

## **Chikungunya- A New Mosquito-Borne Disease**

Chikungunya is a viral disease transmitted to humans by infected mosquitoes. Chikungunya virus (CHIKV) was first described during an outbreak in southern Tanzania in 1952. The name 'chikungunya' derives from a word in the Kimakonde language, meaning "to become contorted" and describes the stooped appearance of sufferers with joint pain (arthralgia).

Chikungunya occurs in Africa, Asia and the Indian subcontinent. Human infections in Africa have been at relatively low levels for a number of years, but in 1999-2000 there was a large outbreak in the Democratic Republic of the Congo, and in 2007 there was an outbreak in Gabon. Starting in February 2005, a major outbreak of chikungunya occurred in islands of the Indian Ocean. A large number of imported cases in Europe were associated with this outbreak, mostly in 2006 when the Indian Ocean epidemic was at its peak. A large outbreak of chikungunya in India occurred in 2006 and 2007. Several other countries in South-East Asia were also affected. Since 2005, India, Indonesia, Thailand, Maldives and Myanmar have reported over 1.9 million cases. In 2007 transmission was reported for the first time in Europe, in a localized outbreak in north-eastern Italy. There were 197 cases recorded during this outbreak and it confirmed that mosquito-borne outbreaks are plausible in Europe.

In December 2013, France reported 2 laboratory-confirmed autochthonous (native) cases of chikungunya in the French part of the Caribbean island of St Martin. Since then, local transmission has been confirmed in the Dutch part of Saint Martin [St Maarten], Anguilla, British Virgin Islands, Dominica, French Guiana, Guadeloupe, Martinique and St Barthelemy. Aruba only reported imported cases. This virus has not been found in Americas prior to 2013. In late 2013, the first local transmission of CHIKV in the Americas was reported in some Caribbean countries and territories. Local transmission means that mosquitoes in the area have been infected with the virus and are spreading it to people. The virus is spread through the bite of an infected mosquito, similar to West Nile and dengue viruses. Countries and territories in the Americas where chikungunya cases have been reported are: Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Dominican Republic, French Guiana, Guadeloupe, Martinique, Saint Barthelemy, Saint Kitts and Nevis, Saint Martin, Saint Vincent and the Grenadines and Saint Maarten.

### **Transmission**

The CHIKV is transmitted from human to human by the bites of infected female mosquitoes. Most commonly, the mosquitoes involved are the two species *Aedes aegypti* and *Ae. albopictus* which can also transmit other mosquito-borne viruses, including dengue. These mosquitoes can be found biting throughout daylight hours, though there may be peaks of activity in the early morning and late afternoon. Both species are found biting outdoors, but *Ae. aegypti* will also readily feed indoors. After the bite of an infected mosquito, onset of illness occurs usually between three and seven days but can range from two to 12 days.

### **Chikungunya Signs and Symptoms**

An infected person will typically become ill three to seven days after the mosquito bite, but symptoms can begin anywhere from two to 12 days post-bite. These symptoms can last 3-10 days.

Up to 28% of people who are infected will not have any symptoms (asymptomatic), although they can still be infectious to mosquitoes for a short time if bitten. Persons at greatest risk for severe illness include newborn infants, those over 65 years of age, and those who have other health conditions. Treatment is symptomatic or supportive.

Symptoms may include:

- Sudden high fever (usually  $>102^{\circ}$  F) which may be continuous or intermittent
- Severe joint pain that commonly involves the hands and feet
- Joint swelling
- Back pain
- Rash usually 2-5 days after fever starts
- Other symptoms may include headache, body ache, nausea, vomiting, and redness around the eyes. In unusual cases, infection can involve the brain, eyes, heart, kidney and other organs.
- Fatal infections are rare, however many patients have chronic joint pain, arthritis, loss of energy and depression lasting weeks to years.

