

# Section 1

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## Notable Outbreaks and Case Investigations



# Section 1: 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 2019 and 2020 are briefly summarized in this section.

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# Section 1: Notable Outbreaks and Case Investigations

## Bacterial Diseases

### Legionellosis Outbreak Associated With Federal Prison—Sumter County November 2019–February 2020

#### Authors

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#### Background

On January 15, 2020 the Florida Department of Health in Sumter County (FDOH-Sumter) was notified of an influenza-like illness (ILI) outbreak at the Federal Correctional Complex (FCC) Coleman-Satellite Camp. At the time of initial report, there were 45 cases of ILI since December 2019 with 14 cases resulting in pneumonia. On January 22, 2020, FDOH-Sumter received a report of two urine antigen laboratory results positive for *Legionella* Serogroup 1. The Regional Environmental Epidemiologist (REE) was notified on January 22, 2020, and in accordance with the Florida Department of Health's (the Department) *Guidelines for the Surveillance, Investigation and Control of Legionnaires' Disease in Florida*<sup>1</sup> (GSI), FDOH-Sumter initiated a full epidemiologic and environmental waterborne disease outbreak investigation the same day.

#### Methods

##### *Epidemiologic Investigation*

FDOH-Sumter obtained and reviewed the medical records for all reports of legionellosis from the FCC Coleman-Satellite Camp. Active surveillance for additional cases within the facility was performed and recommendations on legionellosis testing methods were provided to facility staff. State-level monitoring for additional cases was conducted. An outbreak-specific questionnaire was developed and administered in person to cases and matched controls. Controls were matched by age and dorm assignments and selected by FCC Coleman staff according to those parameters. The data were recorded electronically using Microsoft Forms and analyzed using Microsoft Excel 2016 and EpiInfo 7.

A confirmed case of Legionnaires' disease was defined as an individual who had overnight exposure to the FCC Coleman-Satellite Camp within 14 days of onset of clinically compatible symptoms (pneumonia and at least two of these symptoms: fever, cough, shortness of breath and/or myalgia) with confirmatory laboratory evidence of infection (i.e., positive culture, urine antigen test, fourfold rise in antibodies) between November 2019 and February 2020.

Figure 1: Google Maps image of the FCC Coleman Satellite Camp facility areas, November 2019–February 2020



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A suspect case of Legionnaires' disease was defined as an individual who had overnight exposure to the FCC Coleman-Satellite Camp within 14 days of onset of clinically compatible symptoms (pneumonia and at least two of these symptoms: fever, cough, shortness of breath and/or myalgia) with supportive laboratory evidence of infection (i.e., single positive antibody titer) between November 2019 and February 2020.

A confirmed case of Pontiac fever was defined as an individual who had overnight exposure to the FCC Coleman-Satellite Camp within 5 to 72 hours of onset of clinically compatible symptoms (fever, chills, myalgia, malaise, headache, fatigue, nausea or vomiting) without pneumonia and with confirmatory laboratory evidence of infection (i.e., positive culture, urine antigen test, 4-fold rise in antibodies) between November 2019 and February 2020.

A suspect case of Pontiac fever was defined as an individual who had overnight exposure to the FCC Coleman-Satellite Camp within 5 to 72 hours of onset of clinically compatible symptoms (fever, chills, myalgia, malaise, headache, fatigue, nausea or vomiting) without pneumonia and with supportive laboratory evidence of infection (i.e., single positive antibody titer) between November 2019 and February 2020.

## *Laboratory Analysis*

Clinical specimens were requested from all persons at the FCC Coleman-Satellite Camp who presented with acute respiratory symptoms consistent with legionellosis between November 2019–February 2020. The specimens were tested by a private laboratory. Environmental samples were collected by FDOH-Sumter and the REE and were tested by the Bureau of Public Health Laboratories in Jacksonville (BPHL-Jacksonville).

## *Environmental Assessment*

On January 23, 2020, an environmental health assessment of the facility was conducted by FDOH-Sumter and the REE. The facility plumbing was visually inspected on site but building blueprint diagrams were not available for review. Free chlorine levels, pH and water temperature were measured and recorded throughout the facility premise plumbing.

On February 20, 2020, the REE and FDOH-Sumter staff returned to the facility for an environmental health assessment of the cooling tower units closest to the Satellite Camp and the cosmetology building. FCC Coleman staff and Federal Bureau of Prisons staff assisted the FDOH-Sumter assessment team.

## **Results**

### *Epidemiologic Investigation*

A total of 34 cases of legionellosis were identified as part of the outbreak investigation: two confirmed cases of Legionnaires' disease, two confirmed cases of Pontiac fever, five suspect cases of Legionnaires' disease and 25 suspect cases of Pontiac fever. Cases ranged in age from 23 to 73 years old (median 45.5 years) and all were female. Symptoms reported among cases included cough (85%), myalgia (59%), fever (56%) and headache (56%). Onset dates ranged from November 4, 2019 through February 3, 2020 (Figure 2). Three cases were hospitalized and no deaths were reported among cases. Incubation period and duration of illness were not reported for the outbreak cases.

A case control study was conducted to identify statistically significant exposures. The controls were matched by age and dorm assigned and selected by the facility staff. All cases and controls were interviewed in person by eight FDOH epidemiology staff from four county health departments and two REEs on February 26, 2020. One selected control refused interview, so there were 32 cases and 31 controls. No exposures were found to be statistically significant.

### *Laboratory Analysis*

Four clinical specimens tested positive by urine antigen and 30 clinical specimens were positive by one antibody titer. For the 30 suspect cases, either no convalescent specimen was collected or the convalescent specimen did not demonstrate a four-fold increase in antibody titer levels from the first test.

Thirty environmental samples were collected between January 23, 2020 and February 20, 2020, including 16 one-liter bulk water bottles and 14 swabs, and all samples tested negative for growth of *Legionella pneumophila* by BPHL-Jacksonville.

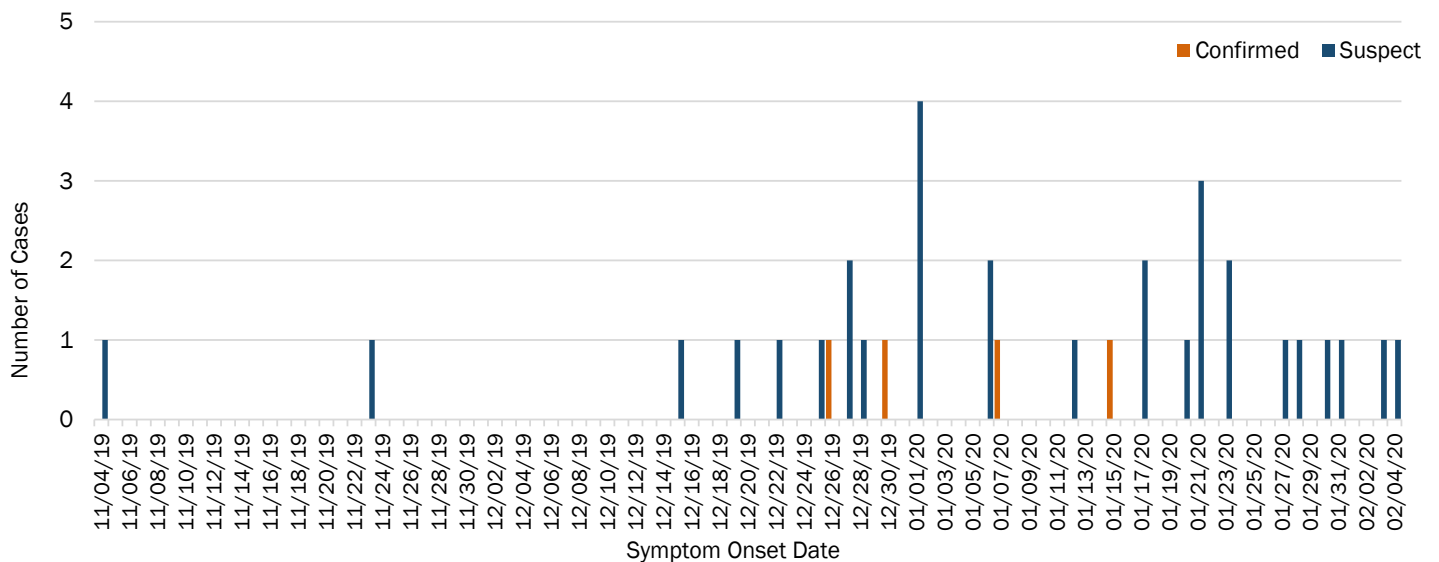
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## Environmental Assessment

Premise plumbing water samples of the FCC Coleman-Satellite Camp F1 and F3 showers and sinks, ground floor boiler, food service boiler and the facility water main access locations were collected on January 23, 2020 and analyzed by BPHL -Jacksonville. Water temperatures, pH and residual free chlorine were also measured when collecting samples and other areas for the premise plumbing. Hot water temperatures ranged from 105°F to 128.8°F with a median of 108.7°F and free chlorine residual results ranged from 0.18 ppm to 1.25 ppm with a median of 0.81 ppm. On February 8, 2020 the facility installed point-of-use filters on the showers to protect against *Legionella* in the FCC Coleman-Satellite Camp.

