

Section 4

Notable Outbreaks and Case Investigations

Notable Outbreaks and Case Investigations

In Florida, any disease outbreak in a community, hospital or institution, as well as any grouping or clustering of patients having similar disease, symptoms, syndromes or etiological agents that may indicate the presence of an outbreak is reportable as per Florida Administrative Code Chapter 64D-3. Selected outbreaks or case investigations of public health importance that occurred in 2013 are briefly summarized in this section.

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Bacterial Diseases

***Bordetella pertussis*: Outbreak of Pertussis in a Community That is Averse to Medical Treatments and Vaccines, Columbia County**

Background: On August 30, 2013, the Florida Department of Health (DOH) in Columbia County (DOH-Columbia) was notified of a positive polymerase chain reaction test for *Bordetella pertussis* from an unvaccinated child attending a local charter school in a medical- and vaccine-averse religious community. Interviews confirmed a sibling with symptoms consistent with pertussis. By September 3, another child from the same school was confirmed to have pertussis. Because of the potential for spread in this unvaccinated community, on September 12, a declaration of communicable disease emergency was instituted by DOH-Columbia; children with cough were excluded from school and re-entry required an evaluation by a health care provider. Following laboratory confirmation of a fourth patient on September 27, DOH-Columbia requested epidemiologic assistance from the DOH Bureau of Epidemiology. An investigation was conducted to control the spread of pertussis and determine disease incidence within this community.

Methods: Medical record review and household interviews were conducted for 130 children excluded or absent from the charter school for cough illness. Cases were classified using the DOH surveillance case definition for pertussis. A suspect case definition was created to capture people with a cough illness of 7 to 13 days duration or who received treatment for pertussis without additional clinical details. Cases were investigated to determine onset date, vaccination status, demographics, and attack rates by grade level.

Results: A total of 109 people were classified as confirmed (8), probable (61), or suspect (40) cases within this community. Out of 316 students and 16 teachers, 94 students (30%) and one teacher (6%) met the case definition. Fourteen of the cases were household contacts of ill charter school students. Only one confirmed and one probable case reported receiving any vaccination against pertussis. The investigation identified 14 cases with symptom onset prior to the first reported case. Students and household contacts were evaluated and treated primarily by one pediatrician who performed minimal laboratory testing and did not report clinically diagnosed pertussis cases to DOH. Attack rates were highest in the youngest students (pre-kindergarten attack rate was 57%) and decreased with increasing age (eighth grade attack rate was 14%).

Conclusions and Recommendations: In vaccine-averse communities, controlling vaccine-preventable disease outbreaks is challenging, particularly when susceptible community members have prolonged contact in multiple settings. The use of extraordinary outbreak control measures including a school-wide cough exclusion policy and a low threshold for prescribing household prophylaxis should be evaluated in communities with low pertussis immunity. Physicians need to understand the importance of reporting presumptive pertussis cases without laboratory confirmation. In medically averse communities, local public health agencies need to identify and collaborate with health care resources used by that community.

***Bordetella pertussis*: Outbreak in a Cohort of Recently Vaccinated 1- to 5-Year-Olds, Leon County**

Background: Despite widespread childhood vaccination in the U.S., the prevalence of pertussis has increased steadily over the past few decades. On September 1, 2013, the Florida Department of Health (DOH) in Leon County was notified of a positive polymerase chain reaction (PCR) test for *Bordetella pertussis* in a 1-year-old preschool attendee, followed by two additional PCR-positive pertussis cases on December 11, 2013 and December 16, 2013, linked to the same preschool. In response to these reports, an outbreak investigation was initiated.

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Methods: The DOH surveillance case definition for pertussis was used to classify cases for this outbreak. On December 19, 2013, a site visit at the preschool was conducted to query staff, identify children with pertussis-like symptoms, recommend post-exposure antimicrobial prophylaxis if indicated, and conduct school surveillance. On January 7 and 8, 2014, DOH staff administered an on-site questionnaire inquiring about cough illnesses between December 1, 2013 and January 8, 2014 to student and staff households. The survey had a 98% completion rate by January 8, 2014.

Results: Eleven people were classified as confirmed cases: five laboratory-confirmed and six epidemiologically linked household contacts. Twenty-eight people were classified as probable cases. Four of the infants and children were hospitalized. The highest attack rate (47%) was observed in the 3-year-old classroom (nine cases among 17 people). Of the 26 child cases, 24 were up-to-date on pertussis vaccine. Vaccine effectiveness amongst children attending the preschool was estimated to be 45%. The average number of days from last vaccination to onset of symptoms for the students was only 667 days and seven (27%) children were vaccinated within the past year.

Conclusions and Recommendations: The high attack rates among the cohort of recently vaccinated 1- to 5-year-olds made this an unusual outbreak. Physicians need to be aware that vaccination against pertussis does not preclude a pertussis infection, and it is imperative that county health departments and health care providers establish communications to ensure appropriate testing, treatment, and investigations for pertussis. Further monitoring of acellular pertussis vaccine performance in this preschool age group is necessary to determine if this outbreak was an isolated finding or possibly the start of a new epidemiologic trend.

***Bordetella pertussis*: Household Outbreak and Infant Death, Orange County**

Background: On April 14, 2013, a local hospital infectious disease (ID) physician notified the Florida Department of Health in Orange County (DOH-Orange) of a suspect pertussis case in a 6-week-old boy. The infant had onset of paroxysmal cough approximately on April 8, and subsequent brief episodes of apnea beginning on April 12. Against the recommendation of the infant's pediatrician, the parents treated the infant with homeopathic remedies prior to hospitalization. The infant was hospitalized on April 14, requiring mechanical ventilation and died on April 16. The case represents the first pertussis-related death in Orange County since the early 1990's and the only pertussis-related death in Florida in 2013.

Methods: An investigation was immediately initiated, with an interview with the infant's mother and father. Health status and vaccine histories were obtained for three siblings (2-, 4-, and 7-year-olds), parents, paternal grandparents, and two additional relatives. The infant's parents were philosophically opposed to vaccination. Student immunization records and symptom assessments were conducted at one linked school.

Results: On April 16, the initial case tested positive for *Bordetella pertussis* by polymerase chain reaction. The three siblings were unvaccinated. All siblings were symptomatic, with approximate cough illness onsets from April 3 to April 5, along with paroxysmal cough, posttussive vomiting, and apnea. The parents and grandparents reported receiving no vaccines since childhood. The hospital ID physician provided prophylaxis treatment for immediate family members and two grandparents and recommended prophylaxis for two extended family members. DOH-Orange facilitated filling prescriptions as needed. At the school attended by the 4-year-old, a pertussis notification letter was distributed to parents. All other students at the school were up-to-date on vaccinations and no other cases were identified.

Conclusions and Recommendations: This household outbreak highlights the ease of transmission among susceptible people and potential severity of pertussis in infants. When pertussis is introduced into a susceptible group, transmission can occur immediately after disease onset, often before diagnosis by a physician and initiation of disease prevention interventions. To educate the community, a media release was distributed on April 19 highlighting pertussis, mentioning the infant death, and noting the importance of vaccination.

***Clostridium tetani*: Tetanus Mortality in Unvaccinated Woman, Duval County**

Background: On April 24, 2013, the epidemiology program at the Florida Department of Health in Duval County (DOH-Duval) received a report of a wound culture presumptive positive for *Clostridium tetani* from a 79-year-old woman from Duval County. The woman had symptoms consistent with tetanus and a history of an anaphylactic reaction to a tetanus diphtheria vaccination prior to 1947. The woman had not received any further tetanus or diphtheria vaccinations or any desensitization therapy for the allergy to the vaccine throughout her life. An anaphylactic reaction to vaccines containing tetanus or diphtheria toxoids is a contraindication to further doses, unless the patient can be desensitized by an allergy specialist.

Methods: DOH-Duval initiated an investigation and coordinated information and updates through the hospital infection control nurse. Risk factor information was obtained from interviewing the patient's daughter. The hospital's referral laboratory performed laboratory testing on a specimen collected from the arm wound.

Results: The woman fell at her home in mid-March, wounded her arm, and developed malaise and headache during the last week of March. On April 13, symptoms progressed to pain in the jaw, tongue, both ears, and the back of her head, and she was not able to sleep or eat due to the pain. The severity of the jaw pain increased, and she was admitted to the hospital on April 16. Trismus (lockjaw) was present upon admission. The infected arm wound was culture-positive for *C. tetani*. The woman received tetanus immune globulin and tetanus and diphtheria toxoids vaccine within 24 hours of admission. The day after admission she experienced a respiratory code, was intubated, developed multi-system organ failure, and subsequently died 10 days after admission.

Conclusions and Recommendations: Tetanus is normally diagnosed clinically by excluding other causes of the syndrome, usually without confirmatory laboratory tests, as the culture of *C. tetani* has low sensitivity. Along with the clinical diagnosis of tetanus, the wound culture that was positive for *C. tetani*, which is rarely recovered from the infection site, excluded other causes of illness. Patients with a new wound that have unknown or no tetanus vaccine history should be evaluated by a health care provider as soon as possible for immediate administration of tetanus-containing vaccine and tetanus immune globulin, if indicated.

