



# Zika virus Investigation Guideline

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*Attachments can be accessed through the Adobe Reader’s navigation panel for attachments. Throughout this document attachment links are indicated by this symbol ; when the link is activated in Adobe Reader it will open the attachments navigation panel. The link may not work when using PDF readers other than Adobe.*

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# Zika virus

## Disease Management and Investigation Guidelines

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### CASE DEFINITION – Zika virus disease (ZIKV), non-congenital (Interim based on [CSTE Position Statement](#) and is subject to change)

#### Clinical Description for Public Health Surveillance

A person with one or more of the following not explained by another etiology:

- Clinically compatible illness that includes
  - acute onset of fever (measured or reported), or
  - maculopapular rash, or
  - arthralgia, or
  - conjunctivitis
- Complication of pregnancy
  - fetal loss in a mother with compatible illness and/or epidemiologic risk factors; OR
  - fetus or neonate with congenital [microcephaly](#), congenital intracranial calcifications, other structural brain or eye abnormalities, or other congenital central nervous system-related abnormalities including defects such as clubfoot or multiple joint contractures
- Guillain-Barré syndrome or other neurologic manifestations

#### Laboratory Criteria

Recent ZIKV infection

- Culture of ZIKV from blood, body fluid, or tissue; OR
- Detection of ZIKV antigen or viral RNA in serum, CSF, placenta, umbilical cord, fetal tissue, or other specimen (e.g., amniotic fluid, urine, semen, saliva), OR
- Positive ZIKV IgM antibody test in serum or CSF with positive ZIKV neutralizing antibody titers and negative neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred.

Recent flavivirus infection, possible ZIKV

- Positive ZIKV IgM antibody test of serum or CSF with positive neutralizing antibody titers against ZIKV and dengue virus or other flaviviruses endemic to the region where exposure occurred
- Positive ZIKV IgM antibody test AND negative dengue virus IgM antibody test with no neutralizing antibody testing performed R

#### Epidemiologic Linkage

- Resides in or recent travel to an area with known ZIKV transmission; OR
- Sexual contact with a confirmed or probable case within the infection transmission risk window of ZIKV infection or person with recent travel to an area with known ZIKV transmission; OR
- Receipt of blood or blood products within 30 days of symptom onset; OR
- Organ or tissue transplant recipient within 30 days of symptom onset; OR
- Association in time and place with a confirmed or probable case; OR
- Likely vector exposure in an area with suitable seasonal and ecological conditions for potential local vectorborne transmission.

## **CASE CLASSIFICATION**

### **Confirmed disease case**

Meets clinical criteria for non-congenital disease; 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
- Positive ZIKV IgM antibody test of serum or CSF with positive ZIKV neutralizing antibody titers and negative neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred

### **Probable disease case**

Meets clinical criteria for non-congenital disease; AND

Has an epidemiologic linkage; AND

Has laboratory evidence of recent ZIKV or flavivirus infection by:

- Positive ZIKV IgM antibody test of serum or CSF with:
  - positive neutralizing antibody titers against ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred; OR
  - negative dengue virus IgM antibody test and no neutralizing antibody testing performed.

## **Infection that Does Not Meet Clinical Criteria, non-congenital**

### **Confirmed ZIKV Infection**

A person who does not meet clinical criteria for non-congenital disease; 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
- Positive ZIKV IgM antibody test of serum or CSF with positive ZIKV neutralizing antibody titers and negative neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred.

### **Probable ZIKV Infection**

A person who does not meet clinical criteria for non-congenital disease; BUT

Has an epidemiologic linkage; AND

Has laboratory evidence of recent ZIKV infection by:

- Positive ZIKV IgM antibody test of serum or CSF with:
  - positive neutralizing antibody titers against ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred; OR
  - negative dengue virus IgM antibody test and no neutralizing antibody testing performed.

## **CASE DEFINITION – Zika virus, congenital infection**

### **Clinical Description for Public Health Surveillance:**

- Liveborn infant with congenital [microcephaly](#), or intracranial calcifications, or structural brain or eye abnormalities, or other congenital central nervous system-related abnormalities not explained by another etiology

(As part of the complete evaluation of congenital microcephaly or other CNS birth defects, testing for other congenital infections such as syphilis, toxoplasmosis, rubella, cytomegalovirus infection, lymphocytic choriomeningitis virus infection, and herpes simplex virus infections should be considered. An assessment of potential genetic and other teratogenic causes of the congenital anomalies should also be performed.)

### **CASE CLASSIFICATION**

#### **Confirmed Congenital Disease Case**

A neonate meets the clinical criteria for congenital disease AND meets one of the following laboratory criteria:

- ZIKV detection by culture, viral antigen, or viral RNA in fetal tissue, umbilical cord blood, or amniotic fluid; OR neonatal serum, CSF, or urine collected within 2 days of birth; OR
- Positive ZIKV IgM antibody test of umbilical cord blood, neonatal serum or CSF collected within 2 days of birth with positive ZIKV neutralizing antibody titers and negative neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred

#### **Probable Congenital Disease Case**

A neonate meets clinical criteria for congenital disease; AND

The neonate's mother has an epidemiologic linkage or meets laboratory criteria for recent ZIKV or flavivirus infection; AND

The neonate has laboratory evidence of ZIKV or flavivirus infection by:

- Positive ZIKV IgM antibody test of serum or CSF collected within 2 days of birth; and
  - positive neutralizing antibody titers against ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred; OR
  - negative dengue virus IgM antibody test and no neutralizing antibody testing performed

**Infection that Does Not Meet Clinical Criteria, Congenital (Refer to next page)**

## **Infection that Does Not Meet Clinical Criteria, Congenital**

### **Confirmed Congenital Infection without disease**

Neonate who does not meet clinical criteria for a congenital disease case; BUT

The neonate has laboratory evidence of recent ZIKV or flavivirus infection by:

- ZIKV detection by culture, viral antigen or viral RNA in fetal tissue, umbilical cord blood, or amniotic fluid; OR neonatal serum, CSF, or urine collected within 2 days of birth; OR
- Positive ZIKV IgM antibody test of umbilical cord blood, neonatal serum or CSF collected within 2 days of birth with positive ZIKV neutralizing antibody titers and negative neutralizing antibody titers against dengue or other flaviviruses endemic to the region where exposure occurred

### **Probable Congenital Infection without disease**

Neonate who does not meet clinical criteria for a congenital disease case; BUT

The neonate's mother has an epidemiologic linkage or meets laboratory criteria for recent ZIKV or flavivirus infection; AND

The neonate has laboratory evidence of ZIKV or flavivirus infection by:

- Positive ZIKV IgM antibody test of serum or CSF collected within 2 days of birth; and
  - negative dengue IgM antibody test and no neutralizing antibody testing performed; or
  - positive neutralizing antibody titers against ZIKV and dengue or other flaviviruses endemic to the region where exposure occurred.

## LABORATORY ANALYSIS:

Public health testing for Zika virus **must be** coordinated between the clinician and the Kansas Department of Health and Environment (KDHE) Bureau of Epidemiology and Public Health Informatics (BEPHI) prior to specimen collection.

- A BEPHI epidemiologist must gather required clinical and exposure information from the clinician to determine if a patient meets the criteria for testing.
- For each patient that meets the established criteria, the BEPHI epidemiologist will work with the clinician and/or the local laboratory regarding specimen collection, forms, and shipping.
- For any patient not meeting the criteria for testing at a public health laboratory, the clinician is encouraged to consider the [CDC's recommendations for Zika testing](#) and the [details regarding FDA's Emergency Use Authorization for Zika testing](#) prior to making other arrangements.

**All specimens must be approved** prior to shipping to the public health laboratory. Contact the KDHE-BEPHI Epidemiologist-on-Call at 877-427-7317.

Criteria for testing (Additional scenarios will be evaluated case-by-case):

1. Clinical signs and symptoms
  - One or more of the following: acute fever, rash, arthralgia, conjunctivitis
  - A pregnant woman or newborn child may be approved for testing even if he or she is asymptomatic
2. Exposure to Zika virus via
  - Travel within the previous 12 weeks to [an area with ongoing transmission of Zika virus](#)
  - Sexual contact within the past 12 weeks with a person who traveled to [an area with ongoing transmission of Zika virus](#)
  - Mother-to-child transmission
  - Blood transfusion
  - Laboratory exposure
3. Availability of an appropriate clinical specimen that was collected within the timeframe required for testing (usually within 12 weeks of onset or exposure)

### Laboratory assays

The following laboratory assays can be performed and depend on the time from illness onset or time from the last exposure for asymptomatic pregnant females:

- RT-PCR
  - Preferred for acute phase of infection
  - Serum can be tested by PCR if collected within 7 days of illness.
  - Urine should be collected within 14 days of illness onset and must be accompanied by a patient-matched serum if specimens are collected within 7 days of onset.
  - Because of the decline in the level of viremia over time and possible inaccuracy in reporting of dates of illness onset, a negative rRT-PCR

result does not exclude Zika virus infection\*. In such cases, CDC recommends serologic testing by ELISA for Zika IgM antibody.

- Providers who request molecular testing for Zika virus infection from a commercial testing laboratory are advised to retain and store in a refrigerator (2-8°C) an aliquot of the patient's serum for subsequent Zika IgM ELISA testing if the rRT-PCR is negative.
- When no stored serum specimen is available, another serum specimen should be collected within 12 weeks of symptom onset for Zika IgM ELISA testing.
- IgM ELISA (serology):
  - Preferred test method for non-acute phase specimens or for asymptomatic pregnant women.
  - Preferred use  $\geq 8$  days after illness onset or  $\geq 2$  weeks after potential exposure for asymptomatic pregnant women and  $\leq 12$  weeks post-onset or exposure.
    - IgM antibodies may be detectable 4 days after illness onset, and typically persist up to 12 weeks post-onset of symptoms
    - Specimen collection within 7 days of onset may not have detectable Zika virus-specific IgM, and a convalescent specimen should be collected 2-3 weeks after the acute specimen testing.
  - IgM antibodies against Zika virus, dengue viruses, and other flaviviruses (such as yellow fever and West Nile virus) have strong cross-reactivity possibly generating false positive results and will be reflexed for plaque reduction neutralization testing which is only performed at CDC. The reflexed testing will require additional time prior to result being available.

