

Section 6

Notable Outbreaks and Case Investigations

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Bacterial Diseases

***Bacillus anthracis* — Imported Inhalation Anthrax — Pinellas County**

Background: Inhalation anthrax is a rare, frequently fatal infection. On August 6, 2011, the Minnesota Department of Health (MN DOH) identified *Bacillus anthracis* isolated from the blood of a Florida resident who had vacationed in five northern Midwestern states.

Methods: The patient and his wife were interviewed, environmental samples were tested for *B. anthracis*, and the patient's isolate was genotyped. Enhanced surveillance for veterinary and human cases was performed in states visited by the patient, consisting of queries of veterinary diagnostic and reference laboratories for anthrax cases in animals and queries of the National Animal Health Lab Network (NAHLN) and the Laboratory Response Network (LRN) for *Bacillus* species isolates for the period June 1, 2011 to August 31, 2011.

Results: The patient was successfully treated with antimicrobials and anthrax immunoglobulin and was discharged home after a 25-day hospitalization. Possible exposures to anthrax spores in areas where *B. anthracis* is naturally endemic included inhaling dust stirred up by American bison or during rock collecting, preparing fishing flies using hair from hooved animals, and handling antlers. No *B. anthracis* was detected from environmental samples submitted for testing, including samples collected from the patient's home in Pinellas County, Florida. The *B. anthracis* strain was identified as GT-59; no animal cases with this strain or other human cases were identified.

Conclusions: Rapid identification of the organism and aggressive treatment likely contributed to patient survival. Although he had visited areas where anthrax is enzootic and had multiple exposures to soil and animal products, specific causal exposure was not able to be determined. Comprehensive surveillance through multiple networks and systems was useful to assess for missed animal and human cases. Utilizing a "One Health" approach, which incorporated veterinary and human health, and investment in the LRN and NAHLN made this investigation possible.

Editorial Note: Although anthrax is not considered endemic to Florida, clinicians should be aware of clinical presentation and public health reporting requirements in cases of travel, contact with imported goods such as drum skins, and bioterrorist events as occurred in Florida in 2001. This summary was modified from the abstract of an article submitted for publication by the MN DOH and the multistate anthrax investigations team.

***Bordetella pertussis* — Fatal Pertussis Infection in a 6-Week-Old Infant — Palm Beach County**

On August 15, 2011, a 1-month-old premature infant boy developed a paroxysmal cough with apnea. The baby was seen by his pediatrician and was also taken to a local emergency room where he was diagnosed with an upper respiratory infection. Due to continued cough, the infant was referred for admission to the hospital by the pediatrician and azithromycin was started on August 29, 2011. A nasopharyngeal swab was polymerase chain reaction positive for *B. pertussis* on September 2, 2011. A chest x-ray was negative for pneumonia. The infant's condition continued to deteriorate and he died on September 1, 2011. During the case investigation by the Palm Beach County Health Department, two other family members were found to have a similar illness. The mother also met the Florida surveillance case definition for a confirmed case. She had a cough illness onset on August 8, 2011, and did not have a history of Tdap vaccination. The father's cough onset was more recent, starting on August 29, 2011 but he did not meet case definition. They both received treatment. Two other family members and two healthcare workers received prophylaxis.

Editorial Note: Pertussis is a potentially serious, highly contagious bacterial respiratory disease. Pertussis is transmitted by direct contact with respiratory droplets from an infected person. Infected people are contagious for up to four weeks without appropriate antibiotic therapy. During outbreaks, attack rates of up to

80% among susceptible contacts are common. Although pertussis vaccination rates are high in Florida, pertussis continues to circulate. When pertussis is introduced into a susceptible group, wide-scale transmission can occur within a few days after onset, often before diagnosis by a physician and initiation of disease prevention interventions. During this period, infants may be infected. Among infants, complications and hospitalization resulting from pertussis infection are common and antibiotic treatment may not reduce the severity of the disease. Routine childhood, adolescent, and adult vaccination reduces the risk of infection among infants, therefore preventing the most common severe cases of pertussis.

***Bordetella pertussis* — Pertussis Outbreak among Unvaccinated Children in an Extended Family — Escambia County**

Background: The Escambia County Health Department conducted an investigation following a physician's report of a suspected pertussis outbreak among two related families in July 2011.

Methods: Interviews were conducted and medical records were reviewed to collect demographic, clinical, laboratory, vaccination, and close contact information. The Florida surveillance case definition was used to classify cases.

Results: Nine confirmed cases of pertussis were identified. All cases were in unvaccinated children ranging from 1 to 18 years old (median age was 4 years old). Seven cases occurred among two related families consisting of eight children and four adults. All eight children were unvaccinated and seven (87.5%) were infected, while all four adults reported a history of pertussis vaccination and were not infected. Two unvaccinated children that attended the same church as the families were also infected. An unvaccinated 7-year-old boy from one of the families, with disease onset on June 15, 2011, was the first detected case. He infected at least seven of the other cases, with disease onsets from July 1 to July 6, 2011. The last case had disease onset on July 10, 2011. Seven of the cases tested positive for *B. pertussis* by polymerase chain reaction. None of the cases were hospitalized. Antibiotic treatment and prophylaxis was provided to all cases and close contacts. Tdap vaccination was recommended when appropriate. Following the public health and medical response, no additional cases were reported.

Conclusion: This outbreak clearly demonstrates the infectiousness of *B. pertussis* among a susceptible population. Groups of people with low vaccine coverage are at constant risk of pertussis introduction and rapid transmission.

***Capnocytophaga canimorsus* — Fatal *Capnocytophaga canimorsus* Infection in a 39-Year-Old Man — Sarasota County**

On October 12, 2011, a previously healthy 39-year-old white man with asplenia presented to a local hospital complaining of nausea, vomiting, fever, and pain two days after being bitten on the arm by a dog. A physical examination conducted at the time of admission documented a fever (104.9°F), systolic blood pressure in the low 100s, mild conjunctival infection, and tachycardia. A chest x-ray identified increasing interstitial markings and oxygen saturation was 99%. Laboratory studies performed at admission had the following abnormal hematological values: white blood cell count 3,000, platelets 92,000, hemoglobin 12.8, creatinine 1.8, and bilirubin 3.6. He was admitted to the intensive care unit with a diagnosis of sepsis syndrome. Antibiotics (vancomycin, cefepime, and clindamycin) were ordered pending cultures. Blood cultures grew *Capnocytophaga* species on October 15, which was later identified as *Capnocytophaga canimorsus* by the hospital laboratory. Antimicrobial susceptibility testing was not performed. No purulence or fasciitis was noted upon surgical exploration of the wound. He subsequently developed acute hepatitis and pulmonary infiltrates which progressed to acute respiratory distress syndrome. Ventilator support was provided. The illness progressed to multiple organ failure and the patient died on October 16.

Editorial Note: C. canimorsus is a zoonotic bacterium that is found in the normal oral flora of dogs and cats. It is a fastidious organism, often difficult to isolate and identify. The organism can cause rare but severe illness including septicemia, meningitis, and endocarditis. Transmission to people is via bites or licks from healthy-appearing animals. People at increased risk of developing C. canimorsus infections include patients who are asplenic, immunosuppressed, or abuse alcohol. Medical attention and proper wound care following a dog bite may prevent infection.

Lion C, Escande F, Burdin JC. 1996. *Capnocytophaga canimorsus* Infections in Humans: Review of the Literature and Cases Report. *European Journal of Epidemiology*, 12(5);521-533.

***Clostridium tetani* — Fatal Tetanus Case — Citrus County**

On April 29, 2011, an 89-year-old woman presented to the emergency department with a 2-day history of difficulty opening her mouth (trismus, also called lockjaw), and painful muscular contractions in her left arm. One week prior to illness onset, she sustained scratches on her left arm when several of her dogs jumped up to greet her, but she did not seek medical care. Prior tetanus vaccination history was unavailable. Probable tetanus was diagnosed and she was admitted to the hospital for further evaluation and treatment. Initial medical management was complicated by difficulty obtaining tetanus immune globulin (TIG). On May 2, she received 500 units of TIG and she was transferred to a tertiary care facility where an additional 500 units of TIG were administered. She died the following day.

Editorial Note: Three cases of tetanus were reported in 2011; this was the only fatal case. From 2001 to 2010, there were 30 cases (zero to five per year); four (13.3%) were fatal. Almost all reported cases of tetanus are in people who have never been vaccinated with a tetanus toxoid-containing vaccine, or who completed a primary series but have not had a booster in the preceding 10 years as is recommended. A primary series consists of three or four injections of tetanus toxoid-containing vaccines. A booster dose is necessary every 10 years due to waning antitoxin levels. People with wounds that are neither clean nor minor, and who have had zero to two prior doses of tetanus toxoid or have an uncertain history of prior doses should receive TIG as well as Td or Tdap. A single intramuscular dose of 3,000 to 5,000 units of TIG is generally recommended for children and adults, with part of the dose infiltrated around the wound. Intravenous immune globulin contains tetanus antitoxin and may be used if TIG is not available.

