



# Chikungunya

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## Key facts

To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on [Key concepts on epidemiology](#).

## Importance

Chikungunya has been identified in over 60 countries in Asia, Africa, and recently also in Europe and the Americas. Chikungunya virus often causes large explosive outbreaks with high attack rates, affecting one-third to three-quarters of the population in areas where the virus is circulating between years-long periods of quiescence. International travel is one of the major risk factors for the rapid global spread of the disease.

Persistent severe arthralgias could lead to long-term disability and loss of workdays, resulting in a significant burden on the economy and loss of productivity.

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## Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables public health officials to classify and count cases consistently.

*The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community-based surveillance, **volunteers** should use broad (simplified) case definitions (referred to as community case definitions) to recognize most or all possible cases, provide relevant risk communication and appropriate actions and encourage them to seek care. Other actors such as **healthcare workers or investigators** studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

### **Acute clinical case:**

- Clinical criteria: acute onset of fever  $>38.5^{\circ}\text{C}$  and severe joint pain; AND Epidemiological criteria: residing or having visited epidemic areas, having reported transmission within 15 days prior to the onset of symptoms; OR
- Laboratory criterion: confirmation by laboratory

WHO case definition source of information:

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## Alert / epidemic threshold

An **alert threshold** is the pre-defined number of alerts that suggest the beginning of a possible disease outbreak and therefore warrant immediate notification.

**Epidemic thresholds** are the minimum number of cases indicating the beginning of a particular disease's outbreak.

Significant increase above historical averages in endemic countries. One confirmed case, if there is no known outbreak already under investigation.

## Risk factors

- Environments where the *Ae. Albopictus* mosquito breeds are water-filled sites like tree holes, rock pools, or bamboo stumps, or artificial containers like vehicle tyres or saucers beneath plant pots. *Ae. Aegypti* on the other hand is more associated with indoor breeding sites such as water storage vessels, concrete water tanks in bathrooms and flower vessels, as well as the same artificial outdoor breeding sites as *Ae. Albopictus*.
- Increased contact between humans and infected mosquitoes, particularly in urban areas can create epidemics.
- Outbreaks of the disease are of particular concern when they occur in overcrowded settings with inadequate water supply and waste management services that allow the mosquitoes to breed easily.
- Pregnancy in regions where there are chikungunya epidemics.
- Humans travelling to/from endemic/epidemic areas.
- The abundance of *Ae. Aegypti* and *Ae. Albopictus* follow seasonal patterns. Increase in temperature and rainfall patterns contribute to the increase and survival of vectors.
- Children and elderly who sleep during the daytime in epidemic areas are at greater risk.

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## Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

***Attack rates will vary from one outbreak to another. In case of an outbreak, consult the latest information provided by health authorities.***

- Chikungunya affects one-third to three-quarters of the population in areas where the virus is circulating.

## Groups at increased risk of severe illness (most vulnerable)

- Older people (≥65 years).
- Neonates.
- People with medical conditions such as high blood pressure, diabetes, or heart disease and weakened immune systems.
- Pregnant women.

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## Infectious agent

**Infectious agents** are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

*Chikungunya virus.*

**Vector:** Mosquitoes (*Aedes aegypti* and *Aedes albopictus*) are carrying the *Chikungunya virus*.

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## Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

Non-human and human primates are likely the main reservoirs of the virus; other potential reservoirs are various vertebrates.

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## How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key concepts to serve as guidance to better understand the diseases included in this website.

- **Vector-borne:** From human to human through mosquito bite (*Aedes aegypti* and *Aedes albopictus* and some other mosquito vectors in Africa). The mosquitoes usually bite during the daytime (peak biting periods are early in the morning and in the evening at dusk).

- **Congenital transmission:** *Chikungunya virus* is transmitted rarely from mother to newborn around the time of birth.
- **Vehicle-borne transmission:** Blood-borne transmission is possible.

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## Incubation period

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

Four to eight days (range 2—12 days).

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## Period of infectiousness

**Period of infectiousness** is the time interval during which an infected person can transmit the infection to other susceptible persons.

The virus circulates in the blood of infected humans for several days, at approximately the same time that they have chikungunya fever. *Aedes* mosquitoes acquire the virus when they feed on an individual during this period.