***Clostridium tetani*: A Case of Imported Tetanus, Sarasota County**

Background: On Monday, March 18, 2013, the Florida Department of Health in Sarasota County (DOH-Sarasota) was notified of a 45-year-old man with sudden onset of spasms and trismus (tightening of the jaw) characteristic of tetanus. The man had arrived from Mexico on a work visa two days prior to presenting to a local emergency department on March 11. The man had been transferred to a Sarasota hospital for more comprehensive care from a hospital in an adjacent county.

Methods: DOH-Sarasota initiated an investigation to characterize the case and determine risk factors for tetanus.

Results: From March 11 to April 25, he remained comatose in the intensive care unit on a ventilator listed in guarded condition. The hospital checked with other local hospitals for tetanus immune globulin (TIG). The hospital was unable to obtain the desired 3,000 units of TIG and gave 2,750 units on March 13, as well as the first dose of tetanus vaccine. As of April 29, he was awake, alert, and removed from the ventilator. He continued to have minor symptoms attributed to tetanus toxin remaining in his body, including intermittent fevers and mild tachycardia. On May 17, he was sent to the hospital's rehabilitation facility. He continued to have some limitations with leg movement. His family came from Mexico and took him home on May 31. The case was interviewed and he had no memory of any injury leading up to this event and had worked prior to becoming ill doing general farm labor.

Conclusions and Recommendations: Tetanus is a severe disease that can cause long-term morbidity and mortality. Rapid treatment of suspected tetanus cases with airway protection, TIG, antibiotics, sedatives, wound management, and supportive therapy is important to prevent further nervous system involvement and reduce disease severity. Research suggests that a 500-unit dose of TIG is as effective as larger doses, thus physicians should consider immediately administering 500 units of TIG if available. Hospitals can order TIG for overnight delivery from the manufacturer. Note that because this case was in a non-U.S. resident, it is not included in counts elsewhere in this report.

***Ehrlichia*: Fatal Ehrlichiosis Acquired in Florida, Pasco County**

Background: Ehrlichiosis is a reportable tick-borne illness also referred to as human monocytic ehrlichiosis (HME). In humans, disease can be caused by any of at least three species of *Ehrlichia*: *Ehrlichia chaffeensis*, *E. ewingii* and *E. muris-like*. *E. chaffeensis* is thought to be the most pathogenic of these three rickettsial bacteria. The primary tick vector in Florida is the lone star tick, *Amblyomma americanum*. The incubation period is typically 5 to 14 days after being bitten by a tick. Symptoms may include fever, headache, chills, malaise, myalgia, nausea, vomiting, encephalitis, and sometimes rash. Abnormal laboratory findings may include leukopenia, thrombocytopenia, and elevated liver enzymes. Mortality is typically less than 1-2%. Immunosuppression and delays in appropriate treatment with doxycycline can lead to more severe illness. Illness is most common in men and those over 50 years of age. On March 28, 2013, the Florida Department of Health in Pasco County (DOH-Pasco) received an electronic laboratory report (ELR) for a patient with a positive immunoglobulin G (IgG) titer for HME of 1:1024.

Methods: Medical records were requested from the hospital and a local urgent care facility that provided care for the man, and interviews were conducted with next-of-kin by DOH-Pasco to determine if the case met the national surveillance case definition for ehrlichiosis.

Results: The investigation conducted by DOH-Pasco identified that the man was a 72-year-old resident of Michigan with a history of diabetes mellitus and coronary artery disease. In early March, the man and his spouse spent time at a Florida state park in Columbia County. Following the visit to the state park, ticks were found on the man and his dogs, and one attached tick was subsequently found on the man's buttocks. Approximately one week later, the man developed fever and reported not feeling well. He sought care on March 13 at a Pasco County urgent care clinic with symptoms of fever, myalgia, nausea, and sinusitis; thrombocytopenia was also present. He was prescribed sulfamethoxazole/trimethoprim but symptoms worsened with back and knee pain and altered mental status developing. On March 18, the man presented at a Pasco hospital emergency department and was admitted. The man was found to be in atrial fibrillation, with encephalitis, thrombocytopenia, leukopenia, elevated liver enzymes, and mildly elevated creatinine. During interviews with family members, the recent tick bites were reported. Serum samples collected on March 21 were submitted for tick-borne disease testing and doxycycline treatment was initiated. On March 22, the man's condition deteriorated and he went into cardiac arrest leading to anoxic brain injury, coma, and intubation. On March 27, he was terminally extubated and he expired.

Conclusions and Recommendations: Early symptoms of ehrlichiosis are non-specific and in this case were masked by concurrent sinusitis making diagnosis more difficult. Collecting information about recent outdoor activities is important for tick-borne diseases and can facilitate earlier diagnosis and treatment. The patient died before the CHD was notified via ELR.

***Escherichia coli*: Cluster of *Escherichia coli* O157:H7 Gastroenteritis and Hemolytic Uremic Syndrome, Duval County**

Background: The Florida Department of Health in Duval County (DOH-Duval) was notified by a local hospital on September 20, 2013 of a patient diagnosed with severe gastroenteritis and a stool test positive for *Escherichia coli* O157:H7. During the interview, the infected person mentioned routinely consuming raw food items from the Native Sun Natural Food Market. A second case with the same diagnosis was reported to DOH-Duval on September 23. An interview determined that this infected person purchased and consumed foods similar to the first case. On September 24, two siblings diagnosed with hemolytic uremic syndrome (HUS) were reported. HUS is a severe complication of *E. coli* infection that can lead to kidney failure due to destruction of red blood cells. Interviews identified that the siblings had consumed food items similar to the previous two cases. In response to these four cases, an outbreak investigation was initiated to determine the vehicle of the outbreak and prevent additional cases.

Methods: DOH-Duval notified local health care practitioners of the increase in *E. coli* and HUS reports and reminded providers to report all cases of Shiga toxin-producing *E. coli* and HUS to DOH-Duval. A request for active surveillance was also made to the local infection control practitioners. Four stool specimens were forwarded to the Bureau of Public Health Laboratories in Jacksonville (BPHL) for confirmation and pulsed-field gel electrophoresis (PFGE) analysis. All cases were interviewed using a standard questionnaire. An environmental assessment of the grocery store was conducted with outbreak investigation team members and the Florida Department of Agriculture and Consumer Services. A case was defined as a person diagnosed with *E. coli* O157 or HUS who consumed food purchased from the natural food store.

Results: Six people were identified as meeting the case definition (four *E. coli* O157:H7 and two HUS). Four cases (67%) were in women. The four people diagnosed with *E. coli* had ages ranging from 34 to 69 years with a median age of 62 years. The two HUS cases were in a 17-year-old and a 19-year-old. All six experienced diarrhea, bloody stools, and abdominal cramping. Five cases were hospitalized and no deaths were reported. Onset dates ranged from September 14 to 19. Food histories indicated that all six cases consumed kale coleslaw made at the store. PFGE analysis by BPHL found that all specimens had indistinguishable patterns. The environmental assessment identified a single supplier of the kale.

Conclusions and Recommendations: This was an outbreak of *E. coli* O157:H7 and HUS likely associated with kale from the natural food store. The store was made aware of the potential contamination issue and stopped using the identified product; no product was left in the store for additional analysis or traceback.

***Legionella pneumophila*: Legionellosis Outbreak Associated With a Recreational Vehicle (RV) Resort, DeSoto County**

Background: The Florida Department of Health in DeSoto County (DOH-DeSoto) investigated three legionellosis cases that occurred in April 2013 in occupants of a local recreational vehicle (RV) resort. In response to these three cases associated with the facility, an outbreak investigation was initiated to determine the sources of illness, identify additional cases, and recommend control and prevention strategies.

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Methods: A list of occupants was provided to DOH-DeSoto for additional case finding. A notification letter was sent to people who stayed at the RV resort during April. An environmental assessment of the RV resort, pool, and spa was conducted by DOH-DeSoto and the regional environmental epidemiologist. Samples collected from the spa and outdoor shower were sent to the Bureau of Public Health Laboratories in Jacksonville (BPHL) for *Legionella pneumophila* testing. A confirmed case was defined as laboratory-confirmed legionellosis in a resident or guest of the RV resort in April. A suspect case was defined as physician-diagnosed pneumonia in a resident or guest of the RV resort in April.

Results: Four people met the case definition (three confirmed, one suspect). Two cases (50%) were in women. Ages ranged from 64 to 73 years old, with a median age of 68.5 years old. All three confirmed cases were hospitalized. The RV resort had a 27,406-gallon outdoor pool with diatomaceous earth filter and a 1,414-gallon outdoor hot tub with two cartridge filters that were cleaned twice a month, both of which used automatic chlorine feeders. During the environmental assessments, the pool and spa were in satisfactory condition. The environmental samples tested by BPHL were negative for *Legionella pneumophila*. Three of the four cases reported regular usage of the hot tub.

Conclusions and Recommendations: Epidemiologic data indicate that the source of the legionellosis outbreak was the RV resort in DeSoto County. The only common exposure identified among the four cases was staying at this RV park in the month of April. The negative environmental samples may be due to the time lapse from exposure and sample collection and from remediation known to have occurred prior to sampling (i.e., addition of chlorine). Negative laboratory results do not rule out the possibility that *Legionella* bacteria were present at the time of exposure or intermittently during multiple exposures.