Atkinson W, Wolfe S, Hamborsky J, eds. 2011. *Epidemiology and Prevention of Vaccine- Preventable Diseases*. 12th ed. Atlanta, GA: Centers for Disease Control and Prevention; 291-300.

Lee DC, Lederman HM. 1992. Anti-Tetanus Toxoid Antibodies in Intravenous Gamma Globulin: An Alternative to Tetanus Immune Globulin. *Journal of Infectious Disease*, 166(3);642-645.

***Ehrlichia ewingii* — Infection Acquired from Leukoreduced Platelet Transfusion, July 2011 — Multistate**

Background: A Georgia patient with acute lymphoblastic leukemia presented to a local hospital with acute fever, malaise, and neutropenia following three blood transfusions and was diagnosed with *Ehrlichia ewingii* infection. The man had no known tick exposure. Transfusion products originated at a Florida blood bank.

Methods: The Florida Department of Health, the Centers for Disease Control and Prevention (CDC), and the Florida blood bank conducted traceback of transfusion product donors. Testing of the recipients and donors was conducted by a local hospital, Mayo Clinic (Rochester), or CDC.

Results: The recipient was diagnosed with *E. ewingii* infection based on detection of *Ehrlichia morulae* in blood smears and positive reverse transcription polymerase chain reaction testing of whole blood. The recipient received multiple transfusions originating from three donors, including two who donated

leukoreduced single donor platelets and one who donated irradiated and leukoreduced red blood cells. The blood bank performed a traceback on the three donors and obtained whole blood and serum from each. Follow-up of *Ehrlichia* serology was positive for one Florida donor, who had a titer of 1:512. This donor had regularly donated platelets and plasma one or two times per month. During the investigation, the donor was found to have recent known tick exposures at his home in Florida and at a wooded property in South Carolina. He reported no febrile illnesses in the two months prior to and following the suspect donation. Routine complete blood counts performed at the time of each donation were within normal limits. Further investigation identified eight additional recipients receiving blood products from the positive donor. Five recipients received leukoreduced platelets and three recipients received plasma from the donor. Three of the recipients died within one to two days of transfusion due to unrelated causes. The remaining five recipients reported no symptoms of illness associated with *E. ewingii* and all tested negative for *Ehrlichia* antibodies.

Conclusion: This is the first known transmission of any *Ehrlichia* species via blood transfusion. Leukoreduction of platelets likely reduces the risk of transmission of intracellular white blood cell pathogens, but this case demonstrates risk is not entirely eliminated.

Editorial Note: Successful transfusion-acquired infection traceback investigations require strong partnerships with blood banks, healthcare providers, and public health officials.

***Klebsiella pneumoniae* — Outbreak of Carbapenem-Resistant Enterobacteriaceae at a Long-Term Acute Care Hospital — Pinellas County**

Background: In July 2010, the Florida Department of Health became aware of carbapenem-resistant Enterobacteriaceae (CRE) detected in clinical cultures from long-term acute care hospital (LTACH) A. As a result, the county and state health department and LTACH A developed an infection prevention plan to assess and reduce CRE transmission at the facility.

Methods: Microbiology records at LTACH A from March 2009 to February 2011 were reviewed to identify CRE transmission cases and cases admitted with CRE. CRE bacteremia episodes were identified from March 2009 to July 2011. Biweekly CRE prevalence surveys were conducted from July 2010 to July 2011 and interventions to prevent transmission were implemented, including education and auditing of staff and isolation and cohorting of CRE patients with dedicated nursing staff and shared medical equipment. Trends were evaluated using weighted linear or Poisson regression. CRE transmission cases were included in a case-control study to evaluate risk factors for acquisition. A real-time polymerase chain reaction assay was used to detect the *blaKPC* gene, and pulsed-field gel electrophoresis was performed to assess the genetic relatedness of isolates.

Results: Ninety-nine CRE transmission cases, 16 admission cases (from seven acute care hospitals), and 29 CRE bacteremia episodes were identified. From July 2010 through July 2011, significant reductions were observed in CRE prevalence (49% vs. 8%), percentage of patients screened with newly detected CRE (44% vs. 0%), and CRE bacteremia episodes (2.5 vs. 0.0 per 1,000 patient-days). Cases were more likely to have received β -lactam antibiotics, have diabetes, and require mechanical ventilation. All tested isolates were *Klebsiella pneumoniae* carbapenemase-producing *K. pneumoniae* and nearly all isolates were genetically related.

Conclusion: CRE transmission can be reduced in LTACHs through surveillance testing and targeted interventions. Sustainable reductions within and across healthcare facilities may require a regional public health approach.

Chitnis AS, Caruthers PS, Rao AK, Lamb J, Lurvey R, Beau De Rochars VM, Kitchel B, Cancio M, Török TJ, Guh A, Gould CV, Wise ME. 2012. Outbreak of Carbapenem-Resistant Enterobacteriaceae at a Long-Term Acute Care Hospital: Sustained Reductions in Transmission through Active Surveillance and Targeted Interventions. *Infection Control and Hospital Epidemiology*, 33(10);984-992.

***Klebsiella pneumoniae* — Outbreak of Carbapenem-Resistant *Klebsiella pneumoniae* Infection at a Long-Term Acute Care Hospital — Broward County**

Background: Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) infections have limited treatment options and are associated with increased risk of death. In July 2011, a long-term acute care hospital (LTACH) reported four patients with CRKP to the Broward County Health Department. An investigation was conducted to describe the outbreak and develop recommendations for enhanced infection control.

Methods: Microbiology records from January 2010 to November 2011 were reviewed to identify CRKP cases. CRKP was identified in one of three ways: clinical cultures of ill patients, surveillance cultures of newly admitted patients, and periodic surveillance cultures of all patients without a history of CRKP. Point prevalence surveys were conducted from July 2011 to September 2012. The Bureau of Public Health Laboratories performed pulsed-field gel electrophoresis (PFGE) on available CRKP isolates. The facility implemented interventions to prevent transmission, including education of staff and administration, ensuring appropriate contact isolation procedures, and cohorting of CRKP patients with dedicated nursing staff and medical equipment.

Results: Thirty-two CRKP cases were detected by clinical culture (25) or by inpatient surveillance culture (7) from March 2010 to November 2011. The 25 ill patients' first CRKP-positive cultures occurred during one of two time periods; Period 1, March 2010–November 2010 (n=12), or Period 2, March 2011–November 2011 (n=13). Of these 25 cases, 14 were only identified by retrospective microbiology record review. Positive clinical culture sites included respiratory sites (10), blood (6), urine (5), and other sites (4). PFGE results of CRKP isolates from 15 patients collected during Period 2 indicated that 12 were >97% similar (Group 1); eight of these were indistinguishable. A second group of isolates (Group 2) was indistinguishable from each other and different from Group 1. One isolate, from an admission surveillance culture, was not similar to either group. CRKP prevalence was reduced from 17% in July 2011 to 4.5% in December 2011.

Conclusion: The combination of enhanced laboratory surveillance and infection control interventions was successful in controlling this long-term outbreak of CRKP. It is important that hospital and laboratory staff work together to confirm that carbapenem-resistant Enterobacteriaceae (CRE) are promptly recognized to ensure that appropriate precautions are taken.

Editorial Note: Carbapenems are a class of broad-spectrum β -lactam antibiotics used for treating severe infections caused by gram-positive, gram-negative, and anaerobic bacteria. Because they are more resistant to β -lactamase than other β -lactam antibiotics, carbapenems have been used as a drug of last resort for resistant organisms. However, healthcare-associated spread of carbapenem-resistant organisms is an increasing problem in Florida. CRE incidence and prevalence can be reduced in LTACHs through implementation of targeted infection prevention interventions. As a result of the success of the interventions put in place during the Pinellas County outbreak (above), a similar approach was replicated during the Broward County response resulting in a rapid end to a prolonged outbreak. Point prevalence studies through 2012 have demonstrated prolonged reductions in CRKP within the facility.

***Legionella pneumophila* — An Outbreak of Legionnaires' Disease Linked to an Outside Decorative Fountain — Hillsborough County**

Background: From October 14, 2011 to October 16, 2011, three cases of community-acquired Legionnaires' disease, or legionellosis, were reported to the Hillsborough County Health Department (HCHD). The cases resided in the same retirement community in Plant City, Florida. Epidemiologic and environmental investigations were conducted to identify the source of the outbreak.

