deciding which cluster or outbreak investigations should have a completed Respiratory Disease Outbreak Summary Form faxed to DSHS:

In hospital or clinic settings:

- A sudden increase of cases over the normal background rate
- Three or more healthcare-associated infections of AFRI or ILI among patients or healthcare workers on the same unit within 72 hours
- One or more healthcare-associated infections of confirmed influenza

In long-term care settings:

- A sudden increase of cases over the normal background rate
- Three or more cases of AFRI or ILI among residents or healthcare workers who are in close proximity with each other (e.g., same area of the facility) within 72 hours
- Two or more cases of AFRI or ILI among residents when there is at least one confirmed influenza case in the facility

In school or child care settings:

- A sudden increase of cases or absenteeism over the normal background rate
- Five or more cases of AFRI or ILI in one week among students or staff in an epidemiologically linked group (e.g., single class, sports team or after school group)

In other settings:

- A sudden increase of cases over the normal background rate
- Five or more cases of AFRI or ILI within one week in people in the same area of the building or work group

Selected terms in the operational outbreak definitions:

- Healthcare-associated infection (HAI) of influenza: Onset of new respiratory symptoms and positive influenza test was > 3 days after admission to hospital
- Acute febrile respiratory illness (AFRI): An illness characterized with onset in the past 4 days of fever and at least one of the following: cough, sore throat, rhinorrhea or nasal congestion
- Influenza-like illness (ILI): An illness characterized with a fever greater than or equal to 100˚F plus a cough and/or a sore throat in the absence of a known cause other than influenza

Outline of an Outbreak Response

No two outbreak investigations are the same. The course of the outbreak investigation depends on multiple factors including the pathogen, the setting of the outbreak, the number of people involved, the demographics of the people involved, the geographic spread and the severity of the illness. Interest in the outbreak by the facilities involved, the health departments involved, the media and community leaders also influences outbreak investigations. Outbreak investigators must be flexible and able to expand or limit the investigation as needed based on the information that is learned over the course of the investigation. The following outline describes some of the key processes and decisions that occur in outbreak investigations.

1. Receive Initial Report
   - Collect basic information on the situation being reported. See page VII.8.
   - Provide basic respiratory control measures and/or review control measures the entity has already implemented. See page VII.21.

2. Assess Situation
   - Determine if the situation requires additional follow-up.
     - Affirmative answers to the following questions indicate additional follow-up is warranted:
       - Is the outbreak ongoing?
       - Will health department involvement help stop the outbreak?
       - Will health department involvement help the facility to prevent future outbreaks?
       - See pages VII.3 and 4 for additional outbreak characteristics meriting further investigation.
     - Consult with fellow epidemiologists and supervisor if uncertain.
   - Determine who will fill the lead investigator role.

3. Conduct Outbreak Investigation
   - Notify appropriate partners of the outbreak investigation initiation.
     - Include background on the outbreak and expectations for assistance that may be requested.
       - Alert internal chain of command and public affairs.
       - Alert appropriate DSHS regional office(s).
   - Develop and maintain case definitions, a line list and an epidemic curve (epi curve). See pages VII.10 - VII.19.
   - Confirm the existence of an outbreak through historical review of similar cases, case investigation and laboratory testing. See page VII.20.
   - Review and/or recommend diagnostic testing; assist with coordination of specimen collection or submission as necessary. See page VII.20.
     - Arrange for 5 to 10 specimens to be tested for influenza even if rapid influenza testing has already been done.
   - Identify risk factors using appropriate epidemiologic tools and investigation/study designs:
     - Review case medical records

  - Interview cases and (potentially) controls
  - Map locations of cases in the facility/community
  - Observe or review infection control practices
- Implement and adapt control measures as necessary. See page VII.21.

4. Expand Investigation (as needed)
   - Consider utilizing an incident command system (ICS) structure to ensure that the roles of individuals and assisting agencies are clearly defined.
   - Surge internally as needed
     - Identify staff who can assist with data entry, interviewing and other tasks as necessary.
   - Surge externally as needed
     - Activate MOUs/MOAs with other health departments.
     - Utilize volunteers and/or student groups.
     - Request assistance from DSHS regional office
       - DSHS epidemiologists can act as subject matter experts for consultation with investigation plans and operations.
       - DSHS epidemiologists can also provide surge capacity for investigation operations.
       - DSHS can provide logistical support for laboratory testing, control measure recommendations and acquisition and distribution of chemoprophylaxis and vaccines.
       - DSHS regional epidemiologists can request assistance from DSHS EAIDB epidemiologists.
     - CDC Epi-Aid teams are valuable resources for conducting in-depth studies associated with the investigation. CDC Epi-Aid teams can only be requested by the state epidemiologist. Contact DSHS EAIDB to start the CDC Epi-Aid request process.
   - Note for cross-jurisdictional investigations:
     - DSHS regional epidemiologist should facilitate the coordination of investigations involving multiple counties within a single region.
     - DSHS EAIDB epidemiologists should facilitate the coordination of investigations crossing multiple regions or states.

5. Communicate Findings and Document Investigation
   - Share findings and final recommendations in writing with the facility.
   - Provide a final update to internal and external partners.
   - Draft a written report summarizing the investigation.
     - Consider sharing the experience with the public health community through presentations at conferences, publishing in public health newsletters, publishing in peer reviewed journals and/or Epi-X reports.
   - Conduct an after action report on the investigation and use the results to improve future investigation responses.
   - Submit the outbreak summary report to DSHS. A Respiratory Disease Outbreak Summary Form is available on the DSHS website.

Basic Information to Collect

When a call is received regarding a potential outbreak, it is important to collect as much information as possible. The information collected during the initial report will help describe the situation and determine what resources are needed to respond. The following list has basic information that should be collected for any outbreak.

On the reporter

- Name of caller
- Caller's title/position
- Caller's phone number

On the setting/facility

- Type of cluster/outbreak setting (e.g., private party/celebration/event, nursing home, jail)
- If applicable, date of event
- Name of setting
- Address of setting
- Setting/facility contact person
- Phone number of setting/facility contact person
- Total number of people in the setting
- If applicable, total number of staff

On potential cases

- Number of people ill
- If applicable, number of staff ill
- Description of symptoms seen
- Number of people hospitalized
- Number of people deceased
- Date of first onset of illness
- Date of most recent onset of illness
- What medical evaluation has been done?
- What diagnostic testing has been performed? Results?

On control measures

- What control measures have already been implemented?
- Have efforts been made to separate people who are ill from those who are not?

Additional information to consider requesting

- For private events/parties/celebrations
    - Name and contact information of attendees
- For facilities
    - Line list of cases to include names, onset dates, symptoms, room number(s) and any other information you feel may help determine risk
    - Map of the facility
    - Calendar of events

Example data from two different outbreak settings:

Question	Wedding Scenario	Nursing Home Scenario
Name of caller:	Mrs. Smith	Mrs. Jackson
Caller's title/position:	Mother of the Bride	Guardian of a resident
Caller's phone number:	512-458-1234	512-458-5678
Type of cluster/outbreak setting (private party/celebration/event, nursing home, jail, etc.):	Private celebration - wedding	Nursing home
If applicable, date of event:	01/01/10	n/a
Name of setting:	Mrs. Smith's House	Long Life Nursing Home
Address of setting:	123 Somestreet, Austin, TX	123 Anotherstreet, Austin, TX
Setting/facility contact person:	Bride is Mrs. Taylor	Mr. Davids – Director
Phone number of setting/facility contact person:	Same as caller	512-458-1289
Total number of people in the setting:	100	100
If applicable, total number of staff:	n/a	20
Number of people ill:	Maybe 30	30
If applicable, number of staff ill:	n/a	1
Description of symptoms seen:	Sore throat, fever	Sore throat, fever, some pneumonia
Number of people hospitalized:	0	3
Number of people deceased:	0	0
Date of first onset of illness:	01/02/10	02/13/10
Date of most recent onset of illness:	01/05/10	02/25/10
What medical evaluation has been done?	Unknown	3 were hospitalized, waiting for diagnosis
What testing has been done? Results?	n/a	Bacterial cultures on 3 hospitalized are pending. 5 people were rapid influenza test negative
What control measures have already been implemented?	n/a	Hand hygiene training. Made hand sanitizer available to most residents
Have efforts been made to separate people who are ill from those who are not?	n/a	Yes
Comments	Guests started calling mother of the bride saying they were ill and wanted to know if others are ill too. Willing to provide guest list to us. No food served.	Caller said everyone ill at nursing home. Spoke with director and got more info. They will send us a line list.

Case Definitions

In order to accurately count how many cases of an illness have occurred, it is necessary to clearly define what constitutes a case. In public health, there are two main uses for case definitions: 1) surveillance of notifiable conditions for reporting purposes and 2) outbreak investigations.

