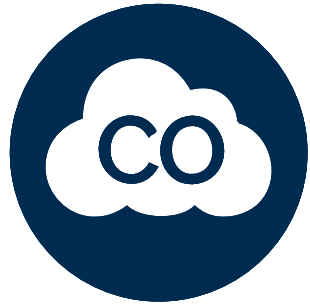


Section 3: Notable Outbreaks and Case Investigations



Section 3: Notable Outbreaks and Case Investigations

In Florida, any disease outbreak in a community, hospital, or institution, and any grouping or clustering of patients having similar disease, symptoms, syndromes or etiological agents that may indicate the presence of an outbreak are reportable as per Florida Administrative Code Chapter 64D-3. Selected outbreaks and case investigations of public health importance that occurred in 2017 are briefly summarized in this section.

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Bacterial Diseases

Investigation of Verona Integron-Encoded Metallo- β -Lactamase-Producing *Pseudomonas aeruginosa* Associated With a Long-Term Acute-Care Hospital, Orange County, July 2017–April 2018

Authors

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Background

On July 5, 2017, the Florida Department of Health Bureau of Public Health Laboratories (BPHL) notified the Florida Department of Health in Orange County (DOH-Orange) of an isolate of Verona integron-encoded metallo- β -lactamase (VIM)-producing *Pseudomonas aeruginosa* (VIM-Pa). The isolate was from a patient who had been hospitalized at a local long-term acute-care hospital (LTACH) since May 2017. Immediately upon notification, DOH-Orange contacted the LTACH's infection preventionist to request medical records and provide verbal infection control recommendations.

P. aeruginosa is a common pathogen causing health care-associated infections among hospitalized patients due to their ubiquity and ability to colonize and survive in hospital reservoirs. VIM is a mechanism of resistance that can be horizontally transferred to *P. aeruginosa* through mobile genetic elements. Mechanisms and frequency of resistance exchange are poorly understood and are not regularly found in the central Florida region. Thus, identification of VIM-producing organisms is a sentinel event that warrants investigation and careful management.

Methods

DOH-Orange epidemiology staff reviewed the colonized patient's medical records and extracted exposures and procedures that may have potentially contributed to acquisition. An interview with the patient's proxy was conducted to inquire about international medical procedures and travel history. The patient had no international medical procedures or exposures, was not on contact precautions, and was frequently transferred across the LTACH. Monthly non-regulatory site visits were conducted in August, September, October, November, December, January, and February to continually evaluate infection control practices and procedures (i.e., infection control assessment) such as hand hygiene, personal protective equipment (PPE) use, and environmental cleaning. Prospective laboratory surveillance was established and all *P. aeruginosa* isolates resistant to carbapenems (e.g., imipenem, meropenem, doripenem, ertapenem) were forwarded to BPHL for mechanism testing. Florida Health collaborated with the Tennessee Department of Health, the Southeast Regional Antibiotic Resistance Laboratory Network in Tennessee, and the Centers for Disease Control and Prevention to conduct antimicrobial resistance testing for all patients upon admission, discharge, and on a biweekly basis.

Results

On August 1, 2017, DOH-Orange conducted an initial infection control assessment and identified gaps in hand hygiene (adherence rate was 61%), use of PPE (gown adherence rate was 61%; glove adherence rate was 67%), contact precautions, and environmental cleaning. Infection control recommendations and education were provided to the LTACH to improve and enhance practices among health care personnel. DOH-Orange conducted additional infection control observations on hand hygiene, PPE use, and environmental cleaning to monitor and document improvements and adherence to recommendations throughout the investigation.

From July 5, 2017 to April 3, 2018, 13 cases of VIM-Pa colonization were identified through laboratory surveillance (i.e., admission, discharge, biweekly point prevalence surveys, and prospective surveillance). Colonized patients ranged from 21 to 80 years old, with a median age of 65 years, and 62% were males. Of the 13 colonized patients, 10 had tracheostomy tubes, 10 were undergoing invasive mechanical ventilation, and six were receiving hemodialysis. No cases of infection or complications associated with VIM-Pa colonization were reported at the LTACH.

Conclusions

This investigation documents the first identification of VIM-Pa in Florida. Transmission can occur via hand carriage by health care personnel, through shared medical equipment, and through fomites. The lack of adherence to hand hygiene, contact precautions, and proper environmental cleaning and disinfecting of patient rooms and shared medical equipment likely contributed to transmission. Constant education and reinforcement of proper infection control practices are imperative to halt transmission. In addition, it is vital to frequently communicate and collaborate with the outbreak facility.

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Investigations of Campylobacteriosis Related to Pet Store Puppies, Multiple Counties, 2017–2018

Authors

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Background

The Florida Department of Health in Orange County (DOH-Orange) investigated three human *Campylobacter* infections between April and June 2017. All reported exposure to animals at two locations of a multi-state pet store chain or puppies purchased from those stores. DOH-Orange notified the store of the human illnesses on July 11, and on July 18 used EpiCom, Florida's outbreak communication system, to request that other Florida counties report campylobacteriosis cases with exposure to pet store animals, including puppies, to the State Public Health Veterinarian. Florida Health subsequently published a Centers for Disease Control and Prevention (CDC) Epi-X notification to alert health departments nationally.

Based on similar investigations being conducted in several states and a molecular linkage between pet store puppies and human samples, the CDC launched a multi-state investigation in September 2017. The CDC confirmed antibiotic resistance to several antibiotics in many of the cases; this became the focus of the national outbreak investigation (for the full national report, see www.cdc.gov/mmwr/volumes/67/wr/mm6737a3.htm?s_cid=mm6737a3_w). This report summarizes multiple puppy-linked campylobacteriosis cases identified in Florida and is not restricted to those linked to the national outbreak.

Methods

Epidemiologic Investigation

Campylobacteriosis is reportable in Florida. Interviews are conducted on all individuals who test positive for any *Campylobacter* species (including *jejuni*) by culture or culture-independent diagnostic testing (CIDT). Cases were defined as persons meeting the national outbreak case definition or persons with symptoms consistent with campylobacteriosis and positive laboratory test results (culture or CIDT) who either worked at or visited a pet store or had contact with a puppy purchased in the 10 days prior to illness onset since January 1, 2017.

Laboratory Analysis

Human stool samples tested at commercial and hospital laboratories were forwarded to the Bureau of Public Health Laboratories (BPHL) for confirmatory culture if samples were still available. Available samples collected from puppies linked to human illnesses were also tested at BPHL. If *Campylobacter jejuni* was isolated, specimens were further characterized using whole-genome sequencing (WGS). WGS results were uploaded to the national CDC PulseNet database; this allowed for comparison of Florida isolates to those obtained from other cases and states.

