

Section 5: Influenza-Associated Pediatric Mortality

BASIC EPIDEMIOLOGY

Infectious Agent

Influenza A, B or C virus

Transmission

Transmission occurs via droplet spread. After a person infected with influenza coughs or sneezes, 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.

Incubation Period

The incubation period is 1 to 4 days with most infections occurring within 2 days of exposure to an infected individual.

Communicability

Influenza is easily transmitted from person to person. Infected persons can start shedding virus up to 24 hours before the onset of symptoms. Additionally, some persons who become infected with influenza remain asymptomatic.

Clinical Illness

Symptoms of influenza include fever, cough, sore throat, myalgia (muscle 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.

Severity

An estimated 23,607 (range 3,349-48,614) deaths associated with influenza occur every year in the United States.

DEFINITIONS

Clinical Case Definition

An influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. There should be no period of complete recovery between the illness and death. Influenza-associated deaths in all persons aged <18 years should be reported.

- 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.
 - For example, a child with a positive influenza test whose death clearly resulted from trauma after a car accident would not qualify as a case. However, a child with a respiratory illness and a positive influenza test whose death is attributed to another infectious cause such as staphylococcal pneumonia would still qualify as a case.)

Laboratory Confirmation

Laboratory testing for influenza virus infection may be done on pre- or post-mortem clinical specimens, and may include identification of influenza A or B virus infections by a positive result by at least one of the following:

- Influenza virus isolation in tissue cell culture from respiratory specimens;
- Reverse-transcriptase 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

Case Classifications

- **Confirmed:** A death meeting the clinical case definition that is laboratory confirmed
- **Probable:** No probable case definition

CASE INVESTIGATION & TREATMENT

Case Investigation

Local and regional health departments should investigate all reports of suspected influenza-associated deaths in any person under 18 years of age.

Case Investigation Checklist

- Confirm that laboratory results meet the case definition.
- Review medical records or speak to an infection preventionist or physician to verify case definition, underlying health conditions and course of illness.
- Interview case (or surrogate) to identify vaccination status and risk factors.
 - If multiple attempts were made to contact the case or surrogate and attempts were unsuccessful, please fill out the case investigation form with as much information as possible and indicate reasons for missing information (e.g. lost to follow up – patient did not return call; multiple messages left).
- Complete the influenza-associated pediatric mortality form and fax it to DSHS.

- All confirmed case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.
- **Control Measures**
- Provide education on influenza as needed.
 - 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.
- Recommend that anyone with risk factors experiencing symptoms or anyone with severe illness be evaluated by a healthcare provider.
- See the Texas Influenza Surveillance Handbook for additional influenza control measures.

Exclusion

Children with influenza are required to be excluded from school/daycare for at least 24 hours after fever has subsided without the use of fever suppressing medications. It is recommended that adults with influenza not return to work for at least 24 hours after fever has subsided without the use of fever suppressing medications.

MANAGING SPECIAL SITUATIONS

Outbreaks

Influenza-associated pediatric deaths may result in high levels of media and public attention. If the death is linked to an influenza outbreak, then the outbreak investigation may also be subject to additional media or public attention. If an outbreak of influenza is suspected, notify the DSHS Infectious Disease Control Unit (IDCU) at **(800) 252-8239** or **(512) 776-7676**.

The local/regional health department should:

- Work with the facility to ensure staff and students/residents get hand hygiene and respiratory etiquette education.
- Recommend staff with influenza be restricted from working until 24 hours after fever has subsided without the use of fever suppressing medications.
- Recommend that anyone with risk factors experiencing symptoms or anyone with severe illness be evaluated by a healthcare provider.
- See the Texas Influenza Surveillance Handbook for more information on control measures and responding to influenza outbreaks.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements

Confirmed and suspected cases should be reported within 1 week of suspicion to the local or regional health department or the Texas Department of State Health Services, Infectious Disease Control Unit at (800) 252-8239 or (512) 512-776-7676.

Local and Regional Reporting and Follow-up Responsibilities

Local and regional health departments should fax (or mail) a completed investigation form and submit an NBS notification on all confirmed cases to DSHS within 30 days of receiving a report. Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules. Investigation forms may be faxed to 512-776-7616 or mailed to

Infectious Disease Control Unit,
Texas Department of State Health Services
Mail Code: 1960
PO Box 149347
Austin, TX 78714-9347

Local and regional health departments should report suspected outbreaks of influenza or influenza-like illness within 24 hours of identification to the regional DSHS office or to DSHS at 512-776-7676 and submit a completed respiratory outbreak form at the conclusion of the outbreak investigation (fax a copy to the DSHS regional office and/or IDCU 512-776-7676)

LABORATORY PROCEDURES

Specimens for influenza testing should be submitted to the DSHS Laboratory (or an LRN laboratory) for any influenza-associated pediatric mortality. It is especially important to submit specimens if influenza was suspected but not confirmed or only confirmed with a rapid influenza test.

Please note that post-mortem specimens collected during an autopsy may be tested for influenza and bacterial co-infections by the CDC. Contact the Texas Department of State Health Services, Infectious Disease Control Unit at (800) 252-8239 or (512) 512-7676 for instructions on post-mortem autopsy specimen collection and submission.

Specimen Collection

- Follow the specimen collection instructions in the current influenza season's laboratory surveillance protocol. The protocol is available by request from the DSHS Emerging and Acute Infectious Disease Branch (EAIDB) or from the regional influenza surveillance coordinator.
- A nasopharyngeal swab is the preferred specimen type. Other respiratory specimens may be accepted as described in the current protocol.
- Refrigerate (2°–8 °C) or freeze (-70°C) specimen vials immediately after collection.

Submission Form

- Use the DSHS Laboratory G2-A Specimen Submission Form for specimen submission. On the form, under the Virology section, check the box for **influenza surveillance**. In the blank space at the bottom of the Virology section next to other, write “pediatric flu death”.

Section 10. VIROLOGY

Electron microscopy

Influenza surveillance
Vaccine received: Yes No

Reference culture (Virus ID on isolate)
Suspected: _____
Submitted on: _____

Virus isolation (comprehensive)
Suspected if any: _____

Other: *Pediatric flu death*

- Make sure the patient's name and date of birth on the form exactly match what is written on the transport tubes.
- Make sure to fill in the date and time of collection in addition to the patient demographics on the form.

Specimen Shipping

- Transport temperature: Store the specimen at 2°-8°C if the specimen will be received at the laboratory within 72 hours of collection: ship the specimen on cold packs or wet ice (double bagged). Otherwise, the specimen must be stored frozen (-70°C) and shipped on dry ice.
- Ship specimens via overnight delivery.
- DO NOT mail specimens on a Friday or the day before a holiday unless special arrangements have been made in advance with the DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

Common Causes for Rejection:

- Discrepancy between name on tube and name on form
- Not shipped in viral transport media or media is expired
- Specimen is received more than 72 hours after collection (if refrigerated)
- Specimen is received at ambient temperature