

# Chikungunya-draft

## 1. REPORTING AND FOLLOW-UP

### 1.1 Purpose of Reporting and Surveillance

1. To characterize the epidemiology and clinical aspects of the disease.
2. To monitor disease trends, and recognize outbreaks and local transmission.
3. To identify cases during their infectious period and to prevent transmission to local mosquito vectors.
4. To provide education and recommend preventive measures.

### 1.2 Laboratory and Physician Reporting Requirements

1. Health care providers, health care facilities, and clinical laboratories are required to report chikungunya to the local public health department within one local public health authority working day.
2. Laboratories are asked to submit preliminary positive samples to the Oregon State Public Health Laboratory (OSPHL) for confirmatory testing at CDC.

### 1.3 Local Health Department Reporting and Follow-Up Responsibilities

1. Report suspect and confirmed cases to the Oregon Health Authority (OHA) by the end of the calendar week of the initial physician/lab report.
2. Begin the investigation within one working day. Enter case in Orpheus as “Chikungunya.” Case report form located at: <https://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/ReportingForms/Documents/chikungunya-draft.pdf>.
3. Attempt to identify the source of infection, and whether the case traveled as part of a larger group. If so, discuss the merits of additional testing of symptomatic fellow travel companions.
4. Advise avoidance of mosquito bites if the case is in the infectious period (1st week of illness).
5. Ensure that the laboratory forwards preliminary positive samples to OSPHL for confirmatory testing at CDC.

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

Chikungunya fever (CHIK) is a mosquito-borne, dengue-like illness identified in east Africa (Tanzania) and Asia during the 1950s, but imported into the Americas during December 2013. The name "chikungunya" derives from a Makonde word roughly meaning “that which bends,” describing the characteristic appearance of sufferers contorted by the painful arthralgias. The Makonde ethnic group lives in southeast Tanzania and northern Mozambique; epidemics of fever, rash and arthritis resembling CHIK have been reported in the region since the 1770s.

Unlike West Nile virus, humans are not a dead end host. The virus (CHIKV) is transmitted in a human-to-mosquito-to-human cycle (autochthonously); *Aedes aegypti* and *Aedes albopictus* mosquitoes are the major known vectors, and although they are not found in Oregon, other *Aedes* spp. mosquitoes are. In 2007, an outbreak involving 250 people in northern Italy ensued after a viremic traveler from India introduced the virus into the local mosquito population.

Historically, CHIKV appeared cyclically (every 4–30 years). Since 2004, CHIKV has expanded beyond its traditional geographical range of Africa and Asia. Cases have been reported in the Caribbean, Haiti, Central and South America, Africa, Southern Europe, Southeast Asia, Micronesia, and islands in the Indian and Pacific Oceans. In July 2014, two locally acquired cases of CHIK were confirmed in Florida. In Oregon, CHIKV infection has been reported among travelers returning from the Caribbean, including Haiti. For CHIK’s current distribution, consult the CDC CHIKV Geographic Distribution Map: [www.cdc.gov/chikungunya/geo/index.html](http://www.cdc.gov/chikungunya/geo/index.html).

As the Florida cases demonstrated, CHIK has the potential for ongoing transmission in the United States: we have humans, some of whom travel, and we have the *Aedes* vectors.

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## 2.1 Etiologic Agent

CHIKV is an RNA virus that belongs to the *Alphavirus* genus in the *Togaviridae* family. It was first isolated during an outbreak in Tanzania, 1952–1953.

## 2.2 Description of Illness

CHIK is characterized by acute fever and severe arthralgia, commonly affecting more than 1 joint (polyarthralgia). Other symptoms (in order of frequency) include: rash, headache, muscle pain (myalgia), nausea, vomiting, conjunctivitis, swollen joints (periarticular edema), back pain, polyarthrititis, and leukopenia (WBC <5000/ $\mu$ L). Liver enzymes and inflammatory markers (erythrocyte sedimentation rate, C-reactive protein) can be elevated, too. Atypical manifestations include: meningoencephalitis, seizures, optic neuritis, myocarditis, arrhythmias, photosensitive hyperpigmentation, vesicubullous dermatosis, nephritis, and bleeding dyscrasias.

Those at risk for more severe disease include newborn infants, adults  $\geq 65$  years of age, and persons with medical conditions such as high blood pressure, diabetes, or heart disease.

Acute CHIK can resemble dengue fever on initial presentation; dengue should be included in the initial diagnostic work-up because of its severe hemorrhagic complications. In countries with endemic CHIK and dengue fevers (e.g., Haiti), the following table may be helpful:

Feature	Chikungunya	Dengue
Fever ( $>39^{\circ}\text{C}$ )	+++	++
Arthralgia	+++	+/-
Arthritis	+	-
Headache	++	++
Rash	++	+
Myalgia	+	++
Hemorrhage	+/-	++
Shock	-	+
Lymphopenia	+++	++
Neutropenia	+	+++
Thrombocytopenia	+	+++
Hemoconcentration	-	++

## 2.3 Reservoirs

CHIKV has the potential for ongoing transmission in the United States because humans are reservoirs of the virus during epidemics. Between epidemics, implicated reservoirs have included non-human primates, rodents, birds, and some small mammals.

