

# CHIKUNGUNYA VIRUS

*Guidance for Michigan local health departments  
and healthcare providers*

## Chikungunya virus disease case investigation, diagnosis, and reporting for Michigan local health departments and healthcare providers

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### Information and contacts

Michigan Department of Community Health, Communicable Disease Division: 517-335-8165

More information is available at <http://www.cdc.gov/chikungunya/>.

Michigan Department of Community Health  
Communicable Disease Division  
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Michigan Department  
of Community Health



## Scenario 1: Patient with clinical illness but chikungunya virus (CHIKV) testing not yet performed

1. Obtain or confirm initial clinical and epidemiologic data
  - a. Demographics (age, sex, place of residence)
  - b. Clinical symptoms
  - c. Date of illness onset
  - d. Hospitalization
  - e. Travel history in 2 weeks prior to illness onset
2. Establish if the patient has a clinically compatible illness of fever and polyarthralgia or polyarthritis
  - a. Clinically compatible illness: Continue investigation for possible chikungunya virus or other arboviral infections (this may include Dengue virus if travel to the Caribbean is indicated).
  - b. No clinically compatible illness: Determine if there are other reasons to continue investigation for possible chikungunya virus or other arboviral infections.
3. Assess for possible travel-associated versus locally-acquired infection
  - a. Recent travel: Determine the specific dates and location of travel in the 2 weeks prior to illness onset. (See <http://www.cdc.gov/chikungunya/geo/americas.html> for the current list of North American countries and states with local transmission of CHIKV.) If recent travel to area with no known local transmission, notify MDCH Communicable Disease (CD) Division (517-335-8165).
  - b. Norecent travel: Determine if the local health department or healthcare provider is aware of other similar cases in the area or among contacts of the patient. If concern of local transmission in Michigan, notify MDCH CD Division (517-335-8165).
4. Assess risk of being viremic while in United States and Michigan
  - a. No travel outside the United States
  - b. Onset of symptoms within the last 7 days, or
  - c. Returned to the United States <7 days after illness onset
5. If risk of viremia while in the U.S. and Michigan, assess and mitigate risk of local transmission
  - a. In Michigan, out of an abundance of caution, it is recommended that the case-patient stay in air conditioned or screened accommodations during the first week of illness and reduce mosquito breeding sites in and around the patient's home. However, the mosquitoes that transmit chikungunya (*Aedes aegypti* and *Aedes albopictus*) are not suited to Michigan's climate, and populations of these mosquitoes have not been identified in the state. Local transmission of chikungunya is unlikely.
  - b. For patients residing in other U.S. locations, notify the state health department about the potential risk for local transmission.
6. Ensure laboratory testing is performed for chikungunya and dengue viruses and obtain results [Appendix A]
  - a. Positive test results: Complete case investigation [Scenario 2]
  - b. Negative test results: Determine if additional testing is needed

## Scenario 2: Patient with positive chikungunya virus test results

1. Perform standard case investigation to obtain or confirm clinical and epidemiologic data
  - a. Demographics (age, sex, race/ethnicity, place of residence)
  - b. Clinical symptoms and syndrome
  - c. Date of illness onset
  - d. Hospitalization and outcome
  - e. Travel history in 2 weeks prior to illness onset
  - f. Organ, tissue, or blood donor or recipient
  - g. Pregnant or breast feeding
  - h. Contacts with similar illness
2. If the patient is a recent organ, tissue (e.g., corneas, skin), or blood donor or recipient
  - a. Notify blood or tissue banks
  - b. Quarantine remaining co-component blood or tissues
  - c. Identify other possibly exposed patients
  - d. Notify MDCH (517-335-8165)
3. Assess for possible travel-associated versus locally-acquired infection
  - a. Recent travel: Determine the specific dates and location of travel in the 2 weeks prior to illness onset. (See <http://www.cdc.gov/chikungunya/geo/americas.html> for the current list of North American countries and states with local transmission of CHIKV.) If recent travel to area with no known local transmission, notify MDCH CD Division (517-335-8165).
  - b. No recent travel: Determine if the local health department or healthcare provider is aware of other similar cases in the area or among contacts of the patient. If concern of local transmission in Michigan, notify MDCH CD Division (517-335-8165).
4. Assess evidence or risk of being viremic while in United States and Michigan
  - a. Positive RT-PCR or viral culture?
  - b. No travel outside the United States?
  - c. Returned to the United States <7 days after illness onset?
  - d. Onset of symptoms within the last 7 days?
5. If evidence (PCR +) or risk of viremia, assess and mitigate risk of local transmission
  - a. In Michigan, out of an abundance of caution, it is recommended that the case-patient stay in air-conditioned or screened accommodations during the first week of illness and reduce mosquito breeding sites in and around the patient's home. However, the mosquitoes that transmit chikungunya (*Aedes aegypti* and *Aedes albopictus*) are not suited to Michigan's climate, and populations of these mosquitoes have not been identified in the state. Local transmission of chikungunya is unlikely.
  - b. For patients residing in other U.S. locations, notify the state health department where the patient resides about the potential risk for local transmission.
6. If there is evidence of local transmission (confirmed or probable case with no travel outside the U.S. and/or Michigan in the two weeks prior to illness onset)
  - a. Notify MDCH (517-335-8165)
  - b. Work with local health department and vector control agencies to determine vector control options
  - c. Inform the public of the potential transmission risk and prevention measures