Results

Between April 2017 and August 2018, Florida Health investigated 31 confirmed and probable cases of human campylobacteriosis associated with pet stores or puppies recently purchased from pet stores (23 in 2017 and 8 in 2018). Cases were in people ranging from 0 to 72 years old with a median age 24; four cases were in children ≤ 10 years old. The most common symptoms were diarrhea (100%) and abdominal pain (80%); one person reported joint-related sequelae. Seven cases were hospitalized, though three of those cases did not meet the national outbreak criteria. Cases were in residents of eight counties and reported exposure to puppies (30 cases), pet stores (9 cases), or dog breeders (2 cases). Of the 31 cases, 9 were occupational exposures, 18 were exposures to owned puppies, and the remaining 4 were related to visiting pet stores and contacting animals. Of the nine cases exposed to pet stores, eight were pet stores that were part of a national chain associated with the multi-state outbreak.

Conclusions and Recommendations

This investigation highlights that companion animals can be a source of *C. jejuni*, and this transmission mechanism should be considered when conducting future campylobacteriosis investigations. *Campylobacter* carriage can be common in puppies, kittens, and potentially ferrets, particularly animals subjected to increased stress or crowding. These animals may be asymptomatic or only mildly affected. Pet owners and pet store employees and visitors should routinely be reminded to use proper hand hygiene techniques after contacting an animal or its stool. More work to develop industry standards and educational materials on infection control for pet stores and commercial breeders should be considered. Veterinarians treating companion animals for enteric diseases should use antibiotics responsibly and emphasize the importance of responsible antibiotic use to their clients.

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Legionnaires' Disease Outbreak Associated With a Local Fitness Center, Orange County, April 2017

Author

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Background

Between April 10 and 11, 2017, the Florida Department of Health in Orange County (DOH-Orange) was notified by a local hospital of two confirmed cases of Legionnaires' disease (LD). During routine case investigation interviews, the two cases of LD were found to have common exposures to a local fitness center in the 2 to 10 days prior to symptom onset. The first case (Patient A) developed respiratory symptoms on April 6 and a follow-up chest x-ray confirmed pneumonia. *Legionella pneumophila* serogroup 1 antigen (Lp1) was detected on April 9 in a urine specimen. The second case (Patient B) developed symptoms on April 6 with a chest x-ray-confirmed pneumonia diagnosis. On April 10, a urine antigen test detected Lp1 antigen. DOH-Orange Epidemiology Program notified the Florida Health Bureau of Epidemiology and DOH-Orange Environmental Health, and an outbreak investigation was initiated on April 12. An investigation was conducted to determine the extent of the outbreak, confirm common exposures, and identify potential sources of *Legionella* contamination.

Methods

Epidemiologic Investigation

In this investigation, a confirmed case was defined as a person with a *Legionella*-positive urinary antigen test or culture and an illness that was clinically compatible with legionellosis 2 to 10 days following exposure to the fitness center. Medical records and laboratory results were reviewed and initial phone interviews were conducted with the cases' proxies to identify and assess common exposures.

Various methods were used to identify additional LD cases associated with the fitness center. Information pertaining to travel, health care settings, and exposure to whirlpool spas in the 10 days prior to illness onset was collected using a national case report form and an additional county-specific case report form. Syndromic surveillance data were reviewed. The DOH-Orange exposure tracking log was also used to retrospectively identify cases with exposures to the fitness center. On April 15 and 16, DOH-Orange contacted two major hospital systems in Orange County via telephone and email to alert them of the ongoing investigation and to consider appropriate testing should patients present with signs or symptoms consistent with legionellosis. On April 17, DOH-Orange sent a notification to all county health departments in Florida using EpiCom, Florida's outbreak communication system, advising them of the LD outbreak. Pursuant to the DOH-Orange recommendations, a guest notification letter highlighting the ongoing investigation of LD cases associated with the fitness center and general legionellosis information was provided to the fitness center on April 13 for same-day distribution to guests at check-in. On April 18, the same letter was provided to prior guests from March 15 to April 14 via email. Guests were provided an opportunity to make an informed decision based on their personal assessment of risk to seek medical care for appropriate testing, diagnosis, and treatment if symptoms developed within 14 days after exposure to aerosolized water at the fitness center.

Environmental Investigation

On April 13, Florida Health conducted a joint epidemiological and environmental assessment of the fitness center to determine potential sources of aerosolized water mechanisms and provide recommendations to prevent additional cases of legionellosis. Maintenance records of the spa and premise plumbing system were requested for the exposure period. Previous inspection records from Florida Health were reviewed. An understanding of the storage and distribution of the hot water system for the facility was solicited and observed. Inquiries and observations were made for any additional sources that could produce aerosolized mists in and around the fitness center. A sampling plan was developed based on the on-site observations and current epidemiological data of the two cases. Biocide, pH, and temperature measurements were taken at each location where samples were collected. On April 13, bulk water samples and biofilm swabs were collected by DOH-Orange. Water samples and swabs were collected from multiple sites throughout the facility to capture the potable water currently in the distribution system. Post-remediation and follow-up water samples were collected from the fitness center by a private water treatment management company on April 20, May 31, and June 29. Samples were shipped to the Florida Health Bureau of Public Health Laboratories (BPHL).

Laboratory Investigation

BPHL cultured bulk water and swab samples for the presence of *Legionella*. Testing for *Legionella* was conducted by the private water company at an independent Environmental Legionella Isolation Techniques Evaluation (ELITE) Program-certified laboratory.

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Results

Epidemiologic Investigation

A third case (Patient C) was identified on April 14 via ongoing disease surveillance. Patient C had symptom onset on April 5 with chest x-ray-confirmed pneumonia. Lp1 antigen was detected on April 14 in a urine specimen. On May 10, a sputum culture from Patient B identified Lp1. No additional cases were identified via the exposure tracking log. A total of three confirmed LD cases associated with the fitness center were identified.

The three infected people were 59, 65, and 79 years old and two were female. Two people had symptom onset on April 6 and one on April 5. All three cases had fever and cough and were hospitalized. One person died due to hypertension and atherosclerotic cardiovascular disease. Interviews with case proxies identified that all three had visited the fitness center on multiple days in the 2 to 10 days prior to illness. At the fitness center, all three people used the shower and pool and one person used the spa. The pool and spa were in close proximity in an enclosed area.

Environmental Investigation

The fitness center is located in a commercial real estate building that is composed of eight single commercial retail businesses, including the fitness center. There were no cooling towers or decorative fountains at the fitness center. The facility has central heating and cooling systems and water is supplied from the municipal water system. Two water heaters are used to store and heat water prior to being distributed throughout the facility. Temperature controls for the hot water heaters were set at 124°F and 123°F. The actual measured values of the water directly from the two hot water heaters were 110°F and 105°F, respectively. The fitness center did not have a water management program for the control and prevention of *Legionella*. Prior to April 2017, there were no reported LD or Pontiac fever cases associated with this fitness center nor any outbreaks or clusters.