***Legionella pneumophila*: Hospital-Associated Legionellosis Cluster, Indian River County**

Background: On October 11, 2013, the Florida Department of Health in Indian River County (DOH-Indian River) was notified of a legionellosis case who was an inpatient at a local hospital for 19 days prior to symptom onset. An investigation was initiated and on October 24, DOH-Indian River was notified of another case associated with the facility. Active case finding was initiated, and environmental assessment of the facility was conducted to determine the source and prevent additional cases.

Methods: DOH-Indian River recommended *Legionella* testing for patients who developed pneumonia while hospitalized, as well as patients readmitted within 10 days of discharge with a new diagnosis of respiratory disease or pneumonia. An environmental assessment of the facility was conducted and potable water samples were collected and submitted to the Bureau of Public Health Laboratories in Jacksonville (BPHL) for analysis. A case was defined as any person diagnosed with legionellosis who had been hospitalized at the facility for any part of the 10 days prior to symptom onset.

Results: Four people met the case definition, half of whom were women. Ages ranged from 41 to 74 years old with a median age of 70.5 years. All people had at least one medical condition that put them at a higher risk for developing *Legionella* infection after exposure. All four people stayed in the acute care wing or rehabilitation section of the facility. Multiple water samples collected from these patient rooms were analyzed by the BPHL and were positive for *Legionella pneumophila*. The acute care and rehabilitation wings have a shared recirculating hot water system. The rehabilitation wing was closed for a year for remodeling and recently reopened. During remodeling, hot water was stagnant in the unit due to non-use. When the system was brought back online, no disinfection or flushing of the hot water system was done. The rehabilitation facility requires that point-of-use hot water temperatures are between 105-115 °F. The hot water system supplied both acute care and rehabilitation rooms, resulting in a hot water temperature decrease in both units.

Conclusions and Recommendations: American Society of Heating, Refrigeration, and Air-Conditioning Engineers guidelines cite water temperatures of 77-108 °F and stagnation as factors that can contribute to amplification of *Legionella*. DOH-Indian River recommended the facility begin remediation and have a *Legionella* monitoring and control plan developed for their facility, continue active surveillance for new cases of legionellosis, and report these immediately to DOH-Indian River. No additional legionellosis cases were reported.

Multiple Bacteria: Injection-Site Abscesses Associated With Contaminated Compounded Preservative-Free Methylprednisolone Injections, Washington County

Background: On May 28, 2013, Main Street Family Pharmacy (MSFP) of Tennessee recalled all lots of sterile compounded products manufactured since December 1, 2012. On June 7, 2013, the Food and Drug Administration (FDA) reported bacterial and fungal growth from two separate lots of unopened 80 milligrams per milliliter (mg/mL) 10 milliliter (mL) vials of preservative-free methylprednisolone acetate (PF-MPA) from MSFP. As of June 27, 2013, the Centers for Disease Control and Prevention (CDC) reported 26 people in four states had an infection suspected to be associated with exposure to recalled MSFP products. The investigation objective was to identify injection-site abscesses and quantify risk factors from injections with subsequently recalled PF-MPA 10 mL single dose (not labelled as such) vials from MSFP administered to multiple patients at a single clinic in Florida.

Methods: Medical records were abstracted for people identified at the Florida clinic with an adverse event and for all people recorded as exposed to PF-MPA lots 011413dan and 120612dan. Facility records from July 2006 to August 2013 were queried for ICD-9 CM 682.5 (abscess of the buttocks) and 680.5 (carbuncle of the buttocks) codes to identify additional adverse events. Univariate analysis and logistic regression were performed to identify risk factors for adverse events and to control for demographic factors, co-morbidities, and injection-related risk factors.

Results: Sixteen of 307 exposed people developed soft tissue abscesses at the injection site, an attack rate of 5%. Twelve patients (75%) required incision and drainage of their abscesses for treatment. Most patients received injections for symptoms related to allergic rhinitis or an acute upper respiratory infection. Four of the abscesses were cultured; *Klebsiella pneumoniae* was identified in all four cultures and *Enterobacter cloacae* was identified in two cultures. Increasing body mass index (BMI) (odds ratio [OR] = 1.17; 95% confidence interval [CI]: 1.04-1.33), age of vial at injection (OR = 1.13; CI: 1.00-1.27), and receiving an injection during an 11-day period (OR = 10.01; CI: 1.49-67.11) were significant factors associated with adverse events. Query of ICD-9 CM codes identified two additional patients who received an injection with MPA prior to diagnosis of abscess of the buttocks.

Conclusions and Recommendations: Health care providers should factor BMI and potential fat pad depths for intramuscular injections to reach the muscle, and alter needle length and gauge to reach the intended injection location. A written protocol for the PF-MPA injections including needle size and gauge should be created and trainings on this protocol provided to staff administering injections. Preservative-free compounded products should only be used when absolutely necessary and should be considered single-dose products. Health care practitioners should be reminded to report any adverse events from pharmaceuticals to MedWatch, the FDA safety information and adverse event reporting program.

***Mycobacterium tuberculosis*: Large Contact Investigation in Response to a High School Student With Active Tuberculosis, Marion County**

Background: On July 29, 2013, the Florida Department of Health (DOH) in Marion County (DOH-Marion) was notified of a 17-year-old boy hospitalized with suspected pulmonary tuberculosis. The patient was a household contact to a previous tuberculosis case, despite negative tuberculin skin tests (TST) in August and November 2012. In April 2013, he was evaluated for chest pain, and over the course of a month experienced symptoms of vomiting, abdominal pain, fever, decreased appetite, cough, night sweats, and weight loss of 14 pounds. In May, the patient was diagnosed with pneumonia. On July 25, a chest x-ray and CT without contrast were ordered to evaluate productive cough and pleuritic chest pain. The patient was diagnosed with bilateral pneumonia and admitted to the hospital. *Mycobacterium tuberculosis* was cultured from sputum collected August 9. To evaluate if *M. tuberculosis* was transmitted to close contacts and prevent active disease, a contact investigation was initiated.

Methods: Medical records were obtained and reviewed by the Tuberculosis Physician's Consultation Network. An initial case interview was conducted on July 30; close contacts, those people with a minimum of eight hours shared air space during the infectious period, were documented, education was provided, and directly observed treatment (DOT) was explained. The investigation included contacting family and social contacts, and coordinating with the local school district to obtain contacts for the 2012-2013 school year, summer school, and school bus transportation. A strike team was organized to conduct calls, mail, and hand-deliver letters to several schools and private residences. DOH, Quest Diagnostics, and Qiagen, who manufactures the Quantiferon Gold test kit, worked with a local clinic to collect blood for Quantiferon Gold-Interferon Gamma Release Assay (IGRA) testing. Contacts who were positive for *M. tuberculosis* infection were further evaluated and offered treatment for latent tuberculosis infection (LTBI). A second round of testing among identified contacts was conducted 10 weeks from last exposure.

Results: A total of 150 (88%) of 170 contacts were tested, six by tuberculin skin test (TST) and the rest by IGRA. One contact had already begun LTBI preventative therapy and was therefore not tested. The remaining contacts either refused testing or were unable to be reached despite extensive efforts. Of the people tested, 12 (8%) were diagnosed with LTBI and 11 received preventative therapy, all of whom completed their treatment course for a completion rate of 92%.

Conclusions and Recommendations: Due to the rural community and the young target population, there were challenges in reaching contacts such as non-working phone numbers, returned certified letters, difficulty in obtaining parental consent for minors, and inability to discuss the investigation with parents of contacts who had reached the age of 18 years. The juvenile contacts did not appear to comprehend the seriousness of the investigation. During the investigation, Qiagen reported an issue with the batch of testing tubes used during the investigation which caused a higher than expected number of indeterminate results. However, considering the impediment of reaching contacts and low compliance, testing by IGRA was the most effective form of testing compared to traditional TST, which requires a second visit to read the test result.

***Neisseria meningitidis*: Pediatric Mortality Due to Meningococcal Disease, Pasco County**

Background: Meningococcal disease is caused by the bacterium *Neisseria meningitidis*. The bacteria can be transmitted through the exchange of respiratory and throat secretions and can cause severe illness. The Florida Department of Health in Pasco County (DOH-Pasco) was notified on December 8, 2013, by the medical examiner's office of a 4-year-old child that expired due to suspected meningococcal disease.

Methods: DOH-Pasco initiated an investigation to confirm the case and identify potential contacts. A confirmed case was defined as a clinically compatible illness in a person with isolation of *N. meningitidis* from a sterile site. DOH-Pasco conducted interviews with the patient's family, hospital staff and daycare personnel. A line list was used to identify close contacts for post-exposure prophylaxis (PEP). Isolates were forwarded to the Bureau of Public Health Laboratories in Jacksonville (BPHL) for serogroup analysis.

Results: The child arrived at the emergency department by ambulance with a reported history of fever, headache, and diarrhea. A purpuric rash was noted on the face, trunk, and arms. The child was intubated after becoming unresponsive and limp. Cardiopulmonary resuscitation was initiated. The child expired within an hour of arriving to the emergency department. DOH-Pasco identified over 40 close contacts who received PEP: 22 daycare attendees, 6 teachers, 10 health care workers, 3 EMS workers, and 8 family members. On December 12, DOH-Pasco was notified by the hospital that blood cultures were positive for *N. meningitidis*. The final autopsy report confirmed death due to complications from meningococemia. BPHL later confirmed *N. meningitidis* serogroup B.

