

## **Section 4**

# **Notable Outbreaks and Case Investigations**



# 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 Chapter 64D-3, Florida Administrative Code. Selected outbreaks and case investigations of public health importance that occurred in 2016 are briefly summarized in this section.

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# Notable Outbreaks and Case Investigations

## Bacterial Diseases

### Pertussis Investigation Involving a Faith-Based Community, Escambia County, December 2016

#### Authors

Patrick Lynch, MPH; Candy Luciano-Green, RN

#### Background

On December 14, 2016, the Epidemiology Program at the Florida Department of Health in Escambia County (DOH-Escambia) was notified by a local hospital laboratory of a positive pertussis polymerase chain reaction test result in an unvaccinated 5-year-old child. Upon interviewing the child's family, it was determined that the child had been suffering from a cough illness for over three weeks and the child had contact with multiple people who had been exhibiting similar symptoms. These contacts were all part of a private, faith-based community of approximately 50 members. Several members were either unvaccinated or significantly behind schedule. The community was somewhat passive about vaccinations, though not specifically opposed. DOH-Escambia initiated an investigation of the possible cluster of pertussis cases.

#### Methods

DOH-Escambia epidemiology staff obtained and reviewed medical records for the first reported case of pertussis residing in this faith-based community. The child's symptom onset was November 21. The family was interviewed via phone to assess whether other members of this family and community were exhibiting cough illnesses. The community was very cohesive and after speaking to four heads of household, contacts of the index case and symptomatic people were identified.

A confirmed case of pertussis was defined as a resident of the child's faith-based community who had a cough for at least 14 days and at least one of the following: posttussive vomiting, paroxysmal cough, or apnea with symptom onset between November 15 and December 1. A suspected case of pertussis was defined as a resident of the faith-based community with a clinically compatible cough illness of any length during the same time period.

On December 16, a site visit was conducted at the community's private school to distribute pertussis fact sheets to teachers and students, and then subsequently disseminated to parents and other community members. DOH-Escambia encouraged all members of the community to get up-to-date on their immunizations, including pertussis. For those experiencing symptoms, DOH-Escambia recommended they seek medical attention to possibly get tested and receive treatment.

#### Results

Two confirmed cases were identified, one through laboratory and clinical evidence and one who was clinically compatible and was epidemiologically linked to the index case. Nine other suspected cases were identified within the community. The 11 cases ranged in age from <1 year old to 48 years old. Nine of the cases were in children  $\leq 5$  years old. Ten of the 11 cases were in unvaccinated persons.

#### Conclusions and Recommendations

Excellent interviewing skills allowed DOH-Escambia to quickly gather information and work with the religious community to offer education to prevent further spread and the need for vaccination. While the community seemed to appreciate all the information that was provided to them, they did not use DOH-Escambia's immunization services.

Pertussis is a vaccine-preventable disease (VPD). Building connections and promoting community awareness among populations at high risk for VPDs due to low immunization rates prior to the occurrence of an outbreak facilitates rapid disease control and establishes trust. Public health should continue to educate parents regarding vaccination against VPDs such as pertussis.

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### Investigation of a Salmonellosis Outbreak Associated With a Restaurant, Nassau County, August 2016

#### Authors

Emily Cason, MPH; Jenny Crain, MS, MPH, CPH

#### Background

On August 16, 2016, the Florida Department of Health in Duval County (DOH-Duval) notified the Regional Environmental Epidemiologist (REE) of two unrelated salmonellosis cases in people who had eaten at a restaurant in Nassau County on the same day in July. One additional salmonellosis case in a Nassau County resident who had eaten at the same restaurant was subsequently identified. An investigation into a possible foodborne illness outbreak was initiated on August 17.

#### Methods

An outbreak-specific questionnaire was developed and administered to people who did and did not report illness after consuming food from the restaurant.

A primary confirmed case was defined as someone who ate a meal at the restaurant between July 29 and August 7 and had laboratory evidence of an infection with *Salmonella* I 4,5,12, i- with a pulsed-field gel electrophoresis (PFGE) pattern of JPXX01.1139. A primary probable case was defined as someone who ate a meal at the restaurant between July 29 and August 7 and had onset of diarrhea (two or more loose stools in a 24-hour period). A confirmed secondary case was defined as someone who had close contact with a primary case but did not eat a meal at the restaurant during the exposure period, developed diarrhea, and had laboratory evidence of an infection with *Salmonella* I 4,5,12, i- infection with a PFGE pattern of JPXX01.1139. A probable secondary case was defined as someone who had close contact with a primary case but did not eat a meal at the restaurant in the exposure period and developed diarrhea.

A joint environmental assessment of the restaurant was conducted with the Department of Business and Professional Regulation (DBPR) on August 19.

Stool specimens were sent to the Bureau of Public Health Laboratories (BPHL) for confirmation and PFGE analysis. Three isolates were sent to the Centers for Disease Control and Prevention (CDC) for antimicrobial resistance testing.

#### Results

DOH-Nassau, DOH-Duval, and the REE interviewed 37 people, of whom 16 met the outbreak case definition (seven primary confirmed, five primary probable, one secondary confirmed, and three secondary probable cases). Cases resided in Duval and Nassau counties in Florida, Missouri, and New Jersey. The median age of primary cases was 28 (range: 1 to 62 years old) and half were female. The most prevalent symptoms reported among primary cases included abdominal cramps (100%), diarrhea (100%), fever (67%), chills (50%), muscle aches (50%), and headache (50%). The median incubation period for primary cases was 59 hours (range: 18 to 117 hours). The median duration of symptoms for primary cases with available data was seven days (range: <1 to 21 days). Ten cases visited non-emergency medical providers, four sought medical care at emergency departments, and two cases were hospitalized overnight. Complete survey information was available for 24 people and odds ratios (ORs) were calculated using exposure information obtained from the interviews. Chicken was significantly associated with illness (OR = 8.000, 95% confidence interval = 1.699-37.674).

