

Zika Virus Disease and Zika Congenital Infection Surveillance Protocol

Zika virus disease (Zika) is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week after being bitten by an infected mosquito. People usually do not get sick enough to go to the hospital, and they very rarely die of Zika. For this reason, many people might not realize they have been infected. Once a person has been infected, he or she is likely to be protected from future infections. Zika has been linked to complications such as Guillain-Barre syndrome and poor birth outcomes (e.g. microcephaly) prompting additional research and studies. Because of ongoing studies surrounding these complications, **suspected Zika virus cases should be reported to the local health department within 24 hours.**

Provider Responsibilities

1. Report suspect and confirmed cases within 24 hours. Supply requested clinical information to the local health department to assist with case ascertainment.
2. Assure appropriate testing is completed for patients with suspected Zika virus infection. Testing for Zika virus should be done in coordination with the local health department, the Division of Infectious Disease Epidemiology and the Office of Laboratory Services.
3. Provide preconception counseling for women and their male sexual partners with possible exposure to Zika virus.
 4. Discuss the risk of sexual transmission of Zika with patients. Information can be found at: <http://www.cdc.gov/zika/transmission/sexual-transmission.html>.
5. Advise pregnant women to take precautions when traveling to Zika-affected countries.

Laboratory Responsibilities

1. Report positive Zika virus testing results within 24 hours. Prompt reporting facilitates public health prevention and control activities.
2. Submit positive arboviral samples to the Office of Laboratory Services within 1 week for subsequent testing at CDC.
3. If requesting Zika rRT-PCR testing from a commercial laboratory (not the Office of Laboratory Services), retain an aliquot of the serum for Zika IgM ELISA in the event that rRT-PCR testing is negative.

Local Health Responsibilities

1. Educate the public about Zika virus, especially regarding prevention measures during travel and when mosquitoes are active. Late spring and early summer are optimal times to provide this education. A model press release is available under “Tools for Local Health Departments” at: <http://www.dhhr.wv.gov/oeps/disease/Zoonosis/Mosquito/Pages/Arbo.aspx>
2. Educate providers and laboratories to report Zika cases within 24 hours.
3. For Zika virus infection within 7 days of onset:

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350 Capitol Street, Room 125, Charleston, WV 25301-3715

Phone: (304) 558-5358, extension 1 Fax: (304) 558-6335 www.dide.wv.gov

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- a. Educate the patient about the risk of transmission to others through mosquitoes
- b. Request that the patient stay indoors as much as possible and avoid mosquito bites for the first week of illness.
- c. Educate male patients about sexual transmission of Zika.
4. Conduct an appropriate case investigation.
 - d. Contact the healthcare provider that ordered the laboratory test to obtain the clinical information on the WVEDSS form.
 - e. If needed, contact the patient to obtain information regarding travel history.
 - f. In collaboration with the West Virginia Bureau for Public Health's Vector Control Team, conduct a home visit and perform an environmental assessment to identify potential risk factors for exposure to mosquitoes.
 - g. Educate the patient and the patient's family on mosquito bite prevention and other appropriate prevention messages.
 - h. Report all case data using WVEDSS.
5. Consult with the Division of Infectious Disease Epidemiology (DIDE) for guidance on appropriate case management and public health actions.

State Health Responsibilities

1. Review completed case reports from local health departments within one week.
2. Report all confirmed and probable cases to CDC using ArboNET upon confirmation of case status.
3. Provide training and consultation to local health departments regarding case ascertainment and prevention for Zika infection.
4. Complete enhanced passive surveillance activities each spring. This includes release of a statewide HAN to healthcare providers, a laboratory letter, a training seminar, updates to arboviral information sheets, and release of a memo to local health departments.
5. Conduct yearly mosquito surveillance activities (see mosquito surveillance protocol).
6. Provide regular data feedback to local health departments and public health partners during arboviral disease season (May-October).
7. Ensure that information provided to local health and the general public are up-to-date.
8. Assure resources and equipment are available for laboratory testing and mosquito surveillance.
9. Work with the Office of Maternal, Child, and Family Health to ensure that pregnant women are monitored through the Zika Pregnancy Registry.
10. In the event that local transmission is identified, use GIS mapping to delineate zip code(s) where local transmission is occurring in consultation with local health departments and CDC. Share the information with CDC so that zip codes can be posted and available for blood banks at a national level.
11. Maintain contact with blood collection centers as follows:
 - a. Pre-season
 - i. Compile a list of contacts