Conclusions and Recommendations: Rapid after-hours response and vigilant surveillance resulted in no additional cases during this investigation. DOH-Pasco provided educational materials to the child's family and parents of the daycare attendees. It is important for close contacts to receive post-exposure prophylaxis as soon as possible and to know the symptoms of meningococcal disease since early diagnosis and treatment can save lives.

***Rickettsia africae*: African Tick-Bite Fever Following South African Hunting Trip, Orange County**

Background: *Rickettsia africae* is causative agent of African tick-bite fever, an exotic spotted fever rickettsiosis (SFR) closely related to Rocky Mountain spotted fever (RMSF), and endemic to Africa. All SFR were added to the nationally notifiable disease list in 2010 but were not added to Florida's reportable disease list until 2014. African tick-bite fever symptoms are similar to RMSF, but it is generally a less severe infection. Unlike RMSF, patients commonly present with one or more eschars that develop at the site of a tick bite. Treatment with doxycycline is recommended for all SFR infections. Swabs of the eschar before or within 2-3 days of treatment initiation can provide a definitive diagnosis. If serologic testing is performed, the convalescent sample should be collected at least four weeks after symptom onset. In 2013, the Centers for Disease Control and Prevention (CDC) reported an increased number of African tick-bite fever cases in travelers to southern Africa. On July 3, 2013, the Florida Department of Health (DOH) Bureau of Epidemiology received a phone call from an Orange County infectious disease physician regarding a suspect case of African tick-bite fever. DOH in Orange County (DOH-Orange) was notified and initiated an investigation.

Methods: DOH-Orange requested medical records from the physician and conducted interviews with patients to determine if the case met the national case definition for SFR. Instructions were provided regarding specimen collection and confirmatory testing at CDC.

Results: The initially identified patient (Patient 1) was a 19-year-old man. Interviews identified that the patient was part of a group of six men who traveled to a lodge south of Johannesburg, South Africa, from June 14 to June 24 for a hunting trip. Members of the group did not use tick repellent and did not take the antimalarial medication prescribed for them, but did receive recommended vaccinations. Patient 1 had onset of fever and muscle aches on July 1, and developed an eschar at the site of a tick bite on his calf. Malaria smear and blood cultures were negative, as were Lyme disease and ehrlichiosis testing results. Two travel companions experiencing similar illness were identified during the investigation. Patient 2 was an 18-year-old man who had illness onset on June 28, with fever (103.3 °F), vomiting, diarrhea, rash, and a black eschar on his mid-back. He was hospitalized from

July 2 to July 5. Patient 3 was the father of Patient 1 and per family members, became symptomatic around July 1 with fever, body aches, and an eschar on the torso. Health care providers for the three patients were alerted to the suspect diagnosis of SFR and all three were treated with doxycycline and recovered. Polymerase chain reaction results from the CDC Rickettsial Zoonoses Laboratory reported the eschars from Patient 1 and 2 as positive for *R. africae*. No confirmatory testing was conducted on Patient 3.

Conclusions and Recommendations: Travel history and activities should be routinely collected during patient interviews. Clusters of African tick-bite fever are not uncommon, therefore requesting information about fellow travelers is recommended if this disease is suspected. Consultation with a travel clinic prior to international travel and adhering to the provided travel health recommendations are important preventative actions.

***Serratia marcescens*: Outbreak in a Neonatal Intensive Care Unit, Orange County**

Background: On November 2, 2012, the Florida Department of Health in Orange County (DOH-Orange) received notification of two infants with invasive *Serratia marcescens* infections at a local hospital's neonatal intensive care unit (NICU). On November 9, 2012, a third case of *S. marcescens* septicemia in an infant was reported and pulsed-field gel electrophoresis (PFGE) analysis facilitated through the Bureau of Public Health Laboratories (BPHL) on the initial two cases determined that the isolates had similar patterns.

Methods: An outbreak investigation was initiated, including case identification, review of medical and vital records, active surveillance cultures, PFGE, and recommendations on infection prevention. DOH-Orange conducted a site visit. As recommended, a point prevalence study of specific NICU pods and all new admissions was conducted by hospital staff during the month of January 2013. During the study, respiratory secretions and rectal swabs were collected for each infant.

Results: Between April 24 and November 5, 2012, positive *S. marcescens* cultures were collected from 12 infants. Positive cultures were collected from the eye (6), respiratory tract (5), and blood (3). Four of the infants had other bacteria detected in clinical cultures. Four of the 12 infants died. During two point prevalence surveys conducted in January 2013, 120 cultures were tested; three colonized infants were identified on January 7, 2013, and none were identified on January 21, 2013. The three positive isolates were submitted for PFGE; each had a distinct pattern and none matched the initial pattern.

Conclusions and Recommendations: This outbreak occurred among medically compromised infants at increased risk of infection and a point source was not identified. Improvements in universal precautions and cohorting decreased the number of cases. Based on these findings, DOH-Orange recommended cessation of the point prevalence surveillance, termination of isolation and cohorting of colonized infants, and enhanced surveillance for *S. marcescens* infections through November 2013.

***Staphylococcus aureus*: Conjunctivitis Outbreak in a Nursing Home Facility, Sarasota County**

Background: On June 25, 2013, the infection prevention nurse at a nursing home contacted the Florida Department of Health in Sarasota County (DOH-Sarasota) to report an increase of conjunctivitis among residents, several of whom had cultured positive for methicillin-resistant *Staphylococcus aureus* (MRSA). Conjunctivitis outbreaks among nursing home residents are not uncommon; however MRSA has rarely been documented as the cause.

Methods: DOH-Sarasota requested active surveillance and a line list of ill residents and staff, recommended testing of clinical specimens for viruses, and conducted a site visit. Disease control measures included placing residents with conjunctivitis on contact isolation, increasing cleaning and bleach disinfection, implementing chlorhexidine gluconate towel baths for residents, evaluating potential shared exposures (e.g., speech therapy, physical and occupational therapy, personal and facial grooming, shared makeup, laundry practices), targeted education, and increasing hand hygiene among staff. Genotyping by pulsed-field gel electrophoresis (PFGE) of the three available MRSA isolates was performed at the Bureau of Public Health Laboratories in Jacksonville (BPHL).

Results: Between May 10 and June 26, 11 (24%) of 46 residents at the facility developed conjunctivitis, with more than half occurring June 24 to 26. No staff developed illness. The infected residents ranged from 84 to 100 years old with a mean age of 94 years. No common source was identified among the infected people. Although recommended, no viral testing was performed by the facility and no clinical specimens were available for testing at BPHL. Although no clinical specimens were available for testing at BPHL, eight bacterial cultures were done at the facility. Six (75%) were positive for MRSA. Five (63%) of eight people cultured had history of previous MRSA infections. PFGE results indicated that the three isolates submitted to BPHL were different genotypes.

Conclusions and Recommendations: The epidemiologic and genotyping results support the conclusion that this outbreak consisted of viral conjunctivitis among MRSA-colonized residents. DOH-Sarasota shared these results with the facility and provided education on preventing future conjunctivitis outbreaks. Recommendations included education on appropriate laundering of clothes and shared linens, routine hand hygiene, and good eye behaviors (e.g., avoid touching or rubbing eyes, avoid sharing makeup or eyewear).

***Vibrio cholerae*: Imported Cholera Case With Transmission to a Local Health Care Worker, Miami-Dade County**

Background: On August 2, 2013, the Florida Department of Health in Miami-Dade (DOH-Miami-Dade) was notified of an imported case of suspected cholera in an 80-year-old visitor from Haiti, with subsequent transmission to a 51-year-old emergency room patient care technician (PCT). Sporadic importation of cholera cases to Florida has occurred since the start of the cholera outbreak in Haiti in 2010. Documented transmission in the health care setting is rare with no previous reports in the U.S.

Methods: Patients were interviewed using a standard gastrointestinal illness questionnaire. Specific questions addressed infection control measures used by the PCT. The infection control nurse (ICN) provided information on clinical management. DOH-Miami-Dade provided the facility with verbal and written outbreak control recommendations and verified their implementation with the ICN. Isolates were sent to the Bureau of Public Health Laboratories for confirmation and serotyping. Final strain confirmation and toxigenicity testing were performed at the Centers of Disease Control and Prevention (CDC).

Results: *Vibrio cholerae* infection was laboratory confirmed in the Haitian patient four days after admission. DOH-Miami-Dade was not notified of the case until the hospital laboratory confirmed *V. cholerae*, rather than upon initial suspicion (i.e., laboratory test order) as required. The PCT provided direct care on the day of admission and developed diarrhea and abdominal cramps the following day and worked one day while symptomatic. Appropriate personal protective equipment (PPE) was not worn by the PCT while performing an electrocardiogram that took place after bathing the patient following an episode of fecal incontinence. The PCT had no history of travel in the seven days prior to symptom onset. No new cases were reported among hospital or household contacts in the two incubation periods following the last possible date of exposure. Both patients recovered. CDC reported that both specimens were positive for toxigenic *V. cholerae* O1, serotype Ogawa, biotype El Tor, the outbreak strain circulating in Haiti.