*\* Because a negative rRT-PCR result alone does not exclude Zika virus infection, a patient should continue to follow the [precautions for avoiding pregnancy](#) as recommended by CDC even after receiving an negative rRT-PCR result.*

### Specimen collection and shipping

If a patient is suspected of having a Zika infection, a serum specimen must be collected, and a urine specimen is also requested for symptomatic patients. Other specimens may be collected depending on the situation, including CSF, amniotic fluid and tissue. Additional information on specimen collection can be found at: [www.cdc.gov/zika/hc-providers/body-fluids-collection-submission.html](http://www.cdc.gov/zika/hc-providers/body-fluids-collection-submission.html)

For serology or PCR testing, the specimen must be kept cold. The sample should be placed in an insulated container with ice packs.

To ensure specimen integrity:

- During hot weather, additional ice packs should be used.
- [Category B agent guidelines](#) must be followed during the packaging and shipping of the specimens.
- Specimens should only be shipped for delivery to the public health laboratory on Monday-Friday.

## EPIDEMIOLOGY

Zika virus was first discovered in 1947 in the Zika Forest of Uganda with the the first human cases detected in 1952. Prior to 2015, outbreaks had been reported in tropical Africa, Southeast Asia, and the Pacific Islands but probably occurred without detection in many locations as the symptoms of Zika are similar to many other diseases. In May 2015, the Pan American Health Organization issued an alert regarding a confirmed case in Brazil. Since then, the World Health Organization has declared Zika virus as a Public Health Emergency of International Concern and local transmission has been reported in many other countries and territories. Refer to [www.cdc.gov/zika/geo/index.html](http://www.cdc.gov/zika/geo/index.html) for additional information on specific areas where Zika is spreading and visit the [CDC Travel's Health](http://www.cdc.gov/travel) site for the most recent updated travel information.

## DISEASE OVERVIEW

### A. Agent:

Zika virus (flavivirus)

### B. Clinical Description:

The most common symptoms are fever, rash, joint pain, and conjunctivitis (red eyes). Other symptoms include headache and myalgia. Many infections may be asymptomatic or the usually mild symptoms are not noticed. Symptoms may last several days to a week. Hospitalization and death are rare. Zika virus infection is also associated with Guillain-Barre syndrome and infection during pregnancy can cause microcephaly and other severe fetal brain defects.

### C. Reservoirs:

Unknown. Nonhuman and human primates most likely the main reservoir.

### D. Mode(s) of Transmission:

- Bite of *Aedes* species mosquito that is infected with Zika virus.
- Perinatal transmission in utero.
- Sexual contact
- Blood transfusion

### E. Incubation Period:

Unknown, likely a few to 14 days.

### F. Period of Communicability:

Remains in blood of an infected person for about a week (can be longer).  
Remains in semen longer than in blood, specific duration unknown.

### G. Susceptibility and Resistance:

Once infected, a person is likely to be protected from future infections.

### H. Treatment:

There is no vaccine to prevent or medicine to treat Zika. Treat the symptoms.

## NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

As an arboviral disease, Zika is a notifiable condition, and cases or suspect cases shall be reported to the appropriate public health authorities\*.

1. Health care providers and hospitals: report to the local public health jurisdiction.
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)  
Bureau of Epidemiology and Public Health Informatics (BEPHI)  
Phone: 1-877-427-7317  
Fax: 1-877-427-7318**

\* **Immediately** contact the KDHE-BEPHI at (1-877-427-7317) for the following situations:

1. A patient with a Zika virus infection who has no history of travel to an area of known Zika transmission.
2. Patients with epidemiological link to another patient with confirmed infection (e.g., household member), if the patients have any of the four clinical findings: rash, fever, non-purulent conjunctivitis, or arthralgia.
3. All patients with laboratory evidence of Zika virus infection.
4. A bioterrorism situation is suspected.
5. A patient provides a history of donating or receiving blood or an organ.

### **Further responsibilities of state and local health departments to the CDC:**

As a nationally notifiable condition, confirmed and probable cases require a STANDARD report to the Center of Disease Control and Prevention (CDC).

1. STANDARD reporting requires KDHE-BEPHI to file an electronic report for within the next reporting cycle.
2. **Local public health jurisdiction** will report information requested as soon as possible, ensuring that the electronic form is completed within 7 days of receiving laboratory results.

### **US Zika Pregnancy Registry**

Pregnant women with Zika virus infection, whether symptomatic or asymptomatic, and their infants, will be reported by the KDHE to the [US Zika Pregnancy Registry](#).

Women are reported to the US Zika Pregnancy Registry if they have any laboratory evidence of possible Zika virus infection during pregnancy or the periconceptional period, which includes 6 weeks prior to last menstrual period (LMP) or 2 weeks after LMP.

Additional clinical and contact information and pregnancy and infant outcome information will be requested for cases identified in pregnant women and for all infants born to these women.