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- ii. Send initial contact email to blood collection centers providing information on Zika and FDA guidelines related to blood safety.
 - b. During the season
 - i. Communicate about Zika surveillance findings and recommendations, including biweekly arbovirus surveillance reports and health alerts.
 - c. In the event that local transmission is identified:
 - i. Begin to notify all blood center contacts by phone within 60 minutes of confirmation of local transmission
 - ii. Follow-up the initial phone call with email documentation of the communication and guidelines for management of blood donations from affected areas.
 - iii. Within 2 business days of the initial contact, make a second phone contact with email follow-up to assure that appropriate guidelines are being followed.
 - d. In the event of a change in local transmission patterns:
 - i. Continue communication with blood collection centers.
 - ii. Notify by phone and email follow up if there is any expansion of area(s) affected by local Zika transmission.
- 12. Notify leadership:
 - a. Weekly summary of Zika cases
 - b. Immediately for any (+) test for Zika
 - c. Immediately for suspected local transmission of Zika

Disease Prevention Objectives

1. Reduce disease risk through:
 - a. Public education regarding prevention and control measures (i.e. mosquito bite prevention, prevention of sexual transmission).
 - b. Public education regarding travel to areas Zika virus transmission is ongoing.
 - c. Appropriate mosquito surveillance and control.
2. Use mosquito surveillance data to provide timely information about the *Aedes albopictus* activity.

Disease Control Objectives

1. Perform or increase mosquito control activities when Zika cases are detected in an area.
2. Provide or increase public education when Zika cases are detected in an area.

Disease Surveillance Objectives

1. To identify and monitor the epidemiologic characteristics of Zika infections in West Virginia.
2. To identify and characterize (by species and geographic distribution) mosquito species associated with transmission of Zika virus.

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3. To promptly detect local transmission of Zika if the situation occurs in West Virginia.

Public Health Significance

In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil and on Feb 1, 2016, the World Health Organization (WHO) declared Zika virus a public health emergency of international concern (PHEIC). Local transmission has been reported in many other countries and territories. Zika virus likely will continue to spread to new areas through the traditional mosquito-borne disease cycle from mosquito-to-person.

Zika virus can be spread from a pregnant woman to her fetus and has been linked to a serious birth defect of the brain called microcephaly. Babies are born with heads that are smaller than other babies of same age and sex. Other problems have been detected among fetuses and infants infected with Zika virus before birth, such as absent or poorly developed brain structures, defects of the eye, hearing deficits, and impaired growth. CDC recommends special precautions for pregnant women. Women who are pregnant should not travel to areas with Zika. Abstinence or condom use is also recommended during pregnancy if a male partner has traveled to a Zika-affected country.

Aedes aegypti and *Aedes albopictus*, mosquitoes known to transmit Zika, prefer to breed near people's homes. They like to breed in water-holding containers such old tires, buckets, kid's pools, and flower pots. They are also day biters and like to live in urban areas. All of these factors contribute to efficient disease transmission.

Clinical Description

Human infection with Zika virus is usually mild and self-limiting. Common symptoms include (low grade) fever, rash, joint pain, and conjunctivitis. Muscle pain and headache have also been reported. Illness lasts from a few days to about a week. Most people who are infected do not show symptoms; hospitalization and death are rare. See *Public Health Significance*. Most people infected with Zika virus show no symptoms; about 80% of those infected are asymptomatic. The most common symptoms of Zika are fever, rash, joint pain, or conjunctivitis (red eyes). Other symptoms include muscle pain and headache.