Water samples were collected and analyzed on April 13, April 20, May 31, and June 29. Water temperatures, pH, and residual free chlorine was measured for the premise plumbing and the spa. The right spa filter was not sampled during the May 31 and June 29 follow-up testing, therefore the level of *Legionella* could not be monitored in consecutive sampling. On April 13, the spa was hyperchlorinated by the fitness center. The spa reopened on April 15. On April 18, the water treatment management company hyperchlorinated the domestic water supply and cleaned/disinfected the spa. Shower use was restricted until point-of-use filters were installed on April 17. Upon receipt of the post-remediation results on May 4, the fitness center removed point-of-use filters from the showerheads.

Per the fitness center's management, regularly scheduled maintenance for the pool and spa was performed by a swimming pool maintenance entity and occurred three days per week on Mondays, Wednesdays, and Fridays. According to management, the free chlorine, pH, and water temperature of the spa and pool are measured daily. On April 5, 2017, DOH-Orange Environmental Health conducted an inspection at the fitness center due to a complaint they received stating the water had a brown/green color in appearance and an odor. The free chlorine in the spa was zero when measured by DOH-Orange on April 5 at 4:15 p.m. However, the requested pool and spa logs suggested the measured free chlorine on April 5 at 8:03 a.m. was 4.5 ppm.

Observed onsite environmental conditions identified areas favorable for biofilm production and *Legionella* harborage and growth, including water temperatures conducive for *Legionella* and low chlorine levels in the premise plumbing system.

Laboratory Investigation

Lp1 was not detected in the samples collected on April 13. Post-remediation samples indicated an Lp1 concentration of 0.8 CFU/ml in one of the spa filter samples. *Legionella* was not detected in the two follow-up samples collected on May 31 and June 29.

Conclusions

Three confirmed LD cases were associated with the fitness center. The cases had multiple days of exposure at the fitness center in the 2 to 10 days prior to illness. Urinary antigen laboratory testing was used to confirm the three LD cases. Lp1 was isolated from one case's sputum culture, suggesting a link to the fitness center based on detection of Lp1 in one of the spa filter samples during post-remediation sampling. Epidemiologic investigation strongly indicates the potable water system as the most likely source for all three cases reporting repeated shower use during their incubation periods. The spa was used by one case; however two other cases reported using the swimming pool adjacent to the spa. Proximity of the cases to the spa is not known and hard to determine. Aerosolized mists from spas can travel when the spa jets are in operation. Observed on-site environmental conditions identified areas favorable for biofilm production and *Legionella* harborage and growth, including water temperatures conducive for *Legionella* growth and low chlorine levels in the premise plumbing system. The presence of a low level of Lp1 in the spa post-remediation could indicate sporadic Lp1 in the facility water systems, which need to be controlled with a water safety management program.

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DOH-Orange required documentation and evidence of implemented control measures and continuous sampling results. In conjunction with the private water treatment management company, a schedule for routine follow-up testing was developed and executed, highlighting the frequency of water testing (monthly for the first three months and then quarterly for the remaining year). DOH-Orange also required water samples to be cultured at an ELITE-certified lab. In the event *Legionella* were found in a sample, remediation and additional testing would be required. The sampling plan for continued monitoring included proximal and distal sites that were based on the original DOH-Orange sampling conducted on April 13, 2017. DOH-Orange's strong relationship with the local hospital systems in Orange County assisted in reporting and investigating LD cases in a timely manner. However, cases are possibly underreported since legionellosis is an under-diagnosed illness, so appropriate laboratory testing for *Legionella* is not always ordered by health care providers.

Based on the findings from the epidemiologic and environmental investigations, DOH-Orange recommended remediation and ongoing maintenance of the premise plumbing system to reduce and prevent *Legionella* transmission. The fitness center implemented water restrictions to control and reduce exposure to aerosolized water generated from spa and shower use. DOH-Orange recommended that the fitness center hire a private water treatment management company and develop a water management plan. In conjunction with the water treatment and management company, the fitness center developed and implemented a remediation and sampling plan of the potable water system to minimize the risk of *Legionella* transmission.

Lyme Borreliosis Cases Acquired in Central Europe, 2017

Authors

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Background

Lyme disease, caused by *Borrelia burgdorferi* bacteria, is the most common vector-borne disease in the U.S. Although Lyme disease can be acquired in Florida, the majority of cases reported to the Florida Department of Health are acquired outside of the state. Collecting data on location of exposure is important in understanding where the risk for exposure is highest to tailor prevention education for the public and to track changes in pathogen geographic distribution. Outside of North America in other temperate regions of the Northern Hemisphere, including northern and central Europe and Asia, the clinical disease is referred to as Lyme borreliosis, and is caused by different serotypes or genospecies than infections in the U.S. These genospecies may not be detected using the standard Lyme disease laboratory testing offered in the U.S. Differences in testing and a lack of awareness of Lyme borreliosis among travelers abroad may lead to under-reporting of internationally acquired cases. Multiple health agencies in Europe have reported increased geographical distribution of the tick vectors as well as a rise in incidence of cases. In 2017, five cases of Lyme borreliosis with exposure in European countries were reported to Florida Health, which was above the 10-year average of 2.2 cases per year from 2007 to 2016.

Methods

Lyme disease cases are classified as confirmed, probable, or suspect using the national Centers for Disease Control and Prevention (CDC) surveillance case definition. Cases reported to Florida Health from January 1, 2007 through December 31, 2017 were reviewed to identify exposures in Europe. Lyme borreliosis incidences in European countries were obtained from data reported by the European Centre for Disease Prevention and Control (ECDC) and the World Health Organization.

Results

Three probable and two confirmed Lyme borreliosis cases with exposure in four European countries were reported in 2017. Three of the five cases had acute manifestations of Lyme borreliosis. The two confirmed cases had health care provider-diagnosed erythema migrans. Three cases reported a known tick bite and all five cases reported outdoor activities that exposed them to tick habitats while abroad. Countries of exposure included Austria, Czech Republic, Germany (2), and Sweden. Austria, Czech Republic, and Germany are located in central Europe and share a border with one another. This region is recognized by the ECDC as the highest area for Lyme borreliosis infection rates on the continent. ECDC has also recognized Sweden (mostly southern Sweden) as an endemic area for Lyme borreliosis.

Conclusions

The ECDC currently provides specific Lyme borreliosis educational materials for travelers to endemic areas of Europe. The CDC has online resources where travelers can look up disease information by country of destination, but these resources do not include information on Lyme or other tick-borne diseases by location of travel. Including tick-borne disease risk information by country of destination would be helpful for both travelers and their health care providers. Florida Health is adding information on Lyme borreliosis

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and other international tick-borne disease risks to existing tick-borne disease resources. A protocol was also created for county epidemiology staff to use when investigating Lyme disease cases with exposure in other countries, as the current Lyme disease case definition only references exposure in high and low incidence U.S. states.