## INVESTIGATOR RESPONSIBILITIES

- 1) [Report](#) all Zika cases to the KDHE-BEPHI and assess the need for investigation.
  - Identify if the patient is pregnant or an infant.
    - KDHE-BEPHI staff will assume responsibility for cases with laboratory evidence of Zika virus during pregnancy; no further investigation is usually needed by local investigators.
  - Determine if laboratory results are pending.
    - If waiting on laboratory results, no immediate follow-up is usually needed until laboratory evidence of Zika virus infection is reported.
    - Follow-up may begin sooner if the local investigator is concerned that a patient who is undergoing testing did not receive the appropriate guidance on preventing further transmission of illness.
  - Initiate the case investigation within 1 day of notification of laboratory evidence of Zika virus infection.
  - Complete the investigation within 3 days of the notification of laboratory evidence of Zika virus infection.
- 2) Complete a review of any information that may have been collected prior to testing to determine what additional information may be needed.
- 3) If additional information is needed, contact the medical provider to collect missing information and to confirm diagnosis using current [case definition](#).
- 4) After the diagnosis has been verified for all confirmed and probable cases:
  - Collect all information requested in [Step 1](#) of case investigation.
  - Ensure that case/proxy is aware of the diagnosis.
  - Conduct a [case investigation](#) to determine the individual's risks of exposure and potential geographical location of exposure.
  - Conduct [contact investigation](#) to educate contacts and identify additional cases, as needed.
- 5) Throughout the investigation, continuously evaluate whether the potential infection is major public health concern, and initiate any needed control and prevention measures.
- 6) [Record](#) data collected during the investigation in the KS EpiTrax system under the data's associated [\[tab\]](#) in the case morbidity report (CMR).
- 7) As appropriate, use the disease [fact sheets](#) to notify the case, contacts and other individuals or groups.

## STANDARD CASE INVESTIGATION AND CONTROL METHODS

### Case Investigation

- 1) Contact the medical provider who ordered testing of the case and obtain the following information. (This includes medical records for hospitalized patients.)
  - Collect patient's demographics (address, birth date, gender, race/ethnicity, primary language, and phone number(s)). [Demographic]
  - Record onset date (approximate if exact date is not known) [Clinical]
    - Obtain clinical information on symptoms, including fever, chills/rigors, headache, fatigue/malaise, rash, nausea, vomiting, diarrhea, muscle weakness/pain, joint pains, arthritis, paresis/paralysis, stiff neck, ataxia, Parkinson/Cogwheel Rigidity, seizures, altered mental status, or any other symptoms [Investigation – Symptoms].
  - Record clinical complications: Guillain-Barré syndrome, meningitis, encephalitis, acute flaccid paralysis. [Investigation – Symptoms]
  - Record hospitalizations: location and duration of stay [Clinical]
  - Record outcomes: survived or date of death [Clinical]
  - Record pregnancy status for women. [Clinical]
  - Travel history in 15 days prior to illness onset? [Investigation – Exposure]
  - Obtain information on laboratory tests performed and results. If needed, obtain copies of laboratory reports that confirm the case. [Laboratory]
    - Attach copies to the EpiTrax record as needed. [Add Attachment]
- 2) Establish if the patient's illness is clinically compatible to the suspected agent.
  - Clinically compatible: Continue investigation for Zika virus infection.
  - Laboratory evidence of Zika virus infection but patient is pregnant:
    - Laboratory evidence of Zika virus during pregnancy will result in the female being reported to the [US Zika Pregnancy registry](#).
    - KDHE-BEPHI staff will assume responsibility for these cases and will continue to monitor the situation during this time period.
    - Communications will continue with involved medical providers during the duration of the pregnancy until the infants first full year of life.
    - Evidence collected during this monitoring may result in the clinical case definition being confirmed.
  - Not clinically compatible or pregnant: Determine if there are other reasons to continue the investigation. (Consultation can occur with KDHE-BEPHI.)
- 3) If a continued investigation is needed and the patient charts do not provide information on the following risk factors or travel, interview the case to determine risk factors and transmission settings within the incubation period of the specific infectious agent and after onset of symptoms. [Investigation – Exposure]
  - Verify/obtain travel history during the 15 days prior to illness onset.
    - Travel to other Kansas counties? (If yes, City/County and dates)
    - Was there travel outside of Kansas?
      - Travel in the U.S.? (If yes, City/State and dates)
      - Travel internationally? (If yes, City/Country and dates)
  - Exposure to mosquitoes: describe situation including geographical location of the exposure.

- Sexual contact (including vaginal, oral, and anal sex) with someone who may have been exposed to Zika virus (If yes, dates of sexual contact)
  - Occupation (including address of occupation) or hobbies, including any laboratory work.
  - Organ, tissue, blood donor (30 days before to 30 days after onset)
  - Organ, tissue, blood recipient (30 days before to 30 days after onset)
  - Breast feeding or potential in utero infection
- 4) Assess if the case-patient may have been exposed to Zika via local transmission:
- Case-patient had no travel outside of the United States.
  - Case-patient became ill after more than 14 days passed since returning from a Zika-affected area.
  - If there is the risk of local transmission:
    - Notify KDHE-BEPHI.
    - KDHE-BEPHI will consult with the CDC Arboviral Disease branch to determine if vector control and mosquito trapping/ testing should be considered.
    - Make healthcare providers aware of the situation and perform enhanced surveillance to identify additional cases.
    - Further guidance is available managing special situations - [Suspected local transmission of Zika virus](#).
- 5) Examining the epidemiological information, record where the infection was most likely imported from. (Indigenous or out-of-county, state, or U.S.)  
[Epidemiologic]
- 6) Collect information from case for the [Contact Investigation](#). (See below).
- 7) Investigate epi-links among cases (clusters in a geographic area and time period, household, co-workers, healthcare exposures, etc).