The joint assessment conducted with DBPR identified several critical food safety violations. A stop sale was issued on potentially hazardous food (PHF) due to temperature abuse. Specifically, chicken was measured at 93°F and queso was measured at 103°F. Though the chicken and queso were

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reportedly in the process of being reheated, neither of the foods reached an internal temperature above 165°F within two hours. The DBPR inspector and DOH-Nassau staff conducted a food preparation review of the food flow cycle for the chicken that was used for both fajitas and tacos. Chicken and beef were prepared in large batches and any leftovers from each service day were cooled, stored overnight below 41°F, and then reheated the next day for use. No temperature measurements were taken throughout these food preparation processes. The joint assessment with DBPR noted several other discrepancies with food safety regulations, but none likely contributed to this outbreak.

Nine cases (eight primary and one secondary) were laboratory-confirmed by stool culture. Eight of the *Salmonella* isolates were serotyped as S. I 4, 5, 12 i- at BPHL with the same PFGE pattern JPXX01.1139.

Three isolates tested by CDC were resistant to ampicillin, streptomycin, sulfisoxazole, tetracycline, and nalidixic acid. One additional isolate was tested at a private laboratory and was resistant to ampicillin. All four stool specimens submitted by restaurant employees were negative for viral, bacterial, and parasitic pathogens.

### Conclusions and Recommendations

This outbreak among patrons of a Nassau County restaurant was most likely associated with chicken prepared and consumed at the restaurant between July 29 and August 7. The causative agent was identified as *Salmonella* I 4, 5, 12 i-. Meals at the implicated restaurant were the only meals in common among all the individuals from these separate households. The CDC microbiological laboratory reported that the outbreak-specific *Salmonella* strains were multi-antibiotic resistant, which implies that the illnesses were more likely attributable to consuming meat versus produce. The epidemiologic evidence from this investigation suggests that eating chicken at the restaurant was significantly associated with illness. The odds of having eaten any chicken item were 8.0 times higher in ill patrons than well patrons. No other entrée items or ingredients were significantly associated with illness. At least four cases had contact with a primary case and became ill through person-to-person household transmission of *Salmonella*.

The joint environmental assessment with DBPR also found evidence to support foodborne salmonellosis. Food handlers at the facility were not carefully following food safety practices, specifically the Food and Drug Administration food code requirement to reheat PHF above 165°F within two hours. In addition, no food temperatures were being monitored during any of the cooking processes at the restaurant. Temperature abuse likely contributed to bacterial growth in chicken that was served at the restaurant. Raw chicken is an inherently contaminated animal product that is intended to be eaten only after a heat kill step. It is likely raw chicken was initially not fully cooked to the appropriate temperature or cross-contamination occurred between raw and fully cooked chicken.

### Staphylococcal Food Poisoning Outbreaks at Multiple Daycares, Broward and Miami-Dade Counties, November 2016

#### Authors

Juan Suarez, Janet Wamnes

#### Background

On November 7, 2016, a news report was released regarding a gastrointestinal illness (GI) outbreak at a Broward County, Florida daycare. Per the report, approximately 29 children at the preschool experienced nausea, vomiting, diarrhea, and dehydration shortly after eating lunch. Paramedics were called to the scene to assist with treating ill children and rule out gas fume exposure. During the

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afternoon, the Florida Department of Health in Miami-Dade County (DOH-Miami-Dade) Office of Epidemiology, Disease Control, and Immunization Services (EDC-IS) received an email regarding a GI outbreak occurring earlier in the day at a Miami-Dade County daycare. Later that evening, the Florida Poison Information Center Network notified EDC-IS of a GI outbreak at a second Miami-Dade County daycare. Several children from both daycares experienced nausea and vomiting within hours of eating the scheduled lunch. As a precaution, several children were taken to area emergency departments (EDs), urgent care centers, and private physician offices. However, no stool specimens were collected. Interviews with the directors of each daycare identified that both lunches were provided by a local catering company located in Miami-Dade County, which also serviced the Broward County daycare with the GI outbreak. The catering company provided lunches to several daycares in south Florida through the Florida Department of Health's Child Care Food Program, a nutrition program that reimburses child care centers for meals and snacks obtained from approved contractors. An outbreak investigation by the Florida Department of Health in Broward County (DOH-Broward) and EDC-IS began immediately on November 7.

On November 8, EDC-IS was notified by the Florida Department of Children and Families of additional GI outbreaks reported on November 7 at other local daycares, all of which were associated with the same catering company. A joint assessment and inspection at the catering facility was conducted on November 9 by EDC-IS, the DOH-Miami-Dade Office of Environmental Health (DOH-EH), and the Florida Department of Business and Professional Regulation (DBPR).

### Methods

#### *Epidemiologic Investigation*

A case was defined as a person who experienced vomiting within three hours after consuming lunch at a daycare served by the catering company on November 7. EDC-IS was provided a list of 16 daycares within Miami-Dade County that participated in the Child Care Food Program and subcontracted meals from the catering company. Each daycare was contacted to obtain the total number of children and staff and a line list of any ill persons. Line lists included age, gender, symptoms, and whether the individual visited a medical provider. DOH-Broward visited the two daycares in Broward County and gathered information about the ill and their food exposures.

#### *Laboratory Analysis*

Samples of leftover food from November 7 were collected at selected daycare facilities serviced by the catering company in both Broward and Miami-Dade counties. Samples were sent to the Bureau of Public Health Laboratories (BPHL) to be analyzed for selected pathogens consistent with the case definition. No patient specimens were collected by health care facilities on associated people who sought medical care.

#### *Environmental Assessment*

On November 9, an environmental assessment of the caterer was conducted during the food preparation hours of 2:30 a.m. to 8:00 a.m. This joint assessment included three DBPR staff, one DOH-EH staff, and two EDC-IS staff. Environmental assessments of the two daycares in Broward County were conducted by DOH-Broward epidemiology and environmental health staff on November 7 and 8.

### Results

#### *Epidemiologic Investigation*

A total of 117 of 403 children in eight daycares in Miami-Dade County and 32 of 53 children in two daycares in Broward County met the outbreak case definition (Table 1). Ages ranged from 1.1 to 10.5 years with a median of 3.3 years. Six Miami-Dade County facility staff who ate on November 7 were also reported ill. They were not included in the analysis as the number of staff consuming food was unknown, so attack rates could not be calculated. Vomiting (100%) and diarrhea (56%) were the most common symptoms reported by cases. Onset dates and exposure dates were both on November 7. The incubation period was <3 hours. Duration of illness was 24 to 48 hours. Sixty-eight (45.6%) of the

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cases sought treatment at a health care facility. Of the cases in Miami-Dade County, 11.7% were hospitalized due to their illness, and 9.5% of the Broward cases were hospitalized. Statistical analysis of food items consumed could not be conducted as this level of data was not collected for daycare attendees.