### **Diagnosis**

Several methods can be used for diagnosis. Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm the presence of Immunoglobulin M (IgM) and Immunoglobulin G (IgG) anti-chikungunya antibodies. IgM antibody levels are highest three to five weeks after the onset of illness and persist for about two months. Samples collected during the first week after the onset of symptoms should be tested by both serological and virological methods (RT-PCR).

The virus may be isolated from the blood during the first few days of infection. Various reverse transcriptase–polymerase chain reaction (RT–PCR) methods are available but are of variable sensitivity. Some are suited to clinical diagnosis. RT–PCR products from clinical samples may also be used for genotyping of the virus, allowing comparisons with virus samples from various geographical sources.

### **Treatment**

There is no specific antiviral drug treatment for Chikungunya. Treatment is directed primarily at relieving the symptoms, including the joint pain using anti-pyretics, optimal analgesics and fluids. There is no commercial chikungunya vaccine.

### **Prevention and Control**

The proximity of mosquito vector breeding sites to human habitation is a significant risk factor for chikungunya as well as for other diseases that these species transmit. Prevention and control relies heavily on reducing the number of natural and artificial water-filled container habitats that support breeding of the mosquitoes. This requires mobilization of affected communities. During outbreaks, insecticides may be sprayed to kill flying mosquitoes, applied to surfaces in and around containers where the mosquitoes land, and used to treat water in containers to kill the immature larvae.

For protection during outbreaks of chikungunya, clothing which minimizes skin exposure to the day-biting vectors is advised. Repellents can be applied to exposed skin or to clothing in strict accordance with product label instructions. Repellents should contain DEET (N, N-diethyl-3-methylbenzamide), IR3535 (3-[N-acetyl-N-butyl]-aminopropionic acid ethyl ester) or picaridin (1-piperidinecarboxylic acid, 2-(2-hydroxyethyl)-1-methylpropylester). For those who sleep during the daytime, particularly young children, or sick or older people, insecticide treated mosquito nets afford good protection. Mosquito coils or other insecticide vaporizers may also reduce indoor biting.

Basic precautions should be taken by people traveling to risk areas and these include use of repellents, wearing long sleeves and pants and ensuring rooms are fitted with screens to prevent mosquitoes from entering.

### **Disease Vectors**

Both *Ae. aegypti* and *Ae. albopictus* have been implicated in large outbreaks of chikungunya. Whereas *Ae. aegypti* is confined within the tropics and sub-tropics, *Ae. albopictus* also occurs in temperate and even cold temperate regions. In recent decades, *Ae. albopictus* has spread from Asia to become established in areas of Africa, Europe and the Americas.

The species *Ae. albopictus* thrives in a wider range of water-filled artificial breeding sites than *Ae. aegypti*, including bamboo stumps, tree holes and rock pools, in addition to artificial containers such as vehicle tires and saucers beneath plant pots. This diversity of habitats explains the abundance of *Ae. albopictus* in rural as well as peri-urban areas and shady city parks.

### ***Ae. albopictus* control**

Currently, *Ae. albopictus* is the only vector species distributed in the Gainesville area. The best approach for controlling *Ae. albopictus* is by eliminating larval habitats. Gainesville Mosquito Control Program will enhance our surveillance and control effort toward the *Ae. albopictus* mosquitoes. Meanwhile, Mosquito Control asks the residents to eliminate any unneeded containers and by frequently emptying the water in other containers (*e.g.*, bird baths, pet-watering dishes, tarps, kid's toys) around your homes, residents can complement the control efforts of our mosquito control program.

For more information about mosquito repellents please visit CDC website at

<http://wwwnc.cdc.gov/travel/page/avoid-bug-bites>

For more information about Chikungunya in the State of Florida, please visit DOH website at

<http://www.floridahealth.gov/diseases-and-conditions/mosquito-borne-diseases/chikungunya.html>

CDC information sheet about Chikungunya: <http://www.floridahealth.gov/diseases-and-conditions/mosquito-borne-diseases/documents/chikungunya-factsheet-cdc.pdf>