Case definitions are different from a doctor's diagnosis. A diagnosis is a process of determining what is affecting an individual's health status and guides what treatment options will be employed. There is room for some subjective consideration by the individual physician for determining the most likely cause of illness. Case definitions for public health surveillance specify what criteria must be met in order to count a person as a case. Surveillance case definitions are not meant to be diagnostic. Case definitions tend to have strict criteria to ensure that there is less variation in what is counted as a case.

Case definitions have four parts:

- Clinical criteria – symptoms and/or laboratory results
- Person – who can be a case
- Place – the outbreak location, where the person was exposed or where the person resides
- Time – when onset or exposure occurred

Surveillance case definitions for reporting individual cases of a notifiable condition describe clinically compatible symptoms and what laboratory testing is required. The person and place portions are understood as residents of the appropriate health jurisdiction. The time portion is implied to be the current reporting year. Case definitions for notifiable conditions are standardized within each state. Case definitions for notifiable conditions in Texas can be found in the Epi Case Criteria Guide located at http://www.dshs.texas.gov/idcu/ under the disease reporting link. The case definitions used in Texas are based upon but not always identical to the case definitions used by the CDC.

Case definitions for outbreaks are determined by the lead outbreak investigator. If the outbreak crosses multiple health jurisdictions, then all of the involved health jurisdictions should agree upon a case definition. Outbreak case definitions need to be very clear and should explicitly state the person, place and time parts of the case definition. The clinical criteria portion of the case definition may be identical, more restrictive or less restrictive than the clinical criteria in a case definition for a notifiable condition. A clear outbreak definition helps to distinguish between cases associated with the outbreak and coincidental cases that may occur sporadically in the same county/city/community but are unrelated to the outbreak.

What works well for clinical criteria may vary depending on the setting. For example, using 100ºF as an indicator of fever in a nursing home resident may not be a good indicator of fever resulting from an infectious disease process. Frail, elderly individuals often have lower baseline temperatures than healthy, younger individuals. Thus, frail nursing home residents infected with influenza may have a fever (higher than normal temperature) that does not exceed 100 ºF (*8*). Patients of any age with severe neurologic or neurodevelopmental conditions may also only have "subtle deviations from their baseline medical status and be unable to communicate symptoms effectively" (*9*). It may be more reliable to define fever in a nursing home outbreak (or any

setting with frail, elderly or immunocompromised individuals) as a temperature two or more degrees above the patient/resident's baseline temperature.

Example surveillance case definition (from the Epi Case Criteria Guide):

Legionellosis: Legionellosis is associated with two clinically and epidemiologically distinct illnesses: Legionnaires disease, which is characterized by fever, myalgia, cough, clinical or radiological pneumonia, and Pontiac fever, a milder illness without pneumonia.

Confirmed: A clinically compatible case that meets at least one of the confirmatory laboratory criteria

Confirmatory laboratory criteria:

- Isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid, or
- Detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents, or
- Demonstration of seroconversion by a fourfold or greater rise in specific serum antibody titer between paired acute and convalescent phase serum specimens to *Legionella pneumophila*

Example outbreak case definitions:

Case definition in outbreak 1: A resident or employee of nursing home X with onset of diarrhea and nausea (or vomiting) since June 23, 2011.

Case definition in outbreak 2: Confirmed - An employee or inmate at correctional facility Y with onset of fever over 100ºF and cough lasting 3 or more days since November 2009 AND either a chest x-ray positive for pneumonia or a positive PCR test for *C. pneumoniae* infection. Probable - An employee or inmate at correctional facility Y with onset of fever over 100º F and cough lasting 3 or more days since November 2009.

Line Lists

Data from outbreak investigations are usually stored in one or more of three formats: hardcopy, database and line list. Hard copies of medical records, interview forms and investigation notes should be kept in accordance with the health department's record retention policy. Databases are often used to enter and store the extensive data collected from record reviews and interviews. Epi Info is an example of a database that is frequently used in public health to enter, store and analyze outbreak investigation data. A line list is a line by line listing of key information on each case in an outbreak investigation. Line lists can be created using almost any word processor or spreadsheet such as Microsoft Excel.

Basic line lists allow for quick review of key case characteristics. Each line on the list represents one person or case. Some line lists may also include close contacts or controls. The following information is typically captured on a line list:

- Demographics
- Symptoms
- Date of onset
- Hospitalization status
- Outcome (recovered/died)
- Lab test results
- Immunization history
- Travel history
- Epidemiologic links

The exact information collected in a line list depends on the specific illness or setting. For example, symptoms can be expanded or removed to capture the symptoms of interest in the investigation. In a respiratory outbreak investigation, the investigator should capture immunization status for influenza and pneumococcal disease. In a norovirus outbreak investigation, vaccination status for influenza is not relevant and would not be captured in the line list.

Here is an example of a simple line list with case definitions:

Case status*	Case initials	Age	Home zip code	Date of onset	Fever	Headache	Cough	Sore throat	Flu test result	Previously vaccinated	Attended gathering	Notes
C	CM	39	78665	07/01/11	Y	N	Y	Y	PCR +	N	Y	
P	LB	35	78755	07/01/11	Y	N	N	N	Rapid test +	Y	Y	Vaccinated on 06/28/11
C	IB	29	78664	06/29/11	Y	Y	N	Y	Rapid test +	N	Y	Ill at gathering
P	MF	37	78756	07/02/11	Y	Y	Y	N	Not done	N	N	Friend of IB

*All cases must have had onset after 06/28/11 and either attended the gathering or are close contacts of someone who attended the gathering.

C: confirmed case meets ILI definition AND has a positive influenza test (includes rapid test)

P: probable case meets ILI definition but does not have a positive influenza test OR does not meet ILI definition but has a positive rapid test

Template line list for public health department use with an influenza outbreak:

General Patient Information									
Case status	**Case ID**	**First name**	**Last name**	**Age**	**Sex**	**Race**	**Ethnicity**	**City of residence**	**Affiliation**
Confirmed	*123*	*Example*	*Example*	*71*	*M*	*W*	*H*	*Austin*	*Resident*
Probable	*456*	*Example*	*Example*	*45*	*F*	*B*	*NH*	*Hutto*	*Staff*
Not a Case	*789*	*Example*	*Example*	*62*	*M*	*A*	*NH*	*Austin*	*Resident*

Medical Information								
Date of onset of flu symptoms	**Cough**	**Sore throat**	**Fever**	**SOB**	**Date symptoms resolved**	**Underlying conditions**	**Hospitalized**	**Died**
2/4/2011	*Yes*	*Yes*	*Yes*	*Yes*	*2/7/2011*	*Heart Disease*	*Yes*	*No*
2/6/2011	*No*	*Yes*	*Yes*	*No*	*2/9/2011*	*Asthma*	*No*	*No*
2/1/2011	*Yes*	*No*	*No*	*No*	*2/2/2011*	*None*	*No*	*No*

Flu Test			Flu Treatment/Prophylaxis		
Flu test	**Flu test result**	**Flu test collection date**	**Date antivirals given**	**Date antivirals ended**	**Name of antiviral given**
PCR	*H3N2*	*2/5/2011*	*2/5/2011*	*2/7/2011*	*Tamiflu*
Rapid Test	*Flu A*	*2/6/2011*	*n/a*	*n/a*	*n/a*
Not Done	*Negative*	*2/1/2011*	*n/a*	*n/a*	*n/a*

Vaccination			Other
Vaccinated for flu this season	**Date of most recent flu vaccination**	**Date of pneumococcal vaccination**	**Notes**
No	*Unknown*	*10/15/2011*	*index case*
Unknown	*Unknown*	*Unknown*	
Yes	*10/15/2010*	*n/a*	*1 day of cough, no other symptoms, tested negative*

In addition to helping public health departments describe outbreaks, line lists can also be used by infection preventionists to monitor outcomes of cases and contacts of cases within a facility. The line lists used by infection preventionists will likely include more information than needed by the health department. It may also be necessary for the infection preventionist to maintain separate lists on patients or residents and on staff.

