

Submission Type Breakout/Quick/Lightning/Poster
ID [8494](#)

Abstract Type Breakout

Abstract Title Abstract A Deetailed Look into Local Zika Virus Investigations and Community Urosurveys—Miami-Dade County, Florida, 2016

BACKGROUND: In July 2016, the Florida Department of Health in Miami-Dade County (DOH-Miami-Dade) identified the first locally-acquired Zika virus outbreak in the continental United States. In order to evaluate the scope of local Zika virus transmission, DOH-Miami-Dade in conjunction with the Florida Department of Health Bureau of Epidemiology (BOE) engaged in case investigation, active surveillance, and community outreach throughout the county. Partners from multiple state and local jurisdictions were recruited to assist with the planning and execution of community urosurvey fieldwork. Between July 23 and December 8, 2016, a total of 27 residential, business, and community urosurveys were conducted in Miami-Dade County.

METHODS: Community urosurveys were conducted in delineated areas of active Zika virus transmission. The geographic boundary of a survey was determined to be a 150 meter radius around a laboratory-confirmed case of epidemiologic importance or a cluster of cases. Sampling locations within this boundary were identified according to their accessibility, facilities, and proximity to an identified exposure location. Individuals who lived or worked within the boundaries of the survey were eligible for Zika testing. Field teams administered a short questionnaire including demographics, recent Zika-like illness, travel and sexual exposure risk, and recent mosquito exposures. A urine sample was collected and tested at the Bureau of Public Health Laboratories—Miami using Zika virus polymerase chain reaction (PCR) testing. PCR results were available within 24-48 hours of sample collection. Participants were advised that those with a positive result would be contacted for follow-up.

RESULTS: Local and state Epidemiology and Public Health Preparedness (PHP) staff coordinated response efforts linked to seven cases of local Zika virus transmission in Miami-Dade County between July and December 2016. Field teams consisting of 231 volunteers across multiple jurisdictions dedicated more than 3,500 hours to the effort. Samples were collected from individuals in more than 300 households, 12 businesses, and six community clinics, encompassing testing across 72 of 81 zip codes within the county. As of December 19, 2016, more than 2,000 samples collected through community urosurveys have been tested with 40 yielding a positive PCR result.

CONCLUSIONS: Community urosurveys, although labor intensive, were successful as a result of a collaborative effort between federal, state and local public health officials. Timely execution of urosurveys was pivotal to the identification of three areas of ongoing local Zika virus transmission in Miami-Dade County and resulted in increased prevention outreach and targeted mosquito control efforts in these areas.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Outbreaks; Epidemiologic Methods; Emergency Preparedness & Response

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8009
Abstract Type	Breakout
Abstract Title Abstract	Area-Level Differences in Zika Virus Testing and Incidence Point to Disparities Among Reproductive Age Women in New York City, 2016

BACKGROUND: Zika virus (ZIKV) infection during pregnancy can cause microcephaly and other severe birth defects in exposed infants. Laboratory diagnosis of ZIKV infection in pregnant women can inform pregnancy management, identify exposed infants, and influence their care. In New York City (NYC) in early February 2016, ZIKV testing was recommended for all pregnant women who traveled to a country with active ZIKV transmission (ZIKV country) or had sex without a condom with a partner who traveled to a ZIKV country. We assessed area-level differences in ZIKV testing and incidence among women of childbearing age (WCBA) in NYC by census tract immigrant number and poverty level.

METHODS: Home addresses of NYC patients tested for ZIKV during January–July 2016 were geocoded to census tracts and classified by poverty level and quartile of the number of immigrants from ZIKV countries per the American Community Survey 2010–2014. Testing and incidence rates of ZIKV laboratory-positive cases were calculated for WCBA. We ranked NYC birth hospitals by the number of deliveries during 2011–2016 to women born in a ZIKV country to identify facilities potentially caring for larger populations at risk for ZIKV exposure.

RESULTS: During January–July 2016, 4,733 WCBA underwent ZIKV testing. During January–February, WCBA living in census tracts in the highest quartile of immigrants from ZIKV areas were less likely to be tested than those in the lowest quartile (15 vs. 52 per 100,000 WCBA; relative risk: 0.29; 95% confidence interval: 0.25–0.35). By June–July 2016, after outreach to reduce barriers and encourage ZIKV testing targeted to providers and birth hospitals serving immigrants from ZIKV countries, testing increased in areas with the largest immigrant populations (51 per 100,000 WCBA). Cumulative ZIKV incidence was higher in census tracts with the largest versus smallest immigrant populations (37 vs. 3/100,000 WBCA) and with the highest versus lowest poverty levels (28 vs. 13/100,000 WCBA). The highest cumulative ZIKV incidence rates were in areas with both large immigrant populations and high poverty (39/100,000 WCBA).

CONCLUSIONS: Communities with large immigrant populations and higher poverty levels were at higher risk for imported ZIKV cases. The lower rates of ZIKV testing initially observed in these communities suggested testing disparities and were helpful in targeting interventions. Testing rates increased in higher risk groups, and the observed differences did not persist. Public health emergency responses can use data successfully to identify and remediate disparities in testing and disease incidence.

Submission Complete? Yes

Committee	Infectious Disease
Topic	Emerging Infectious Diseases (including Zika Virus Disease)
Keywords	Maternal and Child Health; Social Inequalities; Emerging Infections
Consider for Different Presentation?	Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8537
Abstract Type	Breakout
Abstract Title Abstract	Elizabethkingia Anophelis Sterile Site Infections Linked to a Large Primarily Community-Acquired Outbreak, Wisconsin, 2015-2016
BACKGROUND: Members of the genus <i>Elizabethkingia</i> are intrinsically multidrug-resistant Gram-negative bacilli and are rare, opportunistic human pathogens most frequently associated with healthcare associated-infections. However, a large outbreak of primarily community-acquired <i>Elizabethkingia anophelis</i> infections occurred among Wisconsin residents during December 2015 through May 2016. All patients were infected with the outbreak strain of <i>E. anophelis</i>. The source and mode of transmission of the outbreak strain remain unknown. To better understand the clinical course, we retrospectively reviewed medical records of patients with <i>E. anophelis</i> sterile site infection. METHODS: Medical records for the healthcare encounter during which <i>E. anophelis</i> was diagnosed and any subsequent hospitalization were retrospectively reviewed and abstracted using a standardized data collection instrument. We examined patient demographic features, underlying conditions, clinical presentation, clinical course and outcomes using EpiInfo 7.2. RESULTS: Medical record abstraction was completed for 49 of the 58 patients with confirmed outbreak-related positive sterile site cultures. The initial positive sterile site specimens were collected from blood (94%), synovial fluid (2%), aortic wall (2%), and pleural fluid (2%) and were primarily collected in emergency room (67%) or inpatient (29%) settings. The median patient age was 77 (range: 19-101) years, 55% of patients were male. The median Charlson Comorbidity Index score was 4 (range: 0-8), and 73% of patients had ≥2 conditions considered in the CCI score. At the time of initial positive specimen collection, the most common symptoms reported were shortness of breath (43%) and weakness (43%); 2% had temperatures below 95 °F and 29% had temperature above 100.4 °F. Among the 47 (96%) patients who were hospitalized (duration range: 1-22 days), 22 were admitted into an intensive care unit (duration range: 1-19 days) and the most common primary admission diagnoses were pneumonia (15%), sepsis (15%), and cellulitis (11%). Among hospitalized patients, 21% died during their hospitalization. Patients who survived were discharged to home (59%), long-term care facility (16%), hospice (11%), assisted living (8%), independent living (3%), and inpatient rehabilitation (3%). CONCLUSIONS: This outbreak was notable for community-acquired invasive infections that occurred among patients who, despite frequent underlying conditions, did not have obvious primary sites of infection to facilitate bloodstream invasion. Although initial clinical presentations were diverse with non-specific symptoms, recovery of <i>E. anophelis</i> from a sterile site resulted in serious, often fatal, illness, and should be regarded as a pathogen regardless of initial presentation. Public health officials should pursue investigation of clusters of <i>E. anophelis</i> infections when detected.	
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Emerging Infectious Diseases (including Zika Virus Disease) Emerging Infections
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [8334](#)

Abstract Type Breakout

Abstract Title Evolution of a Surveillance System for Zika Virus in a High Prevalence Jurisdiction
Abstract

BACKGROUND: Public health departments faced unique challenges during the rapidly evolving Zika virus (ZIKV) outbreak, including few testing options, no treatment, unclear transmission dynamics, and limited understanding of birth defects and neurological disorders. Because New York City (NYC) is home to a large international community imported ZIKV infections are a concern- especially given the potentially severe consequences of congenital infections. In January 2016 the NYC Department of Health and Mental Hygiene (DOHMH) began preparations to identify and respond to ZIKV.