### Contact Investigation

- 1) Review the patient's occupation and activities that were collected during the case investigation and recorded on the [Epidemiological] and [Investigation-Exposure] tab, especially during the period 2 weeks prior to illness onset up until the time which precautions were taken to prevent transmission.
- 2) The following contacts should be identified:
  - Individuals exposed to the same source of Zika virus as the case
    - Travel companions to Zika-affected areas
    - Blood, semen and organ recipients
  - Individuals who were exposed to the case while communicable through an arthropod vector, sexual contact, or in utero transmission
    - Fetus or infant exposed in utero
    - Sexual partners within 2 weeks prior to and 6 months after case's illness onset
    - Blood, organ, and tissue recipients receiving products from case that were collected 30 days prior to or 30 days after the case's onset.

- Individuals living in the same household or neighborhood who may have been exposed to potentially infected mosquitoes
  1. If the case was bitten while viremic (for approximately 7 days after symptom onset), mosquitoes may be able to transmit Zika virus to others after an incubation period of approximately 7 days.
  2. Consider individuals within a one mile radius of where the case was bitten by mosquitoes
  3. Mosquitoes may be able to transmit Zika virus for up to 45 days after biting a source.
- 3) After identifying potential contacts, create a record in the **[Contact]** tab for each fetus or infant, pregnant contact, or symptomatic contact. **[Contact-'Edit Contact']**
- 4) Follow-up with pregnant or symptomatic contacts as instructed in [Contact Management](#).
  - KDHE-BEPHI will be responsible for follow-up with the fetus or infant

### Isolation, Work and Daycare Restrictions

The risk of local transmission should be mitigated by recommending that the case-patient stay in air conditioned or screened accommodations during the first week of illness and that mosquito breeding sites in and around the patient's home be reduced.

### Case Management

- 1) [Educate](#) the case-patient on measures to avoid disease transmission, including recommendations regarding sexual contact and recommendations listed in [Isolation, Work, and Daycare Restrictions](#)
- 2) Assess potential for case to transmit virus locally
  - Was patient bitten by mosquitoes in the continental US or Hawaii within the first week of illness?
    - If yes, record geographic location of the mosquito exposure

### Contact Management

- 1) Follow-up with the pregnant or symptomatic contacts **[Contact]**.
  - Inform contact of possible exposure to facilitate proper diagnosis and therapy.
  - Collect information on each contact's health status, noting any symptoms
    - Contacts should monitor themselves for Zika-like symptoms until 2 weeks after last exposure
  - Symptomatic individuals may consider seeing their physician and to be tested for Zika virus.
  - Exposed, asymptomatic pregnant women should see their physician and be tested for Zika virus.
  - [Educate](#) the contacts as needed.
  - If the number of contacts is large (e.g., a missionary group who traveled with the case), the LHD may ask a group spokesperson to distribute

information to every individual, rather than contacting individuals separately.

- 2) Assess the risk of local transmission:
  - Contact had no travel outside of the United States.
  - Contact became ill after more than 14 days passed since returning from a Zika-affected area.
- 3) If there is the risk of local transmission:
  - Notify KDHE-BEPHI.
  - KDHE-BEPHI will consult with the CDC Arboviral Disease branch to determine if vector control and mosquito trapping/ testing should be considered.
  - Make healthcare providers aware of the situation and perform enhanced surveillance to identify additional cases.
  - Further guidance is available managing special situations - [Suspected local transmission of Zika virus](#).
- 4) Report possible transfusion associated transmission (TAT) or organ transplantation transmission to KDHE-BEPHI immediately.
  - Possible transfusion or organ transplant transmission will be evaluated by KDHE to determine if a potential contact investigation is necessary. If a blood transfusion or organ transplant is suspected, coordinate with BEPHI.
  - KDHE-BEPHI will work with the LHD to:
    - Notify the CDC Arboviral Diseases Branch.
    - Determine dates, places, and lot numbers. [Investigation –Exposure]
    - Notify blood or tissue banks to quarantine remaining co-component blood or tissues and identify other possible exposed patients.
  - The following guidance will be used:
    - CDC Investigation Toolkit: Transfusion-transmitted Infections (TTI): <http://www.cdc.gov/bloodsafety/tools/investigation-toolkit.html>
    - Recipient and Donor TTI Investigation Forms: <http://www.cdc.gov/bloodsafety/tools/investigation-toolkit.html#tti>
- 5) Report the following to help summarize the contact management efforts:
  - Contacts of same source
    - Number of contacts
      - (a) Number of pregnant contacts
      - (b) Number of contacts ill with Zika-like symptoms
  - Contacts of this case-patient
    - Number of contacts
      - (a) Number of fetuses or infants exposed in utero \_\_\_\_\_
      - (b) Number of sexual contacts \_\_\_\_\_
      - (c) Number of contacts ill with Zika-like symptoms \_\_\_\_\_

