

The global threat of chikungunya virus

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What is virus chikungunya?

Chikungunya virus (CHIKV) is an emerging pathogen that belongs to the *Togaviridae* family. It causes **chikungunya fever (CHIKF)**, a febrile illness associated with arthralgia and rash. The name chikungunya derives from a word in Makonde (Bantu language) meaning “that which bends,” describing the stooped appearance of those people suffering the characteristic painful arthralgia. Although in most cases this virus is not severe, it has become a global threat due to the emergence in recent years of several outbreaks that have affected a large part of the population and to the lack of effective vaccines and antivirals [1].

The chikungunya virus is divided into three distinct lineages [2]:

- West African lineage.
- Eastern / Central / Southern Africa lineage (ECSA). This group emerged a new lineage, the lineage of the Indian Ocean (IOL).
- Asian lineage.

Transmission Dynamics

CHIKV is transmitted by the bite of mosquitoes of genus *Aedes*. There are two main vectors of CHIKV, *A. aegypti* and *A. albopictus* [3].

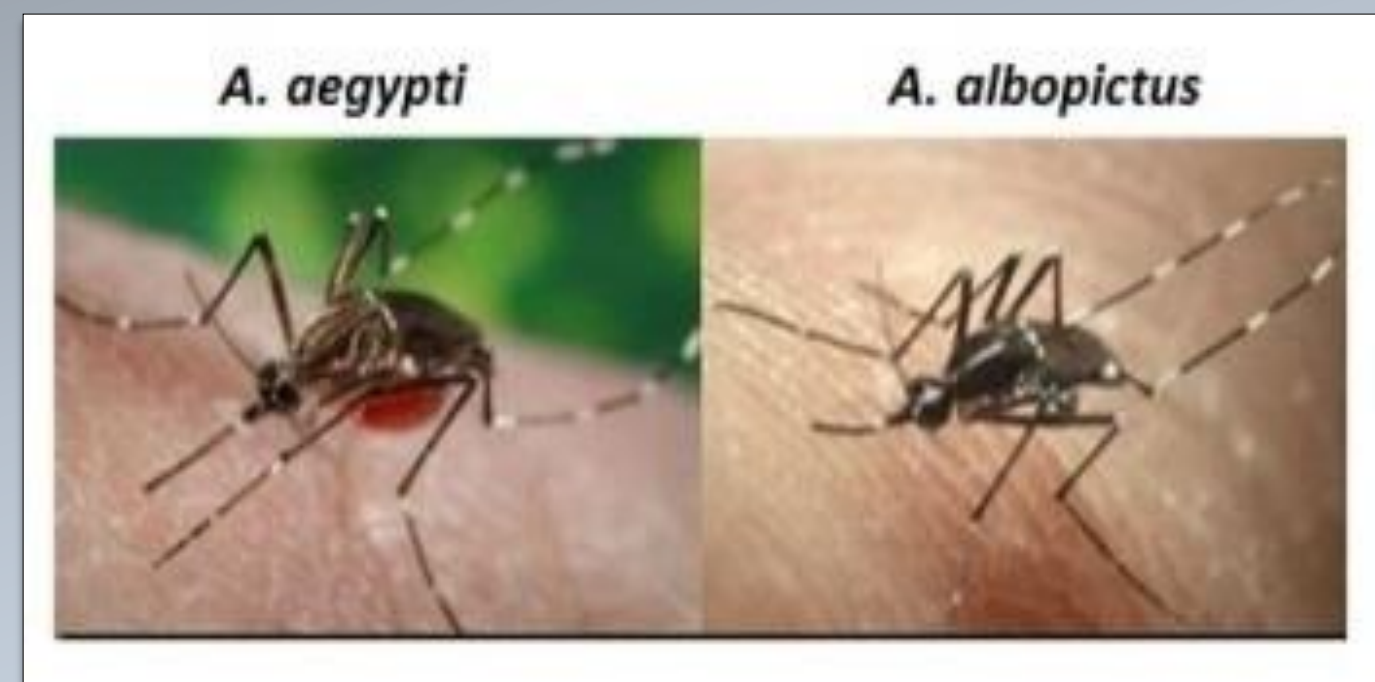


Figure 1. *Aedes aegypti* and *Aedes albopictus*. Images obtained from <http://www.cdc.gov/chikungunya/transmission/>.

Risk factors for virus introduction

- The vector is present in region.
- Presence of individuals sensitive to CHIKV who have never been exposed to this virus.
- The arrival of travellers infected with CHIKV.

Clinical manifestations

3% - 28%

↓
asymptomatic
infections

Symptoms can last for 3-10 days but joint pain may persist for months

Mortality ↓↓

Headache

Fever (↑39°C)