METHODS: We summarized major milestones of the DOHMH public health response to ZIKV in 2016, highlighted key challenges to the response, actions to mitigate barriers, and lessons learned.

RESULTS: There were a total of 976 travel-associated or sexually transmitted confirmed or probable cases of ZIKV in NYC in 2016; 336 of these were pregnant women. The peak volume occurred in June. DOHMH activated the Incident Command System from February-October to increase response capacity by utilizing staff across the agency. City and federal ZIKV funding was used to hire additional laboratorial and epidemiological staff. ZIKV testing was primarily performed by NY State Wadsworth Center Laboratory and NYC Public Health Laboratory (PHL). When guidelines expanded in February to include testing asymptomatic pregnant women, DOHMH was overwhelmed. A ZIKV testing call center for providers was created, where operators used an algorithm to screen for appropriate patients and arrange testing. DOHMH staff developed a specimen collection and test interpretation guidance for providers and disseminated updated information through the DOHMH website, health alert network, webinars, teleconferences and grand rounds. Consultations with the CDC, CSTE, and other health departments were key to troubleshooting evolving issues. Surveillance data were collected via phone interviews with patients and providers and medical records review. DOHMH used a flexible electronic database system that captured epidemiologic and laboratory data for analyses. All eligible pregnant women and their infants were enrolled in the CDC registry and received enhanced case investigation including collection of pre and post-natal clinical information, calls to the provider with new test results, and coordination of placenta and infant testing at birth.

CONCLUSIONS: The novelty and complexity of ZIKV testing required extensive interaction between DOHMH staff and medical providers. Lessons learned were: staff must be designated for managing test requests; enhanced testing and follow-up of pregnant women and infants was critical to the ZIKV response; and a flexible electronic system to capture epidemiologic and laboratory data ensured timely data analysis.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Epidemiology Capacity; Surveillance; Emerging Infections

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8508](#)

Abstract Type Breakout

Abstract Title Abstract Into the Woods: How to Investigate a Zika Virus Outbreak— Miami-Dade County, Florida, 2016

BACKGROUND: On July 22, 2016, the Florida Department of Health in Miami-Dade County (DOH-Miami-Dade) was notified of two possible locally-acquired Zika cases in the iconic art district of Wynwood. The individuals worked at locations within 150 meters of each other and developed fever, rash, and arthralgia on July 9 and 10. An investigation was launched which resulted in the identification of the first outbreak of Zika virus in the continental United States.

METHODS: Local transmission of Zika virus was announced in a one-square mile area on July 28. DOH-Miami-Dade offered testing to local worksites which reported symptomatic employees as well as households within a 150-meter radius of the central cluster. Between July 22 and August 4, epidemiologic investigations and community urosurveys were conducted at three worksites, one community clinic, and 96 households in the immediate area. On July 27, a joint site visit between DOH-Miami-Dade Environmental Health and Miami-Dade County Mosquito Control identified a significant mosquito breeding site at Worksite B.

RESULTS: A total of 38 Zika cases were linked to exposures in Wynwood, of which 18 (47.3%) were associated with worksite clusters. Clusters of laboratory-confirmed cases were identified at all worksites sampled (Worksite A, B, & C) and one household identified through urosurveys. Of the 23 cases reporting exposures at work, two were linked to Worksite A, seven to Worksite B, nine to Worksite C, and five to worksites that did not identify additional cases. Among the 52 urine specimens collected from 28 households during urosurveys, six individuals tested positive of Zika and all were asymptomatic. The remaining 12 cases were identified by healthcare providers. Earliest and latest onsets of the 31 symptomatic cases ranged from June 30 and August 9. On September 19, the outbreak within the one-square mile zone in Wynwood was declared to be over.

CONCLUSIONS: There was strong epidemiologic evidence in the geographic and temporal clustering of cases by worksite location within the epidemic curve. Worksites associated with cases tended to be in an outdoor setting located within close proximity to larval breeding sites. A combination of mosquito abatement efforts including aerial adulticiding, larviciding, and mosquito prevention measures by the community most likely contributed to the decrease in Zika virus transmission in the Wynwood area. This outbreak provided a unique learning opportunity in the investigation of an emerging vector-borne disease in Miami-Dade County and may serve as precedent for future vector-borne disease outbreak investigations.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Epidemiologic Methods; Outbreaks; Emerging Infections

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8470](#)

Abstract Type Breakout

Abstract Title Abstract
Local Mosquito-Borne Transmission of Zika Virus in Florida

BACKGROUND: In mid-July 2016, Florida became the first state in the continental United States with local mosquito-borne transmission of Zika virus when four autochthonous cases of Zika infection were identified in Broward and Miami-Dade counties. As of December 19th, 252 cases have been identified, with local transmission being reported in four counties.

METHODS: Cases were identified through passive reporting from health care providers/laboratories and active surveillance through household investigations, workplace investigations, community urosurveys, blood bank testing, and syndromic surveillance of emergency room discharge data. Data from the Florida Department of Health reportable disease reporting system were used to summarize local cases of Zika virus infection.

RESULTS: Half of the cases (125) were linked to three active transmission areas identified in the Wynwood, Miami Beach and Little River communities. With the exception of these active areas, most investigations resulted in a single identified case. Multiple cases were reported in either the same household or workplace in 8 additional investigations. A potential exposure location could not be identified for 71 cases. Over 2,000 people were tested through active investigations, resulting in 55 additional cases. Almost half of the cases (46%) were initially reported to the county health department by a health care provider, and 10 cases were identified through blood bank testing. Overall, 16 cases (6%) were asymptomatic, and two additional cases had symptoms that didn't meet clinical criteria for Zika infection. Almost all cases met the confirmed case definition (95%). A total of eight pregnant women were identified with locally acquired Zika virus infection, six of whom were symptomatic. Both asymptomatic women and one symptomatic woman were positive by serology alone. Six persons reported sexual contact with individuals who had recently traveled to Zika endemic areas; however, local mosquito-borne transmission could not be ruled out and the cases were counted as mosquito acquired. In addition, 17 cases reported travel to both Florida and countries or territories with widespread Zika virus transmission and exposure location could not definitively be determined.

CONCLUSIONS: Active investigations, while labor intensive, identified 22% of reported cases. Asymptomatic cases identified during active surveillance suggested a greater burden of infection than reflected in the number of reported cases. For several cases, it was impossible to determine whether or not the infection was acquired abroad, through sexual transmission, or by mosquitoes in Florida. Due to mild or asymptomatic illness, testing limitations, and multiple modes of transmission, Zika virus requires use of multiple surveillance methodologies.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Vectorborne Disease; Emerging Infections; Epidemiology

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8272](#)

Abstract Type Breakout

Abstract Title Responding to Zika in a State without Local Vector Presence: The Wisconsin Experience
Abstract

BACKGROUND: The mosquito vectors for Zika virus have not been found in Wisconsin; however the frequency of travel to and migration from Zika-affected areas compels continued, coordinated response efforts to address this emerging disease. The programs involved in Zika preparedness, surveillance, and response are housed in separate areas within the Wisconsin Division of Public Health (DPH), with diverse structures, funding sources, and levels of outbreak response experience. Strategies to bring programs together in a coordinated Zika response were identified in early 2016 and may serve as a model for future response efforts.

METHODS: Fee-exempt testing through the Wisconsin State Laboratory of Hygiene (WSLH) began in March 2016. The Bureau of Communicable Diseases (BCD) and Bureau of Community Health Promotion (BCHP) Maternal and Child Health Program began regular communication at this time and developed strategies to partner on investigating cases involving pregnant women and infants. BCD, BCHP, and the Office of Preparedness and Emergency Health Care (OPEHC) all collaborated on Zika-related grant applications that guide current activities. Given the need for integrated management, the Incident Command System (ICS) was activated in July 2016. This structure facilitated coordination of ongoing activities including mosquito surveillance through the UW-Medical Entomology Lab, communications to preparedness partners and professional organizations, and updates to the Wisconsin Electronic Disease Surveillance System.

RESULTS: As a result of these coordinated efforts during 2016, the WSLH tested 1000 people for Zika of which 69.7% (n=697) were pregnant women and most were asymptomatic (n=662). Additional testing was done at clinical laboratories. Of all Wisconsin residents tested, 1 probable and 56 confirmed cases were identified. Although mosquito surveillance has not yielded any *Aedes* specimens, *Aedes albopictus* mosquitoes were identified in neighboring Illinois. Biweekly ICS meetings are ongoing, along with regular ICS section meetings. Key outcomes beyond the successful execution of ICS include the 1) development of new relationships between DPH offices and bureaus; 2) identification of opportunities for collaboration on other public health efforts including outbreaks; and 3) exploration of sharing data infrastructure between communicable disease and MCH programs.