Table 1. Summary of Gastrointestinal Outbreak in 10 Daycares in Miami-Dade and Broward Counties, November 7, 2016

Daycare	Number of Cases	Number of Attendees	Percent Attack Rate	Percent Male	Median Age (in Years)	Age Range (in Years)	Percent Hospitalized
Miami-Dade facility A	11	13	84.6	54.6	3.7	1.6 - 4.8	15.4
Miami-Dade facility B	24	61	39.3	50.0	3.6	1.6 - 10.5	14.8
Miami-Dade facility C	4	40	10.0	25.0	4.0	1.9 - 4.5	5.0
Miami-Dade facility D	13	63	20.6	23.1	2.3	1.7 - 4.4	7.9
Miami-Dade facility E	9	10	90.0	33.3	3.9	1.6 - 5.2	20.0
Miami-Dade facility F	13	86	15.1	30.8	3.2	2.2 - 5.4	5.8
Miami-Dade facility G	7	70	10.0	57.1	1.7	1.3 - 6.1	4.3
Miami-Dade facility H	36	60	60.0	47.2	3.2	1.1 - 5.18	31.7
Broward facility I	21	30	70.0	--	--	--	9.5
Broward facility J	11	23	47.8	--	--	--	0.0
<b>Total</b>	<b>149</b>	<b>456</b>	<b>32.7</b>	<b>42.7</b>	<b>3.3</b>	<b>1.1-10.5</b>	<b>11.7</b>

### Laboratory Analysis

Samples including leftover ham, turkey, mixed vegetables, black-eyed peas, and dinner rolls were analyzed by BPHL. Testing identified *Staphylococcus aureus* at  $10^8$  colony forming units per gram (CFU/g) in the ham and turkey. Evidence of *S. aureus* was not found in the other foods. Samples were negative for *Bacillus cereus*. Samples of the food saved for quality control purposes by the caterer were sent to a private laboratory for analysis. Those results were negative for enteric pathogens.

### Environmental Assessment

On November 9, a joint assessment of the catering company was conducted by DPBR, DOH-EH, and EDC-IS staff. Several violations were observed, particularly with food handling and time/temperature controls. Stop sales were placed on several food items that were held outside of safe temperatures, including congri (a rice and bean dish), pork, turkey sandwiches, and cooked vegetables. Additional stop sales were issued on dented/rusted cans of peaches and corned beef hash which were being prepared for meals later that day. Observations of the delivery vans storing of hot and cold foods for distribution to the daycares included hot foods kept in warmers and cold foods in ice. There was some concern about the temperature of milk cartons before being placed in the ice. Other issues included a cold room that was held at 60°F, condensation drops falling over a preparation table, a greasy substance coming from the trash and flowing to the storm sewers, and food disposed on the floor next to the trash receptacle.

### Conclusions and Recommendations

Evidence indicates that this outbreak was caused by staphylococcal food poisoning (SFP). SFP is caused by ingesting foods contaminated with enterotoxins produced by the bacterium *S. aureus*. Although the bacteria can be inactivated by heating food prior to consumption, the enterotoxins are heat-resistant and can still cause illness. SFP is characterized by a rapid onset of nausea, numerous vomiting episodes, and abdominal cramping. Diarrhea may also occur and fever is usually absent. The incubation period is typically three hours and ranges from 30 minutes to 8 hours. Illness is usually self-limited with individuals recovering within 24 to 48 hours. Occasionally, SFP can be severe enough to warrant hospitalization. Results from this investigation suggest this outbreak likely resulted from consumption of ham and turkey contaminated with *S. aureus* delivered by the catering company. *S. aureus* levels in the ham exceeded those typically known to cause illness ( $10^6$  CFU/g). In addition, violations found at the catering company during the environmental assessment (improperly preparing and monitoring time and temperature controls for the food) resulted in an environment conducive to *S. aureus* multiplication and toxin production. *S. aureus* contamination and subsequent intoxication can be prevented by appropriate hand washing prior to handling foods and ensuring clean food preparation, storage, and equipment surfaces. Additionally, potentially hazardous prepared foods



should immediately be stored at below 40°F or maintained in hot holding above 140°F to prevent growth of *S. aureus*. Findings emphasize the importance of adhering to food safety regulations. Caterers, especially those serving young children, should be aware of the risks associated with improper food handling and storage. Safe food preparation in lunch programs, particularly daycares, is essential.

### Viral Diseases

#### Varicella Outbreak Among School-Aged Children, Pinellas County, January 2016

##### Authors

Ashley Joseph, MPH; JoAnne Lamb, MPH

##### Background

On January 21, 2016, the Florida Department of Health in Pinellas County (DOH-Pinellas) was contacted by the Pinellas County School Health Services Assistant Manager regarding a varicella outbreak occurring at a local elementary school. The school was notified of three students who were recently diagnosed by their physicians with varicella. Two of the cases were unvaccinated siblings that attended different grades and participated in the afterschool program. The school's student census at the time of reporting was 813, with 46 unvaccinated and under-vaccinated students due to religious and medical exemptions (vaccination rate of 94.3%). DOH-Pinellas began an immediate investigation into the report and began active case finding.

Varicella, also known as chickenpox, is a mild illness that includes a low-grade fever, malaise, and an itchy blister-like rash. After one to two days of illness, the rash typically appears on the head and trunk, then spreads to the extremities. Transmission occurs primarily through airborne exposure to the virus; however, the virus can also be transmitted by direct contact with infectious fluid from the vesicles of an infected person. The incubation period for varicella ranges from 10 to 21 days, with an average of 14 to 16 days. Vaccination with a standard, two-dose varicella vaccine series is the best preventative measure and is 70-100% effective at preventing varicella.

