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REVIEW ARTICLE

# Chikungunya fever: current status in Mexico

**Margarita Nava-Frías**[a], **Ricardo Efrén Searcy-Pavía**[b,*], **Carina Aurora Juárez-Contreras**[b], **Anayeli Valencia-Bautista**[b]

[a] *Departamento de Infectología Pediátrica, Hospital Infantil de México Federico Gómez, Ciudad de México, México*
[b] *Escuela Nacional de Medicina y Homeopatía, Instituto Politécnico Nacional, Ciudad de México, México*

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**KEYWORDS**
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**Abstract** Chikungunya fever is a tropical vector-borne disease that has been spreading rapidly around the world during the last 10 years, and which has been usually misdiagnosed as dengue. Nowadays, this disease is increasing in Mexico, mainly in the southern and central zones of the country, being significantly more common in women, children and young adults (28% in < 20 years of age). The classical presentation includes fever, arthralgia, polyarthritis, back-pain, and skin rashes. Although symptoms and treatment are similar to those for dengue, there are key clinical features to differentiate these two diseases.


**PALABRAS CLAVE**
Chikungunya;
*Aedes*;
Mosquito;
Artralgia;
Fiebre;
México

**Enfermedad por virus de chikungunya: actualidad en México**

**Resumen** La enfermedad por el virus chikungunya es una enfermedad tropical transmitida por vector, que en los últimos 10 años ha tenido una gran diseminación mundial y ha sido históricamente subdiagnosticada debido a las características en común con el dengue. Actualmente la incidencia en México ha ido en aumento, sobre todo en el centro-sur del país. Es más común en mujeres, adultos jóvenes y niños (28% son menores de 20 años). El cuadro clínico suele presentarse con fiebre, artralgia, poliartritis, dolor de espalda, cefalea y erupciones cutáneas. A pesar de que el tratamiento es sintomático y similar al del dengue, existen datos clínicos clave para diferenciarlas.


* Corresponding author.
*E-mail address:* riefsepa93@gmail.com (R.E. Searcy-Pavía).

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## 1. Introduction

The term ''chikungunya'' is derived from the word *kungunyala*, from the African kimakonde language, which means ''one who slouches'' in reference to the stooped posture adopted by the people because of the unbearable joint and muscular pain[1].

It is an arboviral infection caused by the chikungunya virus (CHIKV), which is transmitted by the bite of infected *Aedes* mosquitoes. The main clinical manifestations are fever, arthralgia, polyarthritis, backache, headache, and skin rash[2]. The treatment is symptomatic, with the application of analgesics.

## 2. History

The first CHIKV outbreak was reported in July, 1952, in an epidemic that occurred over the plateaus of Mawia, Makonde and Rondo, now Tanzania. However, retrospective studies suggest that the epidemic of CHIKV has occurred in Africa for centuries, with outbreaks exported to Asia and America in the 18th and 19th centuries although those outbreaks were documented as dengue. Some terms such as *genoux, dengue, knokkelkoorts* (knuckles fever), by the inhabitants of Batavia, *aburokab* (fever of the knees) by the Greeks, and *3-day fever* in Calcutta, have been given to this epidemic[1,3].

Testimony of this is the classic report widely cited as the first description of the dengue epidemic by David Bylon, a surgeon in the city of Batavia (Jakarta), who contracted the disease and wrote the following in 1779:

> *''It was on May 25, at 5:00 in the afternoon when I noted that while I chatted with two good friends of mine, an increased pain in my right hand and forearm joint was step by step proceeding way up toward the shoulder and then continued towards all my limbs; and by 9:00 of the same afternoon I was already in bed with high fever... There have been 3 weeks since... I was hit by the disease, and because of that I had to stay home for 5 days; but even until today, I have a continuous pain and stiffness in joints of both feet with discomfort in both ankles, so much that when I wake up in the mornings, or sit for a while and start to move again, I cannot do it very well, and going up and down stairs is very painful''*[4].