Following the reports of two additional cases with onset dates in February 2020, on February 20, 2020 water samples of the three Satellite Camp cooling tower units and the cosmetology building premise plumbing were collected along with water temperatures, pH and residual free chlorine measurements. During the weekend of February 21–22, 2020, the premise plumbing was hyper-chlorinated by the facility along with the three cooling tower units nearest the Satellite Camp. After the case control study interviews, the interview team was given a tour of the facility and it was learned one of the Satellite Camp cooling tower units had tested positive for 230 CFU/mL of *Legionella pneumophila* Serogroup 1 in June 2019 through routine testing by a private company. According to the facility staff, the specific camp tower unit was immediately taken off line on July 15, 2020 and drained and cleaned.

**Figure 2: Cases associated with legionellosis outbreak at FCC Coleman Satellite Camp November 2019 – February 2020, by illness onset date (n=34)**



## Conclusions

This investigation conducted by FDOH-Sumter was initiated in accordance with the *FDOH GSI of Legionnaires' Disease in Florida*<sup>1</sup> on January 22, 2020 after receiving notification of two confirmed *Legionella pneumophila* cases who stayed overnight at the FCC Coleman-Satellite Camp within 12 months. After a full epidemiological and environmental health assessment, 34 legionellosis cases were associated with this facility. No environmental water samples collected by FDOH-Sumter tested positive for the presence of *Legionella* bacteria. One routine environmental sample collected and tested by a private company contracted by FCC Coleman-Satellite Camp tested positive for *Legionella pneumophila* Serogroup 1 in cooling tower unit 3 in June 2019.

In June of 2019, FCC Coleman had tested 13 different cool tower units on the property and the Satellite Camp tower 3 unit that was positive was the only unit positive for *Legionella* spp. during that round of environmental samples. Detection of 230 CFU/mL of *Legionella* in a cooling tower indicates a level 4 remedial action wherein cleaning and/or biocide treatment of the equipment is indicated. It is additionally stated that a level of *Legionella* between 100-999 CFU/mL represents a moderately high level of concern and is approaching levels that may cause an outbreak.

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Legionellosis is an infection caused by the inhalation or aspiration of water contaminated with *Legionella* bacteria and can be classified into two forms of illness. Legionnaires' disease, a serious and sometimes fatal form of pneumonia, is characterized by a nonproductive cough, shortness of breath, fever, diarrhea, headaches, muscle aches and the presence of pneumonia.<sup>(2,3)</sup> The other form of legionellosis, called Pontiac fever, is less severe illness without the presence of pneumonia that usually resolves without treatment within two to five days. The incubation period for development of both forms of legionellosis is typically 2 to 14 days after exposure to the pathogenic bacteria; however, in practice determination of the exact exposure relative to symptom onset is often difficult.

The facility had not been associated with any previous legionellosis clusters or outbreaks in the past and did not have a *Legionella* water management program in place at the time of the initial investigation. FDOH-Sumter recommended the facility implement a water management program for the prevention and control of *Legionella*.

## References

1. Centers for Disease Control and Prevention. *Legionella* (Legionnaires' Disease and Pontiac Fever): Signs and Symptoms. <https://www.cdc.gov/legionella/about/signs-symptoms.html>.
2. Florida Department of Health. (2014). Guidelines for the Surveillance, Investigation and Control of Legionnaires' Disease in Florida. <https://floridahealth.sharepoint.com/sites/GSI/EpiDocs/gsi-legionella-update-final.pdf>.
3. Heymann, D. (2015). Control of Communicable Diseases Manual. *American Public Health Association*, 20, 334–337.

## Viral Diseases

### Hand, Foot and Mouth Disease Outbreak at a Local University

#### Authors

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#### Background

On November 1, 2019, the Florida Department of Health in Leon County (FDOH-Leon) was contacted by a health clinic medical director about an outbreak of hand, foot and mouth disease among college-age students at a local university. FDOH-Leon immediately initiated an outbreak investigation and active case finding.

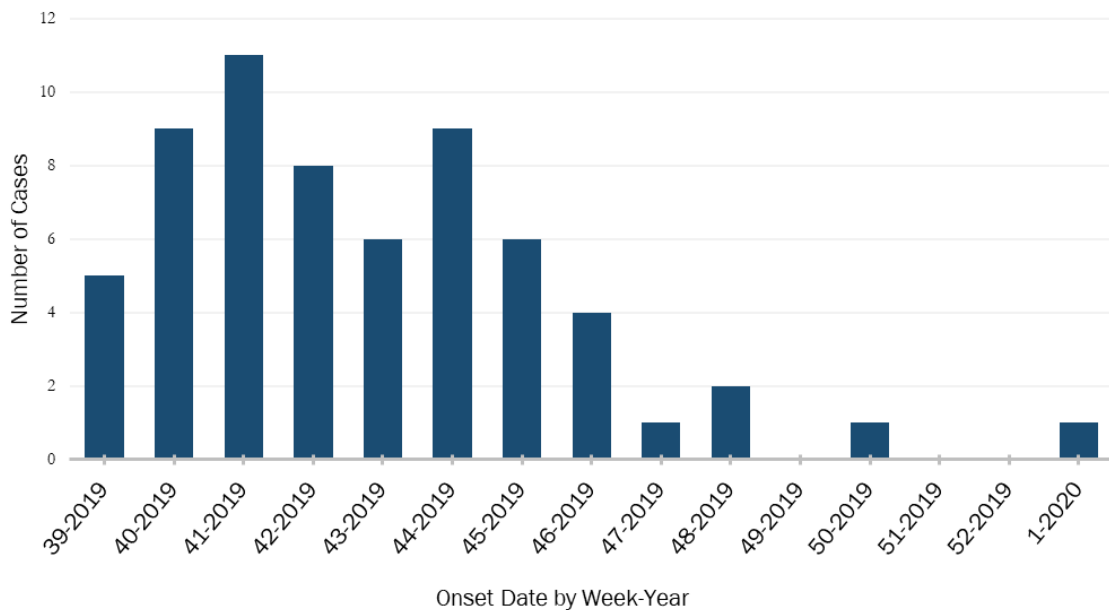
Hand, foot and mouth disease (HFMD) is a contagious viral illness caused by different viruses. Although it is common in infants and children younger than 5 years old, older children and adults can also contract HFMD. Symptoms often include the following: fever, reduced appetite, sore throat and a feeling of being unwell. Painful sores may develop in the mouth. A rash of flat red spots may develop on the hands and feet, including the palms and soles, as well as on other parts of the body. These symptoms usually appear in stages and not all at once. Symptomology and severity often differ among cases but adults are more likely than children to be asymptomatic.

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## Methods

FDOH-Leon collected a list of ill persons from the health clinic medical director. A confirmed case of HFMD was defined as a person affiliated with the local university with multiple papulovesicular or maculopapular lesions affecting the palms of hands, soles of feet, arms, legs, face, oral mucosa or buttocks from September 24, 2019, to January 2020. Cases were interviewed and educated by the local university health clinic providers. All ill persons were provided information on HFMD, hand washing and hygiene and cleaning and disinfecting frequently touched surfaces. Individuals were instructed to notify their personal close contacts. If the ill person provided consent, university housing was notified to perform deep cleaning of the individual's dormitory and bathroom. At this time, there is no specific medical treatment for HFMD and symptoms typically resolve on their own in 7 to 10 days. Active monitoring and surveillance at the institution remained for 2 consecutive incubation periods after the final clinically diagnosed case.

Figure 1. Weekly Number of Hand, Foot and Mouth Cases Among University Students by Onset Date, Leon County, September 24, 2019–January 4, 2020



## Results

The index case was a 21-year-old male who developed a rash and sore throat on September 24, 2019, and subsequently was diagnosed by a university health clinic provider on September 25, 2019. Five days after diagnosis of the index case, 4 symptomatic persons affiliated with the local university were medically evaluated at the university health clinic and clinically diagnosed with HFMD. A total of 63 people met the HFMD confirmed surveillance case classification with onsets ranging from September 24, 2019, to January 4, 2020 (Figure 1). The duration of illness ranged from 6 to 10 days. Cases were adults ages 18 to 24 years old with a median age of 19. All cases reported symptoms of rash, 87% reported sore throat, 66% reported fever and 24% reported cough.

## Conclusions

While HFMD is common in infants and children younger than 5 years old, this investigation is a reminder that individuals of all ages are susceptible to contracting the disease. Additionally, many communicable diseases such as HFMD can spread quickly in individuals who attend schools or daycares and those who reside in congregate or group settings. Proper education and mitigation measures are needed in order to slow the spread of disease. The institution took the necessary precautions by educating students and residents to practice proper hygiene, disinfecting of communal areas, providing residents with sanitation materials, advising students to stay home if ill and offering telemedicine consultations for those unsure about their condition.