##### Methods

###### *Epidemiologic Investigation*

A list of ill students and parent contact information was collected. All parents were interviewed as information was received by the school or reported by health care providers. A letter was drafted by DOH-Pinellas and sent to all parents and staff on January 22. The letter recommended that parents follow up with their health care providers regarding vaccination status and post-exposure prophylaxis. By January 25, seven students were diagnosed with varicella by their health care providers. DOH-Pinellas advised the school's principal that exclusion of all susceptible students from school for the duration of the 21-day incubation period was necessary to mitigate the spread of the virus. Students were excluded if they did not have a previous history of varicella infection or documentation of one dose of the varicella vaccine. The school principal called parents of children to be excluded directly and provided an exclusion letter declaring a communicable disease emergency on January 25.

At the same time, a health care advisory letter was sent to pediatricians in Pinellas County to help increase their awareness and suspicion of varicella and request testing for any suspected cases. The DOH-Pinellas Public Information Officer (PIO) notified the DOH Press Secretary and the Pinellas County School PIO. On January 25, a notice was distributed via EpiCom, Florida's moderated web communication system, for further public health awareness.

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On February 3, DOH-Pinellas staff conducted a site visit at the elementary school and provided education to staff about active surveillance for varicella, proper hand hygiene etiquette, and discussed appropriate distancing in group activities.

### Laboratory Analysis

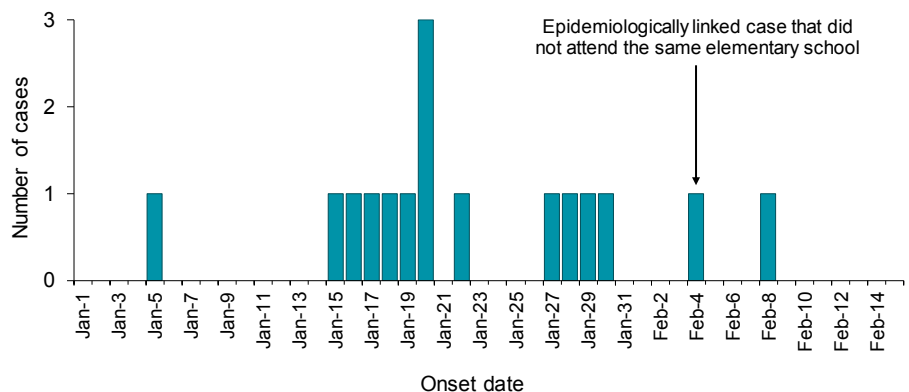
Health care providers were encouraged to conduct polymerase chain reaction (PCR) testing to confirm the clinical diagnosis of any patients who were acutely ill. On January 27, a local pediatrician collected a skin scraping and swab of a vesicular lesion from an infected case. The specimen was sent to the Bureau of Public Health Laboratories for PCR testing.

## Results

### Epidemiologic Investigation

The index patient was a second grader who developed a rash on January 5 and continued to attend school through January 7. The infection spread to a sibling who attended third grade at the same elementary school. A total of 16 people met the confirmed surveillance case definition for varicella with onsets ranging from January 5 to 8 (Figure 1). Cases were in children aged 3 to 12 years old, affecting seven separate grades. One epidemiologically linked case was identified in a family member who attended a separate preschool.

Figure 1. Number of Varicella Cases Among School-Aged Children by Onset Date, Pinellas County, January to February, 2016



Eighteen students met the exclusion criteria. If any of the susceptible students received one dose of the varicella zoster virus (VZV) vaccine, they were allowed to return to school the same day. As a result of the exclusion criteria, six students received their first dose of VZV vaccine and were able to return to school. Twelve students remained excluded from school until February 25.

### Laboratory Analysis

On January 28, the vesicular lesion swab was reported as PCR-positive for varicella.

## Conclusions and Recommendations

As a result of the continued spread of varicella in the school, DOH-Pinellas pursued exclusion of susceptible students. The implementation of the exclusions likely prevented further spread of disease within the school and the community. Large groups of unvaccinated individuals are at high risk of vaccine-preventable disease outbreaks. Wide-scale administration of varicella vaccine is the most effective way to reduce the risk of community-wide outbreaks.

## Non-Infectious Agents

### Carbon Monoxide Poisoning at a Local Gun Range, Polk County, December 2016

#### Authors

Prakash Mulay, MBBS, MPH; Kelsey Rondini

#### Background

Carbon monoxide (CO) is an odorless, colorless, and poisonous gas that can cause sudden illness and death if present in sufficient concentration in ambient air. On December 26, 2016, the Florida Poison Information Center Network (FPICN) notified the Florida Department of Health in Polk County (DOH-Polk) of a cluster of CO poisoning cases. Further review of FPICN data identified eight people who presented to a local emergency department (ED).

#### Methods

DOH-Polk initiated an investigation that included reviewing medical records, interviewing exposed people, and coordinating with the Fire and Rescue Department (responsible for measuring CO levels). The Florida surveillance case definition was used to classify people as cases based on combinations of carboxyhemoglobin (COHb) levels  $\geq 9\%$ , clinically compatible symptoms, and environmental evidence.

#### Results

Case interviews indicated that the building's heating, ventilation, and air conditioning system (HVAC) malfunctioned, leading to an increase in CO in the enclosed gun range area. Eleven first responders were dispatched from the local Fire and Rescue Department; they measured indoor CO levels of 1,212 ppm. They closed the range and ventilated the building. Following closure, a hazmat unit was called, at which time CO levels had decreased to 935 ppm. Mechanical ventilation was used until levels dropped below 50 ppm across the facility. According to one of the first responders, approximately 41 individuals were exposed, although the majority did not seek medical attention.

Eight people presented at a local ED with symptoms including dizziness (50.0%), syncope (25%), headache (25%), weakness (12.5%), and abdominal pain (12.5%) after exposure to CO at the gun range. All were men aged 21 to 76 years (mean age of 40.5 years). Three of the affected men were business patrons, one was a staff member, and four were first responders. Two additional first responders reported feeling ill but did not seek medical treatment. COHb levels measured at the ED for three patrons and the employee were above 9% (range: 11% to 19%). COHb levels for four first responders were below 2% (range: 0.3% to 1.6%). Seven of the men were treated with medical non-rebreather mask and one man was monitored without oxygen intervention. All men were released from the ED on the same day after COHb levels decreased and no complications were observed. All eight men were classified as confirmed cases based on the Florida surveillance case definition for CO poisoning.

