

CHIKUNGUNYA VIRUS

Guidance for U.S. state and territorial health departments

Chikungunya virus disease case investigation, diagnosis, and response for U.S. state and territorial health departments

Scenarios

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Information and contacts

The CDC Arboviral Diseases Branch in Fort Collins, Colorado is responsible for chikungunya surveillance, response, and diagnostic testing.

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

For questions or reporting, please contact the Arboviral Diseases Branch on call epidemiologist at 970-221-6400.

Scenario 1: Patient with clinical illness but chikungunya virus testing not yet performed

1. Establish if the patient has a clinically compatible illness [Appendix A]
 - a. Clinically compatible illness: Obtain patient age, sex, state and county of residence, clinical symptoms (e.g., fever, polyarthralgia, polyarthritis), hospitalization status, date of illness onset, and travel in the 2 weeks prior to onset.
 - b. No clinically compatible illness: Determine if there are other reasons to continue investigation for possible chikungunya virus or other arboviral infections.
2. 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. If recent travel to area with no known local transmission, notify CDC Arboviral Diseases Branch.
 - 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 a new area, notify CDC Arboviral Diseases Branch.
3. Ensure laboratory testing is performed for chikungunya and dengue viruses [Appendix B]
4. Obtain test results and determine chikungunya case classification [Appendix A]
 - a. Confirmed or probable case: Proceed with case investigation [Scenario 3].
 - b. Not a case: Notify healthcare provider and relevant partners.
 - c. Indeterminate: Consider if additional testing is warranted.

Scenario 2: Patient with chikungunya virus test results

1. Establish if the patient has a clinically compatible illness [Appendix A]
 - a. Clinically compatible illness: Proceed with case classification
 - b. No clinically compatible illness: Determine if there are other reasons to continue investigation

2. Determine chikungunya case classification [Appendix A]
 - a. Confirmed or probable case: Proceed with case investigation [Scenario 3]
 - b. Not a case: Notify healthcare provider and relevant partners
 - c. Indeterminate: Consider if additional testing is warranted

Scenario 3: Patient with confirmed or probable chikungunya virus infection

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 CDC Arboviral Diseases Branch
3. If travel within 2 weeks prior to illness onset to an area with no known local transmission, notify CDC Arboviral Diseases Branch and the state/territorial health department.
4. Assess evidence or risk of being viremic while in United States
 - a. Positive RT-PCR or viral culture
 - b. Onset of symptoms within the last 7 days
 - c. Returned to the United States <7 days after illness onset
5. If evidence or risk of viremia, assess evidence or risk of local transmission
 - a. Consult with local health department, vector control agencies, and/or CDC Arboviral Diseases Branch to assess whether *Aedes aegypti* or *Ae. albopictus* mosquitoes are likely present and active in the local area, and determine if mosquito trapping and testing should be considered in the area around the case
 - b. Work with local public health officials and healthcare personnel to perform surveillance for people with similar illnesses in the community
 - c. Recommend 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
6. If there is evidence of local transmission
 - a. Discuss with local health department and vector control agencies to determine if vector control should be conducted in the area
 - b. Inform the public of the potential transmission risk and prevention measures
 - c. Notify CDC Arboviral Diseases Branch
7. Report the case to ArboNET

Appendix A. Proposed case definition for chikungunya virus disease

Clinically compatible illness

- Fever or chills as reported by the patient or a health-care provider, AND
- Arthralgia or arthritis involving two or more joints, AND
- Absence of a more likely clinical explanation

Confirmed case

A person with a clinically compatible illness and one or more of the following:

- 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 determined by plaque reduction neutralization test (PRNT) or immunofluorescence assay (IFA) in paired serum samples, OR
- Virus-specific IgM antibodies in serum or other body fluid with confirmatory virus-specific neutralizing antibodies in the same or a later specimen

Probable case

A person with a clinically compatible illness and virus-specific IgM antibodies in serum or other body fluid but with no virus-specific neutralizing antibody testing performed

Not a case

A person with negative virus-specific IgM or neutralizing antibodies in serum collected ≥ 8 days after illness onset or evidence of a more likely explanation for their illness

Indeterminate

A person with a clinically compatible illness with negative chikungunya virus testing performed on specimens collected < 8 days after illness onset but no virus-specific IgM or neutralizing antibody testing performed on a serum specimen collected ≥ 8 days after illness onset

Appendix B. Diagnostic testing for chikungunya virus

Laboratories that perform chikungunya diagnostic testing (as of January 2014)

- CDC Arboviral Diseases Branch (Fort Collins, CO)
- California, Florida, and New York State Departments of Health
- Focus Diagnostics

Chikungunya virus diagnostic assays*

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

Optimal timing for use of chikungunya virus diagnostic assays

- Viral culture: ≤3 days after illness onset
- RT-PCR: ≤8 days after illness onset
- IgM antibody tests: ≥4 days after illness onset†

Rationale for distinguishing dengue from 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

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

† 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.