CONCLUSIONS: A key aspect of Zika response activities in Wisconsin has been the establishment of partnerships for coordination that are essential for effective public health actions. The benefits have been multifold and include successful coordination of the current response, readiness for escalation of response if required, and setting the stage for future collaborations and partnerships which have potential for benefits in areas beyond Zika.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Collaboration; Emerging Infections; Maternal and Child Health

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8673](#)

Abstract Type Breakout

Abstract Title Result of Expanded Zika Virus Testing Criteria for Pregnant Women in New York State
Abstract

BACKGROUND: National Zika (ZIKV) virus testing guidelines recommend testing for symptomatic pregnant women who present within 2 -12 weeks of symptom onset OR are asymptomatic and present ≥ 2 weeks after potential exposure. Initial testing is ZIKV IgM antibody capture enzyme-linked immunosorbent assay (MAC-ELISA). Reverse transcription-polymerase chain reaction (rRT-PCR) or plaque reduction neutralization test (PRNT) is only to be performed if the ZIKV MAC-ELISA was presumptive positive or equivocal.

Asymptomatic pregnant women who present within 2 weeks of exposure are to be tested by rRT-PCR and a convalescent specimen is to be collected for serologic testing only if rRT-PCR was negative. New York State Department of Health (NYSDOH) excluding New York City, chose to offer testing to all pregnant women regardless of symptomology, residential/travel history and timing of exposure.

METHODS: NYSDOH's Wadsworth Center Laboratory performed rRT-PCR for ZIKV in parallel with serologic testing, ZIKV MAC-ELISA and flavivirus polyvalent microsphere immunofluorescence assay (MIA) (IgM-IgG-IgA, originally developed for West Nile virus) on all submitted serum specimens. PRNT was performed on serum samples from pregnant women that had a presumptive positive or equivocal ZIKV MAC-ELISA or a reactive MIA.

RESULTS: In 2016, NYSDOH conducted ZIKV testing on 2,019 pregnant women. Laboratory evidence of ZIKV infection was identified in 122 (6.1%) of pregnant women tested, 100 (82.0%) of whom were asymptomatic. Fifty-nine (48.4%) of the pregnant women identified with laboratory evidence of ZIKV infection were negative on ZIKV rRT-PCR and ZIKV MAC-ELISA, but had a PRNT ZIKV titer ≥ 10 . Of these 59 cases captured as a result of following the NYSDOH testing algorithm, all were travel associated. Forty-one (70.6%) emigrated from an area with active ZIKV transmission, and 54 (93%) were asymptomatic. Ages ranged from 16 to 42 years, with a mean of 28 years and median of 27 years. They presented for testing between 9 and 40 weeks gestation. One of the women who was asymptomatic delivered an infant with microcephaly; the placenta tested positive using ZIKV rRT-PCR.

CONCLUSIONS: NYSDOH's expanded testing guidelines resulted in 313 additional pregnant women being tested, and identified 59 (18.8%) with possible ZIKV infection that would have been undiscovered had national testing guidelines been followed. Current testing guidelines may need to be reevaluated in light of these findings, as accurate testing will result in appropriate evaluation and monitoring of mother, fetus, and neonate.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Vectorborne Disease; Emerging Infections; Epidemiology

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7484](#)

Abstract Type Breakout

Abstract Title The Epidemiology of Pediatric Zika Virus Infections—Miami, Florida 2016
Abstract

BACKGROUND: Zika virus is a flavivirus spread primarily through the bite of an infected *Aedes aegypti* mosquito. The virus causes a maculopapular rash, fever, conjunctivitis, and joint pain. In June 2016 and August 2016, the Florida Department of Health in Miami-Dade County (DOH-Miami-Dade) was notified of the first travel-associated and locally-acquired pediatric Zika cases, respectively. The purpose of this study was to examine the epidemiology of pediatric Zika virus infections in Miami-Dade County.

METHODS: Zika cases between June 1, 2016 and November 28, 2016 were obtained from Merlin, the Florida Department of Health Epidemiology Surveillance System. A pediatric Zika case was defined as a child (1–17 years) with laboratory evidence of Zika virus infection. SAS 9.4 was used to analyze age, gender, race/ethnicity, symptoms, laboratory results, hospitalizations, travel history, and household clusters.

RESULTS: There were a total of 32 confirmed Zika cases among children in Miami-Dade County. Symptom onsets ranged from June 4, 2016 to September 18, 2016. The mean age of cases was 11.0±4.7 years (median 11). Seventeen (53%) cases were male. Twenty-three (79.3%) cases were Hispanic. Cases reported the following symptoms: 100% (30) reported rash, 80% (24) fever, 40% (12) headache, 30% (9) conjunctivitis, 20% (6) sore throat, and 30% (5) diarrhea. Among the 30 symptomatic cases, 63.3% (19) reported having at least two of the four cardinal symptoms whereas, 23% of cases reported having three or more of the cardinal symptoms. Zika virus was detected within an average of 4.8 days (range 0 – 39) after symptom onset. None of the cases were hospitalized. Twenty-six (81.2%) were travel-associated and six (18.8%) were locally acquired. Travel-associated cases originated from Nicaragua (9, 21.4%), Dominican Republic (5, 17.9%), Puerto Rico (5, 17.9%), Venezuela (3, 10.7%), and Jamaica (2, 7.1%). Three of the locally-acquired cases were associated with household clusters.

CONCLUSIONS: A concurrent outbreak in Puerto Rico identified approximately 30% of all cases being between 1-19 years of age; whereas, the outbreak in Dade county identified 2.4% of all cases between the ages of 1-17. The prevalence of locally-acquired Zika virus infections among children during the outbreak in Miami-Dade County was under-reported. Factors which likely contributed to under-reporting included a bias in the testing criteria towards testing children with international travel history and misdiagnosis with other childhood illnesses.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Children and Adolescents; Emerging Infections; Vectorborne Disease

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8260](#)

Abstract Type Breakout

Abstract Title The Woods, the Beach, and a Little River: Examining the Zika Virus Outbreak in Miami-Dade County, Florida 2016
Abstract

BACKGROUND: In July 2016, the Florida Department of Health in Miami-Dade County (DOH-Miami-Dade) investigated the first outbreak of Zika virus in the continental United States. Throughout the outbreak, sporadic transmission occurred countywide and ongoing active Zika transmission zones were identified in the areas of Wynwood, Miami Beach, and Little River.

METHODS: Zika cases reported between December 1, 2015 and December 21, 2016 were obtained from Merlin, the Florida Department of Health Surveillance System. Zika cases were defined as individuals with laboratory confirmed evidence of infection. Age, sex, mosquito trap density, population density, travel-associated case density, and tourism were examined by reported zone of exposure (Wynwood, Miami Beach, and Little River) and type of exposure (workplace, home, social event, or unknown).

RESULTS: As of December 21, 2016, a total of 237 cases were identified as acquired in Miami-Dade County. Seventy-seven (32.4%) cases were linked to Miami Beach (Population 11511/square mile), 38 (16.0%) cases to Wynwood (7725/sq mi), 10 (4.21%) cases to Little River (8101/sq mi), and 112 (47.2%) were exposed outside the identified zones in Miami-Dade County. Among the 237 cases, 8 (3.3 %) were associated with household clusters. Ongoing transmission continued twice as long in Miami Beach (88 days) as compared to Wynwood and Little River (40 and 39 days, respectively). Travel-associated case density was not a reliable predictor of subsequent local transmission. Type of exposure varied by zone location: 18 (47.3%) cases in Wynwood and 29 (37.6%) of cases in Miami Beach were workplace associated and 9 cases (91.6%) in Little River cases were likely exposed at home. Cases reported in Wynwood and Miami Beach were younger than cases in Little River. In addition, 65.8% of cases in Wynwood were male compared to Miami Beach and Little River (53.3% and 40%, respectively). Initial trap densities of female *Aedes aegypti* were significantly higher in Miami Beach (average 39.2), compared to Wynwood (24.8) and Little River (11.3), which likely contributed to a higher incidence in Miami Beach.