#### Conclusion

This is the first CO poisoning incident in Florida reported at a gun range. The owner of the gun range voluntarily corrected the HVAC system and installed CO detectors to prevent future CO exposure incidents. To prevent this type of CO poisoning, the Department recommends installing battery-operated CO alarms or plug-in CO alarms with battery backup in businesses and homes and ensuring all appliances and equipment are properly installed and used according to the manufacturers' instructions.

### Lead Poisoning Cluster in a Refugee Family, Duval County, August 2016

#### Authors

Sudha Rajagopalan, MPH; Ruth Voss, MPH, RN

#### Background

On August 24, 2016, the Florida Department of Health in Duval County (DOH-Duval) received elevated blood lead level laboratory results for four children, ranging from 18 to 45 µg/dL. Lead poisoning is defined in Florida as a blood lead level  $\geq 10$  µg/dL.

Elevated blood lead levels in children are associated with poor school performance, learning disabilities, hearing damage, poor muscle coordination, decreased muscle and bone growth, and nervous system damage. Prevention efforts such as phasing out leaded gasoline and lead-based paint have led to dramatic declines in rates of lead poisoning in U.S. children, but it is still a problem for high-risk pediatric populations. In addition, certain behaviors (e.g., thumb sucking) place children, especially those aged  $<6$  years, at greater risk for exposure to lead as the typical hand-to-mouth activity of young children provides a pathway for lead to enter the body. Refugees are considered a population at higher risk for lead exposure because they may have been exposed to lead in their countries of origin from a variety of sources, such as continued use of leaded gasoline, limited regulation of emissions from larger industries, or exposure to herbal remedies, cosmetics, or spices that contain lead. Once these refugees are in the U.S., they frequently move into older, pre-1978 housing containing lead-based paint. They may also continue activities such as backyard car repair and use of lead-contaminated herbal remedies, cosmetics, or spices that contribute to elevated blood lead levels. Refugees may have anemia or poor nutritional status that contribute to greater absorption of any lead to which they are exposed.

#### Methods

DOH-Duval initiated an investigation that included reviewing laboratory results, interviewing family members, consulting the Florida Poison Control Network (FPICN), and conducting an enhanced environmental investigation with the help of a lead risk assessor to identify the source of exposure.

#### Results

Epidemiologic investigation by DOH-Duval identified that all four children, aged 3, 5, 8, and 10 years, belonged to the same family who were refugees from Amman, Jordan who had recently arrived in the U.S. The children received lead screening as a part of post-arrival evaluation recommended for newly emigrated refugee children. The youngest of the four had a blood lead level of 45 µg/dL. No symptoms of lead poisoning were reported for the four children. The two younger children aged 3 and 5 years exhibited occasional thumb-sucking behaviors prior to arrival in the U.S. DOH-Duval conducted an enhanced environmental investigation of the family's current residence with the help of a lead risk assessor. The apartment was assessed for the presence of lead using an X-ray fluorescence device. The apartment was built in 1970, but lead was not detected in the paint.

DOH-Duval hypothesized that all four children were exposed to lead in Jordan. Prior to relocating, the family resided in an old residence with peeling paint and mold. The father owned an automobile repair business where he worked as a mechanic. He also mentioned other small jobs, including construction, remodeling, welding, making batteries, and salvaging metal. He stated that he changed clothes before coming home from work when possible. However, work clothes were not always separated from other clothes when laundering them. The family lacked a general awareness of lead poisoning and its consequences. DOH-Duval and the children's pediatrician consulted with FPICN for clinical advice on chelating two of the four children. The 3- and 5-year-olds were chelated with succimer for one week. The 3-year-old's blood lead level declined to  $<3$  µg/dL; however, the chelation drug was not effective for the 5-year-old. The other two children did not receive follow-up lead testing until July 2017, when all four children were retested with blood lead level results ranging from 11 to 34 µg/dL. As of July 2017, DOH-Duval was working with the refugee resettlement agency to use an Arabic interpreter to assist with follow-up interviewing and had made multiple attempts to contact the family for additional information.

### Conclusions and Recommendations

This investigation highlights the importance of lead testing of the refugee population so children with elevated blood lead levels can be appropriately identified and managed. Continued follow-up testing and evaluation is necessary to ensure there are no other ongoing sources of exposure to lead within the children's environment post-arrival. Investigation by DOH-Duval identified several possible sources of lead exposure prior to the family's immigration, including living in an old home and lead hazards from the father's occupation. Risky behaviors, such as thumb-sucking, could increase the chance of ingesting lead, and the family had a general lack of awareness of the dangers of lead. DOH-Duval provided health education on dietary needs and measures to prevent further exposure to lead. To prevent post-immigration lead exposure in refugee children, refugee service providers should ensure prompt initial screening, provide follow-up testing regardless of initial screening results or age, provide safe housing placement, and provide families with information on reducing risks for lead exposure.

### Utilization of Syndromic Surveillance to Identify Illnesses Related to Aerial Spraying for Mosquito Control, Florida, 2016

#### Authors

Prakash Mulay, MBBS, MPH; David Atrubin, MPH

#### Background

Pesticide-related illness and injury is a reportable condition in Florida. In August and September 2016, aerial spraying for mosquito control was conducted to reduce the population of *Aedes aegypti* mosquitoes in Miami-Dade County. Two areas, Wynwood (in August) and Miami Beach (in September), were sprayed with naled. Naled is an organophosphate insecticide registered with the U.S. Environmental Protection Agency which is applied via aerial ultra-low volume spraying. In addition to routine surveillance using exposure calls to the Florida Poison Information Center Network (FPICN) and reportable disease surveillance data to identify acute naled-related illness, the Florida Department of Health also monitored emergency department (ED) chief complaint data to identify any increase in ED visits associated with exposure to naled.

#### Methods

In 2016, the Department used three datasets to monitor illness related to naled exposure: FPICN exposure call data, reportable condition data, and ED chief complaints. ESSENCE-FL, Florida's syndromic surveillance system, was used to monitor FPICN exposure calls and chief complaints from ED visits and identify eye, skin, and respiratory illnesses that may have been associated with naled exposure. People meeting the Florida surveillance case definition for pesticide-related illness and injury were entered into the state's reportable disease surveillance system.