Methods: A case was identified by a positive urine antigen for *Legionella pneumophila* serogroup 1 and pneumonia confirmed by chest x-ray. Case interviews, including one proxy, were conducted using the Legionellosis Investigation Worksheet. Information was provided about planned community activities and risk

factors were identified after assessment of possible exposures on the property. On October 18, 2011, HCHD staff collected environmental samples from six sites at the retirement community. An independent environmental company hired by the management company also collected 12 environmental samples on November 4, 2011. In addition, HCHD inspected the potable water system and the Hillsborough Environmental Protection Commission inspected the wastewater treatment and reclaimed water systems.

Results: Interviews identified the main clubhouse, the decorative fountain outside the main clubhouse, showers with detachable nozzles, and community-operated sprinklers as the only common exposures among all three cases during the ten days before illness onset. All six environmental samples taken by the HCHD failed to grow *Legionella*. Inspections of the potable water, reclaimed water, and wastewater systems found them to be satisfactory. Of the 12 samples tested through independent environmental testing, only the decorative fountain outside of the main clubhouse was positive for *L. pneumophila* serogroup 1; however, the fountain had been drained prior to collection of this sample, and the sample taken was from rainwater that had since accumulated in the fountain.

Conclusion: The results of the investigation suggested that the outdoor decorative fountain at the main clubhouse was the source of the community outbreak of legionellosis. Warm water and presence of biofilm and algae in the fountain provided ideal environmental conditions for *Legionella* growth. HCHD worked closely with the community management company to ensure that all pools, hot tubs, and drinking water systems are maintained in accordance with Florida Administrative Code.

Editorial Note: Legionella pneumophila is a common cause of community-acquired pneumonia, with an estimated 8,000 to 18,000 cases in the United States each year. Legionella bacteria can be found in low concentrations in the natural environment such as the slime, sediments, or biofilms that exist in lakes, rivers, and streams. Humans have coexisted with Legionella for a very long time. Ironically, the advent of industrial technology has created man-made water systems capable of harboring, growing, and transmitting Legionella bacteria via aerosolized pathways to humans. Examples of such systems include warm water found in whirlpool spas, indoor and outdoor decorative fountains, hot water tanks, large plumbing systems, and parts of large air conditioning systems of large buildings such as cooling towers. They do not seem to grow in car or window air conditioners. The infection of human cells by the bacteria is thought to be opportunistic. While Legionella pneumophila is the most common species, causing 80-90% of illness in humans, 22 species have been associated with human disease. People who are susceptible become infected with Legionella when they breathe in a mist or aerosol that contains the bacteria. For instance, water contaminated with Legionella bacteria in a whirlpool spa that is not properly cleaned, disinfected, and maintained could be aerosolized in the form of mist. Person-to-person transmission does not occur.

***Mycobacterium leprae* — Leprosy in a Man with No International Travel History — Osceola County**

Background: On August 12, 2011, the Osceola County Health Department received a call from a local doctor reporting a suspect case of leprosy in a 46-year-old man who had been seen previously by a dermatologist in October 2010 with a quarter-sized lesion that emerged on his right thigh.

Methods: A biopsy was performed in 2010, but results were negative for acid-fast bacilli. On July 25, 2011, a second biopsy was performed by another doctor due to significant spread of the lesion.

Results: The patient reported no international travel within the past few years and multiple exposures to armadillos and hunting. Numerous acid-fast bacilli were present in the granulomatous inflammatory infiltrate within the dermis from the second biopsy. Results confirmed borderline tuberculoid leprosy. The patient was prescribed dapsons 100mg daily, rifampicin 600mg daily, and clofazimine 50mg daily.

Conclusion: The source of the infection is uncertain. Transmission from armadillos is likely because documented case reports have implicated them as a source of infection in U.S. patients.

Editorial Note: Leprosy, or Hansen’s disease, is a chronic disease affecting the skin, peripheral nerves, and upper respiratory tract. The disease, caused by Mycobacterium leprae, appears to be transmitted primarily through prolonged contact with respiratory droplets from infected people. The incubation period is nine months to 20 years after exposure. Leprosy has been reportable in Florida since 1921. Sixty-seven cases of leprosy were reported to the Florida Department of Health between 2001 and 2010; 17 (25.4%) of these reported no travel. Autochthonous cases of leprosy among native-born Americans have been observed in several southern U.S. states in recent years. Bacterial strains isolated from a number of these patients match M. leprae strains isolated from wild nine-banded armadillos (Dasypus novemcinctus) collected in the region. The route of transmission is unclear.

Mycobacterium tuberculosis — A Complex Tuberculosis Investigation in an Assisted Living Facility — Volusia County

Background: In June 2011, the Volusia County Health Department (VCHD) was notified of a 60-year-old white man residing at an assisted living facility (ALF) with laboratory-confirmed tuberculosis (TB). The man was hospitalized and left the hospital against medical advice, after which it was recommended the man be admitted to A.G. Holley State Hospital (AGH). The conventional contact investigation approach was challenging due to the medical and social characteristics of the residents at the ALF.

Methods: On June 23, 2011, the VCHD conducted an active TB case-finding activity at the ALF. Ninety-four ALF residents and staff were screened for active TB disease and latent TB infection (LTBI). Screening was conducted on-site at the ALF and included nursing assessment, interferon gamma release assay (IGRA) testing, chest x-ray (CXR) imaging, and sputum specimen collection. The Bureau of Public Health Laboratories performed smears to detect acid-fast bacilli, mycobacterium direct tests (MTD), and cultures on sputum specimens. An AGH physician reviewed CXR images in real-time online.

Results: Two suspected cases of TB were detected among residents, one of whom was sent to a local hospital for isolation, although TB infection was not confirmed after further evaluation and testing. Eight (8.5%) of the 94 IGRA tests were positive; 90 were repeated. Four people with LTBI were identified and completed preventative therapy. Thirty-eight sputum specimens were collected, all of which were negative for acid-fast bacilli, MTD negative, and culture negative.

Conclusions: The excellent collaborative efforts of all participants in the TB system of care resulted in rapid case detection, efficient contact evaluation, and prevention of further TB transmission in the facility and the community.

Rickettsia typhi — Imported Flea Rickettsiosis in a Resident with Travel to Texas — Hillsborough County

The Hillsborough County Health Department investigated a suspected case of flea rickettsiosis in a 17-year-old woman with a history of travel to Texas. The patient adopted a stray kitten while in Corpus Christie, TX, and then spent 10 days traveling in a car with the kitten and two friends, arriving back in Florida around April 1. The day after returning, the patient developed a febrile illness of 28 days duration, swelling of the left side of the neck, generalized rash, and had elevated liver enzymes. Diagnosis was fever of unknown etiology. Fever resolved in May but the patient continued to report malaise. On June 21, the patient presented to the hospital with symptoms of headache, fever, and stiff neck and was diagnosed with aseptic meningitis. Symptoms resolved until June 28 when the patient had episodes of slurred speech, loss of sensation in one hand, unfocused stare, vomiting, photophobia, diarrhea, and confusion. Serum samples collected on June 29 were strongly positive for *Rickettsia typhi* antibody. The patient made a full recovery following treatment with doxycycline. The patient’s fellow travelers also reported febrile illness following the

car trip. One, a 25-year-old man, became ill on April 16; a serum sample collected July 6 tested positive for *R. typhi* antibody. No serum samples were available from the other traveler.

Editorial Note: Southern Texas is endemic for both murine typhus (R. typhi) and cat flea rickettsiosis (R. felis). The cat flea, Ctenocephalides felis, is a vector for both agents, and antibodies for R. felis strongly cross-react on R. typhi serologic assays. Flea rickettsiosis is typically a self-limited illness with fever, headache, and rash of less than two weeks duration. Meningoencephalitis is uncommon. Chronic infection with R. typhi or R. felis is unusual. Veterinary-approved flea treatment for pets can help prevent flea rickettsiosis and other flea associated illnesses.

Streptococcus species — Outbreak of Streptococcal Endophthalmitis Associated with Intravitreal Injection of Bevacizumab — Miami-Dade and Broward Counties

Background: Bacterial endophthalmitis is a rare but serious complication following intravitreal bevacizumab injection. On July 11, 2011, Miami-Dade County Health Department was notified of six cases of streptococcal endophthalmitis treated at an ophthalmology referral center during the previous two days. All patients had received intravitreal bevacizumab injections one to two days previously.