Facility influenza line list template for residents or patients:

General Patient Information								
Case status	**Patient ID**	**First name**	**Last name**	**Date of birth**	**Room #**	**Date Admitted**	**Date assigned to current room**	**Date discharged**
Case	*123*	*Example*	*Example*	*04/04/62*	*4a*	*1/31/2011*	*2/1/2011*	*2/11/2011*
Contact–Minimal	*456*	*Example*	*Example*	*08/08/58*	*5d*	*2/1/2011*	*2/2/2011*	*2/8/2011*
Contact – High	*789*	*Example*	*Example*	*12/12/80*	*4b*	*2/5/2011*	*2/5/2011*	*2/19/2011*

Symptoms						
Date of onset of flu symptoms	**Cough**	**Sore throat**	**Fever**	**SOB**	**Date symptoms resolved**	**Outcome**
2/4/2011	*Yes*	*Yes*	*Yes*	*Yes*	*2/7/2011*	*recovered*
n/a	*No*	*No*	*Yes*	*No*	*n/a*	*n/a*
n/a	*No*	*No*	*No*	*No*	*n/a*	*n/a*

Flu Test			Flu Treatment/Prophylaxis		
Flu test	**Flu test result**	**Flu test collection date**	**Date antivirals given**	**Date antivirals ended**	**Name of antiviral given**
Rapid Test	*Flu A*	*2/5/2011*	*2/5/2011*	*2/7/2011*	*Tamiflu*
PCR	*Negative*	*2/6/2011*	*n/a*	*n/a*	*n/a*
Not Done	*n/a*	*2/6/2011*	*2/5/2011*	*2/7/2011*	*Relenza*

Vaccination			Infection Control		Other
Vaccinated for flu this season	**Date of most recent flu vaccination**	**Date of pneumococcal vaccination**	**Date droplet precautions initiated**	**Other patient specific control measures**	**Notes**
No	*Unknown*	*10/15/2011*	*2/4/2011*	*Visitation restricted*	*1st case*
Unknown	*Unknown*	*Unknown*	*n/a*	*Hand hygiene sign on door*	*Fever associated with septicemia infection*
Yes	*2/5/2011*	*2/5/2011*	*n/a*	*Hand hygiene sign on door*	*Spent several hours visiting patient 123*

Facility influenza line list template for staff:

	General Information					
Status	**First name**	**Last name**	**Date of birth**	**Station number**	**Shift**	**Worked in room with flu case**
Contact - Minimal	*Example*	*Example*	*10/10/1975*	*1*	*A*	*No*
Contact - Minimal	*Example*	*Example*	*01/01/1965*	*2*	*A*	*Yes*
Contact - High	*Example*	*Example*	*05/05/1970*	*1*	*B*	*Yes*

Symptoms						
Date of onset of flu symptoms	**Cough**	**Sore throat**	**Fever**	**SOB**	**Date last worked before onset of flu symptoms**	**Date symptoms resolved**
n/a	*No*	*No*	*No*	*No*	*No*	*n/a*
n/a	*No*	*No*	*No*	*No*	*No*	*n/a*
n/a	*Yes*	*No*	*No*	*No*	*No*	*n/a*

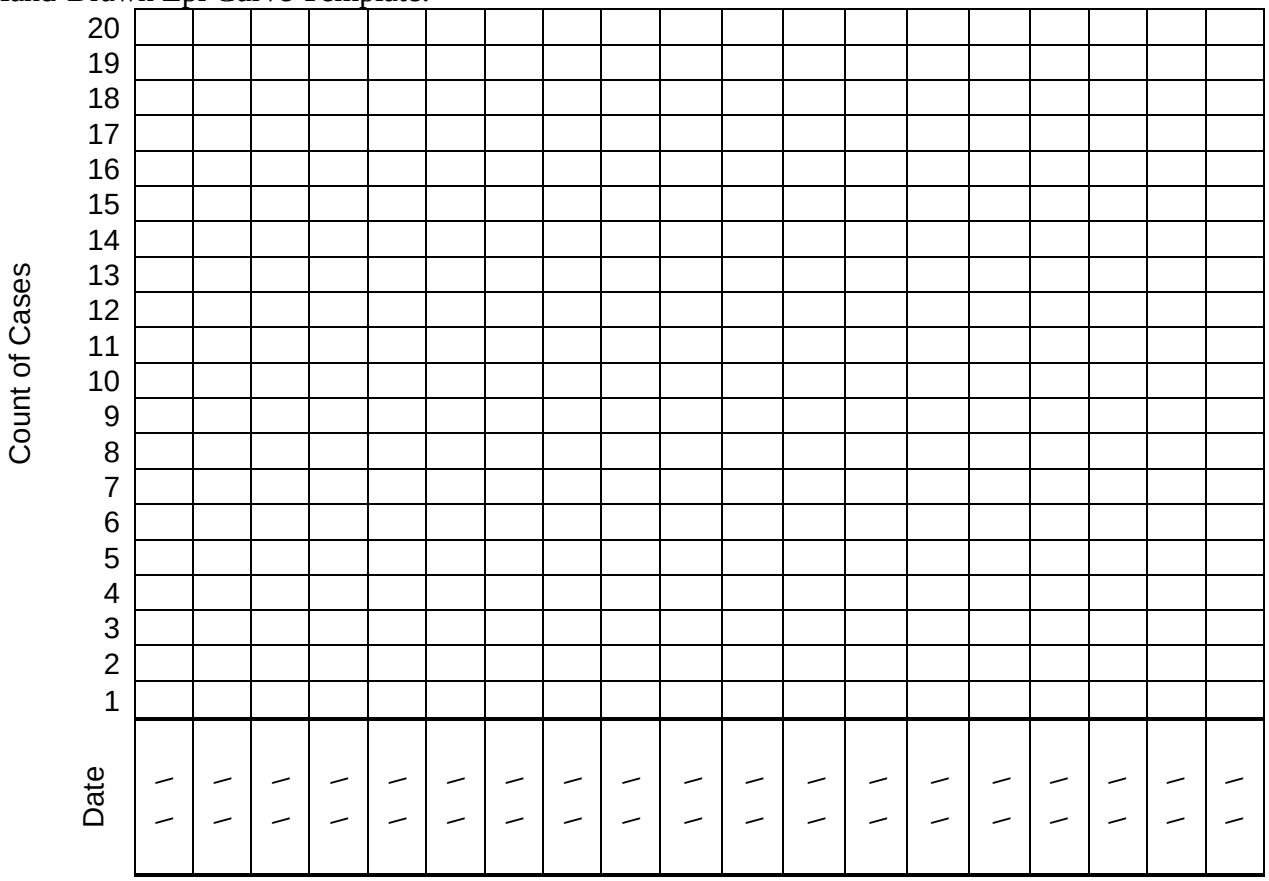
Flu Test			Flu Treatment/Prophylaxis		
Flu test	**Flu test result**	**Flu test collection date**	**Date antivirals given**	**Date antivirals ended**	**Name of antiviral given**
Not Done	*n/a*	*n/a*	*2/5/2011*	*2/7/2011*	*Tamiflu*
Not Done	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
PCR	*Negative*	*2/6/2011*	*n/a*	*n/a*	*n/a*

Vaccination		Other
Vaccinated for flu this season	**Date of most recent flu vaccination**	**Notes**
No	*n/a*	*Contraindication for flu vaccine*
Yes	*10/14/2010*	*Called in sick for 2 days for non-respiratory illness*
Yes	*10/19/2010*	*Cough associated with allergen*

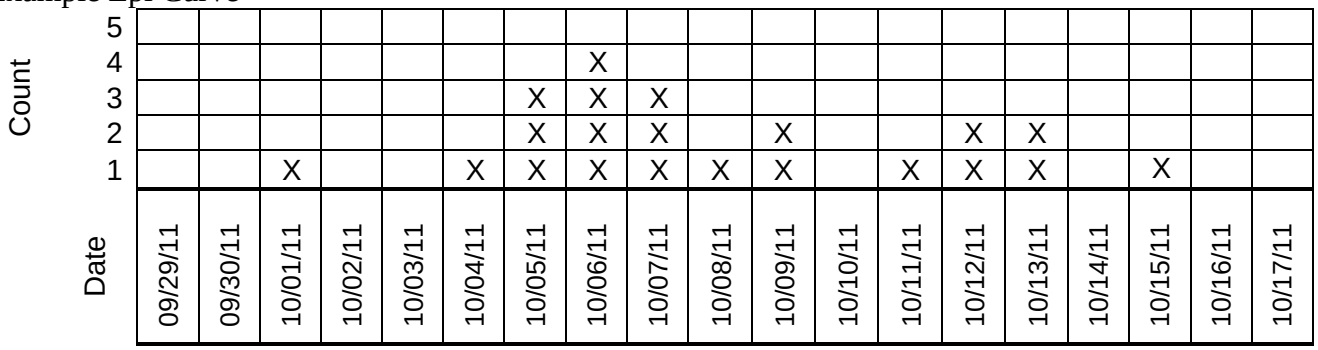
Epi Curves

An epidemic curve or epi curve is a graphical representation of the number of cases occurring over time. Epi curves are typically histograms. The y-axis is the number of cases and the x-axis is a specific time interval that depicts when onset occurred. The time interval of onset may be in minutes, hours, days or even weeks depending on the pathogen. Day representing date of onset is the most commonly used time interval. Epi curves facilitate visualization of the start, magnitude, duration and end of the outbreak. Epi curves can also help determine whether the exposure was a one-time exposure or is ongoing. Epi curves can be hand-drawn or created in a program like Microsoft Excel.

