



INFLUENZA-ASSOCIATED PEDIATRIC DEATH INVESTIGATIONS

Lesley Brannan
State Influenza Surveillance Coordinator
Texas Department of State Health Services



Learning objectives

- List the steps necessary to conduct an influenza-associated pediatric death investigation
- Describe the specimen types and the specimen submission process for an influenza-associated pediatric death investigation



Outline

- Reporting requirements and case definition
- Steps for investigating a pediatric flu death
- Specimen collection and submission procedures
- Specimen testing
- Pediatric death investigation challenges

Why is this condition notifiable?

- Large number of pediatric flu deaths reported in 2003-2004 season
- Define the burden of severe influenza in children
- Develop appropriate strategies for prevention of influenza-associated deaths



Reporting requirements

- Reportable disease
 - US: 2004
 - Texas: 2007
- TAC rules: Report within **1 work day**
- Immunizations grant objective: Report all pediatric flu cases to CDC **within 30 days** of death

How are cases reported?



- Hospital / Healthcare provider
 - Relationship based
 - Most likely to be reported when test and death occur at same location

- Vital Statistics / Death Certificate Reviews
 - By LHD, DSHS, CDC

- News Media

- Medical Examiner
 - Primary reporter or making COD determination

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.

Case definition, continued

- 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, 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.

Steps for investigating a pediatric flu death

- Investigate the case
 - Confirm that the laboratory results meet case definition
 - Obtain specimens for further testing, if available
 - Obtain medical records (from all institutions) or speak to an IP or physician
 - Interview family for additional information
 - Provide influenza education as needed
 - Complete case report form
 - updated version always available at <http://www.dshs.state.tx.us/idcu/investigation/>

Steps for investigating a pediatric flu death (continued)

- Communicate with public health partners
 - Alert Region and EAIDB Flu Team of any cases under investigation (even when suspect)
 - Notify agency press office if necessary
 - Document reason(s) for significant delays in reporting
- Report completed case information
 - Fax case report form to DSHS
 - Enter case in NBS
 - (DSHS EAIDB enters cases into CDC's Influenza-Associated Pediatric Mortality Reporting System)

Specimen collection

- Respiratory specimens
 - Nasopharyngeal swab preferred
 - Oropharyngeal swab (OP) or OP/nasal swab
 - Nasal wash/aspirate
- Serological specimens
- Pathology specimens
 - Recommended tissues:
 - Lung tissue (specific sites)
 - Tissue from other organs, in patients with complications (e.g., myocardium in patients with myocarditis)
 - Other organs with significant gross or microscopic pathology



Specimen collection (continued)

- Collect respiratory specimens following DSHS guidelines
 - For DSHS G-2A submission form, indicate “Pediatric flu death”
- Maximum time allowed from collection to receipt at any laboratory: 72 hours
- Specific instructions for pathology specimens available by contacting flutexas@dshs.state.tx.us

Specimen submission

- Encouraged for all pediatric flu deaths, especially those with only rapid test results
- Respiratory specimens may first be confirmed by DSHS Austin or the LRNs
 - PHLs can refer specimens to CDC for additional testing
- Pathology specimens are tested at CDC
- Essential to inform DSHS Austin that you want to submit specimens to CDC
 - Different specimen types go to different CDC laboratories
 - Each laboratory requires approval and has different requirements

Specimen shipping

- Options
 - Ship to DSHS Austin and we will forward to CDC
 - Ship directly from local area
- Shipping requirements
 - CDC specimen submission form
 - Additional clinical/autopsy and lab testing information
 - Packaging that complies with IATA regulations
 - Shipping box labels
 - Temperature control (cold packs or dry ice) – differs by specimen type
- Current, specific instructions available by contacting flutexas@dshs.state.tx.us

Specimen testing

- PCR
- Culture
- Antigenic characterization
- Antiviral resistance testing
- Testing for other viral and bacterial pathogens



Challenge: lab results

- Rapid flu positive and PCR/culture negative on same patient
- “Weird” results
 - Recent rapid flu tests positive for A and B
 - “Discrepancy” between PCR result at Texas PHL and CDC
 - Suggested action: Confirm/retest at a public health laboratory

Challenge: Is it influenza-associated?



- Yes!
 - Rapid + at hospital. Hospital treating for influenza. Child dies. ME tests for influenza and results are negative, but parainfluenza detected. Makes determination that flu is not cause of death but some other infectious process is.
 - Confirmed flu. Chronic heart condition. Dies from heart failure.
 - Confirmed flu. Hospitalized for flu. Lack of appropriate care at hospital may have contributed to death of patient.

Challenge: Is it influenza-associated?