Methods: A case of bevacizumab-associated endophthalmitis was defined as a clinically-compatible illness following intravitreal bevacizumab injection with illness onset from June 1 to July 15 in a resident of Miami-Dade or Broward counties. Cases were solicited using county and statewide health advisories. Medical records from patients receiving intravitreal injections at three affected practices were reviewed to determine medication type and source, and patient outcome. The Centers for Disease Control and Prevention performed multilocus sequence typing to speciate streptococcal isolates.

Results: Twelve cases of bevacizumab-associated endophthalmitis were identified. Ages ranged from 68 to 89 years old with a mean age of 78.5 years. Outcomes were poor. All but one case had worse visual acuity and seven (58.3%) required eye removal. Cases were injected over a 4-day period, from July 5 to July 8, by four different ophthalmologists at four clinics. Four batches of prefilled bevacizumab syringes prepared by one compounding pharmacy over a 4-week period were associated with cases. There were no cases among patients receiving bevacizumab from other sources ($p < 0.0001$). Vitreous from 10 cases and 12 unused syringes yielded four streptococcal species (nine strains); two strains were common to cases and syringes. Pharmacy records review and inspection identified numerous deficiencies in sterile compounding practices at the preparation pharmacy.

Conclusions: This outbreak was caused by contamination of bevacizumab syringes during preparation (repackaging) at a compounding pharmacy. Multiple errors in sterile compounding practices at the pharmacy could have contributed to product contamination.

Editorial Note: Age-related macular degeneration (AMD) is a leading cause of blindness in the U.S. and worldwide. Bevacizumab is a U.S. Food and Drug Administration (FDA) approved drug used off-label (since 2005) by ophthalmologists to treat patients with AMD and other eye conditions associated with neovascularization. A related medication, ranibizumab, is FDA approved (2006) for treatment of AMD, but costs about 40 times more than bevacizumab. Both drugs represent a major advancement in treatment of AMD and use of both has increased rapidly. The reported incidence of endophthalmitis after intravitreal injection is 0.02%–0.05%.

The severity of illness in this outbreak was typical for endophthalmitis caused by streptococci. There is a poor prognosis even when treatment is initiated promptly as occurred in this outbreak. The species of streptococci (S. infantis, S. oralis, S. sanguinis, and S. salivarius) recovered from patients and unused syringes are typically part of normal mouth flora. Aerosols containing mouth flora could have been generated in the production area if, for example, personnel did not wear face masks consistently or spoke while syringes

were being prepared. Mouth flora could have been introduced into sterile bevacizumab vials if the device used to access vials was removed and reinserted or replaced. Once contaminated, there were insufficient safeguards to detect and discard contaminated syringes before distribution to physician offices. In recent years, many outbreaks in Florida and elsewhere have been linked to inappropriate use of medications labeled as “single dose” or “single use.” These vials typically lack antimicrobial preservatives and can be a source of infection if use is not limited to a single patient and for a single injection or procedure. When necessary because of drug shortage (or high drug cost in the case of bevacizumab) single use vials can be “repackaged” by qualified healthcare personnel in accordance with United States Pharmacopeia General Chapter 797, Pharmaceutical Compounding — Sterile Preparations. Unfortunately, this outbreak was caused by lack of adherence to these quality assurance standards by the implicated compounding pharmacy. Increasing clinical use of bevacizumab and related drugs may lead to increased use of compounding pharmacies and this increased reliance may result in outbreaks like the one described here. Additional information about how to safely repackaging bevacizumab is provided in the reference cited below.

Lim LS, Mitchell P, Seddon JM, Holz FG, Wong TY. 2012. Age-Related Macular Degeneration. *Lancet*, 379 (9827);1728-1738.

***Vibrio cholerae* — Domestic Cholera Transmission from Conch Imported from Haiti — Collier County**
Cholera cases identified by the Florida Department of Health following confirmation of the outbreak in Hispaniola in October 2010 have predominantly been associated with a recent history of travel. On January 21, 2011, the Collier County Health Department was notified by a local hospital that a member of their staff had tested positive for *Vibrio cholerae*. Interview identified no history of travel or known contact with a cholera case; however, two asymptomatic family members had recently returned from a trip to Haiti. On January 11, one of these travelers bought conch from a vendor in Haiti and transported leftover baked conch into Florida using a carry-on cooler with ice. On January 12, the patient consumed the baked conch after reheating in the microwave; onset of symptoms was three days later. Further testing by the Bureau of Public Health Laboratories and the Centers for Disease Control and Prevention confirmed that this case was positive for toxigenic *V. cholerae* O1, making this the first instance of domestic cholera transmission associated with the outbreak in Hispaniola. Isolated cases of cholera related to imported food have been associated with travelers to countries with epidemic cholera. If cholera is suspected in the absence of a history of travel, the collection of a food history should include questions specific for imported food items. The transport of perishable souvenir seafood from countries with epidemic cholera should be discouraged.

Newton A, Heiman K, Schmitz A, Török T, Apostolou A, Hanson H, *et al.* 2011. Cholera in United States Associated with Epidemic in Hispaniola. *Emerging Infectious Diseases*, 17(11); 2166-2168.

***Vibrio cholerae* O75 — Toxin-Producing *Vibrio cholerae* O75 Outbreak — Multistate, Escambia and Nassau Counties**

Background: Non-O1/non-O139 *Vibrio cholerae* strains have been associated with sporadic cases of gastroenteritis. On April 15, 2011, the Escambia County Health Department (ECHD) notified the Florida Department of Health Food and Waterborne Disease Program (FWDP) of a possible case of *Vibrio cholerae* non-O1/non-O139 in a man who developed cramps, fever, watery diarrhea, and nausea on April 12. The case had consumed raw oysters at a restaurant on April 6. On April 18, the Nassau County Health Department (NCHD) reported two cases of gastrointestinal illness after consumption of steamed shell stock oysters on April 10. On April 19, the FWDP was notified of a Louisiana resident who had consumed raw oysters in Okaloosa County on April 7 and was diagnosed with *V. cholerae* non-O1/non-O139.

Methods: ECHD began investigating their case and forwarded the *V. cholerae* specimen to the Bureau of Public Health Laboratories for typing and toxin testing. NCHD collected stool specimens from ill people for analysis and began investigating the source of the oysters. The FWDP began working with the Florida

Department of Agriculture and Consumer Services (DOACS), the agency with regulatory oversight of the oyster industry, and posted EpiCom and Epi-X messages to find additional cases. Results: Laboratory results yielded *V. cholerae* O75. Ten cases (eight confirmed, one probable, and one suspect) were identified in this outbreak. Seven were Florida residents, the three other cases were from Indiana, Georgia, and Louisiana. Cases ranged in age from 22 to 74; six of the 10 cases were men. Cases reported symptoms of nausea (7), vomiting (4), diarrhea (9), chills (8), cramps (1), and fever (1). None required hospitalization. The oysters had been harvested in the same area, Apalachicola Bay 1642. The harvest area was closed on April 30 and dealers and retailers were asked to recall any implicated product still in commerce. The harvest area was reopened on May 11 after oysters from the area tested negative through the Food and Drug Administration laboratory in Dauphin Island, Louisiana.

Conclusion: This was the first recorded outbreak of *V. cholerae* O75 associated with oyster consumption. In response to this outbreak, DOACS continues to monitor the harvesting environment and investigate factors that may have promoted the growth of this pathogen.

Parasitic Diseases

***Cyclospora cayetanensis* — Confirmed *Cyclospora* Outbreak Linked to a Restaurant — Collier County**

Background: On July 29, 2011, the Collier County Health Department (CCHD) and the Florida Department of Health Food and Waterborne Disease Program (FWDP) began investigating three cases of cyclosporiasis that were linked to a restaurant.

Methods: CCHD interviewed other patrons of the restaurant and posted an EpiCom message alerting other counties of the potential exposure. The FWDP conducted a joint environmental assessment of the restaurant with the Florida Department of Business and Professional Regulation.

Results: Thirteen people were interviewed and 12 met the case definition. Cases ranged from 18 to 64 years old; the median age was 51 years, and 66.7% of the cases were women. Duration of symptoms ranged from 5 to 29 days with a median of 15 days. Three cases sought medical care; none were hospitalized. From the patient interviews and the joint environmental assessment, cilantro and onions were identified as common ingredients used in all food dishes prepared at the restaurant. Traceback of the cilantro and onions was not completed because the restaurant did not have the necessary invoices and receipts.

Conclusion: This outbreak of cyclosporiasis was associated with dining at a restaurant in Collier County and was likely caused by contaminated onions or cilantro.