## Reference

1. Centers for Disease Control and Prevention. Hand, Foot, and Mouth Disease (HFMD). <https://www.cdc.gov/hand-foot-mouth/about/treatment.html>.

# Section 1: Notable Outbreaks and Case Investigations

## Measles Acquired Through International Travel in a College Student

### Authors

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### Background

On January 18, 2020, the Florida Department of Health in Hillsborough County (FDOH-Hillsborough) was notified by a local hospital of a 21-year-old male with suspected measles and an investigation was immediately initiated. Measles was suspected after evaluation of symptom progression along with a report of recent international travel to Brazil with a possible epidemiological connection to other measles cases. The patient had been informed by a family friend in Brazil that during the patient's time in Brazil, measles cases had been identified and associated with a New Year's party that the patient had attended. Specimens were collected by the hospital and sent to the Bureau of Public Health Laboratories (BPHL). On January 21, 2020, the patient tested PCR-positive for measles.

### Methods

FDOH-Hillsborough interviewed the suspected measles patient on January 18, 2020 and collected a thorough vaccination history, travel history and symptomology. The patient stated that he was born in Brazil and was vaccinated for measles as a child, reportedly receiving doses of vaccine in 1998, 1999 and 2000. The patient traveled to Brazil from December 15, 2019 to January 6, 2020. On January 14, 2020, the patient developed fever, sore throat, cough, conjunctivitis and nasal congestion. On January 17, the patient developed a rash on his face and presented to a Hillsborough County urgent care clinic (UCC). The patient was diagnosed with an allergic reaction and sent home. The following day, January 18, 2020, the rash progressed to his trunk and the patient visited a Hillsborough County emergency department (ED). The ED performed rapid testing for group A *Streptococcus* (strep), which was positive. The patient was diagnosed with strep throat, given a penicillin shot and discharged home. Later that day, the patient was called by a friend, a physician in Brazil, who had recently diagnosed measles in individuals who had attended the same large party that the patient had attended in Brazil. The patient returned to the ED on January 18, 2020 and provided the information to the hospital, which prompted a suspicion of measles in the patient by the hospital and therefore the hospital notified FDOH-Hillsborough. Nasopharyngeal (NP), blood and urine specimens were collected by the hospital on January 18, and on January 20, the hospital authorized for testing at BPHL. On January 21, the NP and urine were PCR-positive for measles.

FDOH-Hillsborough collected information on all activities during the patient's infectious period. The patient was a current student at a college in Hillsborough and had attended classes while infectious. Possible exposures were also identified at the UCC, ED and at a pharmacy where a prescription was filled. Lists of potential exposed customers, patients and staff were elicited from the UCC, ED and pharmacy. Contacts were interviewed about their vaccination status and current health, were educated on measles and directed to follow up with a health care provider and FDOH-Hillsborough if they developed any symptoms.

To assess college exposures, the patient's class schedule and activities were reviewed with the college and it was determined that because all students and faculty attend a daily chapel session together, everyone should be considered potentially exposed. Proof of vaccination and immunity were reviewed by FDOH-Hillsborough for all student and faculty. Any student without documentation of immunization was advised to isolate in their room during the incubation period. FDOH-Hillsborough provided educational letters to the college, spoke at the college and provided a measles, mumps and rubella (MMR) vaccination opportunity to anyone without proof of previous vaccination. A press release was also issued on January 23, 2020.

All contacts from all locations were monitored through the incubation period and additional notifications were provided to the local medical community through mass email and fax correspondence. Additional surveillance was conducted using Florida's syndromic surveillance system.



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## Results

The patient reported an onset of rash on January 17, 2020, indicating an infectious period of January 13, 2020, until January 21, 2020. During the January 18 interview, FDOH-Hillsborough advised the patient to isolate until specimens had been collected and testing had been finalized, preventing any additional exposures on January 19 to 21. From January 13 to 18, potential exposures were identified among the patient's roommate, a Hillsborough County pharmacy, the UCC, the ED and at the patient's college.

FDOH-Hillsborough identified one roommate who was successfully contacted and was fully vaccinated. FDOH-Hillsborough notified the pharmacy and the staff on shift of the possible exposure. The UCC identified 4 staff and 12 patients with possible exposures. Of these 16 individuals, 13 were successfully contacted by FDOH-Hillsborough and 12 had evidence of immunity. The ED identified approximately 225 potentially exposed staff and patients and 183 were contacted, with 172 having evidence of immunity. Seven patients did not have immunity, resulting in 1 infant being recommended to receive immune globulin as prophylaxis.

The college had an enrollment of 479 students and about 80 current faculty. FDOH-Hillsborough, in collaboration with college leadership, reviewed immunity status of all students and faculty. All faculty had evidence of immunity. The student review resulted in an initial list of about 60 unvaccinated students and five with unknown vaccination status. The 65 students were advised to isolate either in their dorm rooms or at their off-campus housing. All isolated students were interviewed and educated on measles and surveyed on their interest in vaccination. The college agreed to provide support services such as food, nursing and remote learning for all isolated students on campus. FDOH-Hillsborough offered vaccination to all unvaccinated students with 11 accepting. Additional students were able to locate vaccination records, and as result, 30 students without evidence of immunity remained in isolation during their incubation periods. No secondary measles cases were identified among the possible exposures at any of the locations.

## Conclusions

This case investigation highlights the importance of physicians collecting a thorough travel history and the value of awareness of the locations of international measles outbreaks. Even with the initial delays in measles identification, the notification of FDOH-Hillsborough on January 18, 2020, prevented additional exposures from occurring while measles testing was being performed. The college's entrance requirement for documentation of measles vaccine history aided in quickly determining the immunity status of hundreds of possible exposures, many of whom were residents of states outside Florida or countries other than the U.S.

## Atypical West Nile Virus Disease Outbreak in Florida During the Coronavirus Disease-19 (COVID-19) Pandemic

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## Background

West Nile virus (WNV) is the most common mosquito-transmitted human pathogen in Florida. Activity is generally seasonal, with annual disease incidence fluctuating considerably. Most infections are asymptomatic, with <1% developing neuroinvasive disease. Due to the risk of blood transfusion transmission, universal blood donor screening began in 2003. During 2020, the Florida Department of Health (the Department) identified intense WNV activity in Florida, with a high number of WNV-positive blood donors.

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## Methods

### *Epidemiologic Investigation*

WNV disease cases were classified as confirmed or probable using the national Council of State and Territorial Epidemiologists surveillance case definition. While asymptomatic blood donors do not meet case criteria, they are still indicative of virus activity in an area and are reported by Florida to the Centers for Disease Control and Prevention (CDC). Blood banks are required to report donors who screen positive for WNV and the county health departments conduct similar investigations following the receipt of positive laboratory results. Local mosquito control programs were notified of suspected cases as appropriate. Syndromic surveillance queries of emergency room chief complaint and discharge diagnoses were also used as part of the case-finding efforts, targeting individuals between 30–80 years of age with possible WNV disease, encephalitis or meningitis.

Due to the atypical distribution of activity in the state and the high number of blood donors reported, additional data analysis was performed to compare the 2020 WNV activity among symptomatic cases and blood donors to historical data (2001–19). Chi-square or Fisher's exact test were used to test for statistical significance.

### *Laboratory Analysis*

Confirmatory testing was performed at reference laboratories, such as the Department's Bureau of Public Health Laboratories or CDC for all symptomatic cases and blood donors.

## Results

### *Epidemiologic Investigation*

During 2020, 41 WNV-positive blood donors in Florida were reported. Four subsequently developed a febrile illness. An additional 47 WNV disease cases (44 neuroinvasive and 3 non-neuroinvasive) were also identified. Six of the symptomatic cases were first identified using the syndromic surveillance query, 1 of whom had not initially been diagnosed with or tested for WNV infection.

Activity primarily occurred in southern Florida, with Miami-Dade County representing the vast majority (34 asymptomatic blood donors and 28 symptomatic cases, including 2 blood donors). This was almost double the cumulative historical activity for Miami-Dade County; statewide, 2020 had the second-highest number of WNV infections reported. Miami-Dade reported early season transmission (April–September) peaking in July, while activity in other counties occurred later (June–October). Historically, activity primarily occurs in Florida during the summer months, peaking in August. Increased WNV activity was primarily identified among counties that regularly report no activity; environmental conditions were thought to contribute to the atypical distribution.