## Environmental Measures

- 1) The most effective method for reducing mosquito populations is to eliminate stagnant water, where the female mosquito lays her eggs, and to target the larval stages. The control of adult mosquitoes is difficult and expensive.
- 2) To control mosquito breeding involve the community in the following:
  - Eliminate standing water: Check for water trapped in plastic covers on boats and swimming pools. Make sure rain gutters are clean and do not hold water. Fill or drain tree holes, stumps and puddles. Irrigate gardens and lawns carefully to prevent water standing for more than a few days.
  - If it is not possible to eliminate a standing water source:
    - Empty buckets, bowls, cans, bottles, used tires, bird baths and other containers preferably every 3 days but at least once a week.
    - Stock garden ponds with mosquito-eating fish, such as minnows and goldfish and aerate ponds and pools. Remove aquatic vegetation around the edges of garden ponds, to allow predatory fish and predatory insects to reach the mosquito larvae. When feasible, raise and lower the water level to allow predatory fish to reach the mosquito larvae.
    - Selectively use of larvicides, such as Bti, in standing water sources.
  - Additional information at: <http://entomology.k-state.edu/departments/info/associated-websites/west-nile-virus/mosquito-control.html>
- 3) Other mosquito control activities (public removal of mosquito breeding areas, larviciding, or adulticiding) are usually carried out by local governmental agencies. Actions are taken based upon an assessment of human risk and the appropriateness and feasibility of control measures.
  - The county or joint boards of health have the power and authority to examine and order, in writing, the removal of all nuisances and causes of sickness that in their opinion may be injurious to the health of the inhabitants in their jurisdiction (K.S.A. 65-159).
- 4) Additional measures that can assist with determining risk include:
  - Entomologic surveys: Inventory and mapping of mosquito populations with monitoring of larval and adult mosquito density provides measurements of vector population overtime to facilitate appropriate and timely responses to mosquito control. Differentiation between nuisance (non-vector) and vector mosquitoes may not always be done, but is important to note when evaluating the risk of human disease.
  - Testing of mosquito pools: Testing of mosquito pools is contracted through the University of Kansas. Information on positive pools is posted at [www.kdheks.gov/epi/arboviral\\_disease.htm](http://www.kdheks.gov/epi/arboviral_disease.htm).

## Education

- 1) Share and review information on the ZIKA Prevention CDC web page: [www.cdc.gov/zika/prevention/index.html](http://www.cdc.gov/zika/prevention/index.html)
- 2) Key messages for persons returning from Zika affected areas:
  - Advise to seek medical care if they develop a fever, rash, joint pain or red eyes within 2 weeks of travel.

- Take steps to prevent mosquito bites for 3 weeks after returning.
  - Women should avoid pregnancy for at least 8 weeks after returning.
  - Prevent sexual transmission by using condoms or abstaining from sexual activity (defined as vaginal, anal, or oral).
  - Delay donation blood or plasma until 4 weeks after returning.
- 3) Key messages for persons with Zika virus infection or disease:
- Prevent mosquito bites during the first week of illness.
  - Prevent sexual transmission by using condoms or abstaining from sexual activity (defined as vaginal, anal, or oral).
    - o Females until at least 8 weeks after symptoms onset.
    - o Males until at least 6 months after symptoms onset.
    - o Refer to: <http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e2.htm>
  - Delay donation of blood or plasma until 4 weeks after onset.
- 4) Key messages for pregnant women:
- Avoid travel to any area where Zika virus is spreading.
  - If you must travel to one of these areas, talk to your healthcare provider first and strictly follow steps to prevent mosquito bites during your trip.
  - Take steps to prevent getting Zika through sex with partners who may have travelled to Zika affected areas.
  - Refer to:
    - o [www.cdc.gov/zika/pregnancy/protect-yourself.html](http://www.cdc.gov/zika/pregnancy/protect-yourself.html)
    - o [www.cdc.gov/zika/pregnancy/question-answers.html](http://www.cdc.gov/zika/pregnancy/question-answers.html)
    - o <http://www.cdc.gov/mmwr/volumes/65/wr/mm6529e1.htm>
- 5) Key messages on personal protection measures against mosquitoes:
- Use an insect repellent on the skin. Products that contain DEET, IR3535, picaridin or oil of lemon eucalyptus are effective. Follow the label directions for all repellants closely.  
([www.cdc.gov/westnile/faq/repellent.html](http://www.cdc.gov/westnile/faq/repellent.html))
  - Wear protective clothing (long-sleeved and long pants) when practical.
  - Limit outdoor activities at dawn and dusk when mosquitoes are most active.
    - o Note that the *Aedes* species mosquitoes that transmit Zika are aggressive daytime biters and also bit at night.
  - Control mosquitoes at home:
    - o Review [www.cdc.gov/zika/prevention/controlling-mosquitoes-at-home.html](http://www.cdc.gov/zika/prevention/controlling-mosquitoes-at-home.html) for recommendation inside and outside the home.
    - o Repair and use windows and door screens.
    - o Keep windows and doors shut and use air-conditioning.
    - o Reduce source of mosquito breeding sites.
    - o Use outdoor flying insect spray.
    - o Kill mosquitoes inside home targeting areas most likely to rest.
    - o Use larvicide with Bti in water that cannot be drained or removed.
- 6) Public Information campaigns are a key component in the response to a possible arbovirus outbreak.