Conclusions and Recommendations: Untimely reporting delayed provision of recommendations and demonstrated the need for education of hospital staff on current requirements to immediately report cholera cases upon initial suspicion or laboratory test order. Hospital transmission of cholera likely occurred due to lack of or inappropriate use of PPE while rendering direct patient care. To avoid transmission in the health care setting, strict compliance with contact precautions is essential when handling patients with diarrheal illnesses. Employees with diarrheal illness should be excluded from work.

Parasitic Diseases

***Babesia microti*: Imported Babesiosis Presenting as Suspected Local Malaria, Palm Beach County**

Background: Babesiosis is a tick-borne illness caused by several different species of protozoa in the genus *Babesia*. *Babesia microti* is the most common and severe cause of human babesiosis in the U.S., and is found predominantly in the Northeast and upper midwestern states. Under the microscope, *B. microti* appears nearly identical to the malaria parasite *Plasmodium falciparum*. Treatment for babesiosis typically includes a combination of atovaquone and azithromycin, or clindamycin and quinine. In 2013, the Florida Department of Health (DOH) in Palm Beach County (DOH-Palm Beach) investigated two cases of suspected local malaria that were later identified as babesiosis. Malaria introductions have occurred in Palm Beach County in the past.

Methods: Medical records were requested from the treating health care facilities, and DOH-Palm Beach conducted interviews with patients or their proxies to determine if local introduction of malaria had occurred.

Results: DOH-Palm Beach Epidemiology was notified of the first suspected case on August 8 by a local hospital infection preventionist. The 82-year-old man was admitted with a diagnosis of pneumonia after being seen at a hospital emergency department on August 7. The patient's symptom onset was July 7, 2013 and included fever, chills, myalgia, and thrombocytopenia. *Plasmodium* species were reportedly seen on one blood smear. The patient's wife reported domestic travel to Missouri, Washington D.C., and New York in June. Outdoor activities included visiting a state park in Missouri, a coastal park in New York, and participating in an outdoor camera club. The patient did not complain of being bitten by mosquitoes, but the wife reported that mosquitoes and ticks were present in some of the areas they visited. The patient reportedly had not been outdoors in the Palm Beach County area in the four weeks prior to onset. The patient was treated with quinine and doxycycline while the lab confirmation was pending. On August 13, the Bureau of Public Health Laboratories (BPHL) in Jacksonville reported that samples were positive for *Plasmodium falciparum*. Based on the initial laboratory findings, the Palm Beach Mosquito Control District was contacted and reported no *Anopheles* mosquito activity in the area near the patient's home. Additional traps were set in the patient's neighborhood that same evening. DOH requested testing for *Babesia* at the Centers for Disease Control and Prevention (CDC) due to the discrepancy between the date of onset and travel history. On August 27, the CDC laboratory reported the specimen was positive for *B. microti* by polymerase chain reaction. The patient was discharged on August 27.

DOH-Palm Beach was notified of a second suspected case on September 10 by a different local hospital infection preventionist. The patient was a 61-year-old woman admitted with fever, cough, pancytopenia, and myalgia. *Plasmodium* species were found in blood smears, and samples were immediately forwarded to BPHL in Miami for confirmation and typing. The patient's husband was interviewed and reported that the patient had no recent international travel but did travel to New Jersey in May 2013. The patient was exposed to ticks while in a wooded area in New Jersey. On September 11, BPHL in Miami notified DOH-Palm Beach that the samples did not look like

Plasmodium; DOH-Palm Beach requested additional laboratory testing for *Babesia*. On September 12, BPHL in Miami confirmed that *Babesia* was identified. The patient was subsequently treated for babesiosis.

Conclusions and Recommendations: Travel history and activities, as well as illness onset date and sample collection date, should be routinely collected during patient interviews. This information should be included with specimens submitted to laboratories to optimize testing. Florida has a significant number of domestic and international visitors; thus, clinicians need to be aware of both endemic and non-endemic reportable conditions. This is especially important when laboratory diagnostics are challenging as in this situation where *Babesia* and *Plasmodium* are nearly indistinguishable.

***Cryptosporidium* Species: Cryptosporidiosis Outbreak Investigation Involving Swimming Lessons at a Local Pool, Hillsborough County**

Background: On October 2, 2013, the Florida Department of Health in Hillsborough County (DOH-Hillsborough) received two positive *Cryptosporidium* laboratory reports for children. Interviews indicated that these children had two shared exposures, including a local hotel indoor pool where they took swimming lessons, and a daycare. A third symptomatic person associated with the pool was identified. In response to this cluster of illnesses, an outbreak investigation was initiated.

Methods: Interviews were conducted by DOH-Hillsborough. A list of swimming lesson attendees provided by the swimming school instructors was used to perform active case finding. A confirmed case was defined as a person who attended swimming lessons at the identified hotel pool who tested positive for *Cryptosporidium*. A probable case was defined as a person who developed diarrheal symptoms after attending swimming lessons at the identified hotel pool who did not have laboratory testing. An environmental assessment was conducted by DOH-Hillsborough on October 3 at the hotel pool.

Results: Fifteen people met the case definition (eight confirmed and seven probable). Reported symptoms included diarrhea (100%), abdominal pains (60%), fever (46%), vomiting (27%), and anorexia (13%). Cases had onset dates ranging from September 10 to October 11. Results from the pool inspection identified several deficiencies: the water was cloudy, the main drain was not visible, the flow meter was missing, and no current pool log was being maintained. Hotel management denied any recent fecal accident, however this information could not be verified. The pool had been hyperchlorinated at the time of the October 3 environmental assessment, therefore water sampling was not done. Despite instructions to wait for re-inspection, the pool opened prematurely and interviews indicated that symptomatic children attended swimming lessons after the pool had been treated. This resulted in the pool being closed a second time and retreated prior to reopening.

Conclusions and Recommendations: A recreational waterborne *Cryptosporidium* outbreak was associated with swimming lessons held at a hotel pool. Environmental field visits to the swimming pool identified several deficiencies. Inadequate pool filtration and failure to maintain a pool log may have contributed to this outbreak along with allowing symptomatic attendees to continue to participate in swim lessons. Recommendations made to the hotel management included constant monitoring of pool chemicals and conditions and maintenance of a pool log. In addition, the swimming lesson staff should exclude any identified symptomatic children and ask parents of attendees to indicate that their children have been asymptomatic for at least two weeks prior to allowing them back into the class.

***Cyclospora cayetanensis*: Multistate Cyclosporiasis Outbreak**

Background: During July 2013, the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA) began coordinating a multistate investigation into an increase in cyclosporiasis cases in Iowa and Nebraska. A number of other states also began reporting an increase in the number of cyclosporiasis cases. The CDC issued an outbreak-specific questionnaire to help identify cases associated with this multistate outbreak. FDA assisted state and local public health in traceback activities to identify the source of the outbreak.

Methods: The Florida Department of Health (DOH) began interviewing all newly reported cyclosporiasis cases using the outbreak-specific questionnaire. Questionnaires were reviewed to identify commonalities and information was shared with CDC and FDA on regularly scheduled conference calls.

Results: A total of 631 cases from 25 states were identified for this multistate outbreak. A total of 59 people were hospitalized but no deaths were reported. Cluster investigations conducted in Nebraska and Iowa identified a linkage between cases and consumption of a salad mix that was produced by Taylor Farms de Mexico. Additional investigation into Texas cases identified a link between fresh cilantro consumption and illness. DOH reported a total of 33 cases likely associated with this multistate outbreak, although a clear consumption history to either implicated product was not required for this outbreak due to the long incubation period and waxing and waning of symptoms, leading to difficulty recalling food products consumed.

Conclusions and Recommendations: Only one reported restaurant cluster involving three cases was investigated by DOH. This restaurant did not use fresh cilantro or the implicated bagged salad mix. Some Florida residents did consume the salad mix implicated by Iowa and Nebraska, which was likely the source of their infection. The implicated lot of bagged salad mix was not uniformly distributed throughout Florida. It is likely some of Florida's 33 cases were expected background cases and not actually associated with the outbreak.

***Naegleria fowleri*: Primary Amebic Meningoencephalitis, Glades County**

Background: On August 8, 2013, the Florida Department of Health (DOH) Bureau of Epidemiology (BOE) received an email from the Centers for Disease Control and Prevention (CDC) stating they were working with the intensive care unit team at a local hospital in Miami regarding a 12-year-old boy with suspected primary amebic meningoencephalitis (PAM) caused by *Naegleria fowleri* infection. CDC was coordinating sample collection and release of the investigative drug miltefosine to the hospital. The boy was a resident of Glades County. In response to this notification, BOE notified DOH in Glades County (DOH-Glades) and an outbreak investigation was initiated.

Methods: A joint investigation was conducted by DOH in Miami-Dade County (DOH-Miami-Dade), DOH-Glades, and BOE. Medical records were reviewed by the investigation team. An environmental site assessment to collect information regarding exposure source was conducted by DOH-Glades. A cerebral spinal fluid sample was sent to the CDC reference laboratory for confirmation on August 8. A case was defined as a clinically compatible illness in a person with laboratory confirmation.