Historically, few blood donors are reported annually (range 0–8), with the overall ratio of neuroinvasive cases to blood donors at 7.44:1. During 2020, this ratio was approximately 1.07:1. In 2020, blood donors were reported from five blood banks; one represented 72% of Miami-Dade County's blood donors alone. Ethnicity was statistically significant, with a higher proportion of Hispanic individuals reported in 2020 (47% of symptomatic cases and 51% of blood donors vs. 5% of symptomatic cases and 7% of blood donors historically), most likely reflecting the differences in underlying population demographics in south Florida compared to other parts of the state. Age was also significant among symptomatic cases, occurring in older individuals on average in 2020 (range 29–85, median 63) than historically (range 2–93, median 53). A statistically significant higher proportion of homeless blood donors were reported in 2020 (49%) than historically (5%; data from 2005–2019). Overall, there were 20 blood donors and 1 symptomatic case who reported being homeless.

## Conclusions

Both the high numbers of blood donors and homeless person infections identified in Miami-Dade County have not previously been seen in Florida. Many blood banks had a reduction in donors during 2020 due to COVID-19; the blood bank associated with most positive samples reported a 40% reduction. This blood bank provides cash incentives for donations and represented most homeless blood donors (95%). The full impact that COVID-19 played on exposure risk to WNV is unknown and should be investigated further.

# Section 1: Notable Outbreaks and Case Investigations

## Responding to a Dengue Fever Outbreak During the Coronavirus Disease-19 (COVID-19) Pandemic, Key Largo, Florida, 2020

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### Background

Dengue virus (DENV), an arbovirus, is a leading cause of acute febrile illness among returning U.S. travelers. While previously endemic in Florida, locally acquired cases were not identified after 1935 until the 2009–10 Key West outbreak. Since then, there has been at least 1 local case almost annually. Despite decreases in travel during the COVID-19 pandemic, a local dengue fever (DF) outbreak was identified in Key Largo in 2020. Dengue fever and COVID-19 can have similar febrile illnesses, making detection of DF cases more challenging.

### Methods

#### *Epidemiologic Investigation*

The Florida Department of Health in Monroe County (FDOH-Monroe) issued a mosquito-borne illness advisory on March 9, 2020, following the identification of a local DF case in Key Largo (symptom onset February 18, 2020). Due to an increased number of COVID-19 cases, an executive order restricting public access in multiple southeast Florida counties was also implemented at the end of March. No additional cases were identified until several concerned residents called FDOH reporting suspected DF illness on June 16, 2020. This was followed the next day by a report from the local hospital of another suspected case. On June 26, a mosquito-borne illness alert was issued after eight cases were confirmed. While also responding to COVID-19, FDOH-Monroe set up a hotline for residents to report DF-like illness, interviewed suspected DF cases, conducted site visits, provided extensive health care provider and community outreach and promptly provided updates to partners and local media. The State Health Office provided surge support for these activities remotely. Suspected DF cases were asked to provide contact information for persons with shared mosquito exposure risks (e.g., same households, workplaces or outdoor events). Contacts were called and offered DENV testing if they reported a recent unexplained febrile illness. FDOH also conducted syndromic surveillance of local hospital chief complaint and discharge diagnosis records. DF cases were classified as confirmed or probable using the national Council of State and Territorial Epidemiologists surveillance case definition.

#### *Laboratory Analysis*

FDOH-Monroe offered sample collection at their local clinic for individuals reporting symptoms consistent with DF. Samples were sent to the Department's Bureau of Public Health Laboratories (BPHL) for DENV polymerase chain reaction (PCR) and antibody testing (IgM and IgG) as appropriate. BPHL also performed confirmatory testing for commercially positive samples. When available, acute samples where only commercial dengue serology had been ordered were also sent to BPHL for PCR testing. The Centers for Disease Control and Prevention (CDC) assisted with serotyping PCR-positive samples and provided PCR testing for mosquito pools collected by the Florida Keys Mosquito Control District (FKMCD).

#### *Environmental Assessment*

FKMCD was notified of possible mosquito exposure locations for suspected cases during the 2-week incubation period before symptom onset through the potential 1-week viremic period after symptom onset. FKMCD enhanced aerial and truck spraying and canvassed neighborhoods to conduct vector surveillance, remove mosquito breeding sites and provide mosquito control education.

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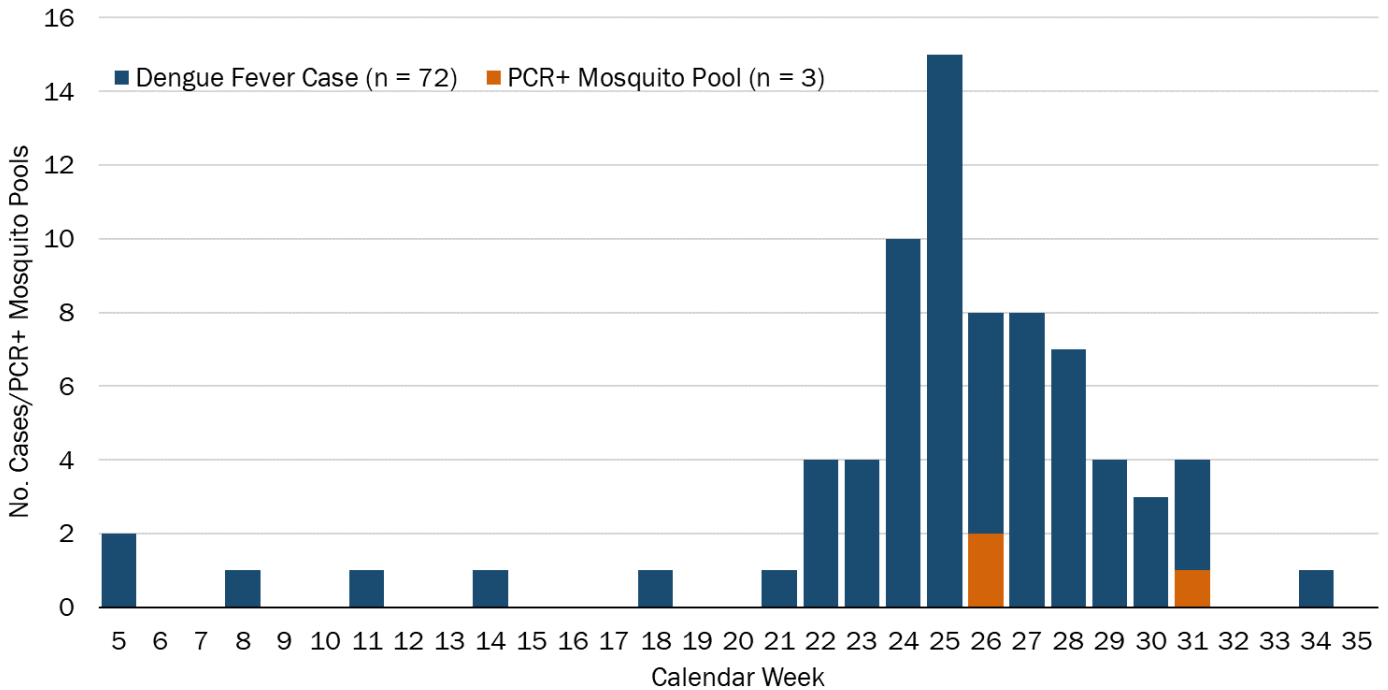
## Results

### Epidemiologic Investigation

Seventy-two locally acquired DF cases were identified. Retrospective case finding and testing identified IgM-positive cases with reported symptom onset as early as January. The case median age was 54 years (range = 8–86 years) and slightly more cases were female (51%). Most cases were white and non-Hispanic (83%). Two cases had unknown race and ethnicity. Eight cases (11%) were hospitalized and no deaths occurred. Self-reporting, including via contact outreach, drove case identification with 61% of cases self-reported and 64% of the positive samples collected directly by FDOH.

### Laboratory Analysis

Forty-three cases sought care for their illness within 1 week of symptom onset. For most of these cases (58%), clinicians ordered COVID-19 testing but no evidence of commercial DF testing was identified. Testing was ordered for both DF and COVID-19 in just under one-third of the cases (30%), while 3 cases (7%) were tested only for DF. For 2 additional cases (5%) neither DF nor COVID-19 testing were ordered. Of the 16 acute cases with testing requested for DF, most (75%) had DENV antibody testing with no PCR, while DENV PCR testing was ordered for only 4 cases (25%). No acute samples were tested using the DENV non-structural protein (NS1) test, an alternative to the DENV PCR test. Of 26 case samples collected within a week of symptom onset with both DENV PCR and IgM testing results from any lab, 14 (54%) were DENV PCR-positive and IgM-negative while only 4 (15%) were DENV IgM-positive and PCR-negative, with the remaining 8 samples (31%) both PCR- and IgM-positive. All PCR-positive cases were serotype DENV-1. Three (3%) of 96 *Aedes aegypti* mosquito pools collected between June 18 and September 21, 2020, also tested positive for DENV-1.



