

Section 5: Enhanced Surveillance for Influenza and Community Associated MRSA Deaths

Enhanced Mortality Surveillance

Bacterial infections can occur as co-infections with influenza or occur after influenza infection. During the 2006-07 influenza season, the Centers for Disease Control and Prevention (CDC) noticed an increase in *Staphylococcus aureus* co-infections among children who had died from or were hospitalized with influenza infection. The CDC began working with states to monitor the situation and requested enhanced surveillance for influenza co-infections during the subsequent influenza season.

Licensed practitioners and medical examiners who diagnosed, treated, or suspected the occurrence of influenza-associated pediatric mortality are required to report the death per chapter 64D-3, *F.A.C.* To gather additional data, voluntary reporting of all Community Associated (CA)-*S. aureus* pneumonia death cases was requested. The Florida Department of Health contacted all Medical Examiners in the state for assistance in a new project to track fatal community associated CA-*S. aureus*-pneumonia in previously healthy individuals co-infected with influenza. Voluntary reporting of CA-*S. aureus* deaths by medical examiners began during the 2007-08 influenza season. During the first year of this program, there were nine deaths reported during the influenza season, of which six were due to pneumonia.

In 2008, chapter 64D-3, *F.A.C.* was updated and included the additional requirement that all practitioners (including medical examiners) report all CA-*S. aureus* deaths. Community-associated *S. aureus* deaths are defined as deaths due to *Staphylococcus aureus* that are culture positive for the bacteria from a sterile or respiratory site and within the last year (prior to death) the patient had not: been hospitalized; undergone dialysis; had surgery; or had indwelling catheters or medical devices that pass through the skin into the body. There were five CA-*S. aureus* deaths reported to the state from the start of the new reporting requirement in November 2008 to the end of the year (December 2008).

Pediatric Influenza-Associated Mortality Surveillance

Background

The pediatric influenza-associated mortality surveillance started in 2004 in order to monitor the number of deaths in individuals less than 18 years of age who died as a result of complications from an influenza infection. A pediatric influenza-associated death is defined for surveillance purposes as a death in persons aged <18 years resulting from a clinically compatible influenza illness that was confirmed to be influenza by an appropriate laboratory test and in the absence of an alternative agreed upon cause of death. There should be no complete recovery between illness and death.

In 2008, three cases of pediatric influenza-associated deaths were reported to the Bureau of Epidemiology. Each case is summarized below.

Pediatric Influenza-Associated Mortality, Sarasota County, January 2008

On February 1, 2008 the Sarasota County Health Department (SCHD) received a report from a local hospital of an influenza-related death in a 40-day-old infant. The child was born on December 23, 2007, and discharged three days after birth, then re-admitted December 30, 2007 with a fever of 102.5°F, was generally fussy, and had constipation. The child was initially evaluated for meningitis and received a lumbar puncture in the emergency department. The cerebrospinal fluid (CSF) red cell count was six and white cell count was 836. The CSF serology was negative, glucose was 32, and protein was 103. RSV test was negative and the initial report stated that the child was influenza A and B negative (testing methodology was not specified). The child was admitted to pediatrics and treated with IV fluids, cefotaxime, and ampicillin but continued to decline.

On January 1, 2008, the mother noted that the child had decreased oral intake and was crying continuously. Acute respiratory failure prompted intubation and transfer to a local children's hospital. The child was admitted to the pediatric intensive care unit that same day. The child was noted to be in cardiogenic shock and an echocardiogram was performed which revealed poor ventricular function, moderate to severe mitral regurgitation, and mild to moderate pulmonary hypertension.

The next day an influenza screening test (EIA) was positive for influenza A and a subsequent culture test that was also positive for influenza A. A CT scan on January 6, 2008 revealed a large non-hemorrhagic left hemispheric stroke.

The child died on January 20, 2008 and the cause of death on the death certificate was listed as myocarditis and renal failure. The SCDH contacted the various healthcare providers in order to obtain any specimens or samples still available in order to perform additional testing at the Bureau of Laboratories. However, all samples had been previously discarded. The final discharge summary indicated that the child suffered from acute respiratory failure, severe cardiac compromise, presumed myocarditis secondary to Enterovirus, influenza A positive, large left hemispheric stroke, endotracheal tube positive for *Stenotrophomonas* and *Candida albicans*, renal insufficiency, and hyperbilirubinemia.

Pediatric Influenza-Associated Mortality, Indian River County, February 2008

The Indian River County Health Department was notified by the Alachua County Health Department of an influenza-associated pediatric death in an Indian River resident. A 17-year-old female with a history of cystic fibrosis was hospitalized in December 2008 for cystic fibrosis exacerbation and again on February 19, 2008 at a hospital in Alachua County. Her symptoms in February were much worse than they had been in December and included: increased coughing with increased thickening of her mucous; fever (102°F); and nausea that resulted in post-tussis emesis and headaches. Hypoxia was significant (low 70's) and oxygen support was provided. The patient was positive for influenza A on an antigen screening test. No further testing was done. Although her chart indicated she was given an influenza shot earlier in the year, this could not be confirmed. The patient's physical status continued to decline. A joint decision between the parents and patient was made to not pursue any continuous means of treatment. She died on March 15, 2008.

Investigation of a Pediatric Influenza A Co-infection Death, Hillsborough County, March 2008

On April 4, 2008, a call was received by the Hillsborough County Health Department (HCHD) from the medical examiner (ME) informing HCHD of a two-year-old child who had succumbed to influenza A on March 26, 2008. The medical records showed that on March 12, 2008, two weeks prior to the patient's death, the girl was seen at Hospital X, and diagnosed with an upper respiratory infection. A week later, on March 19th, 2008, she was taken to Hospital Y with symptoms of an upper respiratory infection, prescribed antibiotics, and sent home. On March 26, 2008, she was found in bed not breathing, laying on her stomach. The deceased was transported to Hospital Z and pronounced dead.

The case was referred to the ME, where several additional tests were conducted. These tests revealed that the child's primary cause of death was due to influenza A, with secondary co-infections of parainfluenza-3 and adenovirus. The ME also discovered that the deceased had sickle cell trait, which was also deemed a contributing factor to her death.

References

The Centers for Disease Control and Prevention, "Influenza-Associated Pediatric Mortality and *Staphylococcus aureus* co-infection" Official CDC Health Advisory, January 30, 2008. Available at <http://www.cdc.gov/flu/professionals/flustaph.htm>.

Florida Administrative Code, 64D-3, http://www.doh.state.fl.us/disease_ctrl/epi/topics/64D-3_11-08.pdf.