## MANAGING SPECIAL SITUATIONS

### A. Suspected local transmission of Zika virus by mosquito vector:

- One or more suspect Zika cases for which a known risk factor (e.g., recent travel of patient or sexual partner) cannot be identified and local transmission of Zika virus infection is being considered, notify KDHE immediately, 1-877-427-7317.
- Autochthonous (indigenous) transmission by mosquitoes should be assumed whenever a case is confirmed and other routes of exposure (e.g. travel, sexual contact, transfusion) have been evaluated and eliminated.
- If a confirmed case of local transmission is identified, KDHE will work with the local jurisdiction and the CDC to implement response measures as detailed in CDC's Interim Response Plan (<http://www.cdc.gov/zika/pdfs/zika-draft-interim-conus-plan.pdf>), including the following:
  - Identify the physical location of the case's most likely place(s) of exposure.
  - Target activities to suspected areas(s) of local transmission to identify if other recent cases are from the same/nearby mosquito pool.
    - Household members: prompt symptoms assessment and urine and serum PCR testing of household members
    - Close neighbors/neighborhood in suspected area: house-to-house surveys or survey at local gathering place, to identify if recently symptomatic people (onset <14 days-21 days earlier) and, whenever possible, obtain urine and serum specimens for testing by PCR.
  - Clinician outreach and communication activities will occur to healthcare providers in the county or jurisdiction of concern through local channels and KS-HANs. The purpose of the communication is to:
    - Intensify syndromic surveillance and surveillance for clusters of Zika-like illness.
    - Ensure that suspect cases will be tested and an investigation can occur as to if there is a single transmission chain or separate occurrences.
  - Community outreach efforts will be implemented with predeveloped messages to encourage care seeking and testing for confirmation, when appropriate for clinically compatible illnesses.
  - Enhance surveillance activities in areas contiguous to the location where local transmission likely occurred, especially when there is documented vector activity and high travel volume to the affected area under investigation.
  - Develop standing communication channels with vector control officials to share vital information and coordinate surveillance and vector control efforts.
- Additional action steps will be carried out as outlined in the national and state Zika response plan under the direction of the KDHE's designated incident commander.

## DATA MANAGEMENT AND REPORTING TO THE KDHE

- A. Accept the case assigned to the LHD and record the date the LHD investigation was started on the **[Administrative]** tab.
- B. Organize and collect data, using appropriate data collection tools including:
  - The [Zika Reporting Form](#) can be used to collect information.
  - Alternatively, investigators can collect and enter all required information directly into EpiTrax **[Investigation]**, **[Clinical]**, **[Demographics]**, **[Epidemiological]**, **[Contacts]** tabs.
  - During outbreak investigations, refer to guidance from a KDHE epidemiologist for appropriate collection tools.
- C. Report data collected during the course of the investigation via EpiTrax.
  - Verify that all data requested on the [Zika Reporting Form](#) has been recorded on an appropriate EpiTrax **[tab]**, or that actions are completed for a case lost to follow-up as outlined below.
  - Some data that cannot be reported on an EpiTrax **[tab]** may need to be recorded in **[Notes]** or scanned and attached to the record.
  - Paper report forms do not need to be sent to KDHE after the information is recorded and/or attached in EpiTrax. The forms should be handled as directed by local administrative practices.
- D. If a case is lost to follow-up, after the appropriate attempts to contact the case have been made:
  - Indicate 'lost to follow-up' on the **[Investigation]** tab with the number of attempts to contact the case recorded.
  - Record at least the information that was collected from the initial reporter.
  - Record a reason for 'lost to follow-up' in **[Notes]**.
- E. Once the investigation is completed, the LHD investigator will record the date the investigation was completed on the **[Administrative]** tab and click the "Complete" button. This will trigger an alert to the LHD Administrator so they can review the case before sending to the state.
  - The LHD Administrator will then "Approve" or "Reject" the CMR.
  - Once a case is "Approved" by the LHD Administrator, BEPHI staff will review and close the case after ensuring it is complete and that the case is assigned to the correct event, based on the reported symptoms reported. (Review the [EpiTrax User Guide, Case Routing](#) for further guidance.)

## **ADDITIONAL INFORMATION / REFERENCES**

- A. Treatment / Differential Diagnosis:** Red Book: 2015 Report of the Committee on Infectious Diseases. 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2015.
- B. Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual (CCDM), 20th Edition. Washington, DC, American Public Health Association, 2015.
- C. Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: [www.cdc.gov/nndss/](http://www.cdc.gov/nndss/)
- D. Kansas Regulations/Statutes Related to Infectious Disease:** [www.kdheks.gov/epi/regulations.htm](http://www.kdheks.gov/epi/regulations.htm)
- E. Additional Information (CDC):** [www.cdc.gov/zika/index.html](http://www.cdc.gov/zika/index.html)

**ATTACHMENTS**



## Guidance for those who may have been exposed to Zika virus

### Guidance for all travelers returning from Zika-affected areas

- Take steps to prevent mosquito bites for **three weeks, even if you do not feel sick**, to avoid the spreading of Zika to local mosquitoes. Consider the following:
  - Use insect repellent containing DEET, IR3535, picaridin or oil of lemon eucalyptus
    - Use repellents approved by EPA, and follow the directions on the label.
    - Apply sunscreen first, then repellent.
    - Insect repellent is safe for pregnant women.
    - Do not use insect repellents on infants less than 2 months old. Do not use repellent containing oil of lemon eucalyptus on children under age of 3. Do not allow young children to apply insect repellent themselves.
    - Do not apply insect repellent to a child's hands, eyes, mouth or any irritated skin or cuts.
  - Wear long sleeves and pants; dress children the same way. Wear clothing treated with permethrin (a chemical that repels insects).
  - Stay in places with air conditioning or window and door screens.
  - Use a mosquito bed-net if you cannot keep mosquitoes out of your residence. Cover cribs, strollers and baby carriers with mosquito netting.
  - Get rid of standing water that collects in and around your residence, because standing water attracts mosquitoes.