#### Results

Twenty-two naled exposure calls were identified through FPICN data in 2016. Seven calls were excluded after review determined that these people were not exposed to naled. Fifteen exposure calls were investigated and eight people met the Florida surveillance case definition for pesticide-related illness and injury. Among the eight cases, one person was exposed in August (12.5%) and seven in September (87.5%). Everyone had low-severity illness, five (62.5%) were female, and the mean age was 39.6 years (range: 27 to 46 years). Two cases (25.0%) were work-related. Review of the ESSENCE-FL ED data in Miami-Dade County did not detect any increase in eye, skin, or respiratory complaints that could be temporally linked with the aerial spraying of naled.

#### Conclusions and Recommendations

The impact observed in 2016 was minimal as all eight identified cases had low severity of illness, which was consistent with previous findings. FPICN data are useful in identifying cases of naled-related illness. Near-real-time access to FPICN exposure call and ED chief complaint data has enhanced the Department's surveillance capability and served to carefully monitor concerns of naled-related illness following aerial spraying in Miami-Dade County.

### Investigation of a Palytoxin Outbreak After Exposure to Zoanthid Corals, Escambia County, May 2016

#### Authors

Laura P. Matthias, MPH; Patrick Lynch, MPH; Candy Luciano-Green, RN

#### Background

The Florida Department of Health in Escambia County (DOH-Escambia) was notified of a possible waterborne outbreak by the syndromic surveillance system (ESSENCE-FL) on May 4, 2016. The notification included an emergency department discharge diagnosis of palytoxin toxic exposure. DOH-Escambia initiated an investigation the same day.

Palytoxin is a known potentially life-threatening toxin produced by some zoanthid soft corals that can cause illness after dermal, inhalation, or oral exposure. Palytoxin acts as a potent vasoconstrictor that destroys the ion gradient across cell membranes and leads to cell destruction. The amount required to cause effects following contact largely depend on the type of exposure. In the literature, illness has been associated with prolonged handling, inhalation, or exposed skin. Symptoms of palytoxin exposure can vary widely and may include skin and eye irritation, gastrointestinal symptoms, muscle spasms, joint pain, kidney pain, and respiratory symptoms. There is no antidote for the toxin and treatment is supportive.<sup>1</sup>

#### Methods

DOH-Escambia requested a copy of the medical records from the hospital and contacted the patient. DOH-Escambia learned that the patient owned an aquarium business and others were possibly exposed to palytoxin. Information obtained from the patient indicated that he and his employees were installing a new aquarium tank in an office building and some of those office workers may also have experienced symptoms. Active case finding was conducted by DOH-Escambia, working with the Panhandle Regional Environmental Epidemiologist and the Vectorborne Epidemiologist, to create an outbreak-specific questionnaire. The questionnaire was designed to capture exposure information for the current investigation as well as information about past exposures and personal protective equipment use. DOH-Escambia attended a meeting at the aquarium business on May 19 and interviewed all eight employees, including the initial patient. DOH-Escambia was not able to obtain contact information for the office building employees and further follow-up could not be conducted at that facility. DOH-Escambia continued to monitor ESSENCE-FL for any other reports of illness that may have been associated with palytoxin exposure.

A case was defined as someone who worked with zoanthid soft corals on May 2 or 3, 2016 at the aquarium or office building and became ill with cough, scratchy throat, or other symptoms of palytoxin exposure on May 3, 2016.

#### Results

On May 2, one of the aquarium employees installed a new aquarium in an office building. The installation required moving numerous coral and fish from one tank into the new one. The following morning, staff of the office building where the aquarium was installed complained of a “dead” smell and contacted the aquarium shop for remediation. Aquarium staff returned to the office building and began to remediate. Due to the transfer, only three of the seven fish survived and approximately 30% of the corals in the tank died. The remaining coral was removed from the tank and discarded at the office building.

There were eight aquarium staff, of whom three met the case definition. Two cases reported working with the coral only on May 3 and one reported working with the coral on May 2 and 3. The three cases exhibited signs and symptoms consistent with palytoxin exposure and one was diagnosed with palytoxin exposure after visiting the hospital. Cases reported cough (2), scratchy throat (2), eye irritation (1), skin irritation (1), itchy hands (1), sneezing (1), bitter metallic taste (1), dry mouth/throat (1), difficulty swallowing (1), salty taste (1), shortness of breath (1), headache (1), fever (1), dizziness (1), nausea (1), kidney pain (1), unexpected loss of coordination of movement (1), muscle spasms (1), joint/muscle pain (1), tremors (1), weakness (1), and confusion/disorientation (1). The cases were 24,

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37, and 44 years old, and two cases were men. One case sought medical attention for their symptoms and was diagnosed with suspected palytoxin exposure. That case also reported using a relative's inhaler as well as taking Benadryl before seeking medical care. None of the cases reported using any personal protective equipment during the remediation and exposures likely occurred via inhalation and direct contact.

When assessing past exposures of the aquarium employees, all eight reported working with zoanthid corals in the past. Three reported working with the corals every day, three reported every week, and one reported a few times a year (one did not submit a response on how often). Three employees reported experiencing symptoms after working with zoanthid corals in the past. One stated they had blisters on the skin about two years ago, one said they had itchy hands after touching the coral, and one experienced eye irritation due to not washing hands after exposure. Five employees reported that they have used personal protective equipment, but one did not answer how often (Table 1). Five employees reported that they had aquariums in their homes and four of those reported having soft corals in their home aquariums.

Table 1. Personal Protective Equipment (PPE) Use Among Employees Reporting Frequency (n=4)

Type of PPE	Frequency of Use	Number of People
Gloves	Sometimes	2
Gloves	Most of the time	2
Eye Protection	Always	1
Eye Protection	Most of the time	1
Mask	Most of the time	1

### Conclusions and Recommendations

Zoanthid corals are common in home aquariums and often recommended to new aquarium owners as they are easy to keep alive and healthy. However, some zoanthid corals contain palytoxin. Maintenance activities that lead to direct skin contact or those that could potentially produce aerosols, such as scrubbing or using hot water to remove the zoanthid corals, may result in palytoxin exposure. There are currently no regulations regarding testing or labeling of coral that might contain toxins, and regulations under the U.S. Fish and Wildlife Service only pertain to endangered species and reflect ecological concerns. There are also no official recommendations for personal protective equipment use by those working in coral or aquarium shops.<sup>1</sup>

In this investigation, the exposure to palytoxin was due to disturbance of the coral from an aquarium transfer in an office building. None of the cases reported using any personal protective equipment during the remediation, and exposures likely occurred via inhalation and direct contact. Due to this occurrence, the aquarium business held a staff training on May 4 regarding palytoxin and related corals. They reinforced the importance of wearing gloves, goggles, and masks. The owner also indicated that he would put together a brochure to give his customers who request soft corals in their tanks.