CONCLUSIONS: Transmission of Zika virus in Miami-Dade County varied between each zone. In contrast to previous emerging vector-borne diseases in Miami-Dade County, transmission of Zika did not propagate solely within households. County-wide case distribution suggests that population density and tourism may play a significant role in local transmission. This outbreak provided a unique opportunity to examine the epidemiology of an emerging vector-borne disease in Miami-Dade County and how to prevent a reoccurrence next mosquito season.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Epidemiology; Emerging Infections; Outbreaks

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8185
Abstract Type	Breakout
Abstract Title Abstract	Use of Household Cluster Investigations to Identify Factors Associated with Underreporting of Zika Virus Disease in Puerto Rico, 2016 BACKGROUND: Zika virus (ZIKV) disease is characterized by rash, joint pain, fever, and/or conjunctivitis. As of December 16, 2016, the Puerto Rico Department of Health (PRDH) reported 34,478 confirmed ZIKV infections among 65,778 individuals; however, additional ZIKV disease cases likely were not reported to PRDH due to ill individuals not seeking care or clinicians not suspecting ZIKV infection. We used household cluster investigations to identify clinical and demographic factors associated with unreported ZIKV disease cases. METHODS: We offered participation to residents of all households within 100 meters of households where patients with confirmed ZIKV disease lived. Participants provided serum and urine specimens and answered a questionnaire to capture demographic and household characteristics, recent illnesses, and healthcare-seeking behaviors. We defined ZIKV infection as a laboratory-positive result by RT-PCR or IgM ELISA, and Zika-like illness as self-reported rash, arthralgia, fever, or conjunctivitis. We queried the PRDH surveillance database for participants with ZIKV infection who reported seeking care, and presence in the database was regressed on covariates using generalized estimating equations to account for clustering. We removed index participants from the analysis. RESULTS: We carried out 19 cluster investigations during September–October 2016. Approximately half (242; 54.2%) of 446 households offered enrollment accepted, and 379 (58.8%) of 645 residents in enrolled households participated. Among 367 non-index participants, 113 (30.8%) were laboratory-positive; 90 (79.6%) by IgM ELISA, and 23 (20.4%) by PCR. Fifty-seven (50.4%) of these 113 participants reported a Zika-like illness in the prior 6 months (versus 19.7% of uninfected participants; $p<0.0001$). Among 57 laboratory-positive participants who reported Zika-like symptoms, median duration of illness was seven days (range: 2–45), and 33 (57.9%) sought care, of whom seven (21.2%) were laboratory-positive in the PRDH database. Among 33 laboratory-positive participants who sought care, factors significantly associated with being laboratory-positive in the PRDH database included having conjunctivitis (odds ratio [OR]: 12.48; 95% confidence interval [CI]: 1.20–129.92) or abdominal pain (OR: 7.99; CI: 1.01–63.18). CONCLUSIONS: Preliminary results suggest that at most half of people we detected with ZIKV infections were symptomatic, of whom roughly half sought care. One-fifth of those were reported to PRDH. Although having conjunctivitis or abdominal pain was associated with being laboratory-positive in the PRDH database, these findings may have been affected by ascertainment bias resulting from how infected individuals were identified. Additional educational outreach to clinicians should focus on the spectrum of illness associated with ZIKV disease and the need to report all patients with suspected ZIKV disease to PRDH.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Emerging Infectious Diseases (including Zika Virus Disease) Emerging Infections; Epidemiology; Vectorborne Disease
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [8337](#)

Abstract Type Breakout

Abstract Title Zika Virus and Travelers: Review of Confirmed Zika Virus Cases in San Diego County, 2016
Abstract

BACKGROUND: In the continental US, the vast majority of confirmed Zika virus cases are associated with travel. However, limited information exists about the characteristics and risk factors of these travelers. Such information is needed to guide targeted public health interventions for higher risk populations to help reduce the risk of disease importation and prevent local Zika virus transmission. Travelers visiting relatives and friends (VRF travelers) are known to take fewer precautions against mosquito bites during travel, therefore, possibly at greater risk of contracting Zika when traveling.

METHODS: Confirmed Zika virus cases reported to San Diego County in 2016 were analyzed to describe their social demographics, likely country of exposure and main reason for travel.

RESULTS: Preliminary results indicate that among 70 confirmed Zika virus cases in San Diego County, the median age was 32 years (range = 3-71 years) and 39 (56%) were female; 7 % were pregnant. Travel to Mexico was reported in 39% of cases; 26% traveled to Central America, 21 % to the Caribbean, 7% to South America, 4% to other countries, and 3% unknown. Among males, the highest proportion was in persons 20–39 years (51%); similarly for females, the highest proportion was among 20-39 years (56%). In all age groups, females accounted for the majority of cases. Approximately 57% of cases reported the United States as country of birth, 36% were foreign-born, and 7% unknown. Foreign-born travelers were disproportionately represented compared to total foreign-born population in the county (23.5%). Primary language reported was English (76%), followed by Spanish (19%), 4% other and 1 % unknown. Visiting family and friends as a reason for travel was observed among 34.3% of cases. Other reasons of travel included tourism/work (57.1%), and unknown/no-travel reasons (8.6%).

CONCLUSIONS: This evaluation helped identify groups among Zika travel cases, including female travelers, VRF, and foreign-born persons. Public health messaging targeted towards female, foreign-born, and VRF travelers to areas with Zika virus activity could help reduce the incidence of imported infections and subsequent risk of adverse pregnancy outcomes. In jurisdictions where imported cases are common, Zika virus surveillance should include collection of reason for travel to optimize risk communication and to engage the community in preparing and responding to Zika transmission.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Surveillance; Infectious Diseases; Evaluation

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8558
Abstract Type	Lightning
Abstract Title Abstract	Rate of Prolonged Viremia in Pregnant Women Tested for Zika Virus at the New York State (NYS) Public Health Laboratory, 2016 BACKGROUND: By late 2016, there were over 4,800 laboratory confirmed cases of travel-associated and locally acquired Zika virus (ZIKV) infections reported in the US states. While ZIKV testing algorithms and result interpretation are complex, molecular testing offers a rapid and definitive result when positive. Following identification of prolonged viremia (PV) in pregnant women, the New York State Department of Health (NYSDOH) initial time limits, up to four weeks after symptom onset and up to six weeks after last exposure, for molecular testing in pregnant women were removed. This study aims to determine the rate of PV in pregnant women tested through the NYSDOH. METHODS: We evaluated the number of pregnant NYS residents, excluding New York City, tested by serum real-time reverse transcription-polymerase chain reaction (rRT-PCR) at WC from January 1 to December 28, 2016. We calculated the proportion with PV, defined as rRT-PCR positivity in serum ≥ 14 days after symptom onset or, for asymptomatic women, ≥ 21 days after last travel or sexual exposure. Four pregnant women (five specimens) with PV in this report have been previously reported but are included in this analysis to determine a rate. Our study cohort consisted of pregnant women with PV. RESULTS: Molecular testing was performed on 2,019 pregnant women, 203 of whom were symptomatic and 1,816 asymptomatic. There were three (1.5%) symptomatic women and six (0.3%) asymptomatic with PV, out of all pregnant women tested. Of these women tested, 15 (0.7%) were positive on a serum rRT-PCR test, of which nine (60%) had PV. Among this cohort, the mean time of a positive rRT-PCR result in women with PV was 39 days with a range of 17-90 days. Of the nine cases with PV, six (67%) were positive on ZIKV Immunoglobulin M testing and two (22%) were equivocal. Five (56%) of the nine women with PV had complete sexual history data available (four with sexual exposure in addition to travel). Out of the 15 rRT-PCR positive women, ten had repeat rRT-PCR testing performed, with three positive (at 39, 53 and 73 days), one equivocal, one inconclusive, and five negative results. CONCLUSIONS: The rate of PV among serum ZIKV rRT-PCR positive pregnant women is significant. While serology has diagnostic utility, algorithms which limit the time-frame of molecular testing in pregnant women may preclude the rapid and definitive establishment of Zika status. Further study of PV is needed, with more comprehensive sexual history and pregnancy/infant outcome data.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Emerging Infectious Diseases (including Zika Virus Disease) Infectious Diseases; Emerging Infections; Vectorborne Disease
Consider for Different Presentation?	Yes
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Submission Type ID Breakout/Quick/Lightning/Poster [8525](#)

Abstract Type Lightning

Abstract Title Abstract Reinforcing, Enhancing, and Targeting--Arboviral Surveillance and Mitigation in Washington, D.C. Using Geographic Information Systems (GIS)

BACKGROUND: In response to the Zika outbreak in the Americas, we substantially increased our mosquito monitoring activities throughout Washington, D.C. Facilitating a place-based characterization of the urban environment where disease carrying vectors live and breed, the D.C. Department of Health (DOH) turned to technology to improve how we target at-risk populations. GIS concepts that possess capabilities which written narratives cannot provide were used to inform the location, spatial relationships, and, environmental/social issues associated with areas potentially harboring virus carrying vectors.

METHODS: Using ArcGIS online and ArcMap 10.4 to map equidistant trap sites ensured coverage throughout the city and mapped weekly larvicidal treatments to catch basins targeting mosquito larvae. These maps gauged weekly coverage by ward, ensuring a 30-day cycle application, coinciding with product efficacy. Surveillance was conducted with a minimum 4 traps per ward from April-October 2016, following a 48-hour trap-to-harvest protocol utilizing both gravid and carbon dioxide traps, speciating all harvested mosquitoes weekly at the Public Health Lab.

