# Controlling *Aedes aegypti* and *Aedes albopictus*: Information for vector control programs

## Background

- Mosquito-borne viral diseases such as chikungunya, dengue, and Zika can cause similar symptoms, including fever with muscle or joint pain, or rash.
- Outbreaks have occurred throughout countries with tropical climates where *Aedes aegypti* and *Aedes albopictus* mosquitoes are found. These mosquitoes are also found throughout parts of the United States and its territories.
- Visit CDC Travelers' Health website for up-to-date outbreak information and travel notices: www.cdc.gov/travel.

## Vectors of chikungunya, dengue, and Zika viruses

- *Aedes aegypti* and *Aedes albopictus* are the primary vectors. *Aedes aegypti* mosquitoes are more likely to spread viruses like Zika, dengue, chikungunya, and other viruses than other types of mosquitoes like *Aedes albopictus* mosquitoes.
- Both mosquitoes can be identified by the white stripes on their bodies and legs.
- They are daytime and nighttime biters with crepuscular peak feeding activity.
- These mosