First Locally Transmitted Zika Virus Cases Identified in the United States

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As the world becomes smaller with globalization, exposure to diseases from distant lands has increased. This is certainly evident with Zika virus (ZIKV), a flavivirus that was originally isolated in Rhesus monkeys from Uganda. ZIKV subsequently infected humans and migrated from Africa and Asia to the Americas. The actual and most devastating ZIKV outbreak reported in history started in May 2015 in the northeast of Brazil, when approximately 0.4 to 1.3 million people were infected with ZIKV that year.

ZIKV rapidly spread through other countries, and the Centers for Disease Control and Prevention’s (CDC) update shows 51 counties and territories with active ZIKV transmission. Initial reports in the United States included cases only in returning travelers. Although countries in the Americas reported transmission of ZIKV cases, no local transmission was documented in the continental United States until July 2016. At that time, the state of Florida announced that the Florida Department of Health confirmed a total of 14 cases of local ZIKV infection. These are the first known cases of local ZIKV infection in the continent, probably mosquito-transmitted.

ZIKV is primarily transmitted through the bite of infected Aedes mosquitoes (Aedes aegypti and Aedes albopictus), which can also transmit dengue and chikungunya viruses. These mosquitoes are found across the United States, mostly in tropical, subtropical, and some temperate climate regions, including the state of Florida. In addition to mosquito-to-human transmission, ZIKV infections have been documented through intrauterine transmission resulting in congenital infection, sexual transmission, blood transfusion, and laboratory exposure. From these various modes of ZIKV transmission, the vertical transmission is the one that causes more apprehension because of its capacity to cause microcephaly and other severe birth defects, including ocular findings.

In response to the new cases reported in the United States, $26.2 million has been allocated for ZIKV prevention and response to ZIKV in the state of Florida. The strategy is to intensify surveillance and vector control by increasing spraying in the affected areas, encourage health care professionals to report suspected ZIKV disease cases, and track the outcomes of pregnant women infected with ZIKV and their babies. In addition, the CDC has issued a notice advising pregnant women not to travel to Wynwood, the neighborhood in Miami immediately adjacent to the University of Miami/Jackson Memorial Medical Center where ZIKV cases were identified. The CDC advises those living in or traveling to this area to protect themselves from mosquito bites and to take precautions to avoid sexual transmission of the disease.

Following the guidelines of the University of Miami Medical Center, all patients who have traveled to an endemic area in the prior 2 weeks and report at least 2 of the following symptoms (fever, rash, arthralgia, or conjunctivitis) are reported to the Florida Department of Health to determine if further confirmatory testing is warranted. Mothers of infants or fetuses with microcephaly or intracranial calcifications or poor fetal outcome diagnosed after the first trimester and with a history of travel to an area with ZIKV activity during pregnancy are immediately reported. Testing of both mother and infant is recommended. Additionally, the Florida Department of Health has recommended that pregnant women who, while pregnant, traveled to an area reporting ZIKV activity regardless of the length of time since the travel/illness occurred, but ideally within 2 to 12 weeks of travel, may also be tested.

The US Food and Drug Administration has approved real-time reverse transcription polymerase chain reaction (rRT-PCR) and ZIKV IgM antibody–capture enzyme-linked immunosorbent assay (ZIKV MAC-ELISA) for serological confirmation of ZIKV. These assays are offered by the Florida Department of Health. Serum and urine rRT-PCR should be performed to confirm acute illness (within the first 2 weeks after symptom onset), and ZIKV MAC-ELISA for qualitative detection of ZIKV IgM antibodies in the serum or cerebrospinal fluid that can be used to confirm disease up to 12 weeks after exposure. Diagnosing ZIKV is problematic owing to its similar presentation to other flaviviruses, its self-limited nature, and its serologic cross-reactivity with other flaviviruses. Polymerase chain reaction assays can detect ZIKV RNA within the first 14 days of infection, but have limited usefulness beyond that time frame; they are the most useful in the first 4 days following infection but false negatives are increasingly common at later points. Serologic testing for ZIKV IgM has high cross-reactivity with other flaviviruses; therefore, positive results necessitate simultaneous testing for dengue and chikungunya IgM antibodies to exclude cross-reactivity. The serum plaque reduction neutralization technique assay is a means of obtaining greater specificity and can be obtained on select cases at the CDC. In Florida, hospitals with suspected or confirmed cases of the ZIKV must provide case status reports every 24 hours to the Florida Department of Health state epidemiologist. Health care professionals with suspected or confirmed cases of ZIKV must provide case status reports every 72 hours to the Florida Department of Health state epidemiologist.

As a tertiary care eye facility, the Department of Ophthalmology at Bascom Palmer Eye Institute in Miami
is initiating screening of neonates born to mothers with known ZIKV infection during pregnancy. The institution is following the CDC's recommendation on ocular screening, which says that all babies with laboratory evidence or inconclusive laboratory results for ZIKV intrauterine infection should have an eye examination before hospital discharge or within 1 month. The ocular evaluation includes pupillary dilation and fundus examination, since the most common ocular findings detected in these babies affect the retina and optic nerve. Retina and uveitis specialists at Bascom Palmer are also alert regarding ocular findings related to ZIKV infection in adults. In selected cases with clinical suspicion of eye disease that may be associated with ZIKV, antibody tests and rRT-PCR are being performed.

The CDC foresees that there may be additional cases of local ZIKV infection cases in the coming weeks and that the top priority is to protect pregnant women from the potentially devastating harm to fetuses. Patients in childbearing years are advised to protect themselves from mosquito bites and avoid unnecessary travel to epidemic areas, although the disease is increasing worldwide.

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