Hand-Drawn Epi Curve Template:



Example Epi Curve



Instructions for creating a basic epi curve using Microsoft Excel 2010

1. Start with a line list in an Excel workbook

- Each row should represent one case
- There needs to be a column for date of onset

Note: If you created the line list in another program (Access, Epi Info, etc.), you can usually export it to Excel or a CSV file which Excel can read

2. Create a pivot table

- Click on any cell with data in it.
- From the menu at the top of the screen go to 'Insert' then find the button for 'PivotTable'. Using the down arrow under this button, select PivotChart
- The Create PivotTable box will open
    - Under 'Choose the data that you want to analyze', select your data source if it is not already selected
    - Under 'Choose where you want the PivotTable report to be placed', select the location (default is New Worksheet, which is recommended)
    - Click 'OK'
- One new sheet will be added to your workbook. The sheet contains the PivotTable and PivotChart shells, and the PivotTable field list.
- In the PivotTable Field List, drag the variable name for the column with date of onset to the area that says 'Row Labels' (if PivotTable is selected) or 'Axis Fields (Categories)' (if PivotChart is selected).
- The x-axis should now display all of the dates of onset.
- Drag the variable name for the column with the person's name (or any other variable that is a text only field and is entered for all cases) to the area that says 'Σ Values'.

3. Turn the chart into an epi curve

- The pivot chart should have defaulted to a column chart. If it did not, then you will need to right-click on the white area around the chart and select 'Change Chart Type'. Select 'column' as the chart type.
- An epi curve is actually a histogram, not a column chart. A histogram should not have any spaces between the columns. To remove the spaces, right-click on any of the columns. In the Format Data Series box, make sure you are on the tab labeled 'Series Options'. Under Gap Width, change the gap width to 0.

4. Improve the appearance of the epi curve

- Remove the legend: Make sure you have clicked on the PivotChart to select it. In the menu bar at the top of the screen, under PivotChart Tools, select the 'Layout' tab, then the 'Legend' tab, and then 'None'.
- Change the title: The title defaults to total. Double-click on the word 'total'. The word 'total' will be highlighted. Type in your new title for the epi curve.

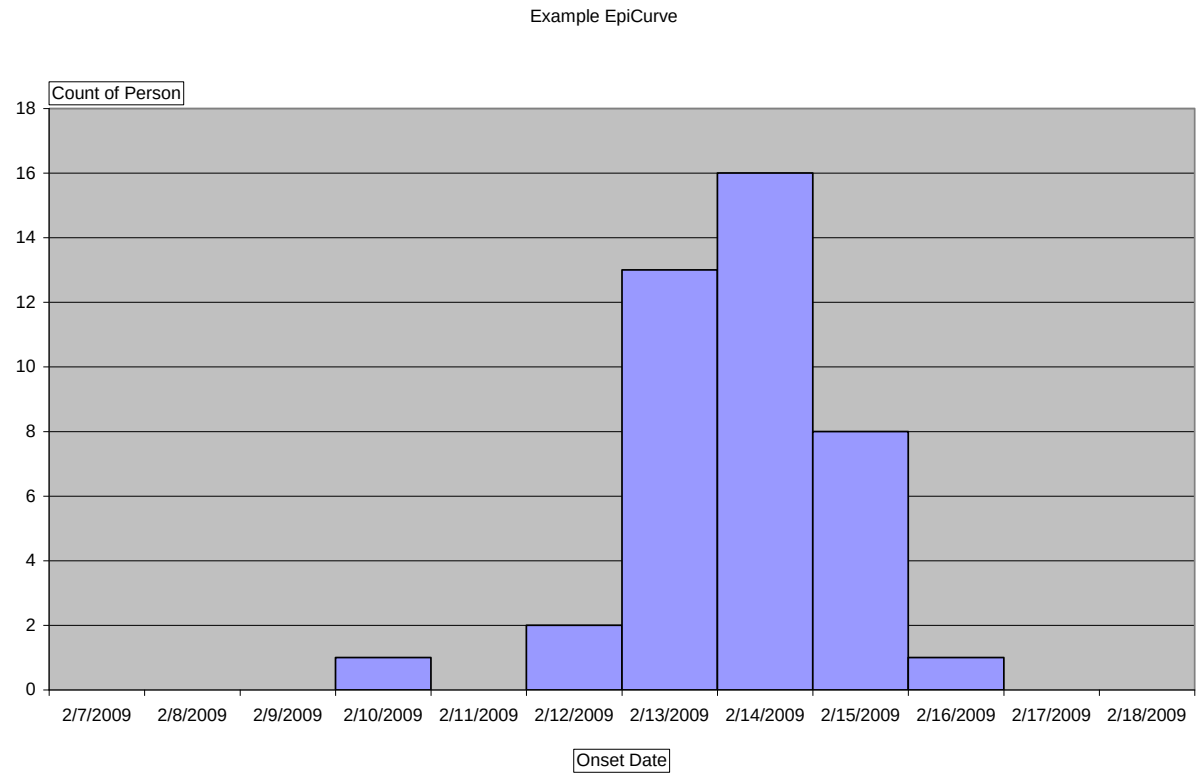
- You now have a basic epi curve that you can print out or copy and paste into a Word document.

5. What to do when the date range in the x-axis does not include every date in the time frame

Before you start creating the epi curve, check to see what onset dates you have. Look at the range from the first onset date to the last onset date. Are there any dates between the first onset and the last onset where no one had an onset? If yes, then you will need to add an extra row to your line list for each missing date. The only data that should be entered on the row is the date of onset. Do not enter any other information. Now when you create the epi curve, the x-axis will have a label for every date in your date range and it will show 0 cases for the dates you inserted.

This same technique can be used to add dates before or after the dates you have cases. Adding the extra days before or after also makes your epi curve more attractive and demonstrates a baseline of cases before or after the outbreak.

This is what your epi curve should look like:



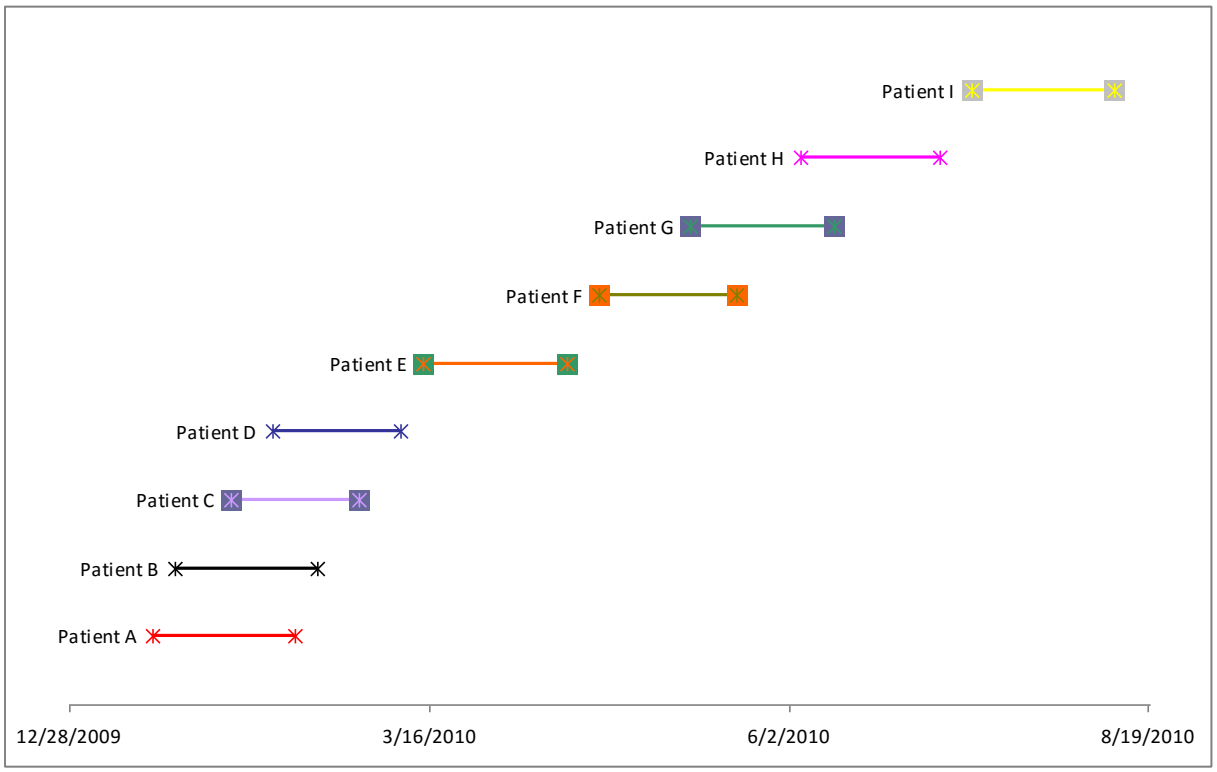
6. Need to stratify the data?

