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The Florida Lab Link

ZIKA VIRUS—FLORIDA RESPONDS

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Zika virus disease (Zika), caused by the Zika virus, is a member of the virus family *Flaviviridae* and the genus *Flavivirus* and is related to the dengue, yellow fever, Japanese encephalitis, and West Nile viruses.[1] It spreads to people primarily through the bite of an infected Aedes species of mosquito.

First discovered in 1947, Zika virus was named after the Zika Forest in Uganda. In 1952, the first human cases of Zika were detected within a narrow equatorial belt from Africa to Asia. Since then, sporadic outbreaks of Zika have been reported in tropical Africa, Southeast Asia, and the Pacific Islands, but Zika outbreaks have probably occurred in many locations. Because the symptoms of Zika are similar to those of many other diseases, many cases may not have been recognized. There were at least 14 documented cases of Zika before 2007, although other non-reported cases were likely to have occurred.

Characteristic clinical findings with Zika include onset of fever, rash, joint pain, and redness in the whites of the

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Special points of interest:

- *Chemical Threat Training*
- *Biological Defense Training*

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eye.[2] Other commonly reported symptoms include myalgia and headache. Clinical illness is usually mild with symptoms lasting for several days to a week. Severe disease requiring hospitalization is uncommon, and case fatality is low. However, most people will not know they have it. Only about one in five people infected with Zika virus will exhibit symptoms, but the vast majority will have no symptoms at all.[3]

In rare cases, Zika has been associated with Guillain-Barre syndrome, a disorder that can cause partial or complete paralysis, usually starting in the legs and most often temporary. An increase in that illness has been seen in areas such as French Polynesia and Brazil, where a Zika epidemic has taken place, but only one U.S. case of Guillain-Barre that may be tied to Zika has been reported to the Centers for Disease Control and Prevention (CDC). Recently, CDC concluded that Zika virus infection during pregnancy is a cause of microcephaly and other severe fetal brain defects.[4]

In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil. On February 1, 2016, the World Health Organization (WHO) declared Zika virus a public health emergency of international concern (PHEIC), because clusters of microcephaly and other neurological disorders were being identified in some Zika affected areas. The CDC elevated its response to Level 1 Activation on February 8, 2016.

Zika virus disease has been identified in most of the countries of Central America, as well as northern and central countries of South America (see map 1).[5] In addition, local mosquito-borne transmission has been reported in the US territories of Puerto Rico, US Virgin Islands and American Samoa. Currently, there are no cases of local mosquito-borne Zika virus disease reported in the United States although, as of June 1, 2016, 618 travel-associated cases have been identified. Of those cases, 128 or 21% have been in Florida. (see map 2).[6]

According to the CDC, as of May 26, 2016, around 195 pregnant women in the United States and another 146 in U.S. territories, primarily Puerto Rico, have tested positive for Zika virus. Because most Zika virus infections are asymptomatic, the number of travel-associated cases in the US is likely much higher.[7]

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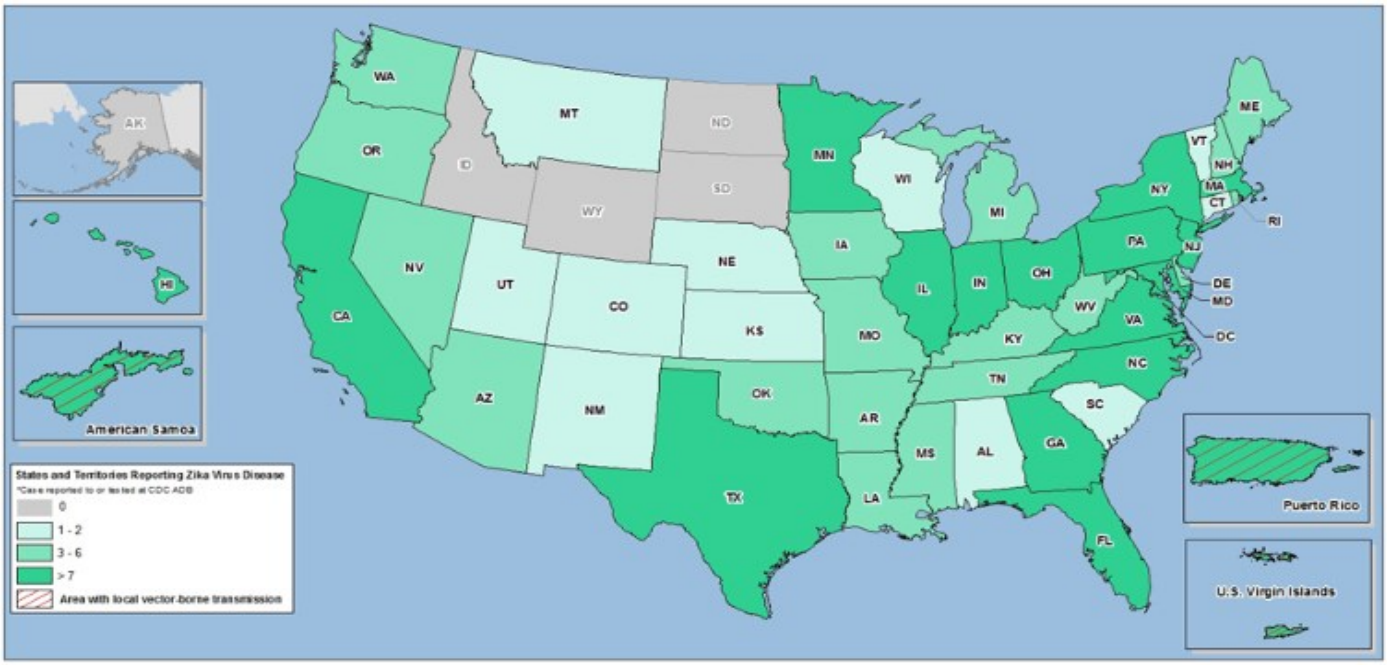
Map 1. All Countries & Territories with Active Zika Virus Transmission as of May 26, 2016.