This report of febrile illness of sudden onset with joints involved suggests that the disease was CHIKV. That same year in Cairo and Alexandria (Egypt) another outbreak of the disease took place with a strong resemblance to CHIKV, in which attack rates reached 40-50%. The soil of these plateau is highly permeable, so local residents need to store water. This results in large populations of *Aedes (Stegomyia) aegypti*, generally considered to be the domesticated form of *A. aegypti* which efficiently transmit arboviruses, such as yellow fever and dengue.

The virus became endemic in Africa by outbreaks that occurred in Uganda, Democratic Republic of the Congo, Zimbabwe, Senegal, Nigeria, South Africa and Kenya. Particularly in Uganda, it was found that the arboreal mosquito *Aedes africanus* becomes infected naturally, being the first evidence of the jungle CHIKV enzootic cycle[3].

After the outbreak of 1952, the virus was spread to India and countries in Southeast Asia, a leader in epidemics during the following years. The first evidence of CHIKV outside of Africa came from Bangkok, Thailand, where the virus was isolated in 1958 during the outbreak, and associated with the transmission of *A. aegypti*, followed by several outbreaks in Cambodia, Vietnam, Malaysia and Taiwan. On the other hand, the first epidemic reported in India was in Kolkata (formerly Calcutta), West of Bengal, in 1963[1,3].

In 1964, antibodies were detected in non-human primates (NHPs) captured in the current Zimbabwe, and green monkeys were shown to be hosts able to amplify the transmission of CHIKV using mosquitoes. Since then, several studies have confirmed the role of the NHPs and *A. africanus, A. furcifer* and other arboreal mosquitoes as enzootic vectors[1].

### 2.1. Recent outbreaks

In 2004, a new outbreak emerged, which started at the coast of Kenya (Mombasa); in the next two years it spread to certain islands in the Indian Ocean, such as The Reunion, Comoros, Mayotte, Madagascar, Mauritius, Seychelles and Maldives. It is estimated that 500,000 cases occurred since the spring of 2004 until the summer of the 2006[5,6].

The epidemic spread from the islands of the Indian Ocean to India, where major outbreaks occurred in 2006. Once introduced, CHIKV spread to 17 of the 28 states of India, infecting more than 1.39 million people before the end of the year. The outbreak in India continued until 2010, with the emergence of new cases in non-affected areas during the initial phase of the epidemic. Outbreaks also spread from India to the Andaman and Nicobar Islands, Sri Lanka, the Maldives, Singapore, Malaysia and Indonesia through travelers who were in the viremic phase[5].

Concern over the spread of CHIKV peaked in 2007, when it was detected that the virus was spreading in an autochthonous form (human-mosquito-human) in the North of Italy, after being introduced by a viremic traveler returning from India. The Italian Ministry of Health confirmed 160 cases in Rabean of which an 83-year-old man died. A year later, the first imported case was detected in Canada[5,6].

In 2010, two cases not imported were detected in the Var region, in southeast France; other cases were imported in Australia, United States and Taiwan, while in October, ten cases were reported in southern China in the city of Dongguan. At the end of that year, a case was diagnosed in La Rioja (Spain) in a person who had visited the North of India shortly before. Subsequently, in September of 2013, a case was detected at the coast of Valencia in a surfer who had spent the summer in the Senegal coast[5].

In 2013, the Panamerican Health Organization (PAHO) reported the first autochthonous cases in America, specifically on the island of St. Martin, in the Caribbean. In May 2014, it reported local circulation of the disease in several islands of the Caribbean such as Antigua and Barbuda, Haiti, Dominican Republic and St. Kitts, among others[7]. That same year the first case in Mexico occurred in a 39-year-old woman who traveled to the Caribbean on May 21st passing through the islands of St. Thomas, St. Martin and St. Kitts, to reach Antigua and Barbuda, where she remained until May 28th[5,8].