Results: According to the patient's history, the boy played in a 2-3 foot ditch filled with rainwater that was knee-high 3-4 days prior to onset of symptoms on August 4. On August 9, CDC confirmed the presence of *N. fowleri* by polymerase chain reaction. The patient was treated with a number of medications, including the investigational drug miltefosine, prior to laboratory confirmation. Neurological tests found no brain activity. Life support was withdrawn and the boy expired on August 24. During an environmental assessment conducted on August 12, the air temperature was 91-92 °F and the temperature of water in the ditch was 98 °F with depth ranging about 2-3 feet.

Conclusions and Recommendations: This is a single fatal case report of a 12-year-old boy diagnosed with PAM from *N. fowleri*. On August 12, DOH-Glades issued a press release warning that a case of PAM was reported in Glades County and highlighting the risks of swimming in freshwater lakes, ponds, and canals. *N. fowleri* can infect people when water containing the amoeba enters the body through the nose and migrates to the brain. Infection is rare and typically occurs when people go swimming or diving in warm freshwater places, like lakes and rivers. Even more rarely, infections have been reported when people submerge their heads, cleanse their noses during religious practices, or irrigate their sinuses (nose) using contaminated tap or faucet water.

Viral Diseases

Dengue Virus: Outbreak Investigation Following a Cluster of Three Locally Acquired Dengue Fever Cases, Martin County

Background: A cluster of three locally acquired dengue fever cases was reported by a local hospital to the Florida Department of Health (DOH) in August 2013. Enhanced mosquito control efforts were implemented immediately. Active surveillance, including a seroprevalence survey, and outreach was initiated to identify additional cases, determine the extent of the outbreak, and to determine if transmission was continuing.

Methods: All suspect cases and serosurvey participants were interviewed to obtain symptoms, date of onset, and recent travel history. Mosquito control officials were provided relevant information for surveillance and control efforts. Local physicians and medical facilities were reminded to report suspect cases of dengue fever to the appropriate county health department (CHD), and a dengue training developed by the Centers for Disease Control and Prevention (CDC) for physicians was provided in two hospitals. The public was encouraged to drain standing water from their property, take mosquito bite precautions, and report to their health care provider if they experienced a febrile illness. Active case finding included outreach to homeless people in the impacted area, encouraging people who thought they might have dengue fever to directly contact the CHD (who were then directed to their health care provider if currently ill or offered free dengue testing if the illness was resolved), creating a query to search the DOH syndromic surveillance system for chief complaints and discharge diagnoses consistent with dengue fever, and conducting a seroprevalence survey in September. Serum samples from suspect cases and serosurvey participants were tested using dengue immunoglobulin M and immunoglobulin G enzyme-linked immunoassays, reverse transcriptase polymerase chain reaction assays and plaque reduction neutralization tests as appropriate. All testing was performed at the Bureau of Public Health Laboratories in Tampa and Jacksonville.

Results: Specimens from 140 patients submitted for diagnostic testing and 396 serosurvey participants were tested from August 2 to October 31. Testing identified 28 laboratory-positive infections of dengue virus (DENV-1). Twenty-one cases were identified through hospital submissions, self-reporting, active, and syndromic surveillance. The serosurvey identified an additional seven infections, four of which were asymptomatic and therefore did not meet the Florida surveillance case definition. Of the 28 identified infections, the four asymptomatic infections and two cases in residents of other states were not counted as Florida dengue fever cases for this report. Ages ranged from 4 to 74 years old; ten infections (36%) were in women, 18 (64%) were in men. All had outdoor exposure in at least one of two epicenters in the northern part of Martin County. Individuals with dengue infections were identified by self/family reporting directly to the CHD (11, 39%), hospital or physician reporting (9, 32%), syndromic surveillance (1, 4%), and serosurvey (7, 25%). The serosurvey determined that approximately 2.1% of the residents of Martin County were infected with DENV. In the serosurvey, individuals that used DEET-containing repellents were less likely to be infected with dengue. However, only 13% of survey participants said that they always use any mosquito repellent when outdoors.

Conclusions and Recommendations: Self/family reporting identified the highest number of cases followed by hospital or physician reporting. Effective communication and outreach to local partners and the public were critical to successful outbreak surveillance and response in Martin County. The major findings from the serosurvey and outbreak investigation reinforce “Drain and Cover” practices as the best personal prevention practices against dengue and other mosquito-borne infections.

Influenza A Virus: High Morbidity in Unvaccinated Pregnant Women at One Hospital, Escambia County

Background: On December 2, 2013, the Florida Department of Health (DOH) in Escambia County (DOH-Escambia) received correspondence from a local hospital-based obstetrician concerned about several severely ill pregnant women with positive influenza A laboratory results. On December 5, four severely ill pregnant women who were all positive for influenza A (2009 H1N1) all delivered prematurely. Three of these women were admitted to the intensive care unit (ICU) post-delivery due to respiratory distress and two women were transferred by air ambulance to the University of Alabama, Birmingham (UAB) Medical Center for extracorporeal membrane oxygenation (ECMO). On December 6, two additional pregnant women, both positive for influenza A, were admitted due to respiratory complications.

Methods: A case definition was established for the apparent outbreak. DOH-Escambia coordinated with the infection preventionists locally and in Alabama to gather hospital daily record updates on the mothers and their premature infants. Active surveillance was implemented to identify additional pregnant women admitted to ICUs with respiratory distress due to influenza A.

Results: Six women required hospital admission prior to expected delivery dates (average 30.4 weeks gestational age). Four delivered premature infants (average 6.9 weeks prior to due date). Two required transfer to UAB for ECMO treatment. One mother expired after several weeks of treatment. All babies survived and are reportedly doing well. All six women were unvaccinated and confirmed to have influenza A (2009 H1N1). A separate investigation confirmed that this many severe cases of influenza represented an outbreak among pregnant women in Escambia County.

Conclusions and Recommendations: Influenza is more likely to cause severe illness, hospitalization, and death in pregnant women. Pregnant women with influenza also have a greater chance for serious problems for their unborn baby. During this investigation, DOH-Escambia implemented and collaborated on multiple outreach interventions to assist with community educational efforts regarding vaccination of pregnant women. The Florida Medicaid program opened funding to provide influenza vaccine to all Medicaid-eligible pregnant women. DOH recommends that everyone six months and older should receive influenza vaccine, especially adults 65 years and older, children 5 years and younger, pregnant women, and caregivers of infants under 6 months of age. Recommendations included removing obstacles to receiving vaccine, including insurance reimbursement, access, and increased education.

Influenza A Virus: Influenza A (2009 H1N1) Outbreak in a Correctional Facility, Martin County

Background: On July 22, 2013, the Florida Department of Health in Martin County (DOH-Martin) was notified that 11 inmates and one staff member were ill with symptoms of influenza-like illness (ILI) at a correctional facility housing 1,300 inmates and employing 380 staff members. Controlling disease spread in this setting can be challenging due to population density, low vaccination rates, inmate turnover, high prevalence of people at high risk for severe disease, and lack of access to vaccines and antiviral medications. DOH-Martin collaborated with the facility to control the outbreak and identify the causative agent.

Methods: Outbreak response included review of patient records and surveillance for new cases. A case of ILI was defined as a person having a fever >100 °F plus cough or malaise. Viral transport media kits were provided to the correctional facility for nasopharyngeal sample collection. Control measures included cohorting of symptomatic inmates and exclusion from the cafeteria and gym. Isolation orders were lifted 48 hours following symptom resolution. Ill staff members were excluded from work until afebrile for 24 hours. Respiratory droplet precautions and hand hygiene were emphasized.

Results: Fifteen (1.2%) inmates and one (0.26%) staff member met the criteria for ILI; one inmate was hospitalized and died. Symptom onset dates ranged from July 19 to 23. Four nasopharyngeal and one endotracheal specimens were submitted to the Bureau of Public Health Laboratories; four were positive for influenza A (H1N1) by polymerase chain reaction. Vaccination status of inmates and staff could not be verified by the facility. Standard operating procedure was to provide influenza vaccines to high-risk inmates; staff vaccination records were not maintained. No inmates received antiviral medications.

Conclusions and Recommendations: Influenza can cause severe illness and even death in otherwise healthy people, as occurred in this outbreak. Early detection of the outbreak and institution of control measures within 48 hours were crucial for curtailing further disease transmission at this facility. Recommendations for improvement included maintaining adequate stocks of influenza vaccine and antiviral medications, offering influenza vaccinations to all inmates and staff, maintaining accessible vaccination records, and using antivirals for treatment and chemoprophylaxis per Centers for Disease Control and Prevention guidelines.

Measles Virus: Locally Acquired Household Outbreak of Measles, Orange County

Background: On January 11, 2013, the Florida Department of Health in Orange County (DOH-Orange) received notification from a teacher at an early childhood learning center regarding an unvaccinated student with suspected measles. The parent was interviewed and reported that the four children had measles-like symptoms. In response to this report, DOH-Orange immediately initiated an outbreak investigation.

Methods: The outbreak investigation included case and contact identification, review of vaccination records and other risk factor information, specimen collection, isolation and quarantine advisement, and enhanced surveillance. DOH-Orange notified administration and parents at the childhood learning center and charter school attended by the siblings. Facilities and organizations where the children participated in extracurricular activities were notified. A notification was faxed to medical providers in Orange County for enhanced surveillance efforts. Enhanced surveillance for one incubation period after the initial exposure to the case was recommended. Clinical samples were obtained from three siblings (blood [2], throat swabs [3], and urine sample [1]) and forwarded to the Bureau of Public Health Laboratories in Jacksonville for measles virus molecular and serologic analysis. Positive specimens were forwarded to the Centers for Disease Control and Prevention (CDC) for sequencing and genotyping.