***Mycobacterium abscessus* Injection Site Infections at a Pain Management Clinic, Collier County, March–October 2017**

Authors

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Background

Nontuberculous mycobacteria (NTM) are ubiquitous in the environment and evidence suggests that nosocomial transmission of these organisms is increasing. Health care-associated infections due to NTM are most commonly of the skin or percutaneous tissues. These organisms have also been known to contaminate medications and medical devices. In August 2017, the Florida Department of Health in Collier County (DOH-Collier) was notified of a patient with a paraspinal abscess and laboratory results indicated infection with an NTM, *Mycobacterium abscessus*. The patient reported receiving spinal injections at a local pain management clinic.

Methods

A confirmed case of injection-site abscess was defined as a person who had an injection at pain management clinic A between March 1, 2017 through October 24, 2017 and a diagnosed soft tissue or joint infection culture-positive for *M. abscessus*. The laboratory component differed for probable and suspect cases, with laboratory evidence of NTM infection and diagnosis of soft tissue or joint infection, respectively. Cases were identified through retrospective surveillance of health care system patients, querying syndromic surveillance data, and review of NTM-positive isolates received at the Florida Health Bureau of Public Health Laboratories (BPHL) from Lee and Collier counties. On December 7, DOH mailed 982 notification letters to pain management clinic patients potentially exposed during the period of interest. Available clinical isolates were submitted to BPHL for further characterization, including identification by polymerase chain reaction (PCR)-restriction analysis, PCR to determine *M. abscessus* subspecies *massiliense*, and whole-genome sequencing (WGS). Sequence data were submitted to CDC for species and subspecies confirmation using multilocus sequence type (MLST) and phylogenetic analysis by high-quality single-nucleotide polymorphism (hqSNP) analysis. An Infection Prevention and Control Assessment Tool for Outpatient Settings (ICAR) site visit of the pain management clinic was conducted.

Results

A total of 982 pain management patients received injections from March 1 through October 24, 2017. Twenty (2%) patients met the case definition for an injection site abscess. The cases identified included 11 (55%) confirmed, 1 (5%) probable, and 8 (40%) suspect. Ages of infected people ranged from 43 to 90 years old, with a mean age of 69 years. Half of the infected people were males and half were females. During the week of May 21 to May 27, 33 injections were administered among 10 patients. Of the 12 isolates submitted to BPHL, all were confirmed as *M. abscessus* subspecies *massiliense*. Phylogenetic analysis showed these isolates were 0–1 SNPs different by sequence analysis and formed a cluster that appears to represent a common source. The findings of the ICAR assessment include several recommendations for improvements in infection control procedures, availability of personal protective equipment, record keeping, client education, and storage of supplies.

Conclusions

The epidemiologic investigation showed exposure likely occurred in the setting of this pain management clinic, but efforts to identify the source were complicated by poor record keeping and infection control practices. Medication records were unavailable and many cases received multiple injections during the six-month exposure period, making it difficult to differentiate between a possible point-source or common intermittent exposure. Laboratory evaluation of available isolates was crucial for identification of the etiology of this cluster and common source. The ICAR assessment showed clinic practices could have played a role in transmission in this setting. Identification of NTM clusters can be further complicated by prolonged incubation periods and lack of active reporting, as sporadic cases of NTM infections are not reportable conditions in Florida. Clinicians should remain vigilant in cases of NTM where patients report injections and be aware that clusters or outbreaks of these infections are reportable. Effective collaboration between DOH-Lee, DOH-Collier, and laboratories at local, state, and federal levels was essential for identification of this health care-acquired infection cluster.

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Viral Diseases

Human Rabies Investigation, Highlands County, October 2017

Authors

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Background

Human rabies cases are rare in the U.S., with one to three cases reported annually. This is largely due to effective domestic animal rabies vaccination policies, well-established animal control organizations, and access to rabies post-exposure prophylaxis (PEP) for individuals who are exposed to a rabid animal. Rabid bats have been identified in 49 of 50 states in the U.S., with the exception of Hawaii. At least some bat rabies virus variants appear to have the capacity to cause infections through inoculation in very minor wounds, possibly a viral adaptation to the small size of U.S. bats' teeth. Rabies infection can be prevented with timely rabies PEP; however, once clinical illness develops, mortality approaches 100%. On the afternoon of October 12, 2017, a central Florida hospital notified the Florida Department of Health in Highlands County (DOH-Highlands) of a suspected rabies infection in 56-year-old woman residing in Highlands County. A rabies investigation was immediately initiated by DOH-Highlands. On October 15, a nuchal skin biopsy collected October 13 tested positive for rabies by standard direct fluorescent antibody as well as polymerase chain reaction.

Methods

Human rabies is a nationally reportable condition. A case is defined in the Centers for Disease Control and Prevention (CDC) national surveillance case definition; cases must meet clinical criteria and test positive for rabies at the CDC laboratory. Identification of a human rabies case triggers investigations to ensure other people were not exposed to either the original rabid animal or to the human patient after they became ill or in the 14 days prior to illness onset.

Results

Symptom onset was October 6, when the patient developed a subjective fever and sharp neck pain that extended into the right arm. The pain worsened over the next three days, and symptomatic treatment for cervical disc disease was provided at two health care facilities. The patient's condition continued to deteriorate, with development of headache, gaze deviation to the right, nystagmus, garbled speech, right arm spasms, tremors, blurred vision, hearing sensitivity, and agitation. The patient was admitted to a local hospital on October 10, and then transferred to a tertiary facility on October 11. The patient reported a bat bite to a family member shortly before being transferred. After this information was reported to health care providers at the tertiary facility, the patient was placed in isolation. Further investigation determined the bite occurred August 11 when the patient picked up what appeared to be a dead bat in the backyard. The patient cleaned the bite site but did not seek further medical care for the minor wound. No one else was exposed to the bat. Although intensive, high-level medical care was provided and the Milwaukee protocol was attempted, the patient passed away approximately two weeks after symptom onset. Post-mortem testing of the brain confirmed the presence of rabies virus antigen. Virus typing was consistent with a rabies virus variant found in *Tadarida brasiliensis* (Brazilian free-tailed bats) in the U.S.

A traceback of patient contacts from September 22 through October 21 identified 62 contacts. All contacts were interviewed. Rabies PEP was recommended for 22; 9 were family members and close friends and 13 were health care providers from the tertiary facility that had contact with the patient prior to placement in isolation. The employee health program at that tertiary facility strongly encouraged their employees to complete the rabies PEP series. Although human-to-human transmission of rabies is not well documented, rabies PEP was recommended to the family and close friends due to their social habits. Most of those for whom rabies PEP was recommended completed the series except for one who declined.