## Clinical signs and symptoms

- 40 to 85 per cent of people develop symptoms after infection:
- Chikungunya is characterized by an abrupt onset of fever frequently accompanied by migratory joint pain, affecting different joints.
- Other common signs and symptoms include muscle pain, headache, nausea, fatigue and rash.
- The joint pain is often very debilitating, usually lasts for a few days or may be prolonged to weeks.
- Most patients recover fully, but in some cases joint pain may persist for several months, or even years.
- Serious complications are not common, but in older people, the disease can contribute to the cause of death.
- Haemorrhagic manifestations are uncommon.

## Other diseases with similar clinical signs and symptoms

Dengue fever, leptospirosis, malaria, meningitis, Zika virus infection, Ebola virus disease and other infections.

## Diagnosis

- PCR (polymerase chain reaction).
- Virus isolation from blood samples.
- Serological tests, like Enzyme linked immunosorbent assay (ELISA).

## Vaccine or treatment

**Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of any treatment should be conducted by health professionals.**

Important therapy principles include the following:

- There is no specific antiviral drug treatment for chikungunya.
- Treatment is directed primarily at relieving the symptoms, including joint pain using drugs reducing fever, optimal analgesics and fluids.
- Chikungunya and Dengue have similar clinical presentations and therefore, care should be taken when administering medications such as aspirin or other nonsteroidal anti-inflammatory drugs (e.g. Ibuprofen, Naproxen). These may increase the risk of bleeding if the case is in fact Dengue fever and not Chikungunya.
- There is no commercial chikungunya vaccine.

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## Immunity

There are two types of immunity:

- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.

Recovery from an infection will confer life-long immunity.

## Which interventions are most effective for prevention and control?

*The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.*

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and

maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately. Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).

- The most effective interventions to prevent chikungunya are those that eliminate mosquito breeding sites (water bodies where the mosquito *Aedes Aegypti* may lay its eggs). These include:
  - Cover water containers (to prevent them from becoming breeding sites).
  - Empty and clean water containers regularly.
  - Reduce any natural water-filled habitats.
  - Remove standing water in flowerpots.
  - Clean up used tyres.
  - Community clean-up campaigns.
  - Avoid accumulating trash; garbage should remain in closed plastic bags.
- Considerable literature supports the gender-related role regarding vector control activities. Targeting males and females separately and being sensitive to their specific gender roles is essential when enlisting their support for vector control.
- Actions to prevent mosquito bites during the day and early evening:
  - Wearing clothes that minimize skin exposure. It is important to assess whether this is culturally accepted, accessible and affordable in the context of intervention.
  - Screening in homes (windows and door screens).
  - Application of 'DEET' mosquito repellent to exposed skin or clothing (in accordance with product label instructions). It is important to assess whether this is culturally accepted, accessible and affordable in the context of intervention.
- Outdoor space spraying for flying mosquitoes, on surfaces or around containers where mosquitoes land.
- If a person has been diagnosed with chikungunya it is important to avoid being bitten by mosquitoes particularly during the first week of infection. Otherwise, the person may transmit the virus to the mosquito, which can in turn infect other people.
- Larviciding, which is the application of insecticides to water bodies, reducing vector density. Note that it is most effective in areas where aquatic habitats (where larvae lie) are easy to identify and are fixed. Larviciding will be costly and less effective in areas where water habitats are predominant, scattered and where their location may vary. It is also important to verify what type of larvicide is approved in-country. The most commonly used for controlling larvae of *Aedes Aegypti* is the organophosphate *temephos*; however, in the Americas resistance to *temephos* has been detected and this poses a threat to the control of the mosquito.

### **Which interventions have NO evidence and therefore are NOT recommended?**

- Bednets are an effective way to prevent mosquito bites; but for chikungunya, these should be used as a preventive measure for those who sleep during the day, e.g. people admitted in hospitals. As the mosquito bites during the day, bednets during the night will not be the most effective preventive measure.
- Mosquito coils and aerosol bug sprays (containing insecticides) are not effective interventions to protect a person or household from the bite of the *Aedes aegypti* mosquito. Research indicated that where mosquito coils and aerosol insecticides were used, chikungunya incidence increased. An explanation as to why this occurred was that householders using coils and aerosols relied solely on these anti-mosquito devices and did not adopt other more effective preventive measures. The cost for these items is another prohibitive factor for their use in widespread community programmes.