Results: All four siblings met the clinical case definition for measles. Dates of illness onset ranged from December 28, 2012 to January 12, 2013. Specimens from three children were positive for measles by polymerase chain reaction. Genotyping at the CDC identified measles virus, genotype D8. The virus was identical to that found in a 20-year-old man from Brazil who visited various Florida theme parks between December 6, 2012 and December 21, 2012 and was diagnosed with measles upon returning to Brazil. The children visited a theme park on December 15, 2012, but it is unknown if the Brazilian man visited the same park as the children. Similar genotype D8 measles viruses were also detected in the United Kingdom around the same time. Three unvaccinated attendees at a daycare attended by one of the siblings underwent voluntary quarantine. No secondary measles cases were detected among the children's contacts.

Conclusions and Recommendations: This outbreak occurred among family members. Exposure is hypothesized to have occurred during a visit to a local theme park. The source case was likely a confirmed case in a Brazilian visitor who visited local theme parks around the same time. There is an ever-present threat of measles importation into Florida from travelers arriving from countries where measles is endemic. Routine childhood measles vaccination would have prevented this outbreak and the subsequent comprehensive public health investigation.

Measles Virus: Measles Case in a United Kingdom Resident, Orange County

Background: On Tuesday, July 23, 2013, the Florida Department of Health in Orange County (DOH-Orange) was notified by a medical concierge service of a 15-year-old girl visiting from the United Kingdom (U.K.) clinically diagnosed with measles. She had been exposed to a confirmed case of measles in the U.K. on July 6. After the exposure, the girl and her 19-year-old brother received their first dose of measles, mumps, and rubella (MMR) vaccine on July 11. On July 15, the case and family traveled to Florida. Symptom onset occurred on July 19 with fever, rash, sore throat, and lethargy. Recommendation for isolation by the medical concierge was disregarded by the family.

Methods: On July 23, DOH-Orange collected samples from the girl and family members and reiterated the isolation recommendation. The Centers for Disease Control and Prevention Quarantine Station was informed of an identified airline exposure.

Results: The case was positive for measles by polymerase chain reaction on July 24. Her father reported history of the disease and this was confirmed with a positive measles immunoglobulin G (IgG) test. The girl's 19-year-old brother tested negative for measles IgG. The family was scheduled to return to the U.K. on July 25; however, the brother was quarantined for 21 days after the last date of exposure to his sister. The brother had blood redrawn after the second MMR dose, but was found not to be immune and thus continued quarantine in Florida. The girl's activities during her infectious period included airline travel, theme park resort stay, and visits to various local attractions and businesses. There were two families identified in Orange County who had airline travel with close proximity to the case; they were evaluated for vaccination status, immunity status, and assessment of symptoms. No secondary cases were identified. A notification letter was provided to each exposure setting in the attractions area with recommendations for contact notification, follow-up, and exclusion. A measles health alert was sent to local health care providers on July 25 and the media was notified through a press release.

Conclusions and Recommendations: The steps taken in this response are consistent with measles control and prevention. However, the quarantine of the contact in his non-home country resulted in questions on procedures for long-term quarantine. The British Embassy was contacted to assist with housing costs and other infectious disease programs were contacted to advise on certain aspects of long-term quarantine. Since the contact purchased travel insurance, these questions on financial responsibility burden fell onto the travel insurance company.

Rabies Virus: Public Health Response to Human Rabies Associated With an Organ Transplant, Broward, Escambia, Okaloosa, and Santa Rosa Counties

Background: Cases of clinical rabies in people are rare in the U.S., with an average of 1-3 cases identified annually. Fatality rate for clinical infections approaches 100%. In 2013, a Maryland resident died from rabies 18 months after receiving a kidney transplant. The donor was a North Carolina resident currently living in Escambia County, Florida at the time of his death in 2011. Rabies was retrospectively diagnosed in the donor using archived tissues; both donor and recipient were found to be infected with raccoon rabies virus variant. These findings triggered a multi-agency public health

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response to identify and provide prophylaxis to three surviving people who had received organs from the same donor, identify the likely source of donor exposure, and identify people potentially exposed to the infected donor and recipient.

Methods: Public health response involved multiple agencies including local and state health departments, public and military hospitals, the organ procurement agency, Centers for Disease Control and Prevention (CDC), and multiple branches of the military. Three surviving recipients were notified and treated by their transplant facility. Most exposure assessments involved hospital staff and were initially conducted internally, with review and follow-up questions by county and state health department staff. The organ procurement organization conducted interviews of laboratory and surgical staff involved with organ harvesting and transplant procedures. County or state health department staff conducted interviews of family, friends, and other non-hospital related contacts of the decedents. Relevant information was shared in daily multi-agency conference calls coordinated by CDC, as well as smaller Florida-specific calls. Shared press releases were coordinated by CDC. Social media was used to track contacts who could not be reached through more traditional methods.

Results: Three surviving organ recipients including a Florida resident received rabies post-exposure prophylaxis (PEP) and developed appropriate antibody response with no signs of illness. The donor likely acquired the rabies infection in North Carolina. During the 18 months prior to onset, the donor reportedly hunted and trapped raccoons in North Carolina, and had been bitten twice by raccoons without seeking medical care. PEP was recommended for 58 (10%) of 564 contacts who were assessed through the course of the investigation. Thirteen additional contacts deemed non-exposed requested and received PEP through their employers. Notification for approximately 90% of contacts was complete within six days of recipient diagnosis and ten days of donor diagnosis. No additional rabies infections occurred.

Conclusions and Recommendations: Rabies is a rare infection but should always be considered by clinicians in cases suggestive of encephalitis, particularly if organ donation is being considered. Rapid and coordinated information sharing is critical for timely and effective public health responses during multi-agency investigations.

Varicella Zoster Virus: Viral Meningitis in an Adult, Pinellas County

Background: On April 10, 2013, during routine surveillance of emergency department data using Florida's syndromic surveillance system, the Florida Department of Health in Pinellas County (DOH-Pinellas) identified a 25-year-old woman diagnosed with varicella meningitis.

Methods: DOH-Pinellas initiated an investigation and collected medical records from the hospital. An interview was conducted with the patient. Contacts were identified to provide control measures and recommend prophylaxis, as needed.

Results: Upon review of medical records, it was found that the woman was admitted to the intensive care unit (ICU) on April 9 after presenting to the emergency department with a severe headache, photophobia, and some neck stiffness. She had onset of a rash a few days prior to her visit. Physical exam identified multiple crops of erythematous lesions with scabbing and multiple stages of healing on her face, trunk, and extremities. She reported that she was diagnosed with chicken pox by her primary care provider the day before. At that time, she was prescribed an antiviral therapy; however, she was unable to fill the prescription and treatment was delayed. While in the ICU, the woman was placed on airborne droplet and contact precautions. A lumbar puncture was performed and cerebrospinal fluid collected was positive for varicella zoster virus (VZV). The patient was treated with intravenous acyclovir for a total of 14 days. The patient reported receiving the varicella vaccine as a young child. Her only possible exposure was visiting a local theme park two weeks prior to her symptom onset.

Conclusions and Recommendations: Although serious infections like this one may be uncommon, severe complications from VZV are possible. The varicella vaccine is effective in preventing illness and prompt treatment with antiviral medications can reduce the severity of symptoms. Two doses of varicella vaccine are currently recommended for children, adolescents, and adults without evidence of immunity to varicella. Close contacts of known cases should be evaluated for history of vaccination or prior infection. Varicella vaccine provided within 120 hours of exposure may prevent or modify the illness. Persons at high risk for complications from a varicella infection can be provided varicella-zoster immune globulin by their medical providers to prevent severe disease.

Non-Infectious Agents

Carbon Monoxide: A Cluster of Confirmed Carbon Monoxide Poisonings Among Warehouse Workers, Hendry County

Background: Carbon monoxide (CO) poisoning is a condition that results from inhalation and absorption of CO gas. CO is an odorless, colorless gas produced by fuel burning devices. Exposure to high levels of CO or low-level exposure for an extended period of time can cause loss of consciousness and death. On March 8, 2013, emergency personnel responded to an agricultural warehouse in Hendry County regarding multiple people complaining of headache, nausea, and vomiting. CO levels were detected at 375 parts per million (ppm) inside the warehouse, well above the recommended level of 50 ppm. Twenty-three people were transported to the hospital. On March 15, the Florida Department of Health in Hendry County (DOH-Hendry) was notified of another occurrence of CO exposures at the same facility. CO levels measuring 101 ppm were detected. Seven employees were transported to the hospital.

Methods: DOH-Hendry initiated an investigation including review of medical records, patient interviews, and assessment of the work environment. A confirmed case was defined as a person with symptoms consistent with acute CO poisoning and an elevated carboxyhemoglobin (COHb) blood level ($\geq 9\%$) or a person with symptoms consistent with acute CO poisoning with supplementary evidence in the form of environmental monitoring data.