Conclusions

Because of the minor nature of bat bites compared to other types of animal bites, bat bite victims may be less likely to seek medical care, particularly if they are unaware of the risk for rabies. Standard rabies prevention education needs to highlight that rabies can result from bat bites that cause minor or no obvious wounds.

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Investigation of Potential Exposure to Rabies After Consumption of a Commercially Distributed Product, Santa Rosa County, April 2017

Authors

Laura Matthias, MPH

Background

On April 3, 2017, the Florida Department of Health was notified of a possible exposure to rabies by a complainant who reported consuming part of a salad mix purchased from a local supermarket on April 2. The complainant was preparing to consume more of the salad on April 3 and discovered parts of a dead bat in the container of salad. In response to this complaint an investigation was initiated.

Methods

Epidemiologic Investigation

The Florida Department of Health in Santa Rosa County (DOH-Santa Rosa) was notified as the complaint was for residents of Santa Rosa County. DOH-Santa Rosa interviewed the individuals to assess symptoms, exposure, and purchase information. Florida Health requested pictures of the bat and salad mix and receipts showing purchase of the salad mix from the supermarket. A case was defined as someone who consumed organic spring mix with a best buy date of April 14, 2017 that had parts of a dead bat in it.

Environmental Assessment

Florida Health notified the Florida Department of Agriculture and Consumer Services (FDACS) and the U.S. Food and Drug Administration (FDA) Florida District office on the evening of April 3. All Florida county health departments where product was shipped were notified. FDACS visited the local supermarket on April 4 to conduct an assessment and collect items from the same lot for analysis. FDACS and FDA initiated a traceback and trace forward on the salad mix.

Laboratory Analysis

DOH-Santa Rosa collected the leftover salad and container from the private home and shipped it to the Florida Health Bureau of Public Health Laboratories (BPHL) for analysis. DOH-Santa Rosa collected the bat and shipped it to the Centers for Disease Control and Prevention (CDC) for analysis. FDACS collected two containers from the same lot at the local supermarket and sent them to the FDACS Bureau of Laboratories for analysis.

Results

Epidemiologic Investigation

Two people consumed the spring mix with parts of dead bat in it. Case 1 reported experiencing two loose bowel movements around 6:00 a.m. on April 3 and a headache and nausea around 5:00 p.m. on April 3 after discovering the bat in the salad mix. Case 2 reported nausea around 5:00 p.m. on April 3 and two loose bowel movements at 7:00 a.m. on April 4. The cases were 35 and 37 years old; one was male, one was female. The salad was purchased on April 2 from a local supermarket. Both cases reported consuming a portion of the salad mix at 8:00 p.m. on April 2. They discovered the dead bat on April 3 between 4:30–5:00 p.m. as they were preparing to consume more salad. Rabies post-exposure prophylaxis (PEP) was recommended for these two individuals by CDC. Rabies immune globulin and rabies vaccine dose one were given on April 7. Subsequent doses of rabies vaccine were administered at DOH-Santa Rosa on April 10, April 14, and April 21. DOH obtained pictures of the salad, bat, and packaging (pictures to the right).

Environmental Assessment

FDA obtained invoices and records that indicated processing facility information. The salad mix was processed on March 30 at a facility in Morrow, GA. Components of the salad mix were from Arizona and California. A full investigation was completed at the processing facility in Morrow, GA on April 6–9. A review of the process from receiving product to packaging was completed. A precautionary recall was issued on April 8. There were 8,152 packages distributed to eight states. Prior to the official recall, the supermarket chain issued guidance to their stores to remove the product from the shelves and destroyed any remaining product. Florida received 2,448 units of product distributed among 17 counties. Of those, 2,214 (90%) were sold and the remaining 234 (10%) were withdrawn and destroyed by the stores.

Tadarida brasiliensis bat in salad



T. brasiliensis bat separated from salad



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Laboratory Analysis

BPHL received the salad mix and packaging; however no analysis was conducted for this product. CDC identified the bat as a juvenile Brazilian free-tailed bat and determined that roughly 65% of the bat had been shipped to them. CDC reported inconclusive rabies results on the bat using polymerase chain reaction and direct fluorescent antibody testing. FDACS reported both samples were negative for *E. coli*, Shiga toxin-producing *E. coli*, and *Salmonella*. FDACS reported finding a whole flying insect and another insect head inside one of the containers.

Conclusions

This investigation was undertaken primarily due to the pathogen of concern. Rabies is an acute viral infection that is nearly always fatal. Exposure to rabies is usually through saliva containing the virus from a rabid animal introduced through a bite or scratch. Though quite rare, it is possible that someone could acquire rabies if the saliva gets directly into their eyes, nose, mouth, or a wound. Since the head of the dead bat was still in the salad, there was potential for exposure to saliva and central nervous tissue. The cases consumed some of the salad on April 2. It may have been difficult to discern smaller bits of the bat tissue from the leafy green mixture. Due to the bat testing inconclusive for rabies, the fatality rate of the disease, and the possible risk of exposure, rabies PEP was recommended. CDC treats inconclusive rabies testing results as though they were positive. Additionally, out of an abundance of caution, the product was recalled.

Through analysis of the bat, CDC determined that the bat was a *Tadarida brasiliensis*, commonly referred to as a Mexican free-tailed bat or Brazilian free-tailed bat. CDC conducted additional phylogenetic analysis on the bat and determined it was most likely a *T. brasiliensis mexicana*, a subspecies that occurs from east Texas to California and into Mexico. This suggests that the bat likely did not live in Florida or Georgia and came from somewhere in the Southwest. Traceback information collected during the investigation indicated the bat likely entered the product during harvest and not during processing at the facility.

No other reports of illness, other animal parts in products, or other concerns were reported to Florida Health.

Measles in a Vaccinated Patient Following Exposure During Airline Travel, Polk County, April 2017

Authors

Gregory Danyluk, PhD, MPH, MS

Background

On March 27, 2017, the Florida Department of Health in Polk County (DOH-Polk) was notified by the Florida Health Bureau of Epidemiology, following notification by CDC, that a 23-year-old male Polk County resident had been exposed to measles during a domestic flight on March 21. DOH-Polk contacted the resident regarding his current health status, confirmed with him that he had received two doses of measles-mumps-rubella (MMR) vaccine during childhood, and advised him to notify DOH-Polk prior to visiting a health care provider if he became symptomatic. On April 7, DOH-Polk was notified after hours by the infection preventionist (IP) of a local hospital that a patient had presented to their emergency department with fever, rash, and diarrhea who had mentioned being contacted by the county health department the previous week regarding possible exposure to measles.

