# CHIKUNGUNYA

*Information for Vector Control Programs*

**Chikungunya (CHIKV) is an arthropod-borne virus (arbovirus) transmitted by *Aedes aegypti* and *Aedes albopictus* mosquito-vectors.** Outbreaks have been described in Africa, Southeast Asia, the Indian subcontinent and Indian Ocean islands. A 2007 outbreak in northern Italy highlighted the risk of local transmission of CHIKV in the US via imported cases. Like Italy, many areas of the US harbor competent mosquito vectors and naïve hosts, which create the potential for emergence of CHIKV. The CDC and PAHO have developed a preparedness and response plan that elaborates on information provided below. The plan is available at: **http://www.cdc.gov/chikungunya**.

## BASIC INFORMATION:

In the absence of an effective CHIKV vaccine, **the only tool available to prevent infection is reduction of human-vector contact.** Both symptomatic and asymptomatic cases remain viremic for 3-10 days.

### Epidemiology:

**1952-53:** The virus was first isolated from human serum and mosquitoes during an epidemic in Tanzania. Subsequent outbreaks occurred in Africa and Asia.
**2004-06:** An outbreak originating on the coast of Kenya spread to several Indian Ocean islands and Asia, causing millions of disease cases.
**2007:** US concern for the spread of CHIKV peaked, when the virus was found to be spreading autochthonously (human-to-mosquito-to-human) in northern Italy, after introduction by a viremic traveler returning from India.
**2006-present:** >100 reported imported cases of CHIK in return travelers to the US. No cases of autochthonous transmission have been reported.

### Hosts:

**Humans** are the primary reservoir for CHIKV during epidemic periods.

### Vectors:

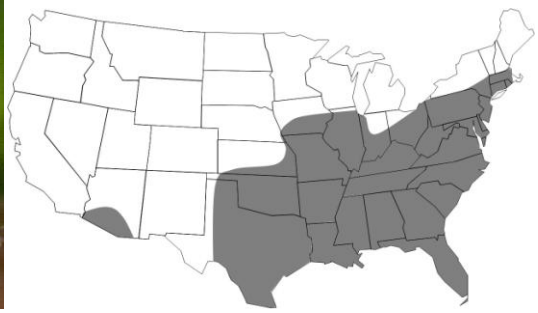
***Aedes aegypti***

***Approximate U.S. Distribution***

***Ae. aegypti*** is an important vector in **urban areas**. *Ae. aegypti* are **closely associated with humans and their homes**. Adults rest indoors, and larval habitats are typically containers on the household premises.

***Aedes albopictus***

***Approximate U.S. Distribution***



***Ae. albopictus*** is likely to play a larger role in the U.S. due to its wide distribution. Larvae occur in **peridomestic habitats** as well as **surrounding natural habitats**.

Both mosquitoes can be identified by the white stripes on their black bodies and legs. They are aggressive daytime biters, with crepuscular peak feeding activity.

**Distribution maps adapted from Darsie & Ward, with current surveillance data provided by Dr. Chet Moore of Colorado State University.*

National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector-Borne Diseases --- http://www.cdc.gov/ncezid/dvbd

## INTEGRATED VECTOR MANAGEMENT (IVM) FOR POTENTIAL CHIKV VECTORS:

Vector control efforts should target both species. Biology and control procedures are generally similar for both.

### Surveillance: **Monitor the potential vector population and CHIKV risk in your area.**

- Implement larval surveillance programs to determine the number, type, and distribution of containers producing *Ae. aegypti* and *Ae. albopictus*.
- If not already developed, establish close lines of communication with local and state health department (e.g. sharing epidemiological and ecological data) to obtain information about travel-related or locally-transmitted CHIKV cases in the area.

### Source Reduction: **Maintain low mosquito densities by reducing production sites.**

Remove mosquito-producing containers through community involvement programs or by vector control personnel.

### Immature control: **Where source reduction is not feasible.**

- Application of biological or chemical pesticides to mosquito-producing containers.
- Use pesticides registered by EPA for application to containers
- Effective in managing mosquitoes in aggregations of containers (e.g., discarded tire piles)
- Although labor intensive and complicated in residential settings, these methods can be effective and are warranted in outbreak situations

### Adult mosquito control: **In outbreak situations.**

- Vectors are day active and are not effectively controlled by standard night-time ULV applications. Early morning or late evening ULV applications may be effective in reducing biting vector densities in outbreaks.
- ULV applications or barrier applications to individual residences may be warranted during outbreaks to further reduce the likelihood of vectors feeding on infectious people (i.e., if case residences or areas of focal transmission can be rapidly identified).

### Resistance monitoring:

Evaluation of pesticide susceptibility in local populations of potential CHIKV vectors should be performed in advance to insure that emergency control measures will be effective if needed.

## PREVENTION OF TRANSMISSION:

Encourage the following measures to reduce the risk of human-vector contact:

### Personal Protection:

- Wear **long-sleeved shirts and long pants**.
- Use mosquito repellents:
  - **DEET**, **picaridin**, **IR3535** and **oil of lemon eucalyptus**.
- Wear **permethrin-treated clothing** to repel and kill mosquitoes

### Household Prevention:

- Ensuring that **screen doors/windows are intact**.
- Reduce local mosquito density by **discarding or emptying water-holding containers**.
- Using **A/C** to reduce vector contact indoors.

During a CHIKV outbreak, aggressive vector management and personal protection activities that effectively reduce mosquito density and prevent mosquitoes from feeding on infected people are required to break the transmission cycle.

## FOR MORE INFORMATION:

**http://www.cdc.gov/chikungunya/**