## 2.4 Sources and Modes of Transmission

CHIKV is transmitted by *Ae. aegypti* and *Ae. albopictus* mosquitoes, which are found in the U.S.: south-east and central east states, Texas, New Mexico, and Arizona and as far north as Central California. Although *Ae. aegypti* and *Ae. albopictus* are not currently found among Oregon mosquito populations, other *Aedes* spp. are (*Ae. japonicus*) are; their potential for effective transmission of CHIKV is unknown, and we'd rather not find out.

## 2.5 Incubation Period

Mosquitoes acquire the virus from a viremic host. Following an average (extrinsic) incubation period of 10 days, the mosquito is then able to transmit the virus to a naïve host, such as a human. The time between the infectious mosquito bite and symptom onset in an infected human (i.e., the "intrinsic" incubation period) is usually 3–7 (range 1–12) days. More than 75% of infected people become symptomatic. Acute illness lasts 7–10 days; however, symptoms of chronic or recurrent joint pain can persist for months.

## 2.6 Period of Communicability

The case is infectious with a high viral load starting two days before and ending one week after illness onset. CHIKV is usually transmitted via infected mosquitoes.

Most CHIKV infections that occur during pregnancy will not result in viral transmission to the fetus; reports of spontaneous abortions are rare. The exception is if the mother becomes viremic during the perinatal period (-4 days before and +1 days after delivery), during which time vertical transmission from mother to infant is as high as 49%. Cesarean section does not appear to prevent transmission. Neonatal CHIK is associated with fever, poor feeding, pain, distal edema, various skin manifestations, seizures, meningoencephalitis, and echocardiographic abnormalities in the newborn. There is no evidence that CHIK is transmitted through breast milk. (Source: PAHO/CDC, 2011)

## 2.7 Treatment

There is no specific treatment or vaccine for acute CHIKV. Treatment is supportive; acetaminophen is the analgesic of choice until other etiologies, like dengue, are ruled out. Aspirin is not advised because of the risk of bleeding. Providers should consider other causes of fever in the returning traveler (i.e., dengue, malaria, typhoid, tickborne-rickettsiae, HIV, schistosomiasis, leptospirosis), and educate patients on bug bite prevention. (See §5.4 for treatment of chronic cases).

## 3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES

Case definition for acute chikungunya fever (adopted from PAHO/CDC, 2011):

### 3.1 Confirmed Case Definition

A patient with acute onset of fever  $>38.5^{\circ}\text{C}$  ( $101.3^{\circ}\text{F}$ ) and severe arthralgia or arthritis not explained by other medical condition, and who resides or has visited epidemic or endemic areas within 2 weeks prior to the onset of symptoms, with any of the following CHIKV-specific tests:

- Presence of virus-specific IgM antibodies in a single serum sample collected in either the acute or convalescent stage, confirmed by CDC lab.
- Four-fold rising of IgG titers in samples collected at least 2 weeks apart, confirmed by CDC lab.
- Presence of viral RNA by RT-PCR.
- Isolation of CHIKV from blood or tissue.

### 3.2 Presumptive Case Definition

A patient with acute onset of fever  $>38.5^{\circ}\text{C}$  ( $101.3^{\circ}\text{F}$ ) and severe arthralgia or arthritis not explained by other medical condition, and who resides or has visited epidemic or endemic areas within 2 weeks prior to the onset of symptoms, with any of the following CHIKV-specific tests:

- A single positive IgM or IgG result from a commercial lab (not CDC).

### 3.3 Suspect Case Definition

A patient with acute onset of fever  $>38.5^{\circ}\text{C}$  ( $101.3^{\circ}\text{F}$ ) and severe arthralgia or arthritis not explained by other medical condition, and who resides or has visited epidemic or endemic areas within 2 weeks prior to the onset of symptoms.

### 3.4 Non-acute Cases

Those persons with a remote history of fever, severe arthritis or arthralgia not explained by another medical condition, a negative IgM, and a single positive IgG could represent resolved CHIK cases. Enter these as "No Case".

### 3.5 Laboratory Testing and Diagnosis

Serological testing (IgM, IgG) is available at Focus Diagnostics (a.k.a., Quest Diagnostics Inc.), Cypress, California (Client Services: 800-445-4032), and the Centers for Disease Control and Prevention (CDC).

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Commercial testing has a faster reporting time, but is considered preliminary; confirmatory testing is available only through the CDC at this time.

To arrange for CDC confirmatory testing: Contact ACDP to inform the on-call Epi of case and testing. Send new samples or forward existing preliminary positive serum specimens to OSPHL, along with the CDC Specimen Form.

CDC Specimen Form: Go to the following OSPHL webpage, and follow instructions for CDC specimen submission: <http://public.health.oregon.gov/LaboratoryServices/Pages/CDC-Testing.aspx>. Allow 3–4 week turnaround for confirmatory testing.

When an LHD arranges forwarding of an existing preliminary positive sample from a reference lab to OSPHL, the LHD may fax the CDC Specimen Form to: 503-693-5605, OSPHL Virology/Immunology.

### 3.6 Specimen Collection

The preferred specimen is serum. Obtain an acute specimen within the first 8 days of illness, and a convalescent specimen at least 2 thereafter. (However, sometimes a robust IgG response may be seen as early as 10 days later).

The best collection tube is a serum separator (typically tiger/speckled-top). The blood should be allowed to coagulate and the tubes spun to separate the serum from the clot prior to shipping. If a red-top is used (no additive), the blood must be allowed to coagulate, the tube centrifuged, and the serum drawn off into a clean tube prior to shipping. Tubes with a heparin (green top) or EDTA (purple top) are unsuitable for CHIKV testing. Transport serum for IgM and IgG serological testing at 2–8°C (icebox).

Other types of specimens are rare: CSF (meningoencephalitis), synovial fluid (arthritis with effusion), or autopsy material. PCR testing and viral isolation on specimens collected during the first 8 days of illness are performed only at specialty labs. Serum, CSF, or tissue to be tested using PCR or viral isolation should be frozen (–20°C). (Source: PAHO/CDC, 2011)

## 4. ROUTINE CASE INVESTIGATION

Complete the fields in Orpheus regarding patient demographics, clinical information, laboratory data, risk factor information, and travel history.

### 4.1 Identify Source of Infection

Obtain history of any travel during the 14 days prior to illness onset. Note any “smoking gun” exposures — mosquitoes, mosquitoes, mosquitoes. *Aedes* mosquitoes bite during the day, too.

### 4.2 Identify Potentially Exposed Persons

Ask about fellow travelers who experienced similar symptoms.

### 4.3 Environmental Evaluation

See §5.6 Environmental Measures for more information.

## 5. CONTROLLING FURTHER SPREAD

### 5.1 Education

When planning a trip, travelers should check their destination for potential health risks, vaccine-preventable diseases, and tips on protecting their health (e.g., preventing bug bites): [wwwnc.cdc.gov/travel/destinations/list](http://wwwnc.cdc.gov/travel/destinations/list). Methods effective in preventing mosquito bites during both day and night barriers both include physical (e.g., long sleeves, bed nets) and chemical (See EPA approved repellents. <http://cfpub.epa.gov/oppreff/insect/>.) (Source: CDC, Protection Against Mosquitoes, 2013)

### 5.2 Infection Control Recommendations

People suspected of having CHIK should diligently protect themselves from further mosquito exposure during the first week of illness to prevent ongoing transmission of the virus. *Ae. aegypti* and *Ae. albopictus* bite during the daytime, dawn to dusk, and even in the presence of artificial light.

Direct contact with viremic blood can transmit CHIKV: 1 case of a needle-stick transmission and several cases of laboratory workers contracting CHIK after handling infected blood have been reported. Transmission through respiratory droplets or particles has not been reported.

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### 5.3 Protection of Contacts

There is no human-to-human transmission, except through maternal-child transmission or direct contact with infected blood (e.g., needle sticks).

### 5.4 Follow up of Cases

Some cases experience recurrent or chronic joint symptoms after the acute infection has resolved. Some cases may require short courses of narcotics or corticosteroids during the convalescent period. Movement and mild exercise tend to improve morning stiffness and pain, but heavy exercise may exacerbate symptoms. (Source: PAHO/CDC, 2011)

### 5.5 Isolation and Work or Care Restrictions

Prevent mosquito exposure during the first week of illness.

### 5.6 Environmental Measures

- Wear long-sleeved shirts, long pants, and socks. Treat clothes with permethrin.
- Apply repellent to exposed skin.
- Use screens on windows; use insecticide-treated bed nets when traveling to endemic countries.
- Drain any standing water in which mosquitoes could breed.
- Discard old tires, tin cans, plastic containers, ceramic pots or other containers that can hold water.
- Repair failed septic systems.
- Drill holes in the bottom of recycling containers left outdoors.
- Keep grass cut short and shrubbery trimmed.
- Clean clogged roof gutters, particularly if leaves tend to plug up the drains.
- Frequently replace the water in pet bowls.
- Flush ornamental fountains and birdbaths periodically.
- Aerate ornamental pools, or stock them with predatory fish.

(Source: CDC Protection Against Mosquitoes, 2013; FAQ: CDC Mosquito Control, 2013)

## 6. MANAGING SPECIAL SITUATIONS

Cases with no history of travel, may herald local acquisition; contact the ACDP Epi On-call **immediately**.

If a large group of returning travelers is identified, contact the ACDP Epi On-call.

## REFERENCES

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## UPDATE LOG

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