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## Conclusions

The COVID-19 pandemic is suspected to have negatively impacted dengue surveillance due to reluctance to seek medical care, competing demands on providers during a rapidly evolving pandemic and similar clinical presentations for COVID-19 and DF. Aggressive community engagement helped deflect some of these impacts as self-reporting and contact outreach contributed to identification of nearly two-thirds of all DF cases. Pandemic-related travel restrictions may also have limited spread of DENV. Only 30% of cases seeking medical care had evidence of testing for both COVID-19 and DF. Commercial DENV PCR and NS1 testing were underutilized despite CDC testing recommendations to use either of these tests in combination with serologic testing for samples collected within 7 days of symptom onset. Acute samples tested according to CDC recommendations demonstrated that 54% of cases with only DENV IgM testing would have been missed compared to just 15% missed using DENV PCR testing alone. The PCR testing also provides valuable serotype information. Provider outreach is needed along with additional study to understand barriers to ordering recommended DENV testing. While no DF cases have been identified with symptom onset after August 2020, surveillance is ongoing to ensure there is no DENV reemergence, as was seen in the Key West 2009–10 outbreak.

## Widespread Outbreak of Hepatitis A in Florida Due to Person-to-Person Spread

### Authors

Timothy Doyle, PhD, MPH; Megan Gumke, MPH; Andrea Leapley, MPH

### Background

Beginning in 2016, several states, including Florida, noted an increase in hepatitis A infections compared to the 2013–15 period. In 2017, several states reported hepatitis A outbreaks associated with drug use and homelessness and among men who have sex with men (MSM). In Florida, hepatitis A cases related to person-to-person spread continued to increase, consistent with similar trends seen in other parts of the country and a hepatitis A outbreak in Florida was declared in 2018. A public health emergency due to hepatitis A was declared in 2019. The outbreak was declared over on August 31, 2021, when case numbers returned to baseline incidence observed prior to the outbreak period.

### Summary of Outbreak

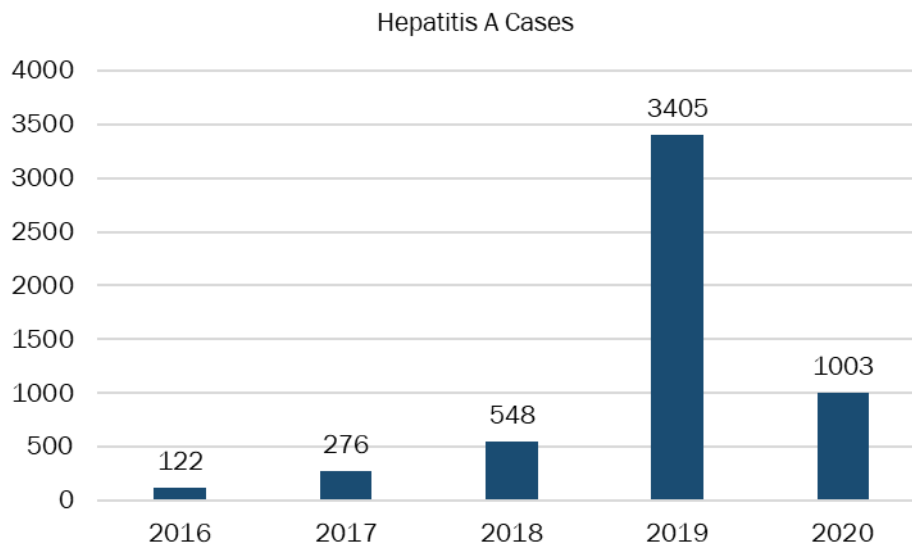
From 2018 until the outbreak was declared over in 2021, 5,103 cases and 77 (1.5%) deaths were reported. Approximately two-thirds of cases were hospitalized for their illnesses. The greatest number of cases were reported during 2019–20, totaling 4,408 cases and 70 deaths (Figure 1). During the outbreak, hepatitis A cases were most common in males (64%), non-Hispanic whites (82%) and in the 30–39-year age group. For cases with identified risk factors, 55% reported recent drug use, 17% reported recent homelessness and 5% occurred among MSM. Coinfection with hepatitis B (2%), hepatitis C (20%) or both (2%) were frequently noted. Current or recent incarceration was also commonly noted (22%) and several counties reported outbreaks in correctional facilities, often with epidemiologic linkages to homeless shelters or drug rehabilitation facilities.

Cases were observed statewide, with the highest incidence rates in Pasco, Volusia and Escambia counties. During the pre-outbreak period prior to 2016, a large proportion of hepatitis A cases in Florida were acquired from international travel outside the U.S. However, during the outbreak period, only about 1% of cases were thought to be acquired outside the U.S. Following the public health emergency declaration in 2019, numerous control measures were put into place statewide, focused primarily on improved access to hepatitis A vaccination for high-risk populations and post-exposure prophylaxis for close contacts, when feasible. From January 2019 to March 2020, more than 370,000 first doses of hepatitis A vaccine were administered to adults statewide by both private providers and county health departments. Following the COVID-19 pandemic onset in March 2020, hepatitis A vaccination activities continued, but at lower levels compared to 2019 due to the competing demands of the COVID-19 response.

# Section 1: Notable Outbreaks and Case Investigations

## Conclusions

Over recent years, Florida observed increased rates of hepatitis A as part of an ongoing statewide outbreak associated with person-to-person transmission, primarily among persons with recent drug use, homelessness, and incarceration and among MSM. Similar patterns have been observed nationally during this time frame and several states have ongoing outbreaks. Adults in the 30–39-year age range are likely too old to have been vaccinated in childhood and too young to have been exposed in childhood during the high-incidence periods of the pre-vaccination era. High-risk exposures in this largely unvaccinated age range have fueled ongoing spread of person-to-person transmission over many months. After extensive effort to increase vaccination access to the hard-to-reach and high-risk populations, the prolonged hepatitis A outbreak in Florida came under control in 2021. Additional details regarding hepatitis A case data during 2019–20 can be found in the hepatitis A section of the main report.



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# Section 1: Notable Outbreaks and Case Investigations

## Rabies Vaccine Failure in a Cat Vaccinated Annually 11 Times, Florida—2020

### Authors

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### Background

Rabies vaccination failure occurs rarely. In December 2020, a 14-year-old, 6.1 kg, castrated, domestic longhair cat with outdoor access and history of feline immunodeficiency virus (FIV) was evaluated in a veterinary clinic for anorexia. The cat had received rabies vaccines (1-year duration) annually for 11 years, most recently on January 15, 2020. During hospitalization, the cat bit a clinic staff member. Euthanasia was elected as the cat's clinical condition continued to deteriorate and rabies testing was also performed, leading to a rabies diagnosis. A public health investigation was performed to understand factors contributing to this rabies vaccination failure and to guide future practices.

### Methods

The cat's veterinary medical records during 2009–20 were reviewed. Two reference laboratories performed comprehensive rabies diagnostics on blood and tissue samples collected at necropsy. The United States Department of Agriculture (USDA) and vaccine manufacturer were contacted to ensure their awareness and obtain information about vaccine lot efficacy. Additional FIV and feline leukemia virus (FeLV) diagnostics were performed.

### Results

Real-time reverse transcription-polymerase chain reaction (RT-PCR) detected rabies viral RNA in brain and salivary gland tissues. Antigenic typing and sequence analysis identified the eastern raccoon rabies virus variant. The rapid fluorescent focus inhibition titer for rabies neutralizing antibodies was inadequate (i.e., incomplete neutralization at 1:5 dilution) to convey immunocompetency against rabies. FIV and FeLV DNA were not detected by viral culture or RT-PCR in splenic, lymph node or kidney tissues. A rapid immunoassay test on postmortem blood (i.e., unvalidated specimen) suggested presence of FIV antibodies and FeLV antigen. A western blot assay detected FIV proteins, confirming FIV infection. The vaccine manufacturer did not report any deficiencies of vaccine efficacy.

### Conclusions

Although the cause of vaccination failure is unclear in this case, immunocompromising conditions, including FIV, aging and no booster vaccination after unrecognized rabies exposure might have contributed. This case highlights the need for systematic data collection of all possible contributing factors when rabies vaccination failures occur to better understand prevalence and risk factors of these rare events and provide vaccination guidance for immunocompromised pets. Therefore, local and state jurisdictions should confirm and report the vaccination status of rabid owned animals. Additionally, to prevent human rabies fatalities, public health officials and veterinarians should consider rabies in the differential diagnosis of vaccinated animals with rabies exposure risk when human exposure occurs.

# Section 1: Notable Outbreaks and Case Investigations

## Parasitic Infections

### Cyclosporiasis Outbreak Associated With a Restaurant—Duval County, June 2019

#### Authors

Paul Rehme, DVM, MPH; Muniba McCabe, MPH

#### Background

On Saturday, June 22, 2019, the Florida Department of Health in Duval County (FDOH-Duval) was notified of an outbreak of gastrointestinal illness among employees of a Jacksonville restaurant by the restaurant corporate manager. About 20 employees were reported ill with onset dates around June 18, 2019. On Sunday, June 23, 2019, the Regional Environmental Epidemiologist (REE) was notified by the Florida Poison Information Center Network that 16 out of 17 persons who dined at the restaurant with a group on June 11, 2019, were ill with a gastrointestinal illness. This information was sent to FDOH-Duval. FDOH-Duval began an outbreak investigation on June 24, 2019.

