

Zika Virus Surveillance Connecticut, 2016-2017

In May 2015, human Zika virus infections were first reported in the Western Hemisphere from Brazil, where the virus spread rapidly. As of May 26, 2017, local mosquito transmission had been identified in at least 47 countries or territories in the Americas plus Florida and Texas in the Continental U.S. (1). In the majority of recent case-patients, Zika virus caused asymptomatic infections or relatively mild illnesses that were rarely fatal. However, infection has also been associated with serious birth defects among infants born to women who were infected during pregnancy. The Connecticut Department of Public Health (DPH) added Zika virus to the lists of Reportable Diseases, Emergency Illnesses and Health Conditions, and Reportable Laboratory Findings in Connecticut, effective February 15, 2016 (2).

Because there was no commercially available diagnostic test, all specimens were sent to the Centers for Disease Control and Prevention (CDC) for testing. Beginning March 1, 2016, the Katherine A. Kelley State Public Health Laboratory (SPHL) began offering reverse transcriptase polymerase chain reaction (RT-PCR) testing for Zika virus genetic material in urine and serum samples collected within 2 weeks of travel. Beginning April 11, 2016, the SPHL offered enzyme linked immunosorbent assay (ELISA) testing for immunoglobulin M (IgM) antibodies in serum collected 2 to 12 weeks after travel; positive results for IgM antibodies were confirmed by plaque reduction neutralization (PRNT) at the CDC. Testing was available for patients with a history of exposure due to travel or unprotected sex with a person who traveled to an affected area plus either clinical illness consistent with Zika virus infection or pregnancy.

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Testing was also available to infants born to women who were exposed during pregnancy and either tested positive or were not tested.

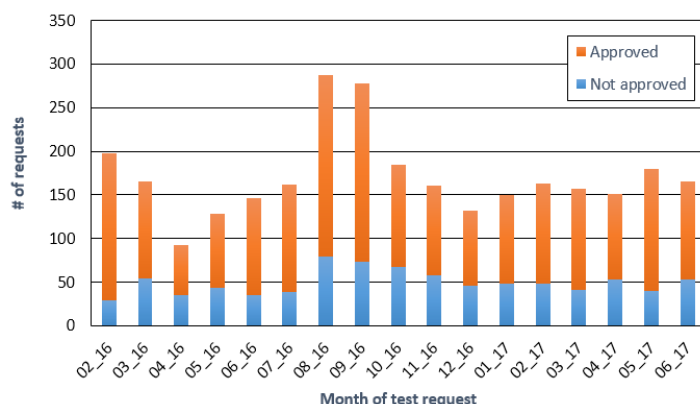
To enhance identification of infants with potential Zika-associated birth defects, surveillance was supplemented by the Connecticut Birth Defects Registry (BDR), which receives reports from birth hospitals across the state. Staff of the BDR collected clinical information for infants with birth defects consistent with Zika virus infection and potential maternal exposure. Pregnant women and infants who tested positive for Zika or an unidentified Flavivirus were reported to the U.S. Zika Pregnancy Registry (USZPR). Infant updates were sent to the USZPR periodically through 12 months of age.

From February 1, 2016 to June 30, 2017, the DPH evaluated 2,901 requests for testing; monthly requests ranged from 92 to 287 (median = 162 tests/month) (Figure 1, on page 14). Overall, final results were received for 1,784 patients including 1,336 (75%) pregnant women. Of the final results, 118 (7%) were positive for Zika virus and 61 (3%) were positive for an unidentified Flavivirus, possibly Zika (Table 1, on page 16).

The 179 patients who tested positive for Zika virus or an unidentified Flavivirus had potential exposure in areas with Zika-positive mosquitoes

While the SPHL will continue to offer testing for symptomatic pregnant women and infants according to the new national guidelines, testing of other patients will be discontinued as of September 1, 2017.

Figure 1. Number of Zika virus testing requests by month (n=2,683) - Connecticut, February 1, 2016- June 30, 2017



(38%) in the third trimesters and resulted in 6 live births, 1 miscarriage and 1 terminated pregnancy. The Flavivirus positive women included 10 (21.3%) in the first, 11 (23.4%) in the second, and 26 (55.3%) in the third trimester and resulted in 40 live births, 4 are still pregnant and 3 pregnancy outcomes could not be determined due to relocation out of Connecticut. Excluding the 3 lost to follow-up and the terminated pregnancy, of the remaining 51 positive pregnant women, 50 were reported to the USZPR. Of the 46 live births to Zika or Flavivirus positive mothers, 34 (74%) babies were tested and all were negative.