Methods

DOH-Polk interviewed the patient on April 7 and reviewed his activities for that day and during the four days prior to the onset of his rash in order to identify exposed individuals while he was potentially infectious. Contacts who were subsequently identified were interviewed regarding their immune status and current health, provided with information on measles signs and symptoms, and encouraged to visit their health care providers if they became ill during the two weeks following their exposures.

Blood and urine specimens from the patient were collected at the hospital and delivered to the Florida Health Bureau of Public Health Laboratories (BPHL) on April 10, and the urine tested positive for measles by polymerase chain reaction (PCR) later that day; the serum was forwarded to the Centers for Disease Control and Prevention for further sequencing and genotyping. The patient's immunization records and those of his three roommates were requested from their respective health care providers who had administered the MMR doses.

The patient reported working at a high school while infectious; therefore, DOH-Polk school health staff reviewed vaccine coverage among students, worked with the school principal to review the immune status of staff, and provided an information letter to distribute to parents and staff notifying them of a possible measles exposure. A letter to local health care providers notifying them of the case

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and providing the Florida Health “Think Measles” infographic was distributed via email and blast fax on April 11, encouraging enhanced surveillance through April 27. Surveillance for additional cases presenting at emergency departments was conducted using Florida’s syndromic surveillance system.

Results

The patient reported that his rash began on April 5, and other than working at the school, he left his home twice in the previous four days, once to visit a local gym (April 1) and once for grocery shopping (April 2). He worked at the school on April 3 and 4, and then briefly on the morning of April 6. He reported that his mother visited him and he stayed in her hotel from April 7 to April 9, but he kept the mask on that he had received from the hospital until he was in her room and remained there the entire time with a “Do Not Disturb” sign on the door. The patient’s roommates’ immunization records confirmed that they had received two MMR doses. The gym manager provided a list of names and contact information for staff and members who, according to their records, were there at the same time as the patient or up to two hours afterward. DOH-Polk contacted 35 of the 39 directly and notified them of their exposures. The managers of the grocery store and the hotel where the patient had stayed were also contacted and asked to notify staff of their possible exposures. The IP at the hospital where the patient presented confirmed that the only exposure was to the triage nurse, who was immune.

DOH-Polk school health staff reviewed students’ immunization records on April 11 and determined that all who attended that school had received two MMR doses. One student with an immune deficiency was identified; the student’s parents were contacted and advised to follow up with the student’s health care provider. On April 12, DOH-Polk immunizations staff provided post-exposure MMR doses to 12 school staff members whose immune status was uncertain or who had not received two doses previously.

In addition to the positive PCR result from urine, on April 12 the patient’s serum tested positive for measles IgG at BPHL. The virus isolated from the patient was identified by CDC on April 20 as genotype B3; in a separate communication from CDC, nucleotide sequences from the isolate were identical to those of isolates from both the index case and another passenger who had become ill after traveling on the same flight. The patient’s immunization records were obtained from his health care provider and documented that MMR had been administered at 12 months and 43 months old.

Conclusions

This measles case investigation demonstrated the value of notifying county health departments of possible exposures to known measles cases during airline travel. The patient had already been made aware of his exposure by DOH-Polk and, although he presented at an emergency department without notifying DOH-Polk prior to his visit as requested, he was able to alert the triage nurse of the likely cause of his illness, which allowed the contact investigation to begin immediately afterwards. The investigation also demonstrated that an exposed, fully vaccinated individual may nevertheless develop the disease.

Adult Lead Poisoning Cluster at a Shooting Range, Lake County, May 2017

Authors

Sudha Rajagopalan, MPH; Brittany Becht MPH, CIC; Giselle A. Barreto, MPH

Background

Lead is a toxic substance with well-known long-term adverse health outcomes. Shooting guns at firing ranges is an occupational necessity for security personnel, police officers, and military, and is increasingly a recreational activity for the public. Discharge of lead dust and gases is a consequence of shooting guns. Starting in 2017, a blood lead level (BLL) ≥ 5 $\mu\text{g}/\text{dL}$ is considered lead poisoning in Florida (previously a BLL ≥ 10 $\mu\text{g}/\text{dL}$ was considered lead poisoning). On May 23, 2017, the Florida Department of Health in Sumter County (DOH-Sumter) received elevated BLL results ranging from 11.6 to 30 $\mu\text{g}/\text{dL}$ for four residents.

Methods

DOH-Sumter initiated an investigation that included reviewing laboratory results, interviewing employees of the gun range, conducting a site visit, and assessing the work environment.

Results

The original BLL results received by DOH-Sumter were for three males and one female aged 70 to 80 years. Investigation determined they were exposed to lead while shooting at a gun range located in the city of Leesburg in Lake County. On May 30, DOH-Sumter

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received elevated BLL results for five additional males aged 67 to 71 years. Four of the five new cases also reported recreational shooting at the same gun range. As of July 19, 2018, 43 cases have been identified. Forty-one of the 43 cases were reported among Sumter County residents and two cases were reported among Lake County residents. None of the cases reported any symptoms of lead poisoning.

A joint investigation by DOH-Sumter and DOH-Lake identified that the cases exposed at the gun range belonged to a shooting club. The shooting club consists of 2,000 members. The club has various groups who shoot recreationally. Members of the all these groups usually target practice in an indoor range. The total number of potentially exposed individuals was unknown; rosters from the shooting club's website indicated several thousand members.

DOH-Lake conducted a site visit of the indoor gun range to discuss the owner's knowledge and familiarity with lead exposure, determine the number of employees at risk for lead exposure, and recommend testing for the rest of the employees. DOH-Lake learned that the range had been operating as a family business for the past 17 years. In that time, the range had not updated their ventilation systems. The range had a direct exhaust system which brings in fresh air from outside and then vents the range air (with airborne lead) outside. It is not clear if this air was filtered. It is also unclear whether the vent systems had any high-efficiency particulate air (HEPA) filters installed or whether the exhaust vent was located away from human activity. The gun range owner stated that airborne lead levels had not been tested despite the regular use of the gun range. DOH-Lake recommended use of a separate ventilation system for firing lanes.

The gun range owner claimed employees maintained and cleaned the facility often and used personal protective equipment, but did not have a schedule or set protocol for regular maintenance. It was not clear if respirator masks were tested for a correct fit for each gun range employee or how well the equipment was maintained. DOH-Lake recommended a written protocol for cleaning practices such as using wet mopping or a vacuum with a HEPA filter instead of dry sweeping to remove dust.

Good hygiene practices were followed at the gun range and shooters used different bathrooms from shop employees and customers. DOH-Lake further emphasized education on good hygiene practices after shooting, such as cleaning thoroughly after target practice with effective lead removal products, changing clothes before going home, and laundering clothes used for target practice in a separate laundry load.