The investigation included reports of symptoms among staff who worked in the office building where the new tank was installed. DOH-Escambia attempted to obtain contact information about the office building to conduct additional follow-up. However, they were not able to obtain the contact information. In the future, it would be ideal to follow up on all possible exposures to better assess the situation and possibly identify other cases.

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### Investigation of Neurological Symptoms Associated With Eating Pufferfish, Seminole County, May 2016

#### Authors

Frances Vaughn, MPH; Tania Slade, MPH; Dean Bodager, RS, DAAS, MPA

#### Background

On June 21, 2016, a Florida Poison Information Center Network (FPICN) record was forwarded to the Florida Department of Health in Seminole County (DOH-Seminole) describing a Seminole County resident who experienced neurological symptoms consistent with paralytic shellfish poisoning or saxitoxin exposure on May 23. The record was identified through routine surveillance within Florida's syndromic surveillance system, ESSENCE-FL, and was not previously reported. A man reported consuming four pufferfish caught from the Indian River Lagoon. Three to four hours after the meal, the man experienced numbness in fingertips and mouth. He was transported to the emergency department where he was monitored overnight.

The ingestion of saxitoxins produces symptoms of tingling and burning of the mouth and tongue, numbness, drowsiness, speech difficulties, ataxia, muscle weakness, and respiratory paralysis. Death can occur if respiratory support is not provided. Onset of symptoms can occur within 30 minutes to 2 hours after toxin ingestion.<sup>1</sup>

#### Methods

DOH-Seminole investigated the foodborne illness case with assistance from the Florida Department of Health Bureau of Epidemiology. Additional surveillance included review of FPICN data, active surveillance of hospital emergency departments, and review of county health department foodborne illness logs. A case was defined as a person who experienced tingling or numbness in the face, arms, and legs, ataxia, respiratory distress, headache, dizziness, weakness, nausea, or vomiting within 15 minutes to 10 hours after consuming Florida pufferfish.

Despite multiple attempts, DOH-Seminole was not able to contact the patient for interview. All contact information on the medical records was used; a family member was contacted but reported that the patient was out of town. There were no known leftover pufferfish remnants or clinical specimens available for analysis.

#### Results

The case was a 73-year-old man residing in Seminole County. He reported catching seven pufferfish from the Indian River Lagoon on May 23 and consuming four pufferfish on the same day. Neurological symptoms began two hours after consumption. Predominant symptoms described by the man included mouth, tongue, and hand numbness. Medical records stated that the man was incorrectly diagnosed in the emergency department with ciguatera toxin poisoning. Per the medical records, the man was not placed on a respirator and was treated with intravenous Benadryl for numbness.

#### Conclusion and Recommendations

This case of neurological illness is compatible with the known symptoms associated with saxitoxin poisoning. The onset followed the consumption of pufferfish caught from the Indian River Lagoon. Pufferfish from the Indian River Lagoon have been associated with previous outbreaks of saxitoxin poisoning. Limitations of this investigation include incomplete meal details, an imprecise fishing location, absence of clinical specimen analysis, and lack of food sample analysis. The length of time between physician diagnosis and reporting to public health authorities also hindered the ability of investigators to obtain any available fish remnants and provide advice on obtaining appropriate clinical specimens. This highlights the importance of good public health reporting and the need for additional education of the clinical community to recognize saxitoxin poisoning.



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In the waters of Volusia, Brevard, Indian River, St. Lucie, and Martin counties, taking fish in the *Spherooides* genus, commonly known as puffers, is prohibited.<sup>2</sup> Toxic dinoflagellates, such as *Pyrodinium bahamense*, produce saxitoxin and often grow on sediments, rocks, seagrass, and algae. These microorganisms are inadvertently ingested by puffer fish when they feed on benthic macrofauna. Toxins are then sequestered in the skin, muscles and viscera of the fish and cannot be destroyed by cooking, thus causing saxitoxin poisoning upon ingestion of contaminated tissue.<sup>3</sup>

Rapid identification of cases by the medical community and the coordination of sample collection are critical in determining the existence of a significant public health event or disease outbreak and the extent of illness. The prompt reporting of neurological manifestations of exposure to foodborne and marine toxins by attending physicians and poison information centers to the Department is essential for quick identification and implementation of appropriate control measures in addition to the rendering of prompt medical care with positive outcomes. Illnesses caused by marine toxins, specifically ciguatoxin, brevetoxins, and saxitoxin, are reportable in Florida. Successful risk communication is a crucial element in attempting to prevent additional illnesses of saxitoxin poisoning from consumption of pufferfish. Despite the many public warnings about the risks, this outbreak investigation and anecdotal evidence continues to demonstrate confusion among the public about the differences between saxitoxin, tetrodotoxin, and other marine toxins such as ciguatoxin. In contrast to tetrodotoxin, pufferfish with saxitoxin cannot be cleaned, cooked, or frozen in a manner that mitigates the effects of the toxin in the human body. Many consumers familiar with fugu poisoning and tetrodotoxin are confused on this critical point. The only way to prevent illness from saxitoxin is to refrain from eating pufferfish. Communicating this message to the public is vital and the use of local media outlets, posters, information cards, and other methods of effective public communication must continue.

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### Foodborne Illness Outbreak Associated With Beverage Consumption at a Hotel Bar, Orange County, March 2016

#### Author

Benjamin G. Klekamp, MSPH, CPH; Dean Bodager, RS, DAAS, MPA

#### Introduction

On March 14, 2016, the Florida Department of Health in Orange County (DOH-Orange) was notified of a potential chemical exposure following beverage consumption by two persons at a hotel restaurant bar on March 11. The complaint from a resident of Clay County originated with the Florida Poison Information Center Network (FPICN) on March 12 and was referred to DOH-Orange via the Regional Environmental Epidemiologist. The complainant reported experiencing nausea and burning throat immediately after drinking a vodka cranberry drink with ice from the hotel bar. The FPICN report stated that the implicated drink had also been tasted by another customer, a resident of Martin County, who also experienced immediate onset of similar symptoms. Both ill persons sought medical care the same evening. DOH-Orange immediately began an outbreak investigation and referred the complaint to the Florida Department of Business and Professional Regulation (DBPR) to schedule a joint assessment of the facility.