Map 2.



Laboratory-confirmed Zika virus disease cases reported to ArboNET by state or territory — United States, 2015–2016 (as of June 01, 2016)

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Viremia is expected to occur from several days before illness onset until a week after illness onset. Zika virus–specific immunoglobulin (Ig) M antibodies develop during the first week of illness. Data on duration of IgM antibody persistence following Zika virus infection are limited. Diagnostic testing for Zika virus infection can be accomplished using both molecular and serologic methods.[8]

For persons with suspected Zika virus disease, a positive real-time reverse transcription–polymerase chain reaction (rRT-PCR) result confirms Zika virus infection, but a negative rRT-PCR result does not exclude infection. In these cases, IgM and neutralizing antibody testing can identify additional recent Zika virus infections. However, Zika virus antibody test results can be difficult to interpret because of cross-reactivity with other flaviviruses. This cross-reactivity can preclude identification of the specific infecting virus, especially when the person previously was infected with or vaccinated against a related flavivirus. This is important because the results of Zika and dengue virus testing will guide clinical management. If serologic testing indicates recent flavivirus infection that could be caused by either Zika or dengue virus, patients should be clinically managed for both infections because they might have been infected with either virus.[8]

The Food and Drug Administration (FDA) has issued an Emergency Use Authorization for the CDC Zika IgM Antibody Capture Enzyme-Linked Immunosorbent Assay (Zika MAC-ELISA) for antibody testing. This assay is currently used by the Florida Bureau of Public Health Laboratories (BPHL) laboratories in Jacksonville and Tampa for the qualitative detection of Zika virus IgM antibodies in serum or cerebrospinal fluid collected from persons meeting the clinical and epidemiologic criteria for suspected Zika virus disease. Results are reported as presumptive positive, equivocal, negative, or inconclusive (i.e., results uninterpretable because of high background optical density).[8]

To resolve false-positive results that might be caused by cross-reactivity or nonspecific reactivity, presumptive positive results are sent to CDC for confirmation with plaque-reduction neutralization (PRNT) against Zika, dengue, and other flaviviruses to which the person might have been exposed. In addition, equivocal and inconclusive results that are not resolved by retesting also should have PRNT performed to rule out a false-positive result.[8]

Since February 2016, over 1,500 Zika rRT-PCR tests and over 1,200 Zika IgM MAC-ELISA tests have been performed by the BPHL to detect the presence of virus genetic material in serum and urine. Other specimen types tested include cerebrospinal fluid