Etiologic Agent

Zika, a single-stranded RNA virus, is a member of the family flaviviridae in the genus flavivirus.

Reservoir

Reservoir hosts for Zika virus are currently unknown, but the virus is likely maintained in two distinct cycles. In Africa, there is a jungle (sylvatic) cycle where Zika virus is transmitted between non-human primates by mosquitoes; however, infected mosquitoes may incidentally transmit virus to human hosts, leading to person to mosquito to person transmission of the virus (epidemic cycle).

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Mode of Transmission

Zika virus is mainly transmitted through bites from infected mosquitoes. *Aedes aegypti* and *Aedes albopictus* are known vectors of Zika. Figures 1 and 2 below show CDC’s best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the United States, respectively. It does not, however, show the exact locations or numbers of mosquitoes living in an area; nor does it show the risk or likelihood that these mosquitoes will spread viruses. Figure 3 shows the known distribution of *Aedes albopictus* in West Virginia; *Aedes aegypti* has not been identified to date.



Figure 1. Estimated range of *Aedes aegypti* mosquitoes in the United States.

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Figure 2. Estimated distribution of *Aedes albopictus* in the United States.

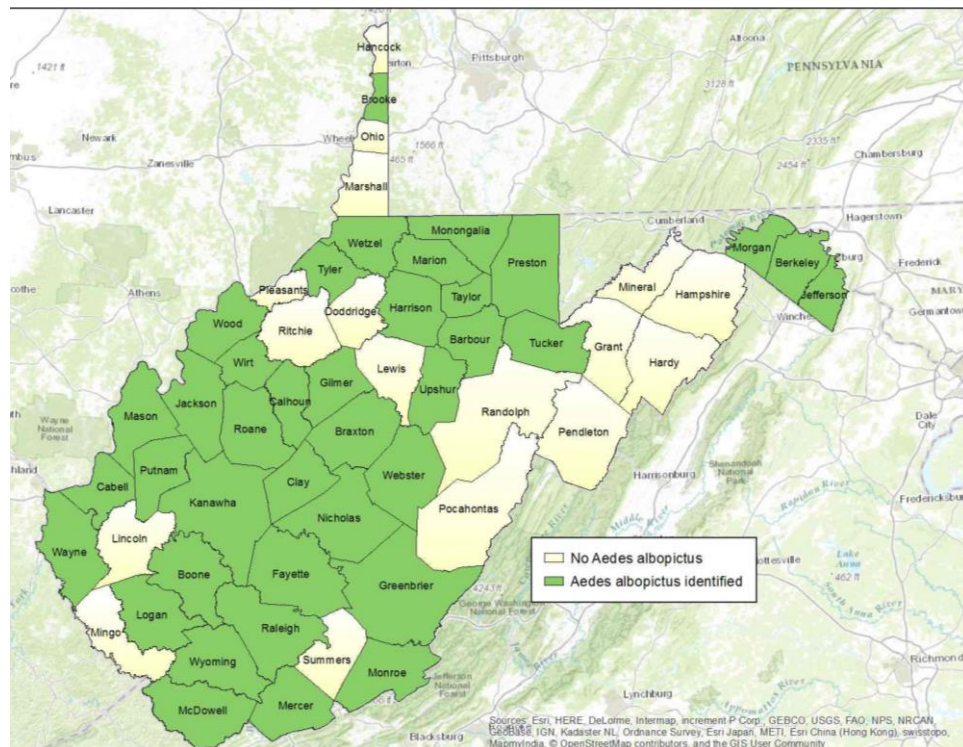


Figure 3. Counties where *Aedes albopictus* has been identified in West Virginia (2010-2015).

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Of major public health concern is that Zika virus can be transmitted from an infected mother to her fetus during pregnancy; Zika virus can also be passed on to a newborn around the time of birth. To date, there are no reports of infants getting Zika virus through breast feeding.