### Guidance on sexual contact\*

It is not known whether men or women with asymptomatic Zika virus infection can transmit the virus sexually, and it is not known how long Zika virus can be present in semen or vaginal fluid. Persons who want to reduce the risk for sexual transmission of Zika virus should abstain from sex, or correctly and consistently use condoms for vaginal, anal, and oral sex, as recommended in the current CDC guidance for up to 6 months after exposure to Zika virus.

*\* On Friday, July 15, the CDC reported the first documented case of sexual transmission of Zika from a woman to her sex partner. All previously reported cases of sexually transmitted Zika virus infection have been spread from men to their sex partners. Guidance on prevention of sexual transmission of Zika virus will be updated as additional information becomes available. For the most up-to-date information, see <http://www.cdc.gov/zika/transmission/sexual-transmission.html>.*

<b>Guidance for people who have sexual contact with someone possibly exposed to Zika virus</b>		
While traveling to a Zika-affected area	Use birth control and condoms correctly	
After returning home from a Zika-affected area	Women should continue using birth control to prevent pregnancy for eight weeks after returning home.	
	<b>Man has symptoms or positive Zika test</b>	Use condoms correctly every time you have vaginal, anal, or oral sex for <b>6 months</b> after returning home
	<b>Man has no symptoms and no positive Zika test</b>	Use condoms correctly every time you have vaginal, anal, or oral sex for <b>8 weeks</b> after returning home

<b>Guidance for pregnant women and their male sex partners</b>	
Pregnant woman who <b>did not</b> travel to a Zika-affected area	<b>Do not travel to a Zika-affected area during your pregnancy.</b> If it's not possible to delay travel, talk to a health care provider first, and take steps to protect yourself with traveling.
Pregnant woman who <b>did</b> travel to or resided in a Zika-affected area	Call your health care provider to discuss Zika testing.
Pregnant woman's <b>sex partner</b> has or might have Zika	Plan together to abstain from sexual activity or use condoms correctly every time you have vaginal, anal, or oral sex for the duration of the pregnancy. If you're pregnant and had condomless vaginal, anal or oral sex with a man or woman who has or might have Zika, contact your health care provider to discuss Zika testing.

<b>Guidance for people trying to conceive</b>		
People who <b>did not</b> travel to a Zika-affected area	<b>Do not travel to a Zika-affected area while trying to conceive.</b>	
Woman has traveled to or resided in a Zika-affected area	<b>Symptoms</b>	Wait <b>at least 8 weeks</b> after symptoms started before trying to conceive
	<b>No Symptoms</b>	Wait <b>at least 8 weeks</b> after last possible Zika exposure before trying to conceive
Man has traveled to or resided in a Zika-affected area	<b>Symptoms</b>	Wait <b>at least 6 months</b> after symptoms started before trying to conceive
	<b>No Symptoms</b>	Wait <b>at least 8 weeks</b> after last possible Zika exposure before trying to conceive

**Questions regarding this guidance can be directed to the Kansas Department of Health and Environment Epidemiology Hotline (877)427-7317.**



## Commercial Laboratory Zika Virus Testing Information and IgM Testing Procedure

### Commercial Zika Virus Testing Information

- Travelers who are symptomatic after returning from a Zika-affected area should be tested for Zika virus by real-time reverse-transcription polymerase chain reaction (rRT-PCR).
- Several PCR tests for Zika virus are now available commercially under the federal Food and Drug Administration (FDA) Emergency Use Authorizations. For additional information, visit <http://www.fda.gov/MedicalDevices/Safety/EmergencySituations/ucm161496.htm#zika>.
- However, the commercially laboratories do not offer Zika virus IgM enzyme-linked immunosorbent assay (ELISA) or confirmatory serologic testing (plaque reduction neutralization test, or PRNT).
- **Providers should store a serum aliquot for subsequent Zika virus IgM MAC-ELISA testing at the state laboratory in the event the PCR is negative.** 2 mLs of serum should be collected between 4 days and 12 weeks after symptom onset.
- For specimens that are PCR negative and a serum aliquot was not saved, another serum specimen should be collected within 12 weeks of symptom onset for Zika virus IgM MAC-ELISA testing.
- Blood should be collected and processed per routine guidelines (collected in a serum separator tube with serum aliquots transferred to new vials), and stored in a refrigerator (2-8°C) until it is known if additional IgM testing is indicated.
- **Call KDHE's Epidemiology Hotline at (877) 427-7317 if you wish to conduct Zika IgM MAC-ELISA testing.**
- **Patients who do not meet the clinical AND epidemiological (travel history or sexual exposure to an individual with suspected Zika virus infection) criteria will not qualify for IgM testing.**

### Why is there a need for additional testing after a PCR negative result?

- Additional testing may be indicated because of the decline in the level of viremia over time and possible inaccuracy in reporting of the dates of illness onset. As with all diagnostic tests, a negative result does not rule out infection.

***Questions regarding this guidance can be directed to the Kansas Department of Health and Environment Epidemiology Hotline (877) 427-7317.***