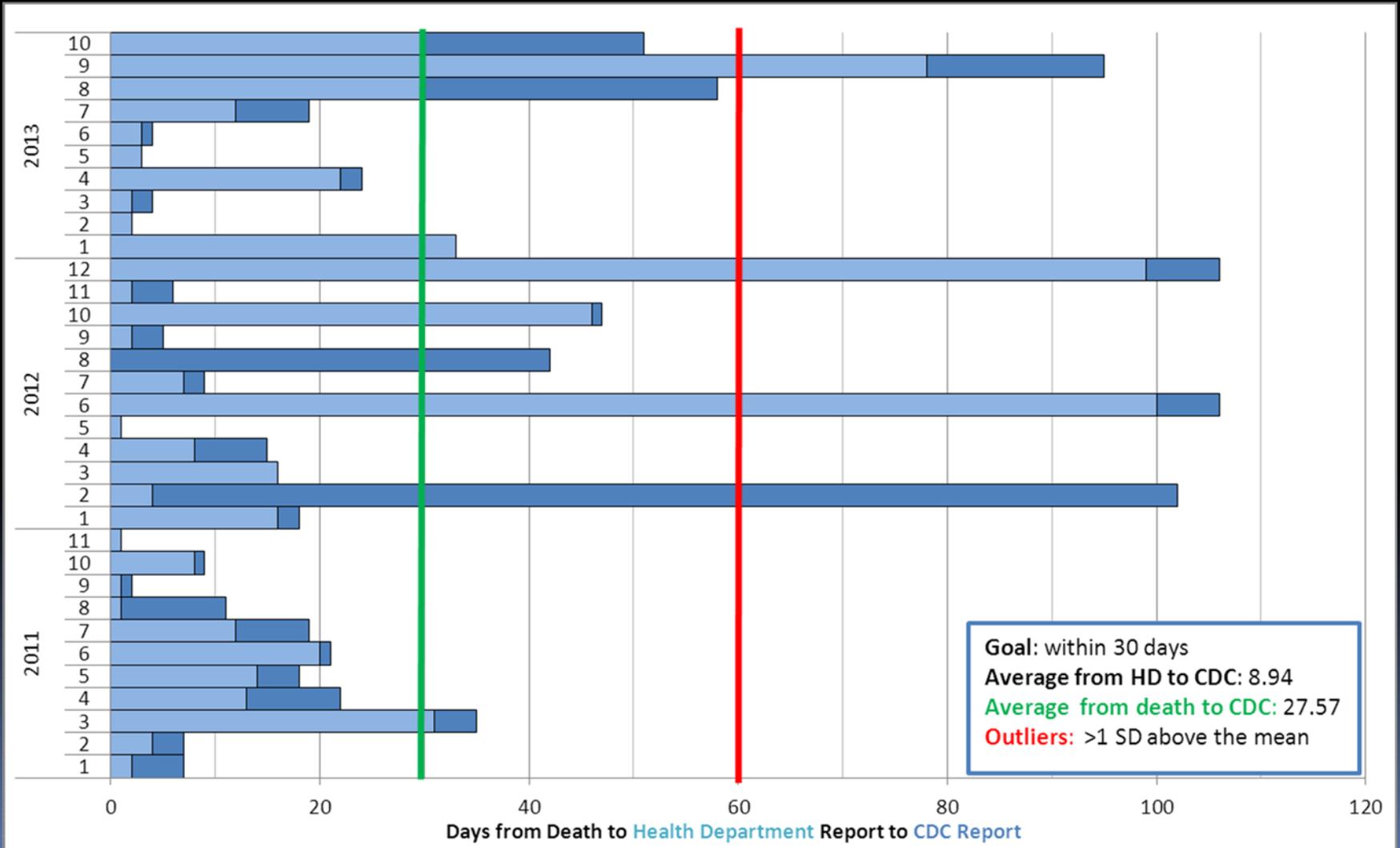
- **Maybe not**
 - Death at home. Positive flu. Minimal symptoms. Police called. Suspicious circumstances. Possible hx of abuse. Suffocation vs infectious process.
- **No**
 - Rapid + for Flu A. Playing on the floor at home. Quits breathing. EMS unable to intubate on transport to hospital. After death, coin found in child's throat.

Challenge: case classification

- ME: "This case is still pending histology examination, examination of the brain, pediatric pathologist consultation, toxicology, culture results and medical records. I will not be able to classify the case until all of those elements are completed (weeks to months). So far it appears to be a natural death PROBABLY related in some way to influenza infection, however, I cannot exclude a superimposed bacterial infection or other disease process until all of the studies are complete. Sorry I can't provide you with more information yet."

Challenge: reporting delays

- How long does it take to report?



Challenge: reporting delays

- Reasons for longer delays
 - Waiting on ME to give final ruling
 - Death only identified through vital stats records
 - Case transferred to another jurisdiction
 - Flu testing performed at a different hospital (multiple care providers for patient)

Take-home messages

- Influenza-associated, not necessarily influenza-caused
 - Case definitions may not match clinical diagnosis or cause of death
- Communicate with DSHS regarding all cases under investigation
- Report cases that meet the case definition unless there is a very compelling reason not to
- Try to obtain specimens for every case, especially to confirm the subtype
- Contact flutexas@dshs.state.tx.us for current guidance for pediatric flu specimen submission