RESULTS: After trapping, harvesting, sorting and testing 1282 pools (15,121 specimens) for Zika, WNV, Dengue, and Chikungunya viruses, no mosquitoes were found to be carrying Zika. Approximately 53.5% of our sites (15 of 28) tested positive for WNV. Breakdown of the specimens collected were as follows: 12,821 (85%) Culex Pipiens, 47 (0.3%) Culex Restuan, and 380 (2.5%) Aedes japonicus. Included were species with the potential to transmit Zika virus: 1125 (7.4%) Aedes albopictus, 187 (1.2%) Aedes aegypti, and, 561 (3.7%) Aedes Species (unknown). A 30-week sampling produced WNV positive pools 46% of the time. Larviciding goals were deficient mainly due to lack of resources.

CONCLUSIONS: Mapping of the 2016 arbovirus data identified gaps in spatial distance between the historical trap sites and vulnerable populations, allowing us to establish better site locations in terms of coverage/ward and habitats with known concentrations of Aedes species. Analysis of the trap sites using GIS identified infrastructure where new sites will be located in 2017, targeting the most vulnerable populations (pregnant women and women of child bearing age) within range of likely concentrations of potential Zika vectors. Mapping WNV Hot-Spots helped inform trapping protocols regarding potential local Zika transmission due to the confirmed the presence of the Zika vector in D.C. Dedicated personnel will be utilized to larvicide in 2017. Findings further indicated the need to focus on proximity to OB/Gyn facilities and other healthcare facilities related to protecting pregnant women from this public health threat.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Geographic Information Systems (GIS); Surveillance; Vectorborne Disease
Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8298](#)

Abstract Type Poster

Abstract Title Assessment of Zika Testing Utilization Among Pregnant Women in Georgia, 2016
Abstract

BACKGROUND: The Georgia Department of Public Health (GDPH) has been conducting surveillance for Zika virus since January 2016. GDPH epidemiologists approve patients for testing at the Georgia Public Health Laboratory (GPHL) using RT-PCR and MAC-ELISA (IgM) based on symptoms and exposure history, including travel and sexual exposures. Due to the potential for severe adverse birth outcomes associated with Zika virus, GDPH epidemiologists approve both symptomatic and asymptomatic pregnant patients with travel or sexual exposure using CDC guidance. Zika infection in pregnant patients results in recommendations for increased fetal monitoring for microcephaly and other birth defects as well as enrollment in the US Zika Pregnancy Registry. Physicians in Georgia call GDPH for Zika testing approval, but the patient or physician may opt to not seek testing after approval is granted. For pregnant women, this may mean a missed opportunity for appropriate pre-natal care.

METHODS: Each patient approved for Zika testing is entered in the Zika Active Monitoring System (ZAMS) within the State Electronic Notifiable Disease Surveillance System (SendSS). Zika test results are entered into ZAMS and linked to each patient's file using electronic and paper reports. Patient files with no pending or received results from GPHL after 12 weeks from the reported exposure or onset date are closed due to ineligibility. The electronic files for all approved, pregnant patients were compiled and analyzed using statistical software.

RESULTS: GDPH epidemiologists have approved 904 pregnant women for Zika testing as of December 19, 2016. Of these, 857 received either RT-PCR or IgM testing through GPHL (94.8%), and 47 did not complete any testing through GPHL although they were eligible (5.2%).

CONCLUSIONS: Through this analysis, we have determined that 5.2% of approved, pregnant patients in Georgia did not complete testing for Zika virus while they meet eligibility requirements. These patients may have refused testing, were not informed of testing options by their physician, or were lost to follow up during their 12 week period of testing eligibility. These data can target education to providers of pregnant patients to pursue active follow up, educate patients about the risks of birth defects associated with Zika, and explain the importance of ongoing fetal monitoring in the event of a positive Zika result. Prioritizing education about Zika infection during pregnancy and practicing active follow up on pregnant patients with suspect Zika exposure will ensure that pregnant women make informed decisions about their prenatal health care.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Barriers to Care; Emerging Infections; Maternal and Child Health

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8279](#)

Abstract Type Poster

Abstract Title Evaluation of Plaque Reduction Neutralization Test Results for Suspected Zika Virus and Dengue Virus Cases in Georgia, 2016
Abstract

BACKGROUND: Georgia Department of Public Health (GDPH) has been conducting surveillance for Zika virus since January 2016. The Georgia Public Health Laboratory (GPHL) has capacity to perform RT-PCR and MAC-ELISA (IgM) testing for Zika. Positive, equivocal, or inconclusive IgM results are not confirmatory for Zika infection due to cross-reactivity with other flaviviruses. Plaque Reduction Neutralization Test (PRNT), performed at the Centers for Disease Control and Prevention (CDC), is then required to confirm Zika virus infection. It can take weeks for GDPH to receive PRNT results, delaying notification and response to confirmed cases. Analysis of PRNT result data to determine the relationship between IgM results and subsequent confirmation of Zika virus infection may be helpful to inform management of suspect cases while PRNT is pending.

METHODS: Lab results on Georgia residents tested for Zika virus are recorded in the Zika Active Monitoring System (ZAMS) within the State Electronic Notifiable Disease Surveillance System (SendSS). PRNT results and their corresponding IgM results were compiled using both electronic and paper lab reports and analyzed using statistical software.

RESULTS: As of December 20, 2016, PRNT results have been received on 110 GA patients originally found to be positive, equivocal, or inconclusive by IgM testing. Of 62 positive IgM samples, 45 were positive for Zika by PRNT (72.6%), 9 were negative for any flavivirus (14.5%), and 8 were positive for dengue only (12.9%). Of 21 equivocal IgM samples, 8 were positive for Zika (38.1%), 8 were negative for any flavivirus (38.1%), and 5 were positive for dengue only (23.8%). Of 27 inconclusive IgM samples, 1 was positive for Zika (3.7%) and 26 were negative for any flavivirus (96.3%).

CONCLUSIONS: Analysis of available data in Georgia show that IgM-positive Zika results are often indicative of true Zika infections as opposed to inconclusive IgM results, which are largely negative for any flavivirus. IgM-equivocal Zika results, however, lead to a roughly even distribution of true Zika and/or dengue infections and no flavivirus infection. The differences in confirmed infections obtained from inconclusive and equivocal IgM results align with our understanding of inconclusive vs. equivocal IgM results as defined by the CDC. This information has helped GDPH epidemiologists prioritize pending patients for additional follow up and provide guidance for physician and patient education. Updating this analysis regularly is critical to relaying the most accurate information to healthcare providers and patients.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Vectorborne Disease; Emerging Infections; Epi / Lab Capacity (ELC)

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8329](#)

Abstract Type Poster

Abstract Title Looking for Trouble: Zika's Impact on Dengue Reporting in Georgia, 2016
Abstract

BACKGROUND: In 2016, Zika virus emerged as a mosquito-borne threat of international concern. Zika and dengue infections have similar clinical presentations, are transmitted by the same mosquito vectors, and occur in the same geographic regions globally. Therefore, distinguishing between dengue and Zika infections may be challenging without diagnostic tests. Threats like Zika have brought a heightened awareness to imported arbovirus infections. Patients approved by Georgia Department of Public Health (GDPH) epidemiologists for Zika testing at the state laboratory receive testing for both Zika and dengue either through RT-PCR or PRNT testing on samples with qualifying MAC-ELISA (IgM) results to distinguish between the similar viruses. Data on these results, compared with reporting information from previous years, may point to underreporting of dengue infections in years prior to the Zika outbreak.

METHODS: Data about suspect and confirmed Zika and dengue cases in Georgia are entered into Georgia's State Electronic Notifiable Disease Surveillance System (SendSS). Data on investigations of dengue and Zika suspect cases from 2009 (the year dengue was made nationally notifiable)-2016 from SendSS were reviewed and analyzed. Cases were confirmed using standard CSTE case definitions. At the Georgia Public Health Laboratory (GPHL), Zika and dengue testing has been completed for over 1,200 Georgia citizens in 2016.

RESULTS: Between 2009-2015, no more than 20 suspect cases of dengue were investigated in a single year in Georgia (2010) and no more than 13 cases of dengue were confirmed (2012). During this period, the average number of dengue cases investigated was 12 per year and the average number of confirmed dengue cases per year was 9. In 2016, 48 cases of dengue were investigated, of which 27 were confirmed as dengue cases. Notably, 20 (74.0%) of the confirmed dengue cases in 2016 were identified in patients originally triaged for Zika testing only. In these cases, a physician suspected Zika and called GDPH based on a patient's self-reported travel and symptoms.