Results: From the initial incident, 22 cases of confirmed CO poisoning were identified in 14 Hispanic women and eight Hispanic men. COHb blood levels ranged from 6.4% to 21.3% (note that people with COHb levels $< 9\%$ still meet the case definition due to environmental data). Symptoms included headache, nausea, dizziness, shortness of breath, vomiting, and visual disturbance. Seven additional people, six Hispanic women and one Hispanic man, were determined to meet the case definition following the second incident. The cause was determined to be a malfunctioning regulator on a propane-fueled forklift operating inside the warehouse. It was also reported that workers inside the warehouse closed all doors to keep warm as temperatures dropped.

Conclusion and Recommendations: The facility was closed until CO detectors could be installed throughout the facility and the malfunctioning forklift was repaired. CO can build up to dangerous concentrations indoors. To prevent CO poisonings from forklifts or other gas-powered equipment, it is important to consider the use of electrical equipment indoors.

Unknown Chemical: Foodborne Illness Associated With Popsicles, Orange County

Background: On August 22, 2013, the Florida Department of Health in Orange County received a complaint of two people who described symptoms consistent with a chemical exposure immediately after consuming popsicles purchased from Walmart. A public health outbreak investigation was initiated to identify the source and etiologic agent and prevent additional cases.

Methods: Cases were interviewed to elicit detailed information on clinical presentation and exposure data. Surveillance was performed via Florida Poison Information Center Network county health department foodborne illness logs. A case was defined as a person who experienced tingling, numbness, burning or a metallic taste in the mouth, throat, or lips following consumption of Budget Saver Sugar Free Popsicles. Open and unopened samples of the implicated product, banana and piña colada flavored popsicles, were collected for laboratory analysis by the Bureau of Public Health Laboratories (BPHL).

Results: No other complaints were received with similar symptoms or exposures. Both people met the case definition. Symptoms reported included a burning sensation of the mouth and lips (2), metallic taste (2), numbness (1), tingling (1), and abdominal cramps (1). Illness onset was immediately after consuming the popsicles on August 19 at 6 p.m. and symptoms lasted approximately 1.5 hours. Medical treatment was not sought. The popsicles had an expiration date of January 14, 2015. BPHL found no evidence of pesticides. The open partially consumed banana popsicle contained 134 milligrams per kilogram (mg/kg) sodium and 4,513 mg/kg calcium and the partially consumed piña colada popsicle contained 88.2 mg/kg sodium and 2,296 mg/kg calcium. The unopened popsicles contained significantly less amounts of sodium and calcium.

Conclusions and Recommendations: These two illnesses appear to be associated with the consumption of popsicles. The symptoms described by the cases are consistent with other documented chemical poisonings attributed to ingestion of popsicles. Calcium chloride is generally used in a brine to freeze popsicles during the production process. Calcium chloride is a known irritant to the skin, eyes, and respiratory tract. Care must be taken by the manufacturer to ensure that none of this brine solution comes into contact with the finished product. It is hypothesized that either the solution was not rinsed off these particular popsicles or the freezing solution was splashed onto the product after release from the molds used to shape the popsicles. The cleaning of food products and equipment must be in accordance with established procedures at all times to protect the public from accidental exposure to harmful substances.

Other or Unknown Etiology

Histamine: Scombroid Poisoning Outbreak, Hillsborough County

Background: The Florida Department of Health in Hillsborough County (DOH-Hillsborough) identified a cluster of illnesses in people with similar symptoms and exposures for scombroid poisoning through reviewing syndromic surveillance data. The cluster involved four people who dined at a local restaurant in Hillsborough County on May 1, 2013. Three people experienced histamine-type reactions within 30 minutes of consuming tuna and a fourth person who had only one bite of the fish experienced mild headache, red flushing of the face, itching, and tingling within 1.5 hours. Reporting information was also received from the Florida Poison Information Center Network. In response to this incident, DOH-Hillsborough initiated an outbreak investigation.

Methods: DOH-Hillsborough interviewed the symptomatic people. A joint environmental assessment of the restaurant was conducted with the Florida Department of Business and Professional Regulation. A case was defined as a person who dined at the identified restaurant with symptoms consistent with a histamine-type reaction after consuming tuna on May 1.

Results: Four cases met the case definition. Reported symptoms included skin flushing (100%), headache (100%), itching (100%), and diarrhea (75%). The onset of symptoms ranged from 30 minutes to 1.5 hours. Symptoms lasted an average of four hours with a range of three to eight hours. All four people took antihistamine medication to alleviate symptoms associated with this illness. None of the ill people sought medical treatment. Results from the environmental assessment identified that

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all of the cold-holding food temperatures were satisfactory. The preparation of the tuna included thawing in a cooler at 39 °F, searing, and placing on a bed of lettuce with cilantro, broccoli, avocado, and wasabi.

Conclusions and Recommendations: Scombroid fish poisoning results from consuming spoiled or decaying fish. It is often associated with fish that are not adequately refrigerated or preserved after being caught. The decaying fish produce histamine which causes an illness consistent with an allergic reaction. Histamine is not destroyed by normal cooking temperatures. It appears that a foodborne outbreak occurred associated with consumption of tuna at a local restaurant in Hillsborough County on May 1. The identified onset of illness was temporally clustered indicating a common source exposure. The incubation period, symptomology, and duration of illness suggest scombroid fish poisoning. It is not clear where the temperature abuse occurred in the distribution chain of the identified product. Traceback by the Florida Department of Agriculture and Consumer Services identified that the frozen tuna was imported from Indonesia.

Saxitoxin: Summary of Three Saxitoxin Fish Poisoning Cases, Hillsborough, Indian River, and St. Lucie Counties

Background: During September and October 2013, three separate cases of saxitoxin fish poisonings (SFP) were reported to the Florida Department of Health. A review of the cases was conducted to describe the epidemiology of these three separate incidents.

Methods: Information from the county health departments was reviewed along with all records in the state reportable disease surveillance system to summarize findings.

Results: Three separate incidents of SFP were investigated during 2013. All three people were hospitalized for their illness. Two of the three cases were in women. Two of the cases were in Asians and one case was in a white person. The cases were 30, 35, and 60 years old. The three people resided in Hillsborough, Indian River, and St. Lucie counties. Time to onset was 2 hours for one person, 5.5 hours for another person, and unknown for the third person. Symptoms of cases included diarrhea, vomiting, dizziness, lightheadedness, ataxia, numbness, tingling, and nausea. Two of the people harvested puffer fish locally, one from the west side of the Indian River Lagoon and the other from a water body in Palm Beach County. The third person's mother sent her dried puffer fish from China through the mail.

Conclusions and Recommendations: These three illnesses appear to be associated with the consumption of puffer fish. The symptoms described by the cases are consistent with other documented saxitoxin poisonings. One person reported that they were unaware of the health risks associated with eating puffer fish and another person reported consuming this type of fish for 40 years with no previous issues. Continued education of Florida fisherman is needed to ensure they are aware of the risks associated with consumption of puffer fish. The Florida Fish and Wildlife Conservation Commission prohibit the taking of puffer fish from waters in Volusia, Brevard, Indian River, St. Lucie, and Martin counties.

Undetermined: Foodborne Illness Outbreak at a Local Restaurant, Pinellas County

Background: On December 2, 2013, the Florida Department of Health in Pinellas County (DOH-Pinellas) received two complaints of possible foodborne illness related to a Thanksgiving Day meal served on November 28 at a local restaurant. Early information indicated symptoms of diarrhea and abdominal pains after consuming the holiday meal. An investigation was initiated immediately to determine the potential source of infection and identify any additional cases.

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Methods: Interviews were conducted with the diners. Syndromic surveillance data from local hospital emergency departments were reviewed from November 28 through December 4 to identify cases. Follow-up was conducted with any patient who presented with a chief complaint or discharge diagnosis of “food poisoning.” Stool specimen submission was requested from diners who were still ill at the time of interview. On December 4, the Florida Department of Business and Professional Regulation and DOH-Pinellas conducted a joint inspection of the restaurant. A case was defined as anyone who became ill with diarrhea or abdominal pain after consuming food from the restaurant on or after November 28.

Results: A total of 16 people were interviewed and 14 were found to meet the case definition. Cases ranged in age from 20 to 74 years old; eight (57%) of the cases were in women, and four (29%) people sought medical treatment. The most commonly reported symptoms were diarrhea (100%) and abdominal cramping (71%). The time to onset time ranged from 6.5 to 14.5 hours and illness duration ranged from 12 to 132 hours. One stool specimen was tested but was negative for norovirus and other enteric pathogens. Several food temperature violations were identified during the restaurant assessment including a 24-hour notice to fix a walk-in cooler with a temperature of 45 °F. From information obtained, the turkey preparation for the Thanksgiving Day meal began several days prior and continued until the morning of November 28. The turkey was cooked to an internal temperature of 165 °F, sliced into large pieces, and placed into large containers stored in the walk-in cooler. The turkey was not rapidly cooled as required by food code. Additionally because the walk-in cooler was not at the proper temperature, the turkey may have remained warm for an extended period of time.

Conclusions and Recommendations: It appears that a foodborne outbreak was associated with the restaurant between November 28 and December 2. The onset of illness for the cases was temporally clustered, indicating a common source exposure. The incubation period, symptomology, and duration of illness suggested a bacterium, possibly *Clostridium perfringens*. No single food item was identified as responsible for the illnesses, but the temperature violations observed at the restaurant provided the opportunity for multiple items to become contaminated.