Myalgias

Polyarthralgias

Rash

Conjunctivitis

Back pain

Nausea

Vomiting

Polyarthrititis

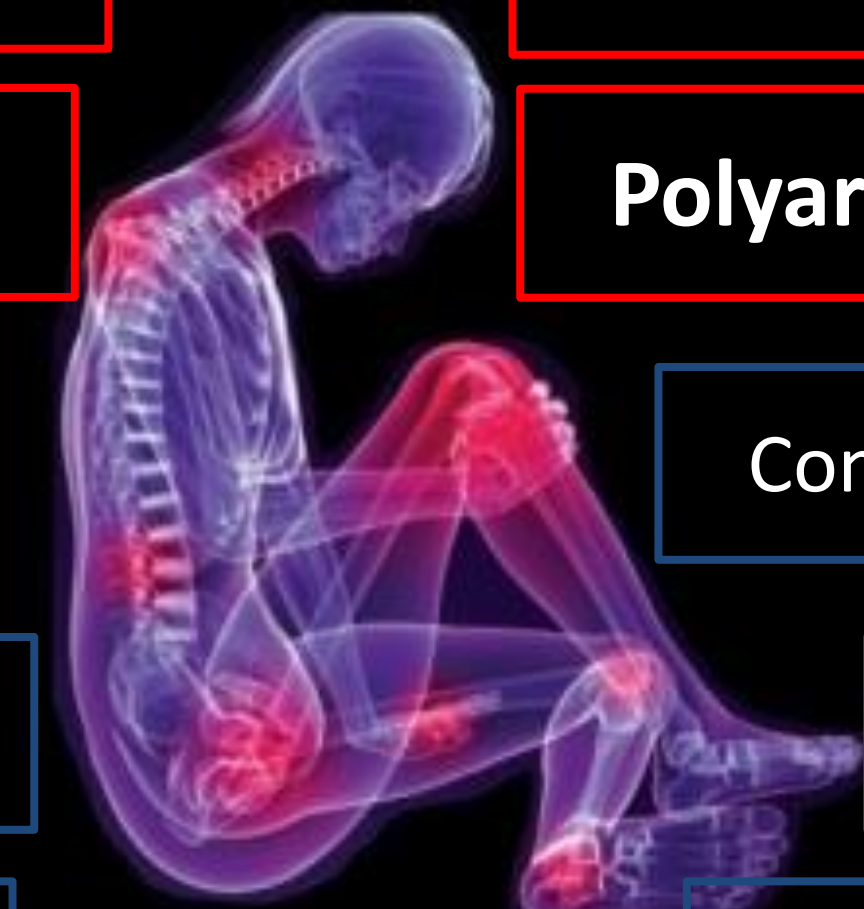


Figure 2. Symptoms of Chikungunya fever. Modified from: http://www1.paho.org/hq/dmdocuments/CHIKV_Spanish.pdf [3]

Treatment and vaccines

- There is no specific antiviral drug treatment for CHIKV.
- Treatment is symptomatic and is based on treating manifestations that appear during infection. In addition, patients are advised to drink plenty of fluids [3].
- Absence of an effective CHIKV vaccine.

Prevention and Control [5]

In the absence of an effective CHIKV vaccine, the only tool available to **prevent** infection is the reduction of **human-vector contact**.

- Use mosquito repellents on exposed skin or clothing.
- Wear long-sleeved shirts and long trousers.
- Should use Insecticide-treated bednets.
- Activate programs for vector control
 - Reduce natural and artificial water tanks
 - Using insecticides

Epidemiology^[4]

In **2013**, autochthonous transmission was first detected in **American Region**. This outbreak has spread rapidly throughout the **Caribbean** and **South America**. 776.000 suspected cases until October 2014, have been reported with 152 deaths. In recent years the **United States**, **Mexico** and **Europe** have been of detecting imported cases of vireemics coming from areas with epidemic transmission.
Asian genotype

In **2007** the first local outbreak came into **Europe**, particularly into **Italy**. It was introduced by a viremic traveler returning from **India**.
ECSA genotype - IOL lineage

In **2004**, the CHIKV explodes worldwide producing a series of devastating outbreaks affecting up to **6.5 million** of people. It emerged in **Kenya** in **2004** and spread to several islands in the **Indian Ocean**, **India** and **Southeast Asia**.
ECSA genotype - IOL lineage

Chikungunya virus was insolated for the first time in **Tanzania** in **1953**, where there was an outbreak during 1952-1953.
ECSA genotype

Between **1960-1970** there were large outbreaks in **Thailand** and **India**.
Asian genotype

Figure 3. The most important outbreaks. Image obtained from: <https://lacasadelpoio.wordpress.com/2007/06/19/mapamundi/>

Conclusions

Chikungunya virus has remained endemic in Africa and South-East Asia, but there was a series of outbreaks in other regions of the world where the virus is not endemic.

The fact that this virus is transmitted by a vector, mosquito *Aedes*, and there are no effective vaccines the only tool available to prevent infection is to reduce human – vector contact.

References

- [1] – Lo Presti A, Lai A, Cella E, Zehender G, Ciccozzi M. Chikungunya virus, epidemiology, clinics and phylogenesis: A review. Asian Pacific Journal of Tropical Medicine [Internet]. 2014; 7(12):925–32.
- [2] – Powers AM, Logue CH. Changing patterns of chikungunya virus: re-emergence of a zoonotic arbovirus. J Gen Virol [Internet]. 2007 Sep; 88(Pt 9):2363–77.
- [3] – Preparación y respuesta ante la eventual introducción del virus chikungunya en las Américas [Internet]. Organización Panamericana de la Salud – CDC. [consulta el 22 de febrer de 2015]. Disponible en: http://www1.paho.org/hq/dmdocuments/CHIKV_Spanish.pdf
- [4] – Weaver SC. Arrival of chikungunya virus in the new world: prospects for spread and impact on public health. PLoS Negl Trop Dis [Internet]. 2014 Jun;8(6):e2921.
- [5] – Organización Mundial de la Salud [Internet]. Chikungunya. [consulta el 22 de febrer de 2015]. Disponible en: <http://www.who.int/mediacentre/factsheets/fs327/es/>