On June 24, 2019, another individual called to report he was in a different group (24 persons) who all became ill except 1 person after eating at the same restaurant on June 13, 2019. Between June 23 and July 3, 2019, 7 independent groups of patrons were identified by FDOH-Duval Epidemiology reporting gastrointestinal illness after they ate food from the same restaurant between June 11 and June 15, 2019.

#### Methods

##### *Epidemiologic Investigation*

Restaurant management distributed an illness survey developed by FDOH-Duval to all 134 employees to complete. FDOH-Duval and the REE developed a questionnaire in Epi Info™ 7 to capture information from people who ate at the restaurant. Information was requested from persons who were ill as well as those who were not. A case-control study was conducted using the employee questionnaires and a retrospective cohort study was conducted using patron interviews/surveys. Information from both employees and patrons was entered into the Epi Info database. Epi Info was used to conduct both descriptive and analytical epidemiology.

A confirmed case was defined as a person who ate at the restaurant from June 11 to 24, 2019, who subsequently developed diarrhea plus one other symptom (e.g., nausea, vomiting, abdominal cramps, fever, headache) with a positive laboratory test for *Cyclospora*. A probable case was defined as a person who ate at the restaurant from June 11 to 24, 2019, who subsequently developed diarrhea plus 1 other symptom.

##### *Environmental Assessment*

On June 25, 2019, FDOH-Duval Environmental Health (EH), the REE and the Florida Department of Business and Professional Regulation (DBPR) conducted a joint environmental assessment at the restaurant. During the assessment, invoices were requested for produce items.

##### *Laboratory Analysis*

Six stool specimens were submitted by FDOH-Duval to the Bureau of Public Health Laboratories (BPHL)—Jacksonville for this investigation from 3 patrons and 3 employees. In addition, numerous stool specimens were collected by hospital staff and private providers.



# Section 1: Notable Outbreaks and Case Investigations

## Results

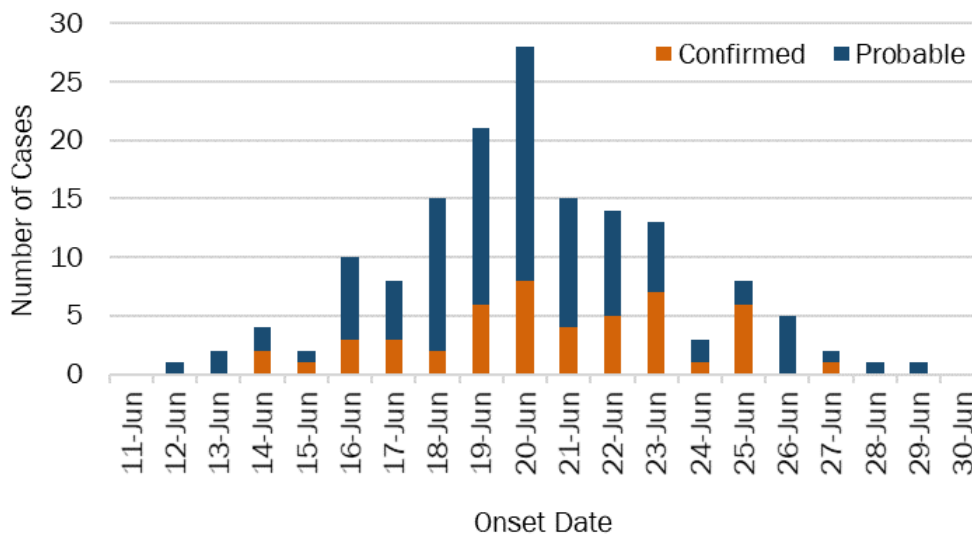
### Epidemiologic Investigation

FDOH-Duval either interviewed or received information for 218 persons who ate at the restaurant including 83 employees and 135 patrons. One hundred and fifty-three people met the outbreak case definition; 50 confirmed cases and 103 probable.

The cases were 64% female and 36% male. The median age was 43 years old and ranged from 15–86 years old. The most prevalent symptoms were diarrhea (100%), nausea (80%), abdominal cramps (70%) and fatigue (66%).

Date of exposure ranged from June 11–June 24, 2019. Onset dates ranged from June 12–June 29, 2019 (Figure 1). The incubation period ranged from 1–11 days with a median of seven days.

**Figure 1. Cases Associated With a Restaurant Outbreak by Onset Date, June 2019 (n=153)**



During the initial week of the investigation, FDOH-Duval determined that all persons from the first 2 groups who were ill had eaten the Caesar salad and those who did not eat the salad were not ill. However, a third group of 6 patrons who were ill did not eat Caesar salad. The ill persons had all eaten bruschetta with fresh basil. After a review of ingredients used to make the Caesar salad it was noted that the Caesar salad also contained fresh basil.

Food items were analyzed for 2 different groups, employees and patrons. The employee data were analyzed using a case-control study to examine whether the employee ate food that contained fresh basil or not. The cases were employees who met the case definition and the controls were employees who ate at the restaurant but did not meet the case definition. The odds ratio for persons eating foods containing fresh basil was 5.6 with a 95% confidence interval of 1.9–16.3.

The food items eaten by patrons were analyzed using a retrospective cohort study. Many of the groups who ate at the restaurant ordered from a fixed menu with a smaller selection of food items and therefore those selected items were used for the analysis. If a person could not recall what they had eaten, their information was not used in the analysis. Due to the low numbers of non-ill persons who completed interviews/surveys, most of the individual items were found not to be statistically significant or minimally so. Therefore, the data were analyzed in terms of whether a case had eaten foods containing fresh basil or not. This analysis showed a relative risk of 3.6 (95% CI: 1.37–9.47).

# Section 1: Notable Outbreaks and Case Investigations

## *Environmental Assessment*

The joint environmental assessment found minor food safety issues, which would not likely have contributed to this outbreak. Management at the restaurant noted that employees often ate food prepared at the restaurant and that it was encouraged.

The salad preparation process was observed from start to finish with no significant adverse findings. The recipe for the Caesar salad and pesto dressing was obtained. Romaine lettuce was received by the head and leaves were washed individually under cold running water. Fresh basil was received in sealed plastic bags and was also individually washed under cold running water. The pesto dressing was made from fresh ingredients including basil and was typically consumed within 3 days.

Produce invoices were obtained from the restaurant. The invoices indicated that produce was received daily from 1 local produce distributor. It was delivered in a refrigerated truck and immediately transferred to a produce refrigerator at the restaurant. Information on the original source of romaine lettuce and basil was requested from the local distributor.

The restaurant received basil, which could have contributed to this outbreak, from 3 different original sources, 1 in Mexico and 2 in Colombia. However, FDOH-Duval was investigating a *Cyclospora* outbreak at another restaurant in Jacksonville and FDOH-Hillsborough was investigating 1 in Tampa. Those outbreaks involved 11 and 9 people respectively. Both were also attributed to fresh basil and they only had 1 original source, which was the source of this outbreak.

Information on the source of the fresh basil was shared with the Florida Department of Agriculture and Consumer Services (FDACS) and the U.S. Food and Drug Administration (FDA) for the purpose of traceback and trace-forward investigations.

FDACS and the FDA were able to trace back the source of the fresh basil from the local distributor to the supplier in Mexico. At the time of this outbreak, there were several other clusters of cyclosporiasis throughout the United States. Ultimately, several of these other clusters were linked to the same original source of fresh basil and an alert was issued by the FDA about the product on July 25, 2019, along with a voluntary recall.<sup>(4)</sup>

## *Laboratory Analysis*

Fifty-three stool specimens tested positive by either ova and parasite analysis or polymerase chain reaction. FDOH-Duval was also notified by the Minnesota Department of Health that 2 out-of-state residents who ate at the restaurant tested positive for *Cyclospora*.

## **Conclusions**

This outbreak involving 153 cases was associated with a point-source exposure from eating food containing fresh basil at a local restaurant. While the original focus was on romaine lettuce and the Caesar salad, subsequent epidemiologic evidence implicated fresh basil as the source of the infection. All food was consumed during a period when a specific batch of fresh basil would have been used as a food ingredient. Epidemiologic analysis of the food history data confirmed that the fresh basil was the most likely contaminated ingredient.