Editorial Note: Cyclosporiasis is an intestinal illness caused by the microscopic parasite Cyclospora cayetanensis. People can become infected with Cyclospora by consuming food or water contaminated with the human parasite. Symptoms of cyclosporiasis begin an average of seven days after ingestion of the parasite. Symptoms may include watery diarrhea, nausea, loss of appetite, abdominal pain, fatigue, and weight loss. Previous outbreaks of cyclosporiasis have been associated with various types of imported fresh produce. Future recommendations are to have restaurants store receipts and invoices for products that they receive in a systematic way to aid in the potential traceback of a contaminated product. The parasite is killed by cooking. Human-to-human transmission is unlikely since Cyclospora parasites shed in human stool require a few days to weeks in the environment before becoming infectious.

***Naegleria fowleri* — Primary Amebic Meningoencephalitis — Brevard County**

Background: On Wednesday, August 10, 2011, the Brevard County Health Department (BCHD) epidemiology department was notified of a possible case of bacterial meningitis in a 16-year-old woman.

Methods: BCHD conducted an epidemiologic investigation of the case and the hospital collected cerebrospinal fluid (CSF) from the woman for laboratory testing.

Results: Motile amebas were found in CSF samples taken from the patient on August 10. On August 15, the Centers for Disease Control and Prevention confirmed the presence of *Naegleria fowleri* by culture and polymerase chain reaction. The woman expired on August 13. The investigation identified that the woman swam (including diving) in a body of freshwater on August 3 and 4 with four other people. The body of freshwater is adjacent to man-made canals on a tributary of a river that is very slow moving. The specific area of exposure was slow moving and stagnant in some places and the water temperature on August 12 was 88°F and air temperature was 99°F.

Conclusion: On August 12, 2011, a health advisory was issued by the BCHD warning of the presence of amebas in bodies of freshwater and the precautions to take when swimming in such waters. This release was also posted on the BCHD website.

Editorial Note: Primary amebic meningoencephalitis (PAM) is an infection caused by N. fowleri. Initial signs and symptoms of PAM start 1 to 14 days after exposure. Symptoms include headache, fever, nausea, vomiting, and stiff neck. N. fowleri is found worldwide. Most commonly, the ameba is found in warm bodies of freshwater, such as lakes and rivers; geothermal water, such as hot springs; warm water discharge from industrial plants; poorly maintained and minimally-chlorinated swimming pools; and soil. Although Naegleria is commonly found in the environment, infections rarely occur. PAM has only been reportable in Florida since 2008, however 33 infections were documented from 1962 to 2011.

***Sarcoptes scabiei* — Scabies in a Skilled Nursing Facility — Seminole County**

Background: An outbreak investigation of scabies in a skilled nursing facility (SNF) in Seminole County was conducted by the Seminole County Health Department (SCHD) epidemiology staff. A case was defined as any resident or staff with a clinical diagnosis of scabies.

Methods: The facility enhanced its rash illness surveillance of residents and staff. SCHD reviewed control measures with their Director of Nursing, including guidelines from the Centers for Disease Control and Prevention.

Results: Twelve cases were identified, which included one resident (1.0% of facility residents) and 11 staff members (6.2% of facility staff). The onset date for the resident was August 8; onset dates for staff ranged from August 12 to August 15. The resident case, a 100-year-old woman, had a microscopically-confirmed infection. The patient had dementia and was not ambulatory. Scabies-like illness among staff was clinically diagnosed. The affected resident lived on the second floor of the facility, while the majority of the staff cases worked only on the first floor. Prophylactic treatment was recommended and implemented for all residents and staff in the facility.

Conclusion: Prompt recognition and treatment of scabies in SNF residents and staff is essential to control transmission. No additional cases were identified.

Editorial Note: Scabies is a contagious parasitic dermatosis caused by an infestation of the skin by the human scabies mite, Sarcoptes scabiei var. hominis. Individual cases of scabies are not reportable to the Florida Department of Health, although outbreaks of this or any other disease are reportable. Symptoms of scabies develop two to six weeks after initial infestation, and one to three days following re-infestation. Classic scabies manifests as generalized intensive pruritus (i.e. severe itching) with nocturnal predominance. Lesions appear as burrows or tiny raised and crooked grayish-white or skin-colored lines on the skin surface, often on the hands, wrists, elbows, genitalia, axillae, umbilicus, buttocks, and nipples. During suspected

scabies outbreaks, it is beneficial to get microscopic confirmation of the diagnosis in a few affected people, including staff and residents. It is not uncommon for staff to feel itchy after scabies has been detected among SNF residents. Simultaneous prophylactic treatment of exposed people is one of the most effective interventions in response to scabies cases in institutional settings. Unfortunately, facilities may be hesitant to provide prophylactic treatment due to the expense. It is not uncommon for outbreaks to persist for several weeks when prophylaxis is incomplete.

Viral Diseases

Adenovirus — Viral Conjunctivitis Linked to an Ophthalmic Care Center — Osceola County

Background: On January 7, 2011, the Osceola County Health Department (OsCHD) was contacted by a person diagnosed with viral conjunctivitis by a local ophthalmologist who suspected that the source of the infection was a local optical facility.

Methods: OsCHD queried local syndromic surveillance data and compiled a list of additional people presenting to hospital emergency departments with complaints related to eye infections. Hospitals were then contacted for additional information on these patients and the OsCHD contacted each patient to gather additional information. An inspection of the optical facility was conducted and infection control measures were assessed. Two specimens were obtained from two patients and sent to the Bureau of Public Health Laboratories.

Results: Six additional patients reported associations with the same optical facility before their eye infections developed for a total of seven identified cases. Onset dates ranged from December 17, 2010 to January 24, 2011. The optical facility had two locations; four patients were seen at one location and three patients were seen at the other. The majority of cases reported symptoms primarily affecting the left eye following eye examinations at the optical facility. Five (71.4%) patients were seen for an eyeglasses examination and the remaining two (28.6%) had a contact lens exam. Duration of symptoms was between 14 and 33 days. No eye infections were reported among facility employees. Both patient specimens collected tested positive for adenovirus by polymerase chain reaction.

Conclusion: Antibiotics or antibacterial eye drops were given to most patients to help alleviate symptoms. Ongoing surveillance for additional cases was recommended and the 2009 American Academy of Ophthalmology Infection Prevention in Eye Care Services and Operating Areas guidelines were provided to the facility. The exposure source remains unknown.

Brechner RJ, Rosenfeld PJ, Babish JD, Caplan S. 2011. Pharmacotherapy for Neovascular Age-Related Macular Degeneration: An Analysis of the 100% 2008 Medicare Fee-for-Service Part B Claims File. *American Journal of Ophthalmology*, 151(5);887-895.

Goldberg RA, Flynn HW, Isom RF, Miller D, Gonzalez S. 2012. An Outbreak of Streptococcal Endophthalmitis after Intravitreal Injection of Bevacizumab. *American Journal of Ophthalmology*, 153(2);204-208.

Gonzalez S, Rosenfeld PJ, Stewart MW, Brown J, Murphy SP. 2012. Avastin Doesn't Blind People, People Blind People. *American Journal of Ophthalmology*, 153(2);196-203.

Dengue Virus — Locally-Acquired Dengue Cases — Hillsborough, Martin, Miami-Dade, and Palm Beach Counties

Background: From 2009 to 2010, an outbreak of locally-acquired dengue fever with 93 cases occurred in Key West, Florida, after more than 60 years with no local dengue transmission detected in the state. Subsequent

enhanced surveillance identified at least six additional dengue virus introductions in 2011. Epidemiologic, ecologic, and laboratory findings from these introductions and associated prevention efforts are discussed.

Methods: Data were collected by the Florida Department of Health (FDOH) Vectorborne Disease Surveillance Program from county health departments and local mosquito control programs. Laboratory testing was performed at FDOH Bureau of Public Health Laboratories.

Results: Introductions occurred in four of Florida's 67 counties: Hillsborough (1), Martin (1), Miami-Dade (3 or 4), and Palm Beach (2). Two cases in Miami-Dade County may have been linked or individual introductions. In all other instances, virus typing and epidemiological data confirmed that cases were isolated. In two instances, autochthonous infections followed international travel by another household member. Imported dengue infections in Florida are commonly identified in Hillsborough, Miami-Dade, and Palm Beach counties, but not in Martin County. The outbreak area in Miami-Dade County included a popular domestic and international tourist destination. Likely sites of exposure include the residence (4 or 5), outdoor occupation (1), and socializing outside a popular restaurant (1). *Aedes albopictus* was believed to be the primary vector in Martin County and for at least one of the Palm Beach County introductions. *Aedes aegypti* appeared to be the most likely vector in the other introductions.

Conclusions: Prevention efforts targeting travelers and international ports of exit and entry are needed. Emphasis should also be placed on using prevention practices when travelers become sick after returning home. Outreach is particularly important in counties with high numbers of imported dengue infections or that have robust populations of *A. aegypti*.

Editorial Note: Local dengue transmission with limited sustained transmission has likely gone undetected in the past. Factors required for sustained transmission as occurred in Monroe County are complex and could occur in future Florida introductions.

Hepatitis B Virus — Perinatal Hepatitis B Case — Hillsborough County

On December 10, 2010, the Hillsborough County Health Department (HCHD) Epidemiology Program received a positive hepatitis B surface antigen (HBsAg) electronic laboratory result for a 1-year-old girl. The infant, born September 2009, was already enrolled in the Perinatal Hepatitis B Prevention Program due to the mother's positive HBsAg status documented during her pregnancy. The mother was born in Thailand, where the prevalence of hepatitis is very high. The infant received hepatitis B immune globulin prophylaxis and the first and second dose of hepatitis B vaccine on schedule. The infant received the third dose of vaccine at nine months of age instead of the recommended six months of age for at-risk infants, potentially leaving the child susceptible to hepatitis B infection. At fourteen months of age, the pediatrician tested only for hepatitis B surface antibody, which was detected. HCHD recommended that the pediatrician also test for hepatitis B virus (HBV) viral load and HBsAg. Upon report of the positive HBsAg, the mother was contacted and advised to retest and follow-up with a specialist. In January 2011, the infant was seen by a pediatric infectious disease specialist and again tested positive for HBsAg and hepatitis B viral DNA. At this time, the mother refused all follow-up care, stating that everyone in her family had hepatitis B and they had remained healthy.

Editorial Note: As a result of routine HBV screening of pregnant women and the availability of effective immunoprophylaxis, perinatal transmission of HBV is rare in Florida. The last perinatal hepatitis B case was reported in 2008. This case illustrates the importance of following recommended hepatitis B vaccination and testing guidelines for at-risk infants. hepatitis B vaccine and hepatitis B immunoglobulin administered within 12 to 24 hours after birth, followed by completion of the three dose vaccine series at 0, 1 to 2, and 6 months, has been shown to be 89-98% effective in preventing acute and chronic HBV infection in infants born to women who are positive for HBsAg. Hepatitis B is endemic in China and other parts of Asia as well as in the Amazon and southern parts of eastern and central Europe. Sensitivity to cultural attitudes could increase the likelihood that people infected with HBV receive appropriate follow-up and medical management.

Measles Virus — Confirmed Measles Case Acquired in India — Alachua County

Background: On Friday April 8, 2011, the Alachua County Health Department (ACHD) received notification of a mother presenting at an ACHD clinic and reporting measles in her 12-year-old son.

Methods: The child received a medical evaluation. Blood, urine, and throat specimens were collected and sent to the Bureau of Public Health Laboratories. ACHD contacted the mother for additional information and she was advised to isolate her son until further information was received. A notification was distributed to local healthcare providers as well as school and religious sector contacts. Surveillance for rash illness was enhanced.

Results: Three measles cases were identified. The 12-year-old boy visited India along with his mother, 16-year-old sister, and a friend (14-year-old girl) from November 10, 2010 to March 31, 2011. The 16-year-old sister was diagnosed with measles while in India; her rash onset was on March 23. The 12-year-old boy's rash onset was April 4. Serologic testing for the 12-year-old boy was positive for measles IgM on April 11 and measles-virus-specific nucleic acid was detected by polymerase chain reaction on April 12. Following laboratory confirmation, it was reported that the 14-year-old friend also had illness compatible with measles; her rash onset was on April 5. All three cases were unvaccinated due to religious beliefs but all parents reported previous vaccinations.

Conclusions: No additional cases among close contacts associated with the trip to India were identified.

Measles Virus — Measles Transmission at an International Trade Show — Multistate, Orange County

Background: On March 24, 2011, Minnesota reported a laboratory-confirmed case of measles (rash onset March 21) in a 34-year-old who was likely exposed during a March 1 to March 10 business trip to Orlando, Florida. From March 1 to March 8, he set up and worked at a booth at an international aviation trade show that featured more than 600 exhibitors and had more than 17,000 attendees.

Methods: To identify additional cases associated with the trade show, the Orange County Health Department (OCHD) posted an alert on EpiCom, notified community healthcare providers, and worked with trade show organizers. OCHD and state partners enhanced emergency department syndromic surveillance through the Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE) for rash illness, notified national public health partners, and developed a questionnaire to collect detailed information about Orlando activities during the exposure period.

Results: Five cases of laboratory-confirmed measles were reported among attendees; four had a professional affiliation with a common exhibitor and the fifth was an infant of an unaffected adult. Cases resided in Michigan (1), Minnesota (1), and Texas (3). Adults were 28, 34, 37, and 49 years old; the infant was 11 months old. Two adult cases reported receiving one dose of measles-containing vaccine as children, two adults were unvaccinated, and vaccination status of the infant was unknown. Fever onset ranged from March 12 to March 19 and rash onset ranged from March 18 to March 23. The infected people attended the trade show between March 1 and March 8, but there was no single date or event when all were in attendance. Infected people stayed at different hotels and no common activities except for the trade show were identified among cases. At least 20 other people from the U.S., France, and Germany were affiliated with the same exhibitor; none were reported ill. Laboratory testing at the Centers for Disease Control and Prevention of one case isolate identified measles virus genotype D4, a strain in wide circulation in Europe. A sixth case (rash onset April 1) was exposed in Texas when the spouse returned from the trade show. No additional measles cases were identified among the 1,946 registered attendees from Florida or in the community at large.

Conclusions: These five cases acquired measles at the trade show over several days, most likely in the vicinity of their booth, and subsequently became ill in their home states. The source of the outbreak was not

determined, but the D4 genotype suggests importation from Europe, possibly from a visitor or exhibitor at the trade show. Measles outbreaks were widespread in Europe in 2011, with the greatest number of cases occurring among unvaccinated children and young adults. Lack of transmission to Florida attendees likely reflects higher measles vaccination rates in the U.S.

Editorial Note: This outbreak highlights the ongoing and underappreciated burden of measles importation into Florida. None of the five cases exposed at the trade show are included as measles cases in the 2011 Florida Morbidity Statistics Report because their official residences are outside of the state. Nevertheless, OCHD led, in cooperation with state and federal officials, a complex, time consuming and costly response effort to limit the possible spread of measles in Orange County and statewide. Endemic transmission of measles ended in the U.S. in the late 1990s, but as a major tourist destination, Florida will always remain a destination for measles until measles is eradicated worldwide. Healthcare providers should suspect measles in people with febrile rash illness and clinically compatible signs and symptoms who have traveled abroad or who have had contact with travelers. Providers should isolate suspected measles cases immediately, report to their local county health department, and obtain appropriate specimens for measles testing.

Centers for Disease Control and Prevention. Measles — United States, 2011. 2012. *Morbidity and Mortality Weekly Report*, 61(15);253-257.

Norovirus — Foodborne Norovirus Outbreak at a Family Restaurant March 2011 — Hernando County

Background: On March 11, 2011, the Florida Department of Business and Professional Regulation (DBPR) and the Hernando County Health Department (HeCHD) received numerous calls from people who had dined at the same restaurant in Hernando County during a six-day period from March 6 to March 11, 2011. Initial reports indicated the patrons had developed gastrointestinal symptoms approximately 30 hours after dining at the restaurant.

Methods: HeCHD and the Florida Department of Health Food and Waterborne Disease Program (FWDP) developed a questionnaire to assess food exposure and symptoms. A case was defined as anyone who visited and consumed food items served at the restaurant between March 6 and March 11 and reported diarrhea or vomiting and an additional gastrointestinal symptom. Four stool specimens were collected and analyzed by the Bureau of Public Health Laboratories. A joint environmental assessment of the restaurant was conducted by DBPR and FWDP.

Results: Seventy-eight ill people met the case definition. Onset of symptoms ranged from seven to 48 hours after the consumed meal with a mean of 27.5 hours. Predominate symptoms included vomiting (83%), nausea (77%), diarrhea (76%), abdominal pains (65%), chills (60%) and fever (30%). Four stool specimens were positive for norovirus genotype II. A case-control study identified iceberg lettuce as statistically significant with an odds ratio of 3.31 and a 95% confidence interval of 1.25 to 11.91. The environmental assessment identified a norovirus-positive food handler with vomiting on March 6. The implicated food handler's primary responsibility was to prepare food items for the salad bar.

Conclusion: This was a classic foodborne norovirus outbreak associated with fresh produce handled by an ill food worker.

Editorial Note: Although transmission of norovirus can be limited by good hand hygiene, people who become sick with vomiting or diarrhea should refrain from preparing food for others until two to three days after symptoms have resolved. Food handlers should inform managers if they have symptoms of norovirus and adequate sick leave should be permitted for the food handler to ensure they do not spread the illness to others.

Norovirus — Norovirus Outbreak Associated With Swimming in a Recreational Spring-Fed Lake — Glades County

Background: On Monday, April 25, 2011, the Glades County Health Department (GCHD) received calls from several groups of concerned citizens because some people from their groups had become ill with symptoms of diarrhea and vomiting after camping in a local campground over the Easter holiday weekend. Preliminary interviews with these different groups did not identify any food items in common or other interaction between groups.

Methods: GCHD and the Florida Department of Health Food and Waterborne Disease Program developed a questionnaire to assess water exposure and symptoms. A case was defined as a person who visited the campground between April 21 and April 24, 2011 and became ill with vomiting or diarrhea (defined as three or more loose stools within 24 hours) within 72 hours. Two stool specimens were collected and analyzed by the Bureau of Public Health Laboratories. GCHD interviewed 78 people as part of a case-control study and an environmental assessment of the campground was conducted. Water samples from the swimming area were collected and the swim area was temporarily closed.

Results: Twenty-nine (37.2%) people met the case definition. Seventeen (58.6%) of the cases were men, ages ranged from 8 months to 43 years old with a median of 12 years. The incubation period ranged from 24 to 72 hours. Two people reported having gastrointestinal symptoms in the two weeks prior to visiting the campground. An incident of someone vomiting in the water was reported and one person reported having diarrhea prior to swimming. None of the cases were hospitalized and three (10.3%) sought medical care. The case-control study identified swimming as a statistically significant risk factor with an odds ratio of 20.7, a 95% confidence interval of 2.60 to 165.49, and p-value of 0.0001. One stool specimen was positive for norovirus genogroup II. Swimming area water samples were satisfactory for total enterococci levels and the swim area was reopened.

Conclusion: This outbreak was most likely caused by norovirus associated with swimming in a lake at a campground. Reports of people swimming while ill suggest that they may have contaminated the swimming area.

Editorial Note: Norovirus is a highly contagious pathogen with a very low infectious dose, estimated to be between 10 and 100 viral particles. Transmitted primarily through the fecal-oral route, norovirus particles may be spread through direct contact or through consuming fecally-contaminated food or water. People should refrain from swimming for at least two weeks after the cessation of a diarrheal illness, avoid getting water in their mouths while swimming, and practice good hygiene to reduce the possibility of developing or transmitting a recreational water illness.

Varicella-Zoster Virus — Varicella in a Daycare Infant Room — Seminole County

Background: On February 24, 2011, a local daycare director reported a clinically diagnosed case of varicella in an 8-month-old boy to the Seminole County Health Department (SCHD). By March 9, six additional cases were reported.

Methods: The SCHD initiated an investigation to gather additional information. Ill cases were excluded from the daycare, and parents were informed about the cases and were provided educational and preventative information. The SCHD conducted active surveillance for an additional two weeks following the last reported case.

Results: A total of eight cases were identified. Seven cases were among infant attendees and one case was in an adult employee. Disease onset for the initial case was February 13 with subsequent case onsets ranging from February 27 to March 6. All cases were clinically diagnosed without any laboratory confirmation.

The outbreak occurred in one of two infant rooms at the daycare facility. The attack rate was 64% among infants in this room.

Conclusion: All attendees in the affected infant room were less than 12 months old, too young to receive the varicella vaccine; however, they did not intermingle with the general student body or aftercare program. The vaccination status of the adult case is unknown. All other employees assigned to the infant room were vaccinated.

Editorial Note: Rapid case identification and public health action are important to prevent varicella infection of susceptible people. Although varicella vaccination coverage has increased and disease incidence has declined, outbreaks continue to occur. Elementary schools are now the most common sites for varicella outbreaks, although they are also commonly identified in daycare settings and in middle and high schools.

West Nile Virus — A Review of the West Nile Virus Disease Outbreak — Duval County

Background: In 2011, Duval County had a resurgence of West Nile virus (WNV) activity and reported the highest number of WNV illness cases in Florida. Twenty locally-acquired WNV infections with onsets ranging from June 23 to October 4, 2011 were identified and three additional asymptomatic blood donors were identified via routine screening.

Methods: Data were collected on cases reported to the Duval County Health Department (DCHD) and included demographics, laboratory information, medical history, and risk factors for infection. Cases were classified using the Florida surveillance case definition for WNV illness. Rates were calculated overall and stratified by age, ZIP code, smoking status, and homelessness using Florida census data for population estimates, Behavioral Risk Factor Surveillance System data for smoking rates, and the University of North Florida Homeless Report.

Results: Sixteen (80.0%) cases had neuroinvasive illness and four (20.0%) had WNV fever. Two neuroinvasive illnesses were fatal. Ages ranged from 38 to 85 years old with a median age of 55 years. Reported risk factors for exposure included smoking (55.0%), spending time outdoors (75.0%), and being homeless (20.0%). Eleven cases (55.0%) had pre-existing medical conditions. Twelve cases (60.0%) and three asymptomatic blood donors resided within two ZIP codes; the rate in these two ZIP codes (17.9 cases per 100,000 population) was higher than for the remainder of Duval County (1.3 cases per 100,000 population). The rate for adult smokers in this area (6.8 cases per 100,000 population) was higher than that for adult non-smokers in Duval County (1.3 cases per 100,000 population). The rate in the homeless population in Duval County was 97.4 cases per 100,000 population.

Conclusion: WNV disease outbreaks can occur in intense focal clusters as in this event. The risk factors associated with this outbreak mirror those seen nationally. Sentinel chicken surveillance did not predict the outbreak. Flock locations were adjusted to improve future surveillance efforts.

Editorial Note: It is important to engage healthcare providers, mosquito control, advocacy groups for vulnerable populations such as the homeless, and the public in the response to arboviral disease outbreaks. Immediately after the 2011 WNV disease outbreak began, the Duval County Health Department, in collaboration with the City of Jacksonville's Mosquito Control Division, focused their control efforts in targeted ZIP codes. The response included enhanced mosquito light trap and sentinel chicken surveillance, property inspections, source reduction, biological and chemical control, and community education. Aggressive outreach to healthcare providers was conducted via advisories to the medical community and participation in medical rounds to ensure reporting of arbovirus cases. The homeless coalition was also engaged to help provide insect repellants for the homeless population.

Non-Infectious Agents

Carbon Monoxide — Vehicle-Related Carbon Monoxide Poisoning Cluster — Hillsborough County

Background: On June 13, 2011, eight adults had a party in an apartment residence and left their car running in the garage overnight. When they woke up at noon the following day, they did not feel well. They called 911 and helped each other out of the apartment.

Methods: The Hillsborough County Health Department conducted an investigation which included hospital record reviews and patient interviews. All cases were classified based on the Florida surveillance case definition for carbon monoxide (CO) poisoning. Environmental testing of the apartment was performed by a hazmat team. Environmental levels of CO were assessed using an MSA Altair device.

Results: The eight affected people were men ranging from 22 to 52 years old. Following the exposure, they experienced headache, fatigue, dizziness, confusion, vomiting, and weakness. Seven of eight cases visited the hospital following the incident. All recovered from their illness. Environmental testing detected CO levels of 60 parts per million (ppm) in the apartment. Based on U.S. Environmental Protection Agency (EPA) estimates, average CO levels in homes without gas stoves vary from 0.5 to 5 ppm. Levels near properly adjusted gas stoves are often 5 to 15 ppm and those near poorly adjusted stoves may be 30 ppm or higher. All eight people at the party were classified as confirmed cases of CO poisoning.

Conclusion: Eight cases of CO poisoning were identified due to exposure to car exhaust. All cases were Asian and seven only communicated in Mandarin, making communication and follow-up challenging.

Editorial Note: CO is an invisible, odorless, tasteless gas, and is highly poisonous. Vehicle-related CO poisonings and deaths were observed throughout 2011. Reported cases increase slightly in summer months, highlighting the importance of prevention messaging at the beginning of the summer. Data collected from Florida cases indicate that people rely on their automobile air conditioning and stay inside the car or run the car inside the garage during hot weather.