CONCLUSIONS: The number of dengue cases confirmed in Georgia increased significantly in 2016 compared to the previous 7-year period. Most of the Georgia dengue cases from 2016 were originally triaged for Zika testing, indicating that these cases might not have been found if the awareness and capability to test for Zika were not available. This indicates that dengue reporting increased due to heightened awareness surrounding Zika and the testing protocols which include testing for both viruses in persons being considered for Zika testing.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Vectorborne Disease; Surveillance; Emerging Infections

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8305](#)

Abstract Type Quick

Abstract Title Abstract
2016 Outbreak of Zika Virus in the U.S. Virgin Islands

BACKGROUND: The U.S. Virgin Islands (USVI) has a population of approximately 100,000 people, and is composed of the islands of St. John, St. Croix, and St. Thomas. Since the first confirmed case of Zika virus (ZIKV) on January 19th, 2016, there has been an ongoing territory-wide outbreak of ZIKV.

METHODS: A confirmed case of ZIKV disease is defined as having clinically compatible symptoms and being 1) positive by serum or urine PCR for ZIKV and/or 2) positive for ZIKV IgM in serum and have a positive ZIKV plaque reduction neutralization test (PRNT) titer. A probable case was defined as being IgM positive in serum, but having pending PRNT titer results. Community outreach was performed to educate the public on methods for preventing the spread of ZIKV. Mosquito vector control was performed around homes and throughout the community. Free ZIKV testing has been offered to symptomatic individuals and asymptomatic pregnant women.

RESULTS: As of December 27, 2016 there have been 1,905 cases reported and 877 have tested positive, with 848 (97%) being confirmed and 29 (3%) being probable. Peak testing occurred in the months of August, September, and October, with 356, 354, and 343 samples tested respectively. Women accounted for 554 (65%) of confirmed cases and 21 (72%) of probable cases. There have been 119 pregnant women who have tested positive, of which 13 (11%) have been symptomatic. Sixty-eight (8%) ZIKV positive cases have been identified on St. John, 182 (21%) on St. Croix, and 627 (71%) on St. Thomas. Reported cases peaked during September on St. Thomas, and peaked in November on St. John and St. Croix. Overall, 631 (72%) cases have reported rash, 516 (70%) reported arthralgia, 408 (56%) reported headache, 312 (36%) reported fever, 326 (37%) reported eye pain, and 169 (26%) reported conjunctivitis. No cases of Guillain-Barré syndrome or microcephaly have been reported.

CONCLUSIONS: St. John has the smallest population and saw the least amount of cases. St. Thomas and St. Croix have similarly sized populations, however the island of St. Croix is larger and less densely populated than St. Thomas. The higher population density on St. Thomas led to the occurrence of more cases, and in turn St. Thomas experienced an earlier peak in the outbreak when compared to St. Croix and St. John. Community outreach has also been pivotal in notifying the public of the outbreak and has been the primary means for conveying strategies for ZIKV prevention.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Emerging Infections; Outbreaks; Vectorborne Disease

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7523](#)

Abstract Type Quick

Abstract Title Abstract
A Primary Amebic Meningoencephalitis Case Associated with Rafting on an Artificial Whitewater River

BACKGROUND: *Naegleria fowleri* is a climate-sensitive thermophilic ameba found in freshwater that causes primary amebic meningoencephalitis (PAM; 0–8 infections per year in the U.S.) when it enters the nose and migrates to the brain. Patient exposure to water containing the ameba typically occurs in warm freshwater lakes and ponds during recreational water activities. In June 2016, an 18-year-old woman died of PAM after traveling to North Carolina, where she participated in whitewater rafting on an artificial whitewater river.

METHODS: To determine water exposures, we reviewed medical records and conducted interviews with family and individuals who had traveled with the case-patient. To further investigate the artificial whitewater river as a possible exposure source, we visited the whitewater facility and collected water, swab, and sediment samples from the facility and from the nearby natural river. We performed water quality tests onsite and tested for the presence of *N. fowleri* by culture and real-time PCR in the laboratory.

RESULTS: Interviews revealed that the case-patient's most probable water exposure in the 10 days before illness onset occurred while rafting on an artificial whitewater river during which she was thrown out of the raft and submerged underwater. The ~11.5 million gallons of water in the whitewater facility were filtered, subjected to UV light, and occasionally chlorinated by facility operators. Heavy algal growth was noted. The free chlorine residual was 0.05 mg/L, turbidity was 6.7 NTU, and water temperature was 30°C in the whitewater facility during the site visit. All 11 water-related samples taken from the facility were positive for *N. fowleri* by PCR and culture. Of 5 samples taken from the natural river, 1 sediment sample was positive for *N. fowleri* by culture.

CONCLUSIONS: This investigation documents a novel exposure to an artificial whitewater river as the likely exposure causing PAM in this case. Conditions in the whitewater facility (warm, turbid water with little chlorine and heavy algal growth) rendered the water treatment ineffective and provided an ideal environment for *N. fowleri* to thrive. The combination of natural and engineered elements at the whitewater facility created a challenging environment to control the growth of *N. fowleri*.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Emerging Infections; Waterborne Disease

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8062](#)

Abstract Type Quick

Abstract Title Abstract
Acute Flaccid Myelitis in Pediatric Patients — Maricopa County, Arizona, 2016

BACKGROUND: Acute flaccid myelitis (AFM) is a type of acute flaccid paralysis reported most commonly among children. In 2014, AFM was reported to be temporally associated with enterovirus (EV)-D68, but no definitive etiology has been identified. In September 2016, the Maricopa County Department of Public Health investigated a cluster of 11 suspected cases of AFM during a six-week period to determine if cases met the standardized case definition and identify risk factors and potential etiologies.

METHODS: AFM CDC patient summary forms were completed by medical record abstraction and reviewed by a clinical team. A confirmed case of AFM was defined as acute focal limb weakness with MRI revealing spinal cord lesions of gray matter at greater than one spinal segments; a probable case was acute focal limb weakness and cerebrospinal fluid white blood cell count >5 cells/mm³. Interviews were conducted to determine risk factors. Clinical specimens were distributed to partner laboratories for further testing.

RESULTS: Four cases were confirmed and one was probable. Among confirmed cases, illness onset was August 20–September 15; ages were 3.5–10 years and 75% were female. All four confirmed cases had preceding respiratory or gastrointestinal illness. Nasopharyngeal swabs were available from six of 11 patients; three confirmed cases and one noncase tested positive for EV-D68 by polymerase chain reaction (PCR) at the Translational Genomics Research Institute (TGen). Coxsackivirus A10 was detected by PCR in stool from the remaining confirmed case.

CONCLUSIONS: No single etiology or risk factor was associated with all confirmed cases. Continued surveillance and reporting of cases is critical to better characterize this disease. Expanded testing for both infectious and noninfectious etiologies might provide further insight into the mechanism of AFM.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Emerging Infections; Vaccine-Preventable Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8309](#)

Abstract Type Quick

Abstract Title Abstract
Current CSTE Zika Case Definition Underestimates True Burden of Zika Virus Disease in U.S. Virgin Islands

BACKGROUND: The U.S. Virgin Islands (USVI) is currently experiencing a territory-wide outbreak of Zika virus (ZIKV). CSTE developed a case definition for ZIKV that considers the possibility of cross-reactivity with dengue virus (DENV). Due to the endemic nature of DENV in the USVI population, the Virgin Islands Department of Health (VIDOH) has employed a case definition that takes past infection with DENV into account. The purpose of this study is to compare the utilization of the CSTE and VIDOH case definitions.

METHODS: The VIDOH and CSTE case definition criteria were applied to current ZIKV cases in USVI. For VIDOH, a case of ZIKV disease is defined as having clinically compatible symptoms and being 1) positive by serum or urine PCR for ZIKV and/or 2) positive for ZIKV IgM in serum and having a positive ZIKV plaque reduction neutralization test (PRNT) titer, regardless of dengue IgM and PRNT titers. A case is defined as probable when PCR results are negative and/or ZIKV IgM results are positive and ZIKV PRNT titer results are pending or not performed. CSTE defines a case of ZIKV as confirmed with a positive PCR result, or by having a positive ZIKV PRNT titer with a negative DENV PRNT titer. Cases with positive ZIKV and DENV PRNT titers are classified as having possible ZIKV.

RESULTS: When 548 cases were compared, 419 (76%) were classified as confirmed by both CSTE and VIDOH with positive PCR results by urine and/or serum. Thirty-four (6%) cases had positive ZIKV PRNT titer results and negative dengue PRNT titer results, and were classified as confirmed by both CSTE and VIDOH. Ninety-five (17%) had positive ZIKV PRNT titer results and positive dengue PRNT titer results, and were classified as possible ZIKV by CSTE definition, and confirmed ZIKV by VIDOH definition.