Outbreaks of cyclosporiasis in the past have been linked to raspberries, lettuce, basil and snow peas, as well as contaminated water.<sup>(2)</sup> Most times the produce has been imported into the United States but there is at least 1 documented instance where it was grown domestically.<sup>(2)</sup> The organism cannot be transmitted person to person as the unsporulated oocysts must be outside the host for 1–2 weeks prior to sporulating and becoming infectious.<sup>(2,3)</sup>

Prevention is through thorough washing of all produce prior to serving. However, the infective *Cyclospora* cyst is not likely to be completely removed through routine washing. It is resistant to chlorination and other disinfectant methods for produce. Appropriate hygienic procedures are required at the farm for prevention.<sup>(3,4)</sup>

In this outbreak, the restaurant likely received fresh basil contaminated with *Cyclospora* cysts. Although the restaurant washed the basil appropriately, the organisms were not completely removed. The basil was then used in various recipes and consumed by the patrons who became infected. The incubation period, clinical signs and symptoms, duration and response to therapy were all characteristic of *Cyclospora* infection.

# Section 1: Notable Outbreaks and Case Investigations

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## Non-Infectious Agents

### Outbreak of Severe Lung Injury Associated With E-cigarette Use or Vaping Products, Florida, January 2019–February 2020

#### Authors

Prakash Mulay, MBBS, MPH; Laura Matthias, MPH; Thomas Troelstrup, MPH

#### Background

In August 2019, the Centers for Disease Control and Prevention (CDC) issued an alert urging clinicians to report possible cases of unexplained pulmonary injury possibly linked to e-cigarette use or vaping to their local health departments.<sup>(1)</sup> E-cigarettes are also called e-hookahs, vapes, vape pens, mods, tank systems and electronic nicotine delivery systems (ENDS). Use of e-cigarettes is known as vaping. The liquid used for vaping contains nicotine, tetrahydrocannabinol (THC), cannabinoid (CBD), flavoring substances and additives.

The Florida Department of Health (the Department) in partnership with the CDC conducted surveillance for e-cigarette, or vaping, product use-associated lung injury (EVALI) cases. Nationally, the number of EVALI cases started to decline gradually after a sharp rise August to September 2019. As a result of this decline, CDC concluded surveillance and stopped reporting on the number of cases in February 2020. As of February 2020, a total of 2,807 hospitalized EVALI cases (including 68 deaths) were reported in the U.S.<sup>(2)</sup>

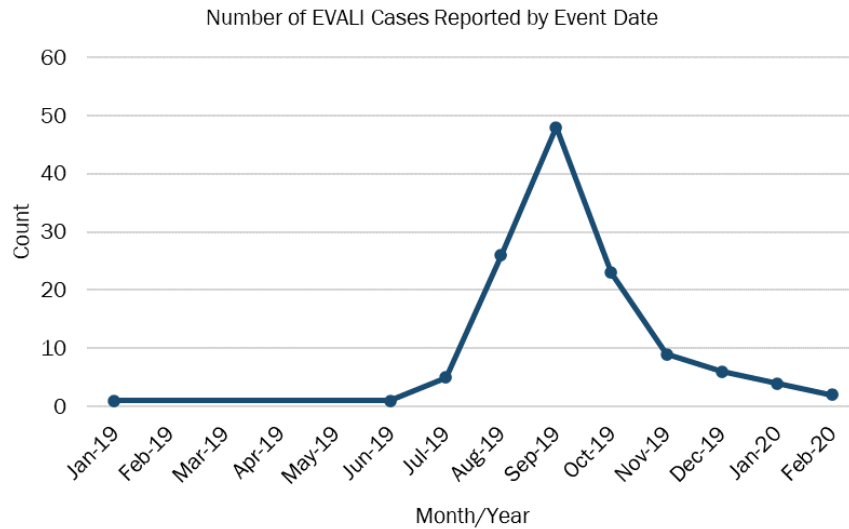
#### Methods

As a part of EVALI surveillance, the Department developed and implemented surveillance and investigation to determine the extent and severity of the lung injuries. In addition to provider reporting, the Bureau of Epidemiology developed guidance for Florida county health departments (CHDs) to conduct EVALI surveillance. The Electronic Surveillance System for the Early Notification of Community-based Epidemics–Florida (ESSENCE-FL) was used for active surveillance. EVALI cases were identified by searching Florida Poison Information Center Network (FPICN) exposure calls, emergency department (ED) visits and urgent care center (UCC) visits. CHD epidemiologists conducted investigations by collecting medical records and laboratory results and conducting interviews with the patient or a proxy. Patients who were hospitalized or died due to pulmonary illness were classified based on clinical presentation of lung injury (e.g., pulmonary infiltrates on chest radiograph or chest computed tomography (CT), laboratory test for common respiratory infections and history of use of e-cigarettes (vaping) prior to onset of illness. An extended data screen in Florida’s reportable disease surveillance system (Merlin) was created to include additional questions related to use of e-cigarettes. CHDs in collaboration with the FDOH Bureau of Public Health Laboratories (BPHL) facilitated collection and shipping of vaping products for testing. All data were collected electronically in Merlin and periodically sent to CDC as a part of national surveillance.

# Section 1: Notable Outbreaks and Case Investigations

## Results

Between July 2019 and February 2020, the Department investigated 125 confirmed and probable cases of EVALI, which included 3 deaths. Cases were predominantly male (67.2%) and ranged in age from 15 to 71 years old with a median age 25 years. All cases were hospitalized or died prior to hospitalization. Cases were reported from 30 counties in Florida. An increasing trend of EVALI cases was observed in August 2019 (20.8%), which peaked in September 2019 (38.4%). Cases reported vaping THC (n=72), nicotine (n=37), CBD (n=10) and flavors (n=3).



Symptoms commonly experienced by EVALI patients were cough, difficulty breathing, shortness of breath, chest pain and fatigue, which developed over days to a week with some developing respiratory failure requiring intubation. Other symptoms reported by some patients included fever, chest pain, weight loss, nausea and diarrhea. Chest radiographs of patients showed bilateral opacities and CT imaging of the chest demonstrated diffuse ground-glass opacities. Evaluation for infectious etiologies was negative among the majority of the patients.

## Conclusions

In Florida, the epidemiologic investigation identified several hospitalizations and deaths associated with EVALI in a short period of time. Outreach and education were conducted by the Department's Bureau of Tobacco Free Florida and Public Health Research Unit. On September 12, 2019, the Bureau of Epidemiology sent out a letter to Florida's health care providers with guidance on managing and reporting cases of EVALI.

CDC in collaboration with the U.S. Food and Drug Administration (FDA) analyzed samples submitted by the state and local health departments. Analysis of those samples showed a strong link between EVALI cases and vitamin E acetate identified in THC-containing products. EVALI patients who only used nicotine-containing products may have multiple contributing causes for lung injury; for example, some patients might not accurately report the content of THC or other compounds in the vaping products they have used. It is also possible that the recent increase in the number of cases of EVALI may be a result of 1 or more chemicals of concern in nicotine-containing products or due to the recent increase in popularity and use of the e-cigarettes.<sup>(3)</sup>

The decline in the number of EVALI cases reported each week since September 2019 indicates that the outbreak peaked in September. Reasons for the decline may be due to rapid public health action to increase public awareness, possible removal of vitamin E acetate from these products by the manufacturers and actions by enforcement agencies to seize illicit THC-containing products.<sup>(4)</sup>

EVALI can be prevented by not using THC-containing e-cigarette or vaping products from informal sources like friends, family or in-person and online dealers. People should not add vitamin E acetate or any other substances to vaping products. E-cigarettes should never be used by youths, young adults, people who do not use tobacco products and pregnant women.

# Section 1: Notable Outbreaks and Case Investigations

## Resources

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## Health Care-Associated Infections (HAI)

### Containment of a *Klebsiella pneumoniae* carbapenemase (KPC)-producing *Serratia marcescens* outbreak in a Ventilator-Capable Skilled Nursing Facility (vSNF) through Collaboration

#### Authors

Nychie Q. Dotson<sup>1</sup>, Sebastian Arenas<sup>1</sup>, Kendra Edwards<sup>1</sup>, Danielle A. Rankin<sup>1,2</sup>

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#### Background

Antibiotic resistance is one of the largest public health challenges. *Klebsiella pneumoniae* carbapenemase (KPC) is one of several mechanisms of resistance through which carbapenem-resistant Enterobacteriaceae confers antibiotic resistance and thereby making infections difficult to treat. On May 15, 2018, the Florida Department of Health in Miami-Dade (FDOH-Miami Dade) was notified by an acute care hospital (ACH) of 3 patients with carbapenem-resistant *Serratia marcescens* to be admitted from the same ventilator-capable skilled nursing facility (vSNF). The patients shared common risk factors such as tracheotomies, ventilator and hemodialysis dependence, and indwelling catheters.

# Section 1: Notable Outbreaks and Case Investigations

## Methods

In collaboration, with the ACH and vSNF, we initiated a containment response that consisted of infection control assessments, point-prevalence surveys (PPS), and retrospective and prospective laboratory surveillance. Infection control assessments were conducted biweekly with assessment of respiratory care, environmental cleaning, and adherence to hand hygiene. PPS were collected in the ventilator-capable unit biweekly through rectal swabs; and were tested by the Southeast regional Antibiotic Resistance Laboratory Network (ARLN) in Tennessee. Expanded surveillance was instituted in partnership with the local ACH to identify positive patients who might have been missed by the PPS.