Sexual transmission of Zika virus has been documented; Zika virus can be spread by a man to his sex partners. Limited data has shown that Zika virus can be spread when the man has symptoms, before symptoms start, and after symptoms resolve. Zika virus is present in semen longer than in blood, prompting recommendations for condom use during sex or abstinence.

Incubation Period

The incubation period for Zika is not known, but is likely a few days to a week.

Period of Communicability

Studies are currently being done on sexual transmission of Zika virus. See *Modes of Transmission*.

Outbreak Recognition

A single case of locally-transmitted Zika (i.e. a case with no reported travel to a Zika-affected area) is considered an outbreak. Clusters of cases with similar exposure history (i.e. travel to a Zika-affected area, multiple sex partners of a confirmed Zika cases) may also be considered as outbreaks.

Case Definition For Zika Virus Disease And Congenital Zika Infection

The 2016 Position Statement is the most current version (CSTE Position State 16-ID-01).

Case Classification Narrative Describing How to Classify Cases with Zika Infection

ZIKV = Zika virus

Clinical Criteria

Mosquito-borne or sexually transmitted case

A person with one or more of the following:

- acute onset of fever (measured or reported)
- maculopapular rash
- arthralgia
- conjunctivitis
- complication of pregnancy
 - fetal loss in a mother with compatible illness and/or epidemiologic risk factors; or
 - in utero findings of microcephaly and/or intracranial calcifications with maternal risk factors

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- Guillain-Barré syndrome not known to be associated with another diagnosed etiology.

Congenital case

- live birth with microcephaly or intracranial calcifications or central nervous system abnormalities

Laboratory Criteria

1. detection of ZIKV or ZIKV specific nucleic acids in specimens of serum, CSF, urine, saliva, amniotic fluid, placenta, umbilical cord, or fetal tissue, OR
2. detection of ZIKV antigen by immunohistochemical staining of maternal or fetal tissue; OR
3. detection of ZIKV specific IgM antibody in serum, CSF, or amniotic fluid; AND ZIKV neutralizing antibody titers ≥ 4 -fold higher than neutralizing antibody titers against dengue virus or other flaviviruses endemic to region of exposure.

Epidemiologic Linkage

- Travel to a country or region with known ZIKV transmission, OR
- Sexual contact with a laboratory confirmed case of ZIKV infection, OR
- Receipt of blood or blood products within 30 days of symptom onset; OR
- Organ transplant recipient within 30 days of symptom onset; OR
- Association in time and place with a confirmed or probable case.
- For congenital syndrome, a pregnancy with maternal epidemiologic linkage.

CASE CLASSIFICATION

ZIKA VIRUS DISEASE

Clinical Criteria

A person with one or more of the following:

- acute onset of fever (measured or reported)
- maculopapular rash
- arthralgia
- conjunctivitis
- complication of pregnancy
 - fetal loss in a mother with compatible illness and/or epidemiologic risk factors; or
 - in utero findings of microcephaly and/or intracranial calcifications with maternal risk factors
- Guillain-Barré syndrome not known to be associated with another diagnosed etiology.

Probable case

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Meets clinical criteria AND

- resides in or has recently traveled to an area with ongoing ZIKV transmission, OR
- has direct epidemiologic linkage to a person with laboratory evidence of recent ZIKV infection (e.g. sexual contact, in utero or perinatal transmission, blood transfusion, organ transplantation), OR
- association in time and place with a confirmed or probable case

AND meets the following laboratory criteria:

- positive ZIKV-specific IgM antibodies in serum or CSF; and
- negative dengue virus-specific IgM antibodies; AND
 - No neutralizing antibody testing performed; or
 - Less than four-fold difference in neutralizing antibody titers between ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred.