CONCLUSIONS: Current CDC DENV PRNT testing includes IgM and IgG antibodies and detects long-term immunity in addition to a short-term immune response. DENV is endemic in the USVI and using DENV PRNT titers to confirm a recent infection with DENV is not conclusive and should not be used to classify a case as possible ZIKV. The current CSTE ZIKV disease case definition underestimates the true burden of ZIKV in the territory. This suggests a need for tailoring the ZIKV case definition to fit the geographic area to which it is being applied. Additionally, future PRNT testing excluding IgG antibodies should be considered.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
Keywords Vectorborne Disease; Emerging Infections; Outbreaks

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7569](#)

Abstract Type Quick

Abstract Title Identifying Areas at Greatest Risk for Zika Virus Importation — New York City, 2016
Abstract

BACKGROUND: To detect and minimize the risk of local Zika virus (ZIKV) transmission throughout the 2016 mosquito season, the New York City (NYC) Department of Health and Mental Hygiene needed to identify areas with potentially viremic travel-associated ZIKV human cases. Imported ZIKV cases identified through passive surveillance might be spatially non-representative, given incomplete case ascertainment of individuals who are asymptomatic or symptomatic but did not seek care or testing. We used statistical modeling to identify areas at greatest risk for ZIKV importation.

METHODS: For each of 14 weeks during June–September 2016, we constructed zero-inflated Poisson regression models to output the predicted number of weighted ZIKV cases per census tract; case counts were weighted by the time since illness onset (i.e., cases with onset in the 28 days before a data pull were counted fully, cases in the past 29–56 days were counted as 1/2 cases, etc.). An automated forward selection process was applied to eleven census tract-level covariates, from static sociodemographic census data and the latest surveillance data. To account for testing bias, we plugged the maximum cumulative observed ZIKV testing rate in any census tract into the final regression equation. Covariates selected for inclusion in the model and with $P < 0.05$ for at least 9 of 14 weeks were summarized. Spearman rank correlation coefficients were used to characterize fluctuation in modeled risk areas over time. Census tracts were grouped by natural breaks into risk categories.

RESULTS: Of 2,140 populated census tracts in NYC, 1,659 (78%) had zero observed ZIKV cases during June–September 2016. Covariates consistently selected for modeling included: the proportion of the population living below the federal poverty level, borough of residence, number of persons with ZIKV testing in the prior 30 days, and the number of dengue and chikungunya cases since 2013 with travel to countries with active ZIKV transmission. Although modeled risk areas fluctuated (e.g., last weeks of July and August 2016: Spearman correlation=0.63, $P < 0.0001$), areas in the Bronx and upper Manhattan were consistently identified as high-risk.

CONCLUSIONS: We used observable characteristics of areas with recent, known travel-associated ZIKV cases to identify similar areas with no observed cases that might also be at-risk in any given week. The lack of data on the spatial distribution within NYC of persons arriving from ZIKV-affected countries is a limitation. Findings were used to target activities including public outreach, sentinel surveillance, and trapping and controlling *Aedes* spp. mosquitoes.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Vectorborne Disease; Epidemiologic Methods; Surveillance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8564](#)

Abstract Type Quick

Abstract Title Identifying at Risk Populations for Local Zika Response
Abstract

BACKGROUND : In January 2016, the first travel-related Zika case in Florida was announced. The Department of Health sought to develop GIS maps that would allow local health departments to target populations that are most at risk. The Florida Environmental Public Health Tracking (Tracking) Program was asked to develop a mapping application to assist local public health responders in identifying populations most at risk for the Zika Virus. The data used to determine which populations were most at risk was based on previous dengue and other arbovirus outbreaks.

METHODS : The Florida Tracking Program calculated the following census-tract level variables using data from the American Community Survey (ACS): (1) Percent below Poverty Line, (2) Percent non-white, (3) Percent women of child-bearing age, (4) Percent Speaking a Language Other than English at Home.

The Florida Tracking Program then used ArcGIS Online to create an interactive mapping application of these variables at the census tract level. Census tract quartiles for each variable were calculated within the county boundaries, making the results county-specific. In addition to the four ACS data points, the map also contains a composite score measure, which was calculated using the sum of the quartile of each of the other data points. The composite score was used to designate census tracts as high, medium, or low risk.

RESULTS : The mapping application was released the first week of February 2016, two weeks following the identification of the first travel-related Zika case in Florida. This innovative tool supported rapid local response efforts by identifying the populations of highest risk for local Zika transmission (those with limited financial resources, language barriers, and women of childbearing age), allowing local health departments to provide outreach in these areas first.

CONCLUSIONS: All counties with travel-associated and locally acquired cases are using this tool to prioritize Zika outreach and education efforts. Because the tool is available on a public facing website, the local health departments have been able to use the tool to present and share the information with other members of the local response teams including mosquito control and emergency response. The National Environmental Health Association (NEHA) and other state health agencies have expressed an interest in adapting it for use in other jurisdictions. At least one county health department in Georgia has already created the tool using Florida's protocol, and NEHA has adapted the tool for the state of Louisiana.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Vectorborne Disease; Emerging Infections; Geographic Information Systems (GIS)

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8434](#)

Abstract Type Quick

Abstract Title Locally Acquired Zika: The Role of the Workplace in the Investigation
Abstract

BACKGROUND: The first outbreak of autochthonous Zika transmission in the continental United States was recognized when two Zika positive individuals working within 120 meters of each other were identified. Further investigation at these workplaces identified five additional infected individuals at one and an infected customer of the business at the other. Occupation is routinely collected through the course of the Florida Department of Health's (DOH) investigations, case work locations and type of workplace were tracked in order to identify potential clusters of cases as well as to identify populations for targeted education.

METHODS: Case workplaces were surveyed if other coworkers reported a Zika-like illness. In some cases, testing was also done for outside workers at six surrounding businesses and two concerned businesses that requested testing. The survey consisted of a short questionnaire related to mosquito exposures at work, recent Zika-like illness, and general Zika risk factors. A urine sample was collected and tested at the state public health laboratory using polymerase chain reaction testing. In some cases, serum and sometimes whole blood were also collected from employees reporting symptoms more than two weeks prior to the interview.

RESULTS: A total of 15 workplace investigations took place during the course of the local investigations, including four construction sites, four semi-open workplaces that left their doors open, four hotel/condo properties, one open-air business, and two enclosed spaces (including one with doors that frequently opened). Overall, there were seven index cases and an additional 422 people were tested with 21 people at six businesses testing positive. In addition, workplace exposures were suspected in 66 individual cases. Of the 252 local cases reported in Florida as of December 18, 37% were potentially linked to the workplace. The most common jobs associated with potential Zika exposure included construction workers, outdoor restaurants, valet attendants, and retail workers.

CONCLUSIONS: These investigations highlight the potential risk for mosquito exposure at the workplace, particularly at workplaces with open-air areas. Health departments should collect information on occupation and workplace as part of ongoing Zika case investigations. Even workplaces without an easily identifiable work-associated location where mosquitoes may be present can still be at risk; break areas, employee parking locations, and other opportunities to be bitten by mosquitoes should also be taken into consideration. Collection of occupation and possible risk for mosquito exposures at work as part of surveillance can facilitate identification of focal mosquito-borne disease activity.

Submission Complete? Yes

Committee Infectious Disease
Topic Emerging Infectious Diseases (including Zika Virus Disease)
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Submission Type Breakout/Quick/Lightning/Poster
ID [8469](#)

Abstract Type Quick

Abstract Title Mapping of Locally Acquired Zika Cases in Florida 2016
Abstract

BACKGROUND: In July 2016, Florida Department of Health identified the first autochthonous Zika virus infections in the continental United States. Since then, over 250 cases have been identified. Zika virus infection results in asymptomatic infections or mild illness for the majority of individuals, increasing the potential for more human movement while viremic. Identification of potential exposure locations is important to ensure proper response and control measures are put in place.

METHODS: Interviews of Zika cases and persons under investigation (PUI) included the collection of addresses visited within two weeks of symptom onset or sample collection date if asymptomatic. Addresses were mapped using ArcMap 10.3.1 software and were stratified by status (case/PUI), type of location (home/work/other), and onset date. Land use data were obtained from the 2015 Department of Revenue dataset. Addresses designated as the most likely source of exposure were determined by case clusters, reported mosquito bites, and time spent outside. Buffers of 150 meters, the *Aedes aegypti* flight range, were placed around the addresses. Cases identified in the buffer could trigger additional active surveillance. To more rapidly identify focal areas of transmission, newly identified PUIs were also mapped.