# Epidemic characteristics and RCRC indicators and targets

The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

Epidemic characteristics and progression
Suspected/confirmed cases per week (disaggregated by sex, age)
Case fatality rate
Indicators for Red Cross Red Crescent activities
Number of volunteers trained on a specific topic (e.g. Epidemic Control for Volunteers (ECV)) <b>Numerator:</b> Number of volunteers trained in ECV Source of information: Training attendance records
Percentage of population with suspect chikungunya for whom advice or treatment was sought. <i>(NB. This indicator requires the implementation of a system in collaboration with the health facility, whereby health workers specifically asked the patient how they heard about the service)</i> <b>Numerator:</b> Number of population for whom advice or treatment was sought from a health facility or provider <b>Denominator:</b> Total number of people surveyed
Percentage of people who know the cause, symptoms, treatment or preventive measures (this indicator can be split into three or four separate indicators) <b>Numerator:</b> Number of people who cite the cause, symptoms, treatment or preventive measures for chikungunya <b>Denominator:</b> Number of people surveyed Source of information: Survey

## See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions, please refer to: IFRC CEA toolkit (*Tool 7.1: Template CEA logframe, activities and indicators*). Available at: <https://www.ifrc.org/document/cea-toolkit>

# Impact on other sectors

Sector	Link to the disease
<b>WASH</b>	Inadequate water supply and waste management allow mosquitoes to breed easily. Stagnant water in and around the household such as flowerpots, vehicle tyres or rock pools contribute to the increase of mosquito breeding sites.
<b>Nutrition</b>	Overweight/obesity and undernourishment increase the risk for severe disease and lead to a poor immune response, which can worsen disease outcomes.
<b>Shelter and settlements (including household items)</b>	People in rural areas and sleeping outdoors during the day are at increased risk of mosquito bites in endemic regions. Key actions at the household level like screening in homes and covering water containers are good prevention strategies to decrease the transmission of chikungunya virus from mosquitoes to humans.
<b>Psychosocial support and mental health</b>	As in the case of a range of other diseases, chikungunya can have several negative impacts on psychological, social and emotional aspects of a person's life, apart from its physical effects only. Psychological reactions may include fear of social stigma, anxiety and worry about the outcome or about the transmission to the fetus, social withdrawal, among others.
<b>Education</b>	If kindergartens and schools do not have the appropriate equipment, such as window and door screens, mosquito nets for naps or covered water containers, the risk of infection is greater. Children may then be at risk of getting the disease if attending classes, or at risk of losing on education if staying at home because of illness. Importantly, schools and other facilities dedicated to children and youth can offer an important space for them to engage, mobilize and raise awareness around health education issues. With support, trust and appropriate capacity-building, young people can be effective advocates for the adoption of preventive measures during an epidemic and are those best placed to mobilize their peers.
<b>Livelihoods</b>	Loss of days of productivity could result from a person's complications of long-lasting chikungunya as people may not be able to work. This can lead to a loss of income due to the reduction in work activity and to the diversion of resources to seek medical treatment.



Sector	Link to the disease
<p><b>Sex and gender</b></p>	<p>Women in their last trimester of pregnancy are high risk for more severe disease. Studies have shown that even though chikungunya is spread via mosquitoes and not directly between humans, human cases spread largely with the same households or in households nearby. In many countries, women spend most of their time at home during the day, while men tend to be away from home during those hours. As such women are at particularly high risk of contracting the virus. In many cultures, it is women who maintain the primary responsibility for the maintenance of containers for household drinking water and for vessels to do laundry, which are prime breeding sites for the <i>Aedes</i> mosquito. Men on the other hand, may be responsible for the disposal of solid waste or for maintaining larger water vessels stored outside the immediate living area. It is therefore important to understand and consider gender roles in vector control activities.</p>

### Resources:

- WHO (2020) *Chikungunya*. Fact sheets. Available at: <https://www.who.int/news-room/fact-sheets/detail/chikungunya>
- Institut Pasteur (2016). Chikungunya spreads in and around homes with women at highest risk. *The Research Journal*. Available at: <https://www.pasteur.fr/en/research-journal/news/chikungunya-spreads-and-around-homes-women-highest-risk>