Confirmed case

Meets clinical criteria AND

Has laboratory evidence of recent ZIKV infection by:

- Detection of ZIKV by culture, viral antigen or viral RNA in serum, CSF, tissue, or other specimen (e.g. amniotic fluid, urine, semen, saliva); OR
- ZIKV IgM antibodies in serum or CSF **with** ZIKA VIRUS neutralizing antibody titers 4-fold or greater than neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred.

ZIKA VIRUS CONGENITAL INFECTION

Clinical Criteria

An infant with microcephaly or intracranial calcifications or other central nervous system abnormalities.

Probable Case

An infant meets the clinical criteria AND:

- Mother lived in or traveled to a country or area with ongoing ZIKV transmission during the pregnancy; OR
- Mother has laboratory evidence of ZIKV or unspecified flavivirus infection during pregnancy;

AND the infant meets the following laboratory criteria:

- ZIKV IgM antibodies detected in serum or CSF; and
- Tests negative for dengue or other endemic flavivirus-specific IgM antibodies; AND

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- No neutralizing antibody testing performed; or
- Less than four-fold difference in neutralizing antibody titers between ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred.

Confirmed Case

An infant meets the clinical criteria AND meets one of the following laboratory criteria:

- ZIKV detection by culture, antigen test, or polymerase chain reaction (PCR) in serum, CSF, amniotic fluid, urine, placenta, umbilical cord, or fetal tissue; OR
- ZIKV IgM antibodies present in serum or CSF with ZIKV neutralizing antibody titers 4-fold or greater than neutralizing antibodies against dengue or other flaviviruses endemic to the region where exposure occurred.

Preventive Interventions

There is currently no vaccine against human arboviruses. Repellants such as DEET, oil of lemon eucalyptus, IR3535 and picaridin have demonstrated efficacy against mosquitoes.

Share these prevention messages with the public:

- Empty standing water in old tires, cemetery urns, buckets, plastic covers, toys, or any other container where mosquitoes may breed.
- Empty and change the water in bird baths, fountains, wading pools, rain barrels, and potted plant trays at least once a week if not more often.
- Drain or fill temporary pools with dirt.
- Keep swimming pools treated and circulating.
- Keep rain gutters unclogged.
- Use mosquito repellents according to the label directions. Apply sparingly to children before they play out of doors, and rinse children off with soap and water when they come back in. Do not apply repellent to the face and hands of young children because they may rub it in their eyes. Follow label directions and precautions closely.
- Wear long sleeves and long pants if you venture into areas with high mosquito populations.
- Make sure window and door screens are bug tight.
- Check travel advisories when traveling out of the United States to determine if mosquito-borne disease transmission is ongoing in the country of upcoming travel.

Below are CDC's current recommendations (April 2016) regarding prevention of sexual transmission of Zika virus:

Couples in which a woman is pregnant

- Couples in which a woman is pregnant should use condoms consistently and correctly or abstain from sex for the duration of the pregnancy.

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Other couples concerned about sexual transmission

- Couples in which a man had confirmed Zika virus infection or clinical illness consistent with Zika virus disease should consider using condoms or abstaining from sex for at least 6 months after onset of illness.
- Couples in which a man traveled to an area with active Zika virus transmission but did not develop symptoms of Zika virus disease should consider using condoms or abstaining from sex for at least 8 weeks after departure from the area.
- Couples in which a man resides in an area with active Zika virus transmission but has not developed symptoms of Zika virus disease might consider using condoms or abstaining from sex while active transmission persists.

Treatment

Supportive; no specific treatment exists for Zika virus.

Surveillance Indicators

1. Proportion of cases with complete clinical, laboratory, and epidemiologic information including clinical symptoms, testing, and risk factor information (e.g. travel history, outdoor activities).
2. Proportion of cases with a home visit completed for environmental evaluation, including GIS coordinates of location and patient and family education.
3. Percentage of Zika cases with positive labs with specimens forwarded by OLS to CDC for additional laboratory confirmation (e.g. PRNT).

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