## Results

From June 2018 to February 2019, a total of 12 biweekly screenings were conducted, which identified 11 additional patients colonized with KPC-producing *Serratia marcescens*; an additional 6 cases were identified through surveillance at the ACH. Infection control assessments revealed an overall lack of hand hygiene compliance (62%) with greater reduction in HH compliance after body fluid exposure (43.8%) and after contact with patient surroundings (40%) (Table 1). Environmental cleaning observations identified lack of standardized methods to cleaning and disinfection techniques to include revealed lack of EPA-registered disinfectant use and failure to follow instructions for use.

Opportunity	Hand hygiene compliance (%)
Before Touching a Patient (n=18)	88.8
Before Clean/Aseptic Procedure (n=2)	100.0
After Touching a Patient (n=7)	85.7
After Body Fluid Exposure Risk (n=16)	43.8
After Touching Patient Surroundings (n=20)	40.0

## Conclusions

Collaboration is essential for the containment of antibiotic resistance organism outbreaks. Throughout the course of the investigation, the most concerning issues at the vSNF included lack of hand hygiene, a paucity of adherence to protective personal equipment (PPE) when treating patients with multidrug-resistant organisms, and gaps in environmental cleaning and disinfection. These deficiencies in infection control led to a total of 20 patients becoming infected or colonized with KPC-producing *S. marcescens* over a nine-month period. Collaboration with CDC, ARLN in Tennessee, Florida Department of Health, local acute care hospitals and the vSNF, was instrumental for the successful containment of the state's first reported outbreak of *Klebsiella pneumoniae* carbapenemase-producing *Serratia marcescens* in a vSNF.

## *Candida auris* in a Specialty Care Unit, 2020

### Authors

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### Background

Three *Candida auris* bloodstream infections and 1 urinary tract infection was reported to the Florida Department of Health's Health Care-Associated Infection Prevention Program in July 2020. The four patients all had recent diagnoses of coronavirus disease 2019 (COVID-19) and received care in the same dedicated COVID-19 unit of an acute care hospital (hospital A). *C. auris* is a multidrug-resistant yeast that can cause invasive infection and spread in health care settings. Before the COVID-19 pandemic, hospital A conducted admission screening for *C. auris* and admitted colonized patients to a separate dedicated ward. Hospital A's COVID-19 unit spanned 5 wings on 4 floors, with 12–20 private, intensive care-capable rooms per wing. Only patients with positive test results for SARS-CoV-2, the virus that causes COVID-19, at the time of admission were admitted to this unit. After patient discharge, room turnover procedures included thorough cleaning of all surfaces and floor and ultraviolet disinfection.

# Section 1: Notable Outbreaks and Case Investigations

## Methods

In response to the 4 clinical *C. auris* infections, unit-wide point prevalence surveys to identify additional hospitalized patients colonized with *C. auris* were conducted during August 4–18; patients on all 4 floors were screened sequentially and rescreened only if their initial result was indeterminate. A joint investigation with Hospital A's infection prevention team, the Florida Department of Health, and CDC was conducted and focused on infection prevention and control at the facility including observation of health care personnel (HCP) use of personal protective equipment (PPE), contact with and disinfection of shared medical equipment, hand hygiene, and supply storage.

## Results

Sixty-seven patients were in the COVID-19 unit and screened during point prevalence surveys; 35 (52%) received positive test results. Mean age of colonized patients was 69 years (range = 38–101 years) and 60% were male. Six (17%) patients later went on to have clinical infections with *C. auris*. HCP in the COVID-19 unit were observed wearing multiple layers of gowns and gloves during care of COVID-19 patients. HCP donned eye protection, an N95 respirator, a cloth isolation gown, gloves, a bouffant cap, and shoe covers on entry to the COVID-19 unit; these were worn during the entire shift. A second, disposable isolation gown and pair of gloves were donned before entering individual patient rooms, then doffed and discarded upon exit. Alcohol-based hand sanitizer was used on gloved hands after doffing outer gloves. HCP removed all PPE and performed hand hygiene before exiting the unit. Opportunities for contamination of the base layer of gown and gloves were observed during doffing and through direct contact with the patient care environment or potentially contaminated surfaces such as mobile computers. Mobile computers and medical equipment were not always disinfected between uses, medical supplies were stored in open bins in hallways and accessed by HCP wearing the base PPE layer, and missed opportunities for performing hand hygiene were observed.

## Conclusions

The COVID-19 pandemic has prompted facilities to implement PPE conservation strategies during anticipated or existing shortages and to use PPE in ways that are not routine (e.g., extended wear and reuse) out of perception of increased protection for HCP and may be motivated by fear of becoming infected with SARS-CoV-2 and may increase risks for self-contamination when doffing. CDC does not recommend the use of more than one isolation gown or pair of gloves at a time when providing care to patients with suspected or confirmed SARS-CoV-2 infection. When managing SARS-CoV-2 patients in a dedicated ward, HCP should maintain standard practices (e.g., hand hygiene at indicated times and recommended cleaning and disinfection) intended to prevent transmission of other pathogens. Outbreaks such as that described in this report highlight the importance of adhering to recommended infection control and PPE practices and continuing surveillance for novel pathogens like *C. auris*.

## Verona Integron-Encoded Metallo- $\beta$ -Lactamase-Producing Carbapenem-Resistant *Pseudomonas aeruginosa* Infection Related to Medical Tourism

### Authors

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### Background

*Pseudomonas aeruginosa* (*P. aeruginosa*) is a gram-negative bacillus that proliferates in health care environments, causes invasive infections, and acquires antibiotic resistance genes like Verona integron-encoded metallo- $\beta$ -lactamase (VIM), conferring resistance to carbapenem antibiotics, often the last line of treatment for resistant infections. In 2019, the Centers for Disease Control and Prevention (CDC) issued a travel alert after detection of 12 VIM-producing carbapenem-resistant *P. aeruginosa* (VIM-CRPA) surgical site infections associated with surgery in Mexico; eleven occurred after bariatric surgery in Tijuana.

# Section 1: Notable Outbreaks and Case Investigations

## Methods

In July 2020, a 28-year-old female with a history of morbid obesity traveled to Tijuana, Mexico, for bariatric gastric bypass. She was discharged without complication and completed a 10-day prophylactic course of cephalexin before returning to Florida. Nine days post-operation she developed abdominal pain with swelling, redness, and drainage at the incision site prompting her to seek treatment at a Florida emergency department. The incision site was cultured and CRPA was identified and sent to the Florida Bureau of Public Health Laboratories to identify potential carbapenemase genes by GeneXpert; VIM-CRPA was identified in the isolate. The patient recovered following some minor complications and several courses of intravenous antibiotic therapy. Patient interview revealed she received surgery at the same health care facility and by a surgeon implicated in the 2019 CDC travel advisory.

## Conclusions

We report a case of VIM-CRPA associated with bariatric surgery in Tijuana, Mexico. Detection of this case and others since the travel advisory two years ago suggests ongoing transmission. CDC provided updated guidance for health care providers, public health officials, and updated medical tourism patient education. This update includes patients alerting their providers to receipt of health care outside of the U.S. Rapid identification of highly resistant bacteria and appropriate care are key to prevent transmission.

## HAI Outbreaks

Facility type	Number of outbreaks in 2019	Number of outbreaks in 2020
Acute Care Hospitals	<ul style="list-style-type: none"> <li>• <i>Acinetobacter baumannii</i>: 1</li> <li>• <i>Enterobacter cloacae</i> complex:1</li> <li>• <i>Escherichia coli</i>: 1</li> <li>• <i>Klebsiella oxytoca</i>: 1</li> <li>• <i>Klebsiella pneumoniae</i>: 1</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Raoultella ornithinolytica</i>: 2</li> <li>• <i>Pseudomonas aeruginosa</i>:6</li> <li>• <i>Candida auris</i>: 20</li> <li>• <i>Acinetobacter baumannii</i>: 3</li> <li>• Carbapenem-producing organisms (CPO): 16</li> </ul>
Long-Term Acute Care Hospitals		<ul style="list-style-type: none"> <li>• <i>Pseudomonas aeruginosa</i>:4</li> <li>• <i>Klebsiella pneumoniae</i>: 2</li> <li>• <i>Candida auris</i>: 6</li> <li>• Carbapenem-producing organisms (CPO): 4</li> </ul>
Nursing Home/Skilled Nursing home (SNF)		<ul style="list-style-type: none"> <li>• Carbapenem-producing organisms (CPO): 1</li> </ul>
Ventilator-capable Nursing Home/Skilled Nursing Facility (vSNF)		<ul style="list-style-type: none"> <li>• Carbapenem-producing organisms (CPO): 2</li> </ul>