Pick the variable by which you want to stratify your data. For example, you may want to show if the cases were male/female, residents/staff, or primary/secondary cases.

In the PivotTable Field List, drag the variable name that you want to stratify by to the area that says 'Column Labels' (if PivotTable is selected) or 'Legend Fields (Series)' (if PivotChart is selected). If the new variable causes the bars to display beside instead of on top of each other, you will need to change the chart type to a Stacked Column (see #3 above to change the chart type).

Other outbreak graphs

Once you have mastered creating epi curves, you can explore other graphical methods of visually displaying your data. The graph below was created by Kelly Johnson, an epidemiologist with Harris County Public Health and Environmental Services. It shows both date of onset and incubation period for each case.



Case Confirmation

One of the essential steps in an outbreak investigation is to confirm the existence of an outbreak. Do all of the initially reported "cases" actually have the same illness? The first thing to do is to review the symptoms of the initial "cases" to see if they have similar patterns of illness suggesting a common cause. Once the key symptoms have been identified, a case definition can be created to guide what will be considered a case. See page VII.10 for information on creating a case definition. The clinical picture of the cases can also be used to help narrow down what etiologic agent may be causing the outbreak. The CDC has a spreadsheet showing basic risk factors for and clinical characteristics of many common respiratory pathogens. The spreadsheet can be found at http://www.cdc.gov/urdo/differential.html.

Laboratory testing can be performed to identify the actual pathogen. In an outbreak in a facility, the facility can use its usual laboratory for the majority of testing and should do so for any clinical testing. The DSHS laboratory can provide support by helping with the preliminary identification of the pathogen and, for some pathogens, performing advanced testing such as serotyping, antimicrobial resistance testing or pulsed-field gel electrophoresis (PFGE). It is important to notify the DSHS Emerging and Acute Infectious Disease Branch (EAIDB) when collecting specimens for an outbreak investigation. The EAIDB works with the DSHS laboratory to approve specimen testing in outbreaks.

In most outbreaks, every case does not need to be tested by the DSHS laboratory. Ideally between 5 and 10 specimens should be collected when the outbreak is first detected to identify what pathogen is responsible. If the outbreak is ongoing, consult with EAIDB to determine if and how many specimens should be collected from future cases for testing by DSHS.

In order to decide from which cases to collect specimens, look for patients with the most recent dates of onset (preferably within the last two days) who are unrelated and (when possible) who have not started antimicrobial (antibiotic/antiviral) treatment yet. Please do not delay treatment for cases while waiting for testing supplies or test results.

All specimens submitted to the DSHS laboratory must follow the guidelines from the DSHS laboratory Manual of Reference Services found at http://www.dshs.texas.gov/lab/default.shtm.

Each specimen must be accompanied by the appropriate laboratory submission form: G-2V for viral testing and G-2B for bacterial or fungal testing. The specimen must be clearly labeled with the patient's first name, last name and date of birth. The information on the specimen needs to match the information on the laboratory submission form.

Nasopharyngeal (NP) swabs are the preferred specimen source for identifying viral respiratory pathogens. Instructions for collecting an NP swab can be found in the appendix of this handbook. For guidance on acceptable specimens for identifying bacterial pathogens, review the DSHS laboratory guidance at http://www.dshs.texas.gov/lab/mic-cb_tests.shtm.

Basic Control Measures for Influenza

General recommendations for the public

- Get vaccinated for influenza every year. Influenza vaccination is recommended for everyone six months of age or older.
- Wash hands frequently with soap and water, especially after coughing or sneezing.
- Use alcohol-based hand sanitizers when facilities are not available for hand washing.
- Cover coughs and sneezes with a disposable tissue or your arm/sleeve.
- Avoid touching your eyes, nose or mouth.
- Avoid close contact with people who are sick.
- When you are sick, limit contact with others and stay home until you are fever-free for 24 hours without the use of fever-reducing medications.
- Seek medical care immediately if you develop any of the following: difficult or painful breathing, shortness of breath at rest, wheezing, coughing up bloody sputum, pain or pressure in the chest or abdomen, sudden dizziness, extreme drowsiness or difficulty waking, confusion or disorientation, severe earache, severe or persistent vomiting, fever lasting three to four days without improvement, or improvement followed by sudden high fever and return of symptoms.

General recommendations for long-term care facilities (*5,6,10*)

- Provide annual influenza vaccination to all residents who do not have a medical contraindication and do not refuse vaccination. Don't forget to vaccinate new residents who may have arrived after the vaccinations were given to other residents.
- Actively promote annual influenza vaccination of all healthcare personnel, volunteers and other staff.
- When a person is suspected or confirmed to have influenza, implement standard and droplet precautions for seven days after onset or until symptom-free for 24 hours, whichever is longer. Standard and droplet precautions should be continued even if the patient was / is on antiviral therapy.
- Administer influenza antiviral medications for treatment when influenza is detected.
- Implement prevention strategies and educational campaigns, such as respiratory hygiene/cough etiquette programs. Post signs for staff, residents and visitors.
    - Examples at www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm
- Conduct surveillance and influenza testing even outside of influenza season to identify cases.
- Discourage ill staff and volunteers from coming to work until they are fever-free for at least 24 hours without the use of fever-reducing medications.
- Discourage ill family and friends from visiting.
- Ensure that healthcare personnel who are not directly employed by the facility are also aware of the policies.
- When influenza is confirmed in at least one person and at least two people develop symptoms of influenza within a 72-hour period in the facility, consider the following:

  - Conduct active surveillance on a daily basis including influenza testing to detect new cases. Active surveillance should continue for at least one week after the last confirmed influenza case occurred.
  - Offer influenza vaccination to any unvaccinated staff and patients/residents who do not have medical contraindications.
  - All non-ill residents should be given chemoprophylaxis regardless of vaccination status. Unvaccinated staff—including staff that have been recently vaccinated—are also recommended to receive chemoprophylaxis. Chemoprophylaxis should be continued for a minimum of two weeks and should continue 7 to 10 days after the last influenza case is detected. Use clinical judgment to determine if chemoprophylaxis should be continued longer if extended viral shedding is suspected (as may occur with young children or in severely immunocompromised patients).
  - Staff should be monitored for symptoms of illness and treated with antivirals at the first sign of illness. Staff are not recommended for chemoprophylaxis unless they are unvaccinated, they were recently (i.e., within the past two weeks) vaccinated with TIV or the influenza strain detected in the facility does not match the vaccine.
  - Isolate or cohort ill residents/patients.
  - Restrict staff movement between wards/buildings/wings especially between ill and non-ill residents/patients.
  - Screen for and restrict ill visitors and personnel from entering the facility.
  - Assign staff returning to work after illness to work with currently ill patients/residents. This protects well staff from ill patients/residents and ensures that previously ill staff do not infect well patients/residents if they return to work while still infectious.
  - Follow the CDC's Interim Guidance for Influenza Outbreak Management in Long-Term Care Facilities at http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm.
- Additional information on infection control and outbreak response in long term care facilities can be found in the Centers for Medicare State Operations Manual available online at www.cms.gov/manuals/downloads/som107_Appendicestoc.pdf and http://cms.gov/manuals/Downloads/som107ap_pp_guidelines_ltcf.pdf.
- Detailed guidance for healthcare and other settings can also be found on the CDC website at http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm, http://www.cdc.gov/HAI/settings/outpatient/outpatient-settings.html, https://www.cdc.gov/correctionalhealth/rec-guide.html and http://www.cdc.gov/HAI/settings/settings.html.

General recommendations for schools (*11*)

- Encourage annual influenza vaccination for all students and those staff who do not have medical contraindications.
- Suggest early treatment of students and staff at higher risk for influenza complications.
- Facilitate use of respiratory etiquette and hand hygiene by students and staff.

- Ensure that sick students and adults do not come to the facility. According to the Texas Administrative Code Title 25 Part 1 Chapter 97 rule §97.7, any student with a fever is required to be excluded until the fever free for at least 24 hours without the use of fever-suppressing medications.
- Discourage attendance at school events by sick people.
- Identify symptomatic individuals as soon as possible and separate them from asymptomatic individuals.
- Perform routine environmental cleaning.
- During influenza outbreaks or if illness is unusually severe, consider the following:
    - Increase social distancing within the school environment.
    - Advise that students with sick household members stay home.
    - Ensure that symptomatic individuals do not return to school until 24 hours after fever has resolved without the use of fever-reducing medications.
    - Consider selective school dismissal for high risk individuals.
    - Consider school dismissals. The superintendent of independent school districts has the authority to close schools. This decision should be made only after consultation with the local health authority and the local health department.