The BDR staff identified 3 infants born with birth defects to women who had potential exposures during pregnancy but were not tested prior to giving birth. Staff also identified 1 infant with birth defects born to a woman who tested positive for Zika virus; all 4 babies tested negative.

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Editorial

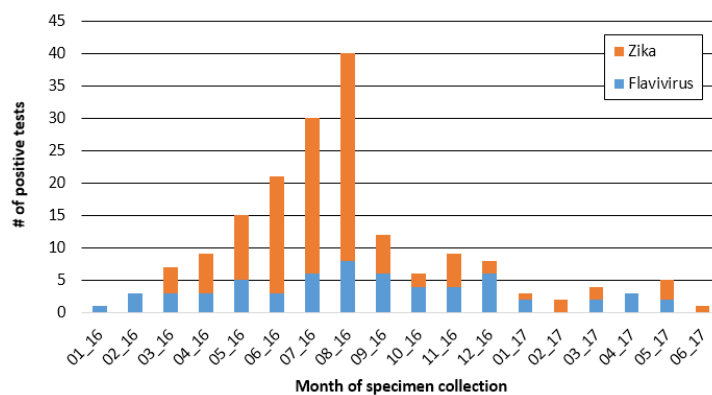
In the Western hemisphere, Zika virus is primarily transmitted to people through the bite of infected *Aedes aegypti* mosquitoes. This species also transmits other Flaviviruses of public health

including Florida (1 person) and 31 other countries or territories outside the continental U.S.; 123 (69%) were likely infected either in Puerto Rico (47), Dominican Republic (38), Jamaica (17), Guatemala (11) or Haiti (10). Among the 178 persons exposed outside the continental U.S., 61 (34%) originated travel to the U.S. from an affected area. The number of positive patients sharply increased starting in May 2016, and peaked during August 2016 (Figure 2).

Among the 118 case-patients with Zika virus infection, 78 (66%) were female, and the median age was 34.5 years (range 3-88) with 75% aged 20-59 years. Of the case-patients, 114 (97%) reported primary symptoms including: rash (90%), arthralgia (67%), fever (57%) and conjunctivitis (39%). No hospitalizations were reported. Among the 61 unidentified Flavivirus infections, 56 (92%) were female; the median age was 30 years (range 10-56) with 82% aged 20-59 years. Of these patients, 13 (21%) reported primary symptoms including: rash (85%), arthralgia (46%), fever (46%), and conjunctivitis (15%). Infection resulted in one patient hospitalized with Guillain Barré syndrome. No fatalities were reported for either type of infection.

Of the 1,336 pregnant women tested, 8 (0.6%) were positive for Zika virus and 47 (4%) were positive for an unidentified Flavivirus. The Zika-positive women, at the time of diagnosis, included 4 (50%) in the first, 1 (12%) in the second, and 3

Figure 2. Number of potential Zika-related infections by month (n=179)-Connecticut, February 1, 2016-June 30, 2017



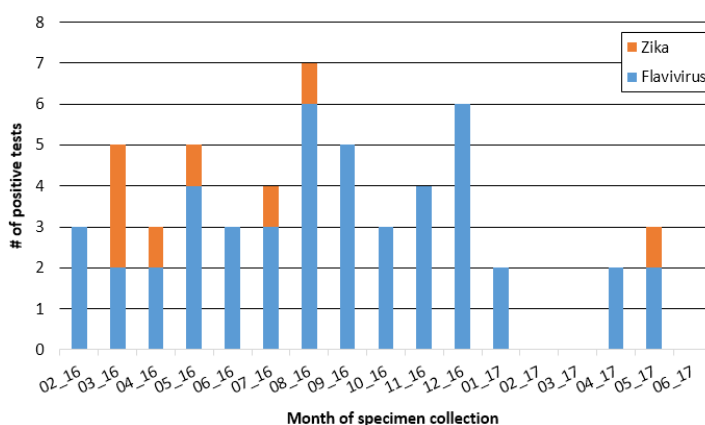
importance including yellow fever, dengue and chikungunya. *Aedes aegypti* is not currently present in Connecticut, and while a related species *Aedes albopictus* has been identified, the likelihood of future local mosquito transmission is unknown (3). For Connecticut residents, Zika virus infections are preventable by avoiding travel to affected areas, and unprotected sex with someone who has recently travelled to an affected area.