## Scenario 2: Patient with positive chikungunya virus test results (continued)

7. Determine chikungunya case classification [Appendix B]
  - a. Confirmed or probable case: Report case to MDCH selecting the “Unusual Occurrence” form in MDSS, and enter “CHIKUNGUNYA” in the text box at the top of the form. Place Clinical and Epidemiological information listed in 1. into the “Notes” section of the form, or complete the CHIKV Case Investigation form (Appendix C) and attach to the Notes Section.
  - b. Indeterminate: Decide if additional testing is needed
  - c. Not a case: Notify healthcare provider and relevant partners

## Appendix A. Diagnostic testing for chikungunya virus

### Laboratories that perform chikungunya diagnostic testing (as of June 2014)

- CDC Arboviral Diseases Branch (Fort Collins, CO)
  - To obtain diagnostic testing from the CDC Arboviral Diseases Branch, please contact the MDCH Communicable Disease Division for assistance (517-335-8165) during normal business hours.
- Focus Diagnostics
- Most commercial laboratories can perform or arrange for Dengue virus testing

### Chikungunya virus diagnostic assays\*

- Viral culture
- Reverse transcriptase-polymerase chain reaction (RT-PCR)
- Enzyme-linked immunosorbent assay (ELISA) or immunofluorescence assay (IFA) for immunoglobulin IgM or IgG antibodies
- Plaque reduction neutralization test (PRNT)
- Immunohistochemical staining (IHC)

### Routine chikungunya virus diagnostic testing performed on serum specimens at CDC

- RT-PCR:  $\leq 5$  days after illness onset<sup>†</sup>
- IgM antibody tests:  $\geq 5$  days after illness onset<sup>‡</sup>

### Consider testing for both dengue and chikungunya

- Viruses transmitted by same mosquitoes
- Diseases have similar clinical features
- Viruses can circulate in same areas and cause co-infections
- Important to rule out dengue, as proper clinical management can improve outcome
- WHO dengue clinical management guidelines are available at:  
[http://whqlibdoc.who.int/publications/2009/9789241547871\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241547871_eng.pdf)

\* *Biosafety in Microbiological and Medical Laboratories (BMBL) 5<sup>th</sup> edition recommends that chikungunya virus be handled under biosafety level 3 (BSL-3) containment.*

† Viral RNA may be detected in serum for up to 8 days after onset of symptoms.

‡ IgM antibodies are generally first detectable at 4 to 8 days after onset of illness and can persist for months. Serum collected within 8 days of illness onset may not have detectable IgM antibodies and testing should be repeated on a convalescent-phase sample to rule out infection in those with a compatible clinical syndrome.

## Appendix B. Chikungunya case definitions and classifications

### Confirmed case\*

A person with fever or chills as reported by the patient or a health-care provider, absence of a more likely explanation, and one or more of the following laboratory criteria:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, or other body fluid, OR
- Four-fold or greater change in virus-specific quantitative antibody titers in paired serum samples, OR
- Virus-specific IgM antibodies in serum with confirmatory neutralizing antibodies (PRNT) in the same or a later specimen

### Probable case\*

A person with fever or chills as reported by the patient or healthcare provider, absence of a more likely explanation, and virus-specific IgM antibodies in serum but with no other testing

### Suspected Case

A person with acute onset of fever and severe arthralgia or arthritis not explained by other medical conditions, and who resides or has visited epidemic or endemic areas within 2 weeks before the onset of symptoms

### Indeterminate

A suspected case without a more likely explanation and negative chikungunya virus testing but no virus-specific IgM or neutralizing antibody testing performed on a serum specimen collected  $\geq 8$  days after illness onset

### Not a case

A suspected case with negative virus-specific IgM or neutralizing antibodies in serum collected  $\geq 8$  days after illness onset or evidence of a more likely explanation for their illness

\*Report confirmed and probable cases into MDSS using the existing CSTE position statement, case definition, data variables, and mechanisms for “Arboviral Diseases, neuroinvasive and non-neuroinvasive”. (Appendix C is provided as a guide for data collection and reporting). More information is available at <http://www.cdc.gov/nndss/>.

# Appendix C. CHIKV Supplemental Case Investigation Form

**Patient name and DOB or MDSS#:** \_\_\_\_\_

**Date of Illness onset:** \_\_\_\_\_

**Hospitalized/outcome:** \_\_\_\_\_

**Clinical Symptoms: (check all that apply)**

- Fever
  - Chills
  - Rash
  - Headache
  - Fatigue or malaise
  - Nausea or vomiting
  - Diarrhea
  - Myalgia
  - Arthralgia
  - Arthritis
  - Other symptoms \_\_\_\_\_
- \_\_\_\_\_

**Travel History in 2 weeks prior to illness onset (location and dates):** \_\_\_\_\_

\_\_\_\_\_

**Organ, tissue, or blood donor recipient in 30 days prior to illness onset?**     Yes     No

**Pregnant or Breastfeeding?**     Yes     No

**Contacts with similar illness: List** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Notes:** \_\_\_\_\_

\_\_\_\_\_