RESULTS: Addresses for over 300 individuals and 850 locations were mapped. On average, 2.9 addresses were mapped per person (range 1-19). Half of the cases were linked to one of three active transmission areas in Miami; however, a potential exposure location could not be identified for 71 cases. Half of the addresses were "other," followed by home (33%), and work (18%). However, designated exposure locations involved home (39%), work (38%), and less frequently "other" (23%). Based on land use data, most case/PUI addresses within the active transmission areas (270 addresses on 161 parcels) were associated with businesses (58%; primarily restaurants, hotels, and retail locations) and 30% were residential locations. Overall, 136 people shared a common location (56 addresses total) and 120 additional addresses were located within 150 meters of another location. Most of these (113) were located in active transmission areas.

CONCLUSIONS: Mapping combined with epidemiologic data facilitated identification of case clusters and linkages to areas of active transmission. However, it may be difficult to determine exposure locations with highly mobile individuals. "Other" addresses provided additional data but identified fewer likely exposure locations. Focusing on "other" locations with increased potential for mosquito exposure may be more efficient. Further analysis of case location data may identify additional variables that can be used in risk models.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Geographic Information Systems (GIS); Vectorborne Disease; Emerging Infections

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7540](#)

Abstract Type Quick

Abstract Title Abstract
Sampling Considerations for a Zika Virus Urosurvey in New York City

BACKGROUND: The presence of imported Zika virus (ZIKV) cases and a potentially competent *Aedes albopictus* vector in New York City (NYC) suggests that local transmission of ZIKV in NYC is a theoretical possibility. Urosurveys can be used to detect ZIKV infections in the event of suspected local transmission. In many parts of NYC, the population is too large to feasibly include all local residents in a urosurvey. Therefore, the NYC Department of Health and Mental Hygiene developed a sampling plan.

METHODS: If two cases of ZIKV infection with no history of travel to a ZIKV-affected area or sexual contact with an infected person were to occur in the same geographic area, then a 150-meter radius circle around each residence or suspected exposure location will be delineated as a suspected risk site. To estimate the underlying population size within a suspected risk site, an in-house GIS application will be used to anonymously extract the number of residential units (from United States Postal service data) and the mean household size (from US Census data). The urosurvey sample size will be calculated using freedom from disease methods (R package FFD, function `computeOptimalSampleSize`) adapted from veterinary epidemiology. This approach requires inputs of the underlying population size, the maximum number of allowable missed cases within the risk site (10), the alpha level (0.05), and the test screening sensitivity (93%). The sample size will be inflated to account for predicted non-response (50%). Five NYC communities varying in population density and housing types were selected as illustrative examples based on local numbers of imported ZIKV cases and trap counts of *Aedes* mosquitoes.

RESULTS: In a 150-meter radius in each of the five communities, the number of urine samples needed ranged from 133 (estimated population of 479, predominantly in low-rise buildings) to 1,244 (estimated population of 4,453, predominantly in high-rise buildings). In the former risk site, 266 people would need to be approached to achieve the required sample size, corresponding to 83 households. In the latter risk site, 2,488 people would need to be approached, corresponding to 968 households.

CONCLUSIONS: Sampling is necessary to determine the extent of locally acquired ZIKV virus transmission in a dense urban environment like NYC. Preparing for such a urosurvey requires detailed residential population geodata and specialized methods for rare events. Finally, there is a necessary tradeoff of resource allocation and the degree of confidence that cases will not be missed.

Submission Complete? Yes

Committee Infectious Disease

Topic Emerging Infectious Diseases (including Zika Virus Disease)

Keywords Emerging Infections; Epidemiologic Methods; Surveillance

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8281
Abstract Type	Quick
Abstract Title Abstract	Utilization of the United States Zika Pregnancy Registry and the Epidemiology of Zika Virus Among Pregnant Women in the U.S. Virgin Islands
	BACKGROUND: The U.S. Virgin Islands (USVI) is experiencing an ongoing outbreak of Zika virus (ZIKV). The USVI sees around 1,600 births annually. Due to the potential for ZIKV related pregnancy complications and birth defects, the CDC has created the U.S. Zika Virus Pregnancy Registry (USZPR), which provides enhanced surveillance through collection of information about antenatal diagnostic testing, and clinical outcomes among ZIKV positive pregnant women and their infants through the first year of life, as well as all infants born with any birth defects. METHODS: Free ZIKV testing has been offered to all pregnant women in the territory and community outreach has been performed territory-wide. Pregnant women who test positive or equivocal for ZIKV, or who give birth to an infant with suspected birth defects, have a maternal health history form completed and are entered into the USZPR. At birth, a neonatal assessment form is filled out, and the serum and urine from the infant, and the placenta are collected for ZIKV testing. The infant is entered into the USZPR and infant follow-up forms are completed at two, six, and twelve months after birth. RESULTS: As of January 3, 2017 there are 130 pregnant women and 47 infants in the USVI USZPR. Five (4%) women are located on St. John, 20 (15%) are on St. Croix, and 105 (81%) are on St. Thomas. Among ZIKV positive pregnant women, there have been 4 miscarriages and 1 stillbirth. There have been 1,378 pregnant women tested for ZIKV, and it is estimated that over 80% of pregnant women in the USVI will receive at least one ZIKV test by the end of their third trimester. No infants have tested positive for ZIKV and no birth defects have been noted. CONCLUSIONS: ZIKV testing has become part of routine prenatal care in the USVI, with most pregnant women being tested at least once during their pregnancy. Most ZIKV positive pregnant women reside in St. Thomas, which is where a majority of all ZIKV cases have been located. The high percentage of pregnant women tested for ZIKV highlights the successful efforts of health care providers and community outreach programs. The outbreak is ongoing and ZIKV positive pregnant women will continue to give birth after the outbreak ends. USZPR surveillance will help in further understanding ZIKV and will assist the USVI in providing the services needed by infants born with birth defects and to ZIKV positive pregnant women.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Emerging Infectious Diseases (including Zika Virus Disease) Outbreaks; Vectorborne Disease; Emerging Infections
Consider for Different Presentation?	Yes
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Submission Type ID	Breakout/Quick/Lightning/Poster 7923
Abstract Type	Quick
Abstract Title Abstract	Zika and the Importance of Social Communication and Engagement – a Neighborhood Approach Using Community Assessment in Travis County, Texas, June 2016

BACKGROUND: Zika virus disease (ZVD) has rapidly spread in the Americas –including the United States– since early 2015. A community assessment was conducted to assess Zika communication and perceived risks and behaviors about Zika among Travis County residents to provide situational awareness to public health and local officials.

METHODS: A two-stage cluster sampling method was used to select households within Travis County, and a two page questionnaire was administered. Interviews were conducted over two days in June, 2016. Point estimates and 95% confidence intervals (CI) were calculated using STATA.

RESULTS: Interview teams conducted 177 interviews, yielding a cooperation rate of 84.3%. An 80.8% (95%CI 74.2-86.3) identified radio/television as principal information source on Zika, followed by internet/social media, 54.2% (95%CI 46.6-61.7). The most trusted sources of information were radio/television, 51.4% (95%CI 43.8-59.0), health care workers, 44.1% (95%CI 36.6-51.7), and internet/social media, 32.3% (95%CI 25.4-39.6). Additional information about prevention and signs and symptoms was required by 38.4% (95%CI 31.2-46.0), and 35.6% (95%CI 28.6-43.1). Prevention behaviors about personal measures (mosquito repellent and long sleeve shirts/pants) were known by 60.6% (95%CI 52.7-68.1), the use of mosquito control products were identified by 47.9% (95%CI 40.0-55.8) and household protection measures such screens, avoid stagnant water, and cleaning habits, were recognized by 38.2% (95%CI 30.7-46.1). Actions to prevent stagnant water in their household were taken by 64.6% (95%CI 56.8-72.0), followed by a 39.9% (95%CI 31.5-46.9) who were taking actions to control mosquito population. Although, a 62.2% (95%CI 54.6-69.3) had flower pots or yard ornaments in their yard, and 50.9% (95%CI 43.2-58.4) had bird baths, tires, pet water dish, fountains, buckets, or rain barrels. Among the action they would like from APH were spraying/fogging 36.2% (95%CI 29.1-43.7) and more information/education about mosquito diseases, 30.5% (95%CI 23.8-37.9).

CONCLUSIONS: This assessment provided important information regarding the community's Zika knowledge and mosquito prevention behaviors. Improvements can be made to increase awareness of Zika, based on how residents are responding. The high proportion of households who know the preventive measure but are not practicing them to protect it from Zika suggests the need for enhanced community education on preventative measures. Communication approaches are needed to give citizens the tools to evaluate their own risk and for them to use that information to prevent exposure to Zika.

Submission Complete? Yes

Committee	Infectious Disease
Topic	Emerging Infectious Diseases (including Zika Virus Disease)
Keywords	Zoonotic Disease; Communication; Community Health Assessment
Consider for Different Presentation?	Yes

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