Birth defects attributable to Zika virus infection may be severe requiring long term monitoring and treatment (4). Based on national data reported to the USZPR during 2016, infants were more frequently born with birth defects when the mother had a laboratory-confirmed Zika virus infection (vs. with unidentified Flavivirus infection), was infected during the first trimester (vs. in 2nd and 3rd trimesters) and developed illness (vs. asymptomatic) (5). Data also showed that infants born with birth defects tested positive four times more frequently than infants who did not have birth defects.

In Connecticut, pregnant women accounted for 75% of patients tested at the SPHL. Testing focused on pregnant women to assist in national efforts to assess risk to exposed fetuses and create guidance for live born infants through their pre- and post-natal care. Over time, potentially exposed women tested in Connecticut were increasingly less likely to give birth to infants with Zika virus associated birth defects and should have received prenatal testing earlier in gestation. The women were more often asymptomatic and originated travel from areas affected for Flaviviruses during their third trimester. When tested at the SPHL, less than one percent tested positive for Zika virus. Of the 50 pregnant women reported to the USZPR, 86% were eligible for inclusion due to positive serologic results for an unidentified Flavivirus; since August 2016 only 1 pregnant woman tested positive for Zika virus (Figure 3).

With declining Zika virus illnesses in the Americas, increasing false positive IgM test results, and analysis of data reported by the USZPR, new national guidelines include changes to

Figure 3. Number of pregnant women with potential Zika-related infections by month (n=55) - Connecticut, February 1, 2016-June 30, 2017



recommendations for testing (6). Most significantly, these changes include testing of exposed symptomatic pregnant women, and women who have a fetus with prenatal findings consistent with Zika virus infection. In addition, asymptomatic women with ongoing exposure (e.g. living in affected areas) should be tested three times during pregnancy. Routine testing is not recommended for pregnant women without symptoms. Infants born to women who tested positive or with birth defects consistent with Zika virus infection and history of exposure should also be tested. Testing is not recommended for infants with normal pre/postnatal examinations when the mother tested negative or was not tested.

Testing is now available at commercial laboratories in Connecticut. While the SPHL will continue to offer testing for symptomatic pregnant women and infants according to the new national guidelines, testing of other patients will be discontinued as of September 1, 2017. Information regarding specimen submissions to the SPHL including the submission form is available at: <http://www.ct.gov/dph/cwp/view.asp?a=3122&q=396860> or by calling 860-920-6662 or 860-920-6500 during normal business hours. For questions regarding Zika virus, contact the DPH Epidemiology and Emerging Infections Program at 860-509-7994.

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Table. Descriptive epidemiology among persons testing positive for Zika and unidentified Flavivirus infections—Connecticut, February 15, 2016-June 30, 2017

Characteristic	Total infections (n=179)	Zika positive (n=118)	Unidentified Flavivirus positive (n=61)
Female	134 (75%)	78 (66%)	56 (92%)
Median age (range)	32 yrs. (3-88)	34.5 yrs. (3-88)	30 yrs. (10-56)
≥1 primary symptom	127 (71%)	114 (97%)	13 (21%)
Rash	114 (90%)	103 (90%)	11 (85%)
Fever	71 (56%)	65 (57%)	6 (46%)
Arthralgia	82 (65%)	76 (67%)	6 (46%)
Conjunctivitis	47 (37%)	45 (39%)	2 (15%)
Pregnant Females	55 (31%)	8 (7%)	47 (77%)
1 st trimester	14 (25%)	4 (50%)	10 (21%)
2 nd trimester	12 (22%)	1 (13%)	11 (23%)
3 rd trimester	29 (53%)	3 (38%)	26 (55%)
Travel to affected area outside CT	179 (100%)	118 (100%)	61 (100%)
Travel originating in affected area	61 (34%)	23 (19%)	38 (62%)

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