Use of antivirals for prophylaxis (*5,6,10,12*)
Antiviral chemoprophylaxis should be used for controlling influenza outbreaks in nursing homes and other long-term care facilities that house large numbers of patients at higher risk for influenza complications. Antiviral chemoprophylaxis can also be considered for controlling influenza outbreaks in closed or semi-closed settings (e.g., correctional facilities or other settings in which persons live in close proximity).

Antiviral chemoprophylaxis is not recommended for use in controlling influenza outbreaks in groups of healthy children or adults based on potential exposures in the community, workplace, school or other settings. Instead, early recognition of illness and prompt treatment is recommended.

When antiviral chemoprophylaxis is given to control an outbreak in an institutional setting, it should be given to all non-ill patients/residents regardless of vaccination status. Antiviral chemoprophylaxis is also recommended for unvaccinated health care personnel. For newly-vaccinated staff, antiviral chemoprophylaxis can be administered for up to two weeks (the time needed for antibody development) following influenza vaccination. Chemoprophylaxis may also be considered for all employees, regardless of their influenza vaccination status, if the outbreak is caused by a strain of influenza virus that is not well-matched by the vaccine. Chemoprophylaxis should be continued for a minimum of two weeks and should continue 7 to 10 days after the last influenza case is detected.

Updated antiviral recommendations are available on the CDC website at http://www.cdc.gov/flu/professionals/antivirals/index.htm.

Environmental cleaning information (*11, 13-15*)

According to the CDC, influenza viruses can generally survive on inanimate objects from two to eight hours. Influenza viruses are fragile, so standard cleaning and disinfection are sufficient when done properly.

- Perform routine cleaning of hard surfaces that are frequently touched by using water and soap (or detergent). Common household cleaners that kill germs can also be used. Always follow the label directions on cleaning products. Hard surfaces that are frequently touched may include doorknobs, bedside tables, bathroom sinks, toilets, counters, phones, toys and computer keyboards or mice.
- Wash bed sheets and towels with normal laundry soap and tumble dry on a hot dryer setting. Hold all dirty laundry away from your face and body. Wash your hands right after touching dirty laundry. It is okay to wash a sick person's bedding or clothes with other people's laundry.
- Wash the sick person's eating utensils and dishes with normal dish soap or place them in the dishwasher. It is okay to wash the sick person's eating utensils and dishes with other people's dishes.
- Avoid touching used tissues and other waste when emptying waste baskets. Wash your hands immediately after emptying waste baskets or touching used tissues.

Notes on using these recommendations for non-influenza outbreaks

Influenza is a respiratory illness spread primarily through droplets. The basic control measures described in this section are applicable to most infectious respiratory diseases because the measures target pathogens spread via droplets. Respiratory hygiene, hand hygiene and droplet infection control measures are critical for preventing infectious respiratory disease outbreaks.

For details on prophylaxis, vaccination and other control measures specific to a non-influenza respiratory pathogen refer to the Control of Communicable Diseases Manual, the Red Book and the CDC website.

Resources and Training

Books

- Control of Communicable Diseases Manual (20th Edition). Heymann, D.L. (Ed). American Public Health Association: Washington; 2015.

- Red Book: 2015 Report of the Committee on Infectious Diseases (30th Edition). Kimberlin DW, Brady MT, Jackson MA, Long SS, eds. American Academy of Pediatrics: Elk Grove Village, IL; 2015.

- Pink Book: Epidemiology and Prevention of Vaccine-Preventable Diseases (13th Edition). Hamborsky J, Kroger A, Wolfe S (Eds). Centers for Disease Control and Prevention; 2015. Available online at http://www.cdc.gov/vaccines/pubs/pinkbook/index.html

- Infectious Disease Epidemiology: Theory and Practice (3rd Edition). Nelson, K.E. and Williams, C.M., (Eds). Jones and Bartlett Publishers: Burlington; 2014.

- Field Epidemiology (3rd Edition). Gregg, M. (Ed). Oxford University Press: New York, NY; 2008.

- A Dictionary of Epidemiology (4th Edition). Last, J.M. (Ed). Oxford University Press: New York, NY; 2001.

Websites

DSHS websites

- www.dshs.texas.gov/
- www.texasflu.org
- www.dshs.texas.gov/idcu/investigation/
- www.dshs.texas.gov/idcu/disease/influenza/

CDC websites

- www.cdc.gov
- https://www.cdc.gov/flu/www.cdc.gov/flu/other_flu.htm
- https://www.cdc.gov/urdo/
- www.cdc.gov/mmwr/preview/mmwrhtml/rr5908a1.htm

Other health department websites

- www.azdhs.gov/phs/oids/pdf/manuals/Arizona_Respiratory_Outbreak_Guidelines.pdf
- http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Outbreaks/Pages/respdisease.aspx
- www.health.state.ny.us/diseases/communicable/control/respiratory_disease_checklist.htm

Trainings

North Carolina Center for Public Health Preparedness has a variety of free online trainings including basic epidemiology, outbreak investigations and ICS for public health at https://nciph.sph.unc.edu/tws/index.php.

North Carolina Center for Public Health Preparedness also has a series called Focus on Field Epidemiology. Focus on Field Epidemiology is set up for use as a self-study course and has materials that instructors can use for training. http://sph.unc.edu/nciph/focus/

The Centers for Disease Control and Prevention has a variety of epidemiology training tools at http://www.cdc.gov/AppliedEpiCompetencies/. These trainings include a self-study course called Principles of Epidemiology in Public Health Practice, and case studies (www.cdc.gov/epicasestudies/ and http://www.cdc.gov/eis/casestudies.html).

The Centers for Disease Control and Prevention also has an e-learning center with resources for several public health trainings at www.cdc.gov/learning/.

FEMA has free online trainings for ICS.
http://training.fema.gov/

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3. State Operations Manual. Centers for Medicare and Medicaid Services. Accessed 10 May 2012. Available from http://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/downloads/r55soma.pdf.

4. American Medical Directors Association (AMDA). (2006). Clinical practice guideline; managing common infections in the assisted living setting. Assisted Living Consult, Jan/Feb 2006: Pp.31 Available from http://www.assistedlivingconsult.com/issues/02-01/ALC2-1_AMDA.pdf

5. Guidelines for Investigating Outbreaks of Influenza-like Illness or Respiratory Disease. Arizona Department of Health Services; 2013 [28 Sep 2016]. Available from http://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/outbreak-investigation-guidelines.pdf.

6. Interim Guidance for Influenza Outbreak Management in Long-Term Care Facilities [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 18 Mar 2016 [26 Sep 2017]. Available from http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm

7. Harper SA, Bradley JS, Englund JA, et al. Seasonal Influenza in Adults and Children – Diagnosis, Treatment, Chemoprophylaxis and Institutional Outbreak Management: Clinical Practice Guidelines of the Infectious Disease Society of America. Clinical Infectious Diseases, 2009:48 Available from IDSA https://academic.oup.com/cid/article-lookup/doi/10.1086/598513

8. Norman, DC Fever in the Elderly. Clinical Infectious Diseases. Vol 31 Issue 1 p148-151.2000 http://cid.oxfordjournals.org/content/31/1/148.full

9. Severe Influenza Among Children and Young Adults with Neurologic and Neurodevelopmental Conditions – Ohio 2011. MMWR 6 January 2012; 60(51); 1729-1733. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6051a1.htm?s_cid=mm6051a1_w

10. Influenza Antiviral Medications: Summary for Clinicians [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 26 May 2016 [28 Sep 2016]. Available from http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm.

11. CDC Guidance for State and Local Public Health Officials and School Administrators for School (K-12) Responses to Influenza during the 2009-2010 School Year [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 22 Feb 2010 [28 Sep 2016]. Available from http://www.cdc.gov/h1n1flu/schools/schoolguidance.htm.

12. Updated Interim Recommendations for the Use of Antiviral Medications in the Treatment and Prevention of Influenza for the 2009-2010 Season [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 7 Dec 2009 [04 Oct 2016]. Available from http://www.cdc.gov/H1N1flu/recommendations.htm.

13. How to Clean the Sick Room [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 13 Aug 2010 [04 Oct 2016]. Available from http://www.cdc.gov/h1n1flu/homecare/cleansickroom.htm.

14. How to Clean and Disinfect Schools to Help Slow the Spread of Flu [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 31 Oct 2014 [04 Oct 2016]. Available from http://www.cdc.gov/flu/school/cleaning.htm.

15. Prevent Seasonal Flu [Internet]. Centers for Disease Control and Prevention (CDC), Department of Health and Human Services; 26 Aug 2017 [28 Sep 2016]. Available from https://www.cdc.gov/flu/prevent/index.html .