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### Methods

Surveillance systems, including syndromic surveillance and foodborne illness complaints, were reviewed throughout the outbreak investigation to identify other potentially associated cases. A case was defined as someone having immediate symptom onset of throat burning following consumption of a beverage from a hotel bar on March 11. Case medical records were requested and reviewed and cases were interviewed. A joint environmental health assessment of the implicated facility was conducted on March 16 by DOH-Orange and DBPR. Samples of the implicated beverage or concentrate were requested from the facility and cases and were sent to the Bureau of Public Health Laboratories (BPHL) for analysis.

### Results

No additional cases of suspected chemical burns associated with the implicated facility were identified. The two cases initially identified in this outbreak included a man and woman who were guests of the hotel, aged 45 and 55 years. Both cases reported immediate symptom onset following consumption of a single vodka cranberry juice beverage on March 11, including mouth and throat burning that did not improve with flushing, as well as nausea and vomiting. Both cases sought medical care within two hours after symptom onset. The cases did not know each other before meeting at the hotel bar and did not travel to seek medical care together. Both cases were seen at the same medical facility, but the commonality was either not identified by medical staff or not reported to public health authorities. The cases were only seen in the emergency department and were not admitted. No mouth or throat blistering was noted in medical records of either case. Both cases had admitting diagnoses of allergic reaction but had different discharge diagnoses. During a follow-up public health interview, one case reported that symptoms of vomiting and nausea subsided within hours of onset, but that mouth and throat irritation continued for at least 10 days.

One case reported that the soda dispenser system used to make mixed drinks was either malfunctioning at the time of service or empty of the concentrated cranberry juice used to make the implicated vodka and cranberry juice drink. As a result, the bartender prepared the implicated vodka and cranberry juice drink with concentrated juice directly from a new bag. The soda dispenser is designed to mix the concentrated cranberry juice product with water and soda for mixing with beverages. The vodka bottle being used was reported to have been less than half full and had been used to serve other customers who did not report or appear to have immediate onset of similar symptoms. Following the cases' onset of symptoms, the hotel quarantined the implicated bag of cranberry juice concentrate. Several days after the on-site investigation, a sign to remind staffers not to pour drinks directly from the concentrated juice bags was observed by the reporting case.

During the March 16 joint environmental health assessment, observations of conditions that may have contributed to the outbreak included accumulation of black mold-like substance and lime in the interior of the ice machine, hand wash sink used for purposes other than hand washing (employee rinsed ice scoop bucket in hand sink), toxic substance/chemical stored by or with food (spray bleach bottle stored on rim of bottled beverage bin at bar), pesticide/insecticide labeled for household use only present in establishment, and no certified food manager for the establishment was present. The bulk juice concentrate used to prepare the implicated drink was reported to have been discarded prior to the joint environmental health assessment. The invoice of the implicated products was requested and collected from the facility. No recalls for the implicated product were identified. Photographs of the cranberry juice concentrate label and container taken by the reporting case prior to the joint assessment were provided to DOH-Orange.

Samples of both the served implicated beverage and the juice concentrate were independently collected by the reporting case in clean bottles obtained from a local pharmacy. DOH-Orange shipped these samples to BPHL for analysis. The samples were analyzed for primary metals (by inductively coupled plasma and inductively coupled plasma mass spectrometry), poisons, and toxins. Results indicate that the samples contained various metals and phenol (Table 1).

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### Conclusions and Recommendations

These two reported illnesses appear to be the result of exposure to excessive sodium and phenol in a vodka cranberry juice beverage prepared and served at a hotel bar on March 11. Both persons experienced similar symptoms immediately following consumption of a single drink made at the hotel bar, strongly indicating a point-source chemical exposure. Direct use of the cranberry juice concentrate to prepare the implicated drink would explain the presence of the elevated chemicals. Laboratory analysis of the remaining implicated drink indicated elevated levels of sodium and the presence of residual phenol, which likely explains the symptoms experienced by the cases. Elevated levels of sodium are known to irritate the mucus membranes, the stomach, and the upper respiratory tract. Phenol is corrosive and can cause chemical burns at the contact site. Ingested chemicals (type and dose dependent) can cause immediate vomiting, nausea, and mucous membrane burns. No additional cases beyond the initial reported two cases were reported or identified. This may be explained by the point-source exposure and the immediate actions of the hotel employees to quarantine the implicated bag of cranberry juice concentrate. Concentrated beverages are designed to be used within dispensing systems that dilute liquid to concentrations intended for human consumption.

Dispensing systems not properly maintained or manual dilution of concentrated beverages may result in illness or injury of the person consuming the beverage. Food and beverage establishments should ensure employees are trained and competent in the use and maintenance of food service equipment. Failure to properly use equipment can lead to employee and customer illness and injury. These procedures and techniques can be learned through food safety education courses, on-site job-specific trainings, and regulatory inspections.

Table 1. Florida Bureau of Public Health Laboratories (BPHL) Analysis of Concentrated Juice and Drink (Concentrated Juice, Vodka, Ice) Samples Served to Cases, Hotel Bar, Orange County, March 2016

Chemical	Chemical Concentration (mg/L)	
	Concentrated Juice	Drink
Sodium	210,000	22,000
Copper	6.50	<0.5
Calcium	5.60	13.00
Iron	1.10	<0.5
Magnesium	0.64	0.54
Antimony	0.73	<0.5
Aluminum	0.92	<0.5
Barium	<0.5	<0.5
Chromium	<0.5	<0.5
Selenium	<0.5	<0.5
Manganese	<0.5	<0.5
Nickel	<0.5	<0.5
Cadmium	<0.5	<0.5
Arsenic	<0.5	<0.5
Zinc	<0.5	<0.5
Lead	<0.5	<0.5
Phenol*	Detected	Residual detected

\* A quantitative result cannot be provided as BPHL does not routinely analyze samples for phenol; however, based on mass spectral analysis, there is a 99% match.