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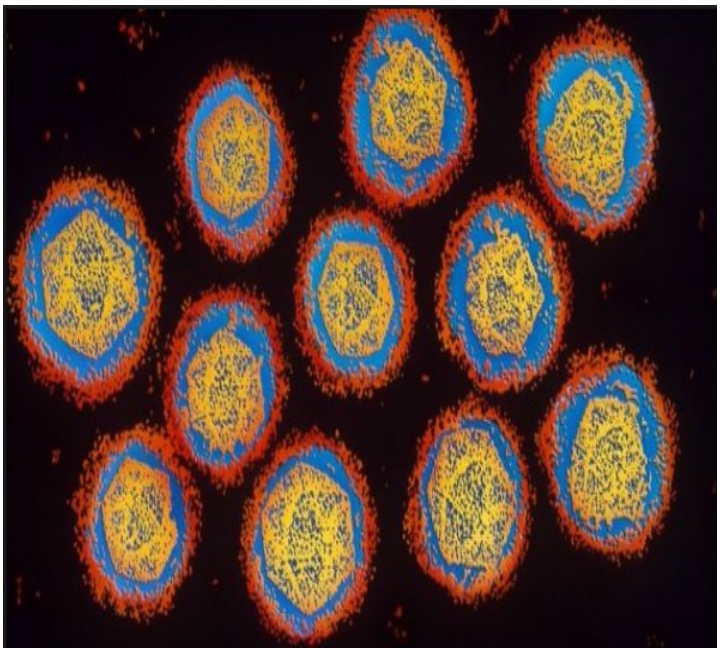
(CSF), semen, amniotic fluid, placenta, cord blood and saliva (though saliva has not been shown to improve detection rates above serum and urine, therefore it is no longer recommended).[9]

The additional Zika testing has had a considerable impact on the workloads at both laboratories. Cross training of laboratory personnel and teamwork helps manage the increased testing volume and enables the BPHL to maintain turnaround time for reporting Zika results while meeting testing demands of day-to-day samples.

The current role of sentinel hospital laboratories is sample collection of pre-approved specimens that are correctly packaged and shipped to the BPHL for testing. This essential role will most likely evolve to include Zika testing should a reasonably priced commercial test kit becomes available.



Guidance documents located on the BPHL website (http://www.floridahealth.gov/programs-and-services/public-health-laboratories/index.html) outline the procedures for obtaining authorization, collection, and packaging and shipping the specimens to the BPHL. Also available is a Zika Testing F.A.Q. document that provides answers to many of the questions asked regarding specimen types and testing available.

The BPHL has been testing all samples submitted that have met the criteria and are authorized by the local County Health Department.[10] A vast majority of these samples are from travelers who have visited countries where the virus is confirmed to be in the mosquito population. To date, there are no cases of locally acquired Zika virus in Florida though this could change as we enter into the summer months. We need to prepare now for a possible increase in the number of patients who visit hospitals due to Zika virus.

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Editor - Betty Wheeler

Chemical Threat (CT) Preparedness Training

The CT laboratory coordinators continue to reach out to the health and medical community by offering training for CT preparedness at hospitals and county health departments (CHDs). This training covers chemical terrorism awareness and the collection of clinical specimens after a chemical terrorism event. Hospital and CHD staff play an important role in the response to a chemical exposure event since clinical specimens will be collected for analysis. For your convenience and to increase participation, this training can be presented at your facility. Each course lasts approximately one hour with one 15-minute break between courses. Florida clinical laboratory and nursing continuing education credits will be offered. Training manuals, "hands on" exercise materials, and CT preparedness kits will be provided. This training is recommended for physicians, nurses, epidemiologists, emergency department personnel, phlebotomists, hospital and health department laboratory personnel, and others who may collect clinical specimens. Contact the CT laboratory coordinators in your region for more information (see the Bureau of Public Health Laboratories Directory on the back of this document for contact information).

Laboratory Response Network (LRN) Training—Biological Defense

The Bureau of Public Health Laboratories is currently offering an LRN sentinel laboratory training course at no cost to you at your facility. This training follows the American Society for Microbiology (ASM) Sentinel Level Clinical Laboratory Protocols for Suspected Biological Threat Agents and Emerging Infectious Diseases. Scheduling the training at your facility is a relatively easy process. Determine when you would like to have the training and how many people will be attending. A time will be set up that is convenient for all. The training materials are provided, as well as the biodefense reference manuals for your laboratory.

"at no cost to you at your facility"

The training syllabus includes: 1) an overview of the LRN; 2) the ASM protocols for ruling out potential bioterrorism agents and how to refer a sample to the state LRN Public Health Reference Laboratory when a bioterrorism agent cannot be ruled out; 3) the role of the sentinel laboratory in responding to pandemic influenza; 4) a brief introduction to packaging and shipping of infectious substances; 5) an introduction to the CDC Select Agent Program; and 6) the College of American Pathologists Laboratory Preparedness Exercise (CAP LPX).

This class awards Florida clinical laboratory continuing education credits based on five hours of instruction. Please contact Betty Wheeler at (904) 791-1568 (Betty.Wheeler@FLhealth.gov) to schedule a class for your facility.

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