Section VIII: Glossary and Acronyms

Term	Definition
Acute febrile respiratory illness	An illness characterized with onset in the past 4 days of fever and at least one of the following: cough, sore throat, rhinorrhea or nasal congestion
Acute respiratory illness	An illness characterized with onset in the past 4 days of at least two of the following: fever, cough, sore throat, rhinorrhea or nasal congestion
CLIA-waived	Refers to a test that is exempt or waived from all regulatory procedures; most of these tests are very simple to carry out and use standardized equipment, which reduces the chances of inaccuracy
Cluster	A grouping of a disease, symptom or syndrome in time or geographic area that appears to be greater than expected
Epidemic	An increase in a disease, symptom or syndrome in a community or region that clearly exceeds the expected level
Healthcare-associated infection	Healthcare-associated infections (HAIs) are infections that patients acquire during the course of receiving healthcare treatment for other conditions
Health department	A division of government that is responsible for oversight or care of matters relating to public health
Health jurisdiction	The geographic area or population that a health department serves
ILI provider	A healthcare provider who reports influenza and ILI directly to a local/regional health department; also see ILINet provider
ILI reporter	Anyone who reports influenza or ILI; also see ILI provider
ILINet provider	A healthcare provider who reports ILI through ILINet
Influenza-like illness	An illness characterized with a fever greater than or equal to 100˚F plus a cough and/or a sore throat in the absence of a known cause other than influenza

Term	Definition
Long-term care	Defined by CMS as "a variety of services that help people with health or personal needs and activities of daily living over a period of time. Long-term care can be provided at home, in the community, or in various types of facilities, including nursing homes and assisted living facilities."
MMWR week	Defined by the CDC for data collection and reporting purposes; the reporting week begins on Sunday and ends on the following Saturday. Interchangeable with reporting week
Nosocomial infection	Defined by the Centers for Medicaid as an infection that generally occurs after 72 hours from the time of admission to a healthcare facility; Also called a healthcare-associated or facility-acquired infection.
Novel Influenza	A human case of infection with an influenza A virus subtype or strain that is different from currently circulating human influenza H1 and H3 viruses. May be referred to as variant influenza.
Outbreak	A localized increase in a disease, symptom or syndrome that clearly exceeds the expected level
Pandemic	A worldwide outbreak or an outbreak that crosses international borders and affects an extremely large number of people
Reporting week	Defined for data collection and reporting purposes; the reporting week begins on Sunday and ends on the following Saturday. Interchangeable with MMWR week
Sensitivity	Probability of correctly diagnosing a case: the number of true positives that test positive over all true positives.
Serum, acute	Serum collected when a person is acutely ill; should be collected no later than 3-5 days after illness onset
Serum, convalescent	Serum collected from a person who is recovering from a particular infection; usually collected 2-4 weeks after onset
Specificity	Probability of correctly diagnosing a non-case: The number of true negatives that test negative over all true negatives
Surveillance	Systematic ongoing collection, collation, analysis and interpretation of health related data and the timely dissemination of information to people who can use the information for action

Term	Definition
Syndrome	A set of clinically recognizable symptoms that tend to occur with specific diseases or types of diseases
Syndromic surveillance	Surveillance of specific syndromes usually done through an automated, electronic system

Acronym or Abbreviation	Meaning
AAP	American Academy of Pediatrics
AAR	After action report
ACIP	Advisory Committee on Immunizations Practices
AFRI	Acute febrile respiratory illness
ALF	Assisted living facility
APC	Advanced Practice Center
APIC	Association for Professionals in Infection Control and Epidemiology
ARI	Acute respiratory illness
ASAP	As soon as possible
AVR	Antiviral resistant
BAL	Bronchoalveolar lavage
BIDS	Border Infectious Disease Surveillance
BISN	Border Influenza Surveillance Network
BMI	Body mass index
BRFSS	Behavioral Risk Factor Surveillance System
BSL	Biosafety Level
BT	Bioterrorism
CASPER	Community Assessment for Public Health Emergency Response
ccIIV	Cell culture-based inactivated influenza vaccine
CDC	Centers for Disease Control and Prevention
CHS	Center for Health Statistics
CIDRAP	Center for Infectious Disease Research and Policy (University of Minnesota)
CLIA	Clinical Laboratory Improvement Amendments
CMS	Centers for Medicaid and Medicare Services
CO	(DSHS) central office
COB	Close of business
CSTE	Council of State and Territorial Epidemiologists
CSV	Comma-separated values
DFA	Direct fluorescent antibody test
DISTRIBUTE	Distributed Surveillance Taskforce for Real-time Influenza Burden Tracking and Evaluation – no longer an active system
DOB	Date of birth
DOD	Date of death
DSHS	(Texas) Department of State Health Services
EAIDB	(DSHS) Emerging and Acute Infectious Disease Branch
ED	Emergency department

Acronym or Abbreviation	Meaning
EIA	Enzyme immunoassay (interchangeable with ELISA)
EIP	Emerging Infections Program
ELC	Epidemiology & Laboratory Capacity
ELISA	Enzyme-linked immunosorbent assay (interchangeable with EIA)
EMS	Emergency medical services
ER	Emergency room
ERT	(DSHS) Epidemiology Response Team
ESSENCE	Electronic Surveillance System for the Early Notification of Community-based Epidemics
EWIDS	Early Warning Infectious Disease Surveillance
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FTM	Flu transport medium
GISN	(WHO) Global Influenza Surveillance Network
HAI	Healthcare-associated infection
HCP	Healthcare provider/professional
HD	Health department
HHS	Health and Human Services
HI	Hemagglutination inhibition
HICPAC	Healthcare Infection Control Practices Advisory Committee
HIV	Human immunodeficiency virus
HPAI	highly pathogenic avian influenza
HSR	(DSHS) Health Service Region
IATA	International Air Transport Association
IC	Infection control
ICD	International Classification of Diseases
ICP	Infection control practitioner
ICS	Incident command system
ICU	Intensive care unit
ID	Identification
IDCU	(DSHS) Infectious Disease Control Unit
IDEAS	Infectious Disease Epidemiology and Surveillance
IFA	Indirect fluorescent antibody test
IHC	Immunohistochemical
IISP	Influenza Incidence Surveillance Project
IIV	Inactivated influenza vaccine
IIV3	Trivalent inactivated influenza vaccine
IIV4	Quadrivalent inactivated influenza vaccine
ILI	Influenza-like illness
ILINet	U.S. Outpatient Influenza-like Illness Surveillance Network
IP	Infection preventionist
IRID	(DSHS) Infectious Respiratory and Invasive Disease (Team)
ITM	Influenza transport medium
LAIV	Live, attenuated influenza vaccine

Acronym or Abbreviation	Meaning
LHD	Local health department
LIMS	Laboratory information management system
LRN	Laboratory Response Network
LTC	Long-term care (facility)
MAARI	Medically attended acute respiratory illness
MC	Mail code
MMWR	Morbidity and Mortality Weekly Report
MOA	Memorandum of agreement
MOU	Memorandum of understanding
N/A	Not applicable
NBS	NEDSS Base System
NEDSS	National Electronic Disease Surveillance System
NP	Nasopharyngeal
NPI	National provider identifier
NPV	Negative predictive value
NRDM	National Retail Data Monitor (system)
NREVSS	National Respiratory and Enteric Virus Surveillance System
NVSN	New Vaccine Surveillance Network
OP	Oropharyngeal
OTC	Over-the-counter
PAHO	Pan American Health Organization
PFGE	Pulsed-field gel electrophoresis
PCR	Polymerase chain reaction
PEP	Post exposure prophylaxis
PHEP	Public Health Emergency Preparedness
PHL	Public health laboratory
PHLIMS	Public health laboratory information management system
PHP	Public Health Preparedness
PPE	Personal protective equipment
PPV	Positive predictive value
ProMed	Program for Monitoring Emerging Diseases
PUI	Patient under investigation
RHD	Regional health department
RIV	Recombinant hemagglutinin influenza vaccine
RNA	Ribonucleic acid
RODS	Real-Time Outbreak and Disease Surveillance
rRT-PCR	Real-time reverse transcription polymerase chain reaction
RVP	Respiratory virus panel (test/assay)
RVSP	Respiratory Virus Surveillance Project
SARI	Severe acute respiratory illness
SHD	State health department
SOB	Shortness of breath
SSN	Social security number
TALHO	Texas Association of Local Health Officials

Acronym or Abbreviation	Meaning
TEA	Texas Education Agency
THA	Texas Hospital Association
TIV	Trivalent inactivated vaccine (used prior to 2013-14 season)
TPI	Texas provider identifier
UN	United Nations
USMU	(CDC) US-Mexico Unit
UTM	Universal transport medium
VTM	Viral transport medium
WHO	World Health Organization

Appendix

Table of Contents

DSHS Contact Information

DSHS Central Office Influenza Surveillance Team

Influenza reports, VTM orders and influenza surveillance questions should be sent to flutexas@dshs.texas.gov. All members of the team have access to and monitor this email box.