The gun range had six employees including the owner. Four of the six employees are contractors who are not screened regularly for lead exposure, and there was no employee lead screening program available at the gun range. DOH-Lake reiterated Occupational Safety and Health Administration (OSHA) recommendations for lead monitoring at the facility and an employee lead screening program. Employees were advised to send family members for lead screening due to the potential for people exposed at the gun range bringing lead into their homes.

DOH-Lake also recommended use of jacketed or lead-free bullets to reduce lead exposure. The range continued to operate; however, the club suspended their shooting activities at this range. Additional follow-up interviews indicated that the gun range did not implement additional measures to prevent lead exposure and members are still concerned regarding additional lead exposure.

Conclusions

The findings suggest that improper design, operation, and maintenance of the gun range were likely causes of elevated BLLs among the gun club members. This investigation highlighted the risk for lead exposure at indoor firing ranges, despite federal regulations and specific guidelines pertaining to range design and operation. Recommendations were made to minimize employee exposure to lead and the owner was educated on risks to employees and customers from airborne and surface lead exposure.

Investigation of Liquid Nitrogen Exposure at a Local Fair, Escambia County, October 2017

Authors

Laura Matthias, MPH

Background

On October 23, 2017, the Florida Department of Health in Escambia County (DOH-Escambia) received reports of burn-like injuries in people who had consumed a dessert called Dragon's Breath at a local fair. A provider who had seen patients with these injuries reported it to the health department. DOH-Escambia initiated an investigation into the reported exposures.

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Methods

Epidemiologic Investigation

DOH-Escambia attempted to interview all people who reported having burn-like injuries after consuming the dessert with an incident-specific questionnaire. DOH-Escambia requested medical records for those who sought medical treatment. Active case finding was conducted using Florida's syndromic surveillance system and by asking those interviewed individuals if they knew of others who became ill or suffered injuries. A case was defined as someone who developed a burn-like injury after consuming or touching the Dragon's Breath dessert at the Pensacola Fair between October 20–23, 2017.

Environmental Investigation

DOH-Escambia contacted the Florida Department of Business and Professional Regulation (DBPR) and the Florida Department of Agriculture and Consumer Services (FDACS) to schedule a joint environmental assessment of the vendor. During the environmental assessment, DOH-Escambia reviewed the vendor's permit, the vendor's supplies for making the dessert, and the procedures and instructions for serving and consuming the dessert.

Results

Epidemiologic Investigation

Three people met the outbreak case definition. No additional cases were found after reviewing syndromic surveillance data. DOH-Escambia interviewed the parents of the three affected teenagers. Exact incubation times were not able to be calculated, as the specific time the product was consumed was not assessed; however, cases reported rapid onsets of symptoms ranging from immediate to within 30 minutes of product consumption. Duration of symptoms ranged from three to four days. Parents of all three teenagers reported not being fully aware of the risk of consuming or handling this product. Two reported that instructions were given on how to handle the product.

Case A was in a 14-year-old female resident of Escambia County. She reported eating a "few" pieces of the dessert with her hands on October 20, as a stick was not provided to eat the dessert. She reported burning her thumb after holding the cup that contained the dessert and also reported abdominal pain and a headache starting on October 21. She sought medical care at an emergency department on October 22 with a chief complaint of a chemical burn and infected nail bed and was treated with antibiotics for the infection. She was with three other friends who also consumed the dessert. It was reported that one other friend also suffered a minor burn but DOH-Escambia was unable to reach that person for further follow-up.

Case B was in a 15-year-old female resident of Santa Rosa County. She reported slight swelling of the tongue and numbness/blistering of the tongue and top of her mouth within 30 minutes after consuming the dessert on October 21 (top right picture). She reported consuming a "few" pieces of the cereal and giving the rest to her sibling. When finished with the dessert, the remaining liquid was thrown away. She sought medical care at a pediatrician's office on October 23 and was diagnosed with a burn of the mouth and pharynx and was advised to use over-the-counter burn coating gel for the injury. She had a sibling who also reported consuming the dessert but the sibling did not have any injuries.

Case C was in a 13-year-old male resident of Escambia County. He reported what appeared to be frostbite on the roof of his mouth and difficulty swallowing after consuming two pieces of the dessert on October 23. He sought medical attention at a pediatrician's office on October 24 and was referred to a pediatric gastroenterologist for possible esophageal injury. Three other people consumed the dessert but no one else reported injuries.

Environmental Investigation

On October 26, DOH-Escambia, DBPR, and FDACS conducted a joint assessment of the vendor. DOH-Escambia obtained information on how the vendor sold the product. Nitrogen was obtained from a supplier (the actual supplier was never revealed, therefore the grade of nitrogen used is unknown) and brought to the fairgrounds in a small tank called a dewar. Other supplies used were hot coffee sleeves (three per cup), disposable cups, skewers, and cereal (source and brand was also never revealed). The liquid nitrogen is added to the cereal in a cooler for a minimum of five minutes. The mixture was ladled into a cup and liquid nitrogen

Case B: View of mouth with burns to the inside roof of the mouth

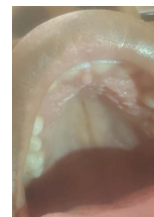


Photo credit: Pensacola pediatrics, Facebook page, Posted October 25, 2017

Dragon's Breath dessert: Three cup holders hide the liquid nitrogen boiling at the bottom of the cup.



Photo credit: Dorothy Kramer

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could be seen boiling at the bottom of the cup (bottom right picture). It was then served to customers and the vendor demonstrated how to consume by following the directions posted on a sign (picture to right). While DOH-Escambia was there, the vendor demonstrated how he could pour out the liquid nitrogen left in the cup and let it roll off the back of his hand without causing him harm. However, the vendor said not let the nitrogen pool in the palm of your hand. The inspector questioned the vendor on consuming the product and the vendor assured them that customers would not be harmed if they followed directions. Instructions were not provided on what to do with any uneaten product. Prior to this site visit, the vendor had been unlicensed to operate at this event. DBPR issued a permit to the vendor on October 26 after the vendor obtained the necessary items required for permitting.

Conclusions

Liquid nitrogen is used in the food community to quickly freeze foods. When in liquid state, it is at an extremely low temperature and the gas can flash freeze foods as well as give off a dense fog that can add a flair element to food preparation. Liquid nitrogen has not been recognized as safe by the U.S. Food and Drug Administration for use in this type of dessert and there is a hazard to consumers if the product is not handled appropriately. Because it is at such a low temperature, it is unsafe for consumers to ingest the liquid and it is only after the liquid has evaporated that food should be consumed. In this investigation, there were reports of liquid being left at the bottom of the cup and liquid nitrogen is known to cause frost-bite-like or burn injuries if not handled appropriately. Instructions did not provide directions on how to dispose of any unconsumed product or the liquid at the bottom of the cups. One case reported throwing away the leftover liquid in the trash. Liquid nitrogen should be disposed of outdoors by slowly pouring the liquid on gravel or the ground so that it can evaporate. The liquid should not be poured on pavement. Throwing away leftover liquid at the bottom of a cup would likely not allow for quick evaporation of the product and could potentially harm others when removing the trash bag or if the bag was spilled. This dessert should not be served with liquid nitrogen at the bottom.