Ciguatera — Ciguatera Outbreak Associated with Commercially Purchased Amberjack — St. Lucie County

On August 25, 2011, the St. Lucie County Health Department was notified of a possible ciguatera outbreak involving three people. The cases became ill after consuming smoked amberjack on August 14. Initial symptoms included vomiting, diarrhea, abdominal pain, and nausea within 5.5 to 10 hours of consumption and were soon followed by temperature reversal, pain in teeth and body joints, breathing difficulties, headache, rash, and itching. Two cases visited healthcare providers (one primary care and one emergency department physician), but neither was able to diagnose their illnesses. The third case visited his dentist as he thought he had a dental problem. After interviewing the cases, it was determined that these people had ciguatera fish poisoning based on their symptoms and type of fish consumed. The smoked amberjack was purchased at a local seafood market. The Florida Department of Agriculture and Consumer Services was notified and a joint investigation was conducted. A sample of the amberjack obtained from one of the cases tested positive for ciguatoxin at the U.S. Food and Drug Administration Gulf Coast Seafood Laboratory in Dauphin Island, Alabama. The environmental health assessment of the seafood market established that the amberjack was caught by a commercial fisherman in approved Florida Atlantic waters. The amberjack was filleted and processed by the market and some of it was sent to a local meat smoking facility where it was smoked and returned to the seafood market.

Editorial Note: In 2011, 48 ciguatera fish poisoning cases were reported to the Bureau of Epidemiology. Of the 20 cases who acquired their illness outside the U.S., 11 (55.0%) consumed fish from the Bahamas, two (10.0%) reported eating fish from Cuba and one (5.0%) ate fish from St. Thomas, USVI. The source of the

fish consumed by the remaining seven cases was not known. Starting in 2006, an overall increase in the incidence of ciguatera cases was observed with the incidence peaking in 2008, when 53 cases were reported. Although this increase may be attributable to an increase in reporting, it is possible that a true increase in ciguatera poisonings has occurred in recent years.

Ciguatoxin — Ciguatera Outbreak in a Charter Fishing Boat Group who Traveled to Great Harbour Cay Bahamas — Multistate, Miami-Dade, and Monroe Counties

A ciguatera outbreak among a group of Florida travelers who visited Great Harbour Cay in the Central Bahamas in July 2011 was investigated by the Monroe and Miami-Dade county health departments. The group commissioned a private charter boat captain to transport them to the Bahamas from the Florida Keys. On July 12, while in the Bahamas, they caught an 86-pound black grouper and froze the fish. Seven people from Monroe County (2), Miami-Dade (2), South Carolina (2), and the Bahamas (1) consumed the grouper upon returning home. All reportedly became ill. The two residents from Monroe County, who were reached for an interview, consumed their portion of the grouper on August 1. Symptoms began 4.5 to 5 hours later and included nausea/vomiting; diarrhea; abdominal pain; loss of appetite; metallic taste; itching or rash; joint or muscle pain or weakness; dizziness or vertigo; tingling, numbness, or pain in hands, feet, gums, or mouth; temperature reversal; attention or concentration problems; anxiety; insomnia; lack of sex drive; excessive salivation; headaches; and irritability. Fish samples tested positive for Caribbean ciguatoxin (C-CTX-1 and C-CTX-2) at the U.S. Food and Drug Administration Gulf Coast Seafood Laboratory in Dauphin Island, Alabama. Snapper caught during the same fishing trip tested negative for ciguatoxin.

Pesticides — Aerial Pesticide Application and Drift Impacting an Elementary School — Palm Beach County

Background: As students were arriving for classes at an elementary school in Palm Beach County on March 31, 2011, an agricultural applicator airplane was spraying a nearby corn field with pesticides (included a pyrethroid insecticide, a bisdithiocarbamate fungicide, and fertilizer). Students and school staff began to notice an odor and complained of eye and skin irritation.

Methods: A survey was conducted using a standard questionnaire to identify symptomatic people and collect additional information. The case definition for this incident was based on the Florida surveillance case definition for pesticide exposure. Environmental sampling and investigation details surrounding the pesticide application were obtained from a Florida Department of Agriculture and Consumer Services investigation.

Results: Interviews indicated that 22 of 813 (2.7%) students and 45 of 85 (52.9%) staff present developed symptoms. Common symptoms were skin itching, burning eyes, and vomiting. Students were 5 to 14 years old and staff ranged from 25 to 65 years old. Of the 67 symptomatic people, 57 (85.0%) were classified as probable cases, of which 27 (47.4%) had low severity of illness and 30 (52.6%) had moderate severity of illness. People with pre-existing conditions were more likely to experience moderate rather than low severity of illness. Similarly, people with moderate versus low severity of illness were more likely to receive medical care. Environmental sampling could not confirm that pesticide misuse had occurred.

Conclusion: Investigation findings indicate that the health effects following the drift incident at the elementary school are consistent with exposure to the pesticides used.

Editorial Note: Past studies indicate that aerial pesticide applications are the most common application method where drift events occur. This event highlights the importance of identifying and preventing contributing factors for drift incidents through investigation, regulation, and education related to aerial pesticide spraying.

Radioactive Strontium — Investigation of Internal Contamination with Radioactive Strontium Following a Cardiac PET Scan — Multistate, Orange County

Background: In the spring of 2011, three people (two from Florida) were identified by U.S. Customs and Border Protection to have internally elevated levels of radioactive strontium (Sr-82/Sr-85). Interviews found that all three people had received a cardiac positron emission tomography (PET) scan using a specific type of generator in the preceding months. To assess the extent of internal contamination with radioactive strontium, the Florida Department of Health (including the Orange County Health Department), along with the U.S. Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention, carried out a study in Florida as part of a larger nationwide study (including Alabama, Pennsylvania, and Tennessee).

Methods: Patients that had a cardiac PET scan between February 17 and July 26, 2011 were randomly selected for recruitment among participating facilities that used the same type of generator in their practice. A clinic was held in Orange County from October 3 to October 6, 2011. Participants were interviewed; onsite radiation, height, and weight measurements were recorded; and a urine sample was collected. Whole body count (WBC) was performed by Oak Ridge National Laboratory in Tennessee on nine patients with the highest strontium above background. Background was established by doing 10-minute counts at the fixed geometry on staff that had not had any medical radioisotope imaging.

Results: Of the 119 patients that participated, five (4.2%) had strontium levels more than twice background levels. Results for all nine participants with a WBC found no increased risk of adverse health effects associated with the amount of strontium received during their cardiac PET scan. Of 101 urine samples available for analysis, strontium levels were either below the minimum detectable activity of 2.5 Becquerel/liter or if they were measurable, levels detected were very low.

Conclusion: The findings of this investigation indicate that none of the study participants received breakthrough of strontium at levels that would lead to adverse health effects.

Editorial Note: Cardiac PET myocardial perfusion imaging is used to diagnose coronary artery disease and myocardial viability. Before sales of new generator units were stopped and existing units were recalled by the manufacturer, this generator was used in clinic settings across the U.S. During this procedure, rubidium-82 (Rb-82) is administered intravenously. The half-life is short, 76 seconds; Rb-82 breaks down quickly. The parent isotope, Sr-82, has a much longer half-life of 26 days. "Breakthrough" of small amounts of Sr-82/Sr-85 is allowable under specific trace level limitations. Exposure to a higher dose of radiation can cause harm. These products are regulated by the FDA.

Undetermined — Investigation of a Cluster of Illnesses Initially Attributed to a Chemical Exposure — Seminole County

Background: On August 17, 2011, the Seminole County Health Department (SCHD) was notified that the Seminole County Fire and Rescue (SCFR) had evacuated an office building in response to a sudden onset of illnesses. Symptoms among five employees included difficulty breathing, dizziness, and burning of the eyes and throat, possibly attributable to a chemical exposure. SCFR assessed eight additional ill employees on site, but found no likely agents during monitoring.

Methods: SCHD conducted an outbreak investigation to identify a possible common exposure source among affected employees. A case was defined as any illness in a worker who presented to either the company nurse or SCFR at the time of the incident.

Results: A total of 13 people were identified that met the case definition. Six cases, including the initial five symptomatic employees, reported smelling a substance in the air that might have triggered their symptoms; however, descriptions of the odor varied widely. No evidence of another possible common exposure was identified.

Conclusion: The lack of identified exposure source, the number of employees becoming ill after evacuation, and the large number of people working in close proximity to each other suggest the possibility that mass psychogenic illness may have been a factor among many of the cases involved in this incident.

Editorial Note: Mass psychogenic illness, also referred to as epidemic hysteria or sociogenic illness, and transient situational disturbance has been discussed for hundreds of years and in many different settings. As described in this investigation, mass psychogenic illness can be difficult to differentiate from acute exposure to toxic substances. Mass psychogenic illness is best managed by providing a credible explanation for symptoms, separating symptomatic from non-symptomatic people, and minimizing unnecessary medical response.

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