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DSHS Regional Influenza Surveillance Coordinators

Lupe Coronado	Region 1 Influenza Surveillance Coordinator	lupe.coronado@dshs.texas.gov	806-783-6461
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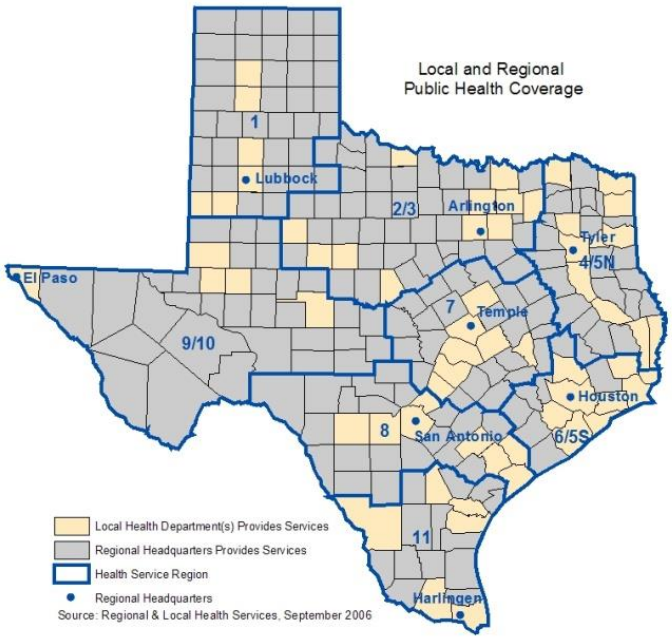
Dustie Wiser	Region 9/10 Influenza Surveillance Coordinator	dustie.wiser@dshs.texas.gov	915-834-7749
Siobhan Loughman	Region 11 Influenza Surveillance Coordinator	Siobhan.Loughman@dshs.texas.gov	956-421-5517



LRN Contact Information

LRN Location	Name	Position	Office Phone
Corpus Christi	Valerie Requenez	BT Coordinator	361-826-7214
Dallas	Daniel Serinaldi Joey Stringer	BT Coordinator Flu Coordinator	972-692-2764 972-692-2762
El Paso	Chris Olivas	BT Coordinator	915-543-3255
South Texas/ Harlingen	Kristina Zamora	BT Coordinator	956-364-8369
Houston	Meilan Bielby	Supervisor, Molecular Diagnostics Section	832-393-3956
Lubbock	Cynthia Reinosa Webb	Temporary BT Coordinator	806-885-0244
San Antonio	Patricia Blevins	BT Coordinator	210-207-5883
Tarrant County	Rebecca McMath	BT Coordinator	817-321-4755
Tyler	Janine Yost	BT Coordinator	903-877-5056

Where to Find Influenza Data

World Health Organization

- Influenza page: http://www.who.int/csr/disease/influenza/en/

- Disease Outbreak News: http://www.who.int/csr/don/en/

Centers for Disease Control and Prevention

- Weekly surveillance reports: http://www.cdc.gov/flu/weekly/fluactivitysurv.htm

Texas Department of State Health Services

- Infectious Disease Control Unit influenza surveillance page: http://www.dshs.texas.gov/idcu/disease/influenza/surveillance/

- TexasFlu.org Flu Surveillance Data page [including 2009 influenza A (H1N1) data]: http://www.dshs.texas.gov/txflu/TX-surveillance.shtm

Department of Defense

- Naval Health Research Center Operational Infectious Diseases Department: http://www.med.navy.mil/sites/nhrc/Pages/Research-Operational-Infectious-Disease.aspx

Recommended Influenza Resources

World Health Organization

- Influenza page: http://www.who.int/csr/disease/influenza/en/
- WHO on Twitter: WHO @WHO

Centers for Disease Control and Prevention

- Seasonal Influenza website: http://www.cdc.gov/flu/

Texas Department of State Health Services

- Main influenza page: http://www.texasflu.org
- Infectious Disease Control Unit flu page: http://www.dshs.texas.gov/idcu/disease/influenza/
- Immunization Branch website: http://www.dshs.texas.gov/immunize/

Center for Infectious Disease Research and Policy (CIDRAP)

- http://www.cidrap.umn.edu/

International Society for Infectious Diseases – ProMed mail

- http://www.promedmail.org/

Nasopharyngeal Swab Collection for Influenza

MATERIALS FOR NASOPHARYNGEAL SWAB COLLECTION:

- Nasopharyngeal swab: Dacron or rayon tipped with a flexible plastic shaft
  - Note: cotton-tipped or calcium alginate swabs are not acceptable
- Thawed viral transport medium (check expiration date and discard if expired)
- Gloves (suggested gloves are powder-free)
- Mask for covering nose and mouth of health worker (e.g., surgical mask)
- Facial tissues (for patient use)
- Eye protection/goggles for health worker (to protect from coughs, sneezes or splashes)

NASOPHARYNGEAL SWAB COLLECTION PROCEDURE:

- Wash or sanitize your hands and put on a mask with face shield or with goggles.
- Ask the patient to look slightly upward and steady the patient's head with one hand under his or her chin if necessary.
- Gently insert dry swab through one nostril horizontally (**straight back** not upwards), along the floor of the nasal passage into the nasopharynx. The distance from the nose to the ear gives an estimate of the distance the swab should be inserted. If resistance is encountered during insertion, remove the swab and attempt insertion into the opposite nostril.
- Rotate swab 2 to 3 times and leave in place for up to 10 seconds.
- Remove the swab slowly. Offer the patient a tissue in case he or she is going to sneeze or cough.
- Immediately place swab into the viral transport medium. Break off or cut the shaft of the swab so that it fits completely into the tube.
- Label the VTM vial with the patient's first name, last name and date of birth.
- Completely fill out the DSHS G-2V Laboratory Specimen Submission Form.
- Store the vial at 2-8ºC until ready to ship**.** Specimens need to be shipped cold with enough ice packs to maintain the temperature. **Cold specimens must be received by the DSHS laboratory within 72 hours of collection.** Specimens may also be stored frozen and shipped on dry ice. Frozen specimens may be received by the DSHS lab ≥ 72 hours after collection if they are shipped on dry ice and arrive frozen.

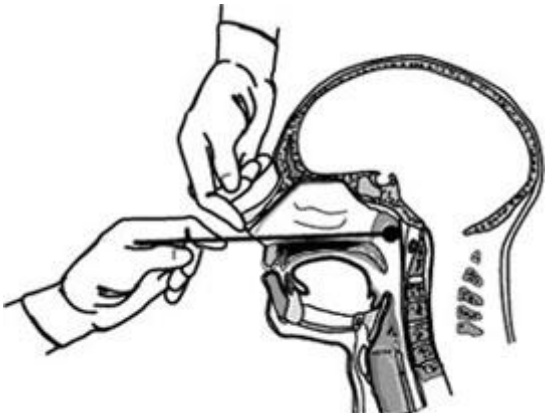


Image: CDC Manual for the Surveillance of Vaccine-Preventable Diseases, 4th ed, 2008

A video demonstrating proper technique for nasopharyngeal collection is available at http://www.cdc.gov/pertussis/clinical/diagnostic-testing/specimen-collection.html. The video references collecting two swabs for pertussis testing. Only one swab is needed for influenza / influenza-like illness surveillance testing.

Investigation and Report Forms

Investigation and report forms are available on the DSHS website at:
http://www.dshs.texas.gov/idcu/investigation/

The following investigation and/or report forms are available for influenza:

Form	Description	Required
Influenza-associated pediatric death investigation form	This form is to investigate and report cases of influenza-associated mortality in children under 18 years of age.	Yes
General influenza investigation form	This form is to investigate cases of influenza such as during an outbreak or during periods of unusual flu activity. It is also used for investigating novel influenza.	Only for novel influenza or when requested
Influenza investigation form supplemental pages	This form captures information that is not always needed in an influenza investigation but has been requested in the past by the CDC for special situations including novel influenza, out of season influenza, pregnant/postpartum influenza, etc.	Only for novel influenza or when requested
Respiratory disease contact tracking form	This form is designed to help keep track of contacts in a respiratory or invasive disease investigation.	Only for novel influenza or when requested
Respiratory disease outbreak summary form	This form is to report respiratory disease outbreaks. The form captures information that is routinely requested during outbreaks and includes information to help meet performance measures associated with the Public Health Emergency Preparedness (PHEP) funds.	Yes