This investigation into the use of liquid nitrogen as a food additive highlights the risk of consuming the product if not handled appropriately. This was a novel dessert to Florida Health investigators and information was shared statewide with county health department environmental health directors in case a vendor like this appears at any other events in the future. The manager of this event stated that a vendor like this would not be allowed to operate at this event in the future; however, this does not prevent a similar vendor from preparing a similar product at other events around the state.

Neurotoxic Shellfish Poisoning Associated With Recreationally Harvested Horse Conch, Orange County, March 2017

Authors

Jennifer T. Jackson, MPH, CIC

Background

On March 23, 2017, the Florida Department of Health in Orange County (DOH-Orange) was notified by a physician at a local emergency department (ED) of Patient A who had signs and symptoms of neurotoxic shellfish poisoning (NSP) after consuming two recreationally harvested horse conch from Sarasota Bay off Florida's Gulf Coast on March 23. On the same day, public health interviews with the treating physician and the symptomatic patient identified additional family members who had the same exposure. DOH-Orange immediately began the investigation by requesting medical records, clinical specimens, and leftover conch meat. Later that same day, Patient B presented to the same ED with signs and symptoms of possible NSP. Patient B indicated exposure to the same conch meal as Patient A. Patient B presented with generalized weakness, unusual fatigue, diffuse numbness, dizziness, and paresthesia approximately six hours after ingestion of conch. Numbness and paresthesia had subsided by the time the patient arrived at the hospital.

NSP is caused by consuming molluscan shellfish contaminated with brevetoxin produced by a dinoflagellate, *Karenia brevis*, typically responsible for red tides in Florida. Diagnosis is typically based on clinical presentation with a recent history of exposure to shellfish. Therapy is supportive and duration of illness is short and self-limiting. Shellfish contaminated with brevetoxin cannot be distinguished by taste or smell. Brevetoxin cannot be destroyed by heating or cooling food.

Directions posted on vendor tent for consumers to follow before/when consuming the dessert



Photo credit: Dorothy Kramer

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Methods

Epidemiologic Investigation

Active and passive surveillance were conducted to identify any potential cases of NSP. On March 27, a statewide notification to all Florida county health departments was distributed via EpiCom, Florida's outbreak communication system. A case was defined as a person with symptoms compatible with NSP, including numbness, paresthesia, and dizziness, within 12 hours after ingesting recreationally harvested shellfish. Interviews with individuals were conducted with open-ended questions and the location of the recreationally harvested conch was requested.

Laboratory Analysis

Leftover horse conch from the initial meal was obtained. Serum and urine specimens were collected from Patients A and B on March 23. Clinical specimens were shipped to the U.S. Food and Drug Administration (FDA) Gulf Coast Seafood Laboratory.

Environmental Assessment

The Florida Fish and Wildlife Conservation Commission (FWC) collected representative shellfish samples, including horse conch (33 cm with shell and 780 g without shell), lightning whelk (25 cm with shell and 150 g without shell), banded tulip, and a sunray venus clam from the approximate location provided by Patients A and B. Shellfish samples were shipped to the FDA Laboratory. Historical data on the presence of *K. brevis* in the described harvest area for February and March 2017 were collected from the FWC website.

Results

Epidemiologic Investigation

During public health interviews conducted March 23–April 3, DOH-Orange learned that four individuals had consumed recreationally harvested horse conch. Two horse conch were caught in Sarasota Bay on March 22 at 4:00 p.m. The individuals seasoned the conch meat with ginger and prepared the conch by boiling the meat in water for 45 minutes. The conch was consumed by all four individuals on March 23 at midnight. Three out of four exposed individuals were interviewed and two were symptomatic, making them cases. The symptomatic individuals were a 39-year-old female and a 35-year-old male. Both experienced body numbness, paresthesia, and dizziness. Illness onsets occurred on March 23 at 4:00 a.m. and 6:00 a.m. (incubation periods were four hours and six hours). Duration of illness was 24 hours for one case and 36 hours for the other.

Laboratory Analysis

Urine specimens from both cases tested positive for brevetoxin. Horse conch viscera, lightning whelk viscera, banded tulip A and B viscera, and whole sunray venus clam were contaminated with brevetoxins at high levels, which exceeded the assay guidance level of 0.8 ppm.

Environmental Assessment

The harvest area experienced severe red tide with high counts of *K. brevis* (>1,000,000 cells/L) from September 2016 through February 2017. In March 2017, FWC determined that *K. brevis* was either not present or present at very low levels (<10,000 cells/L).

Specimen/sample	Results
Urine Case A	Brevetoxin-3 detected
Urine Case B	Brevetoxin-3 detected
Horse Conch (muscle)	Brevetoxin major metabolites detected 0.03 ug/g
Horse Conch (viscera)	Brevetoxin major metabolites detected 1.77 ug/g
Lightning Whelk (muscle)	Brevetoxin major metabolites detected Trace
Lightning Whelk (viscera)	Brevetoxin major metabolites detected 5.23 ug/g
Banded Tulip A (muscle)	Brevetoxin major metabolites detected 0.3 ug/g
Banded Tulip A (viscera)	Brevetoxin major metabolites detected 10.33 ug/g
Banded Tulip B (muscle)	Brevetoxin major metabolites detected 0.21 ug/g
Banded Tulip B (viscera)	Brevetoxin major metabolites detected 58.15 ug/g
Sunray Venus Clam (whole)	Brevetoxin major metabolites detected 13.88 ug/g

Conclusions

On March 23, DOH-Orange investigated two confirmed cases of NSP associated with consumption of recreationally harvested horse conch from Sarasota Bay on March 22. Laboratory toxin testing confirmed the presence of brevetoxin in urine specimens for both cases. FWC collected horse conch, lightning whelk, sunray venus clam, and a banded tulip at the approximate location provided by the cases; toxin testing confirmed high levels of brevetoxin in the muscle and visceral homogenates of all harvested samples.

The Florida Department of Agricultural and Consumer Services (FDACS) only regulates the harvest of bivalves (e.g., clams, oysters). FDACS tests for biotoxins only in clams and oysters as part of a biotoxin monitoring plan. When FDACS orders the closure of water areas for harvesting, it only applies to bivalves. Other gastropods, such as conch, can be harvested from anywhere at any time. Improved outreach regarding the hazards of harvesting any seafood in areas closed to consumers and recreational fishermen can help with lowering the risk of NSP. Consumers wishing to recreationally harvest seafood can lower their risk of brevetoxin exposure by observing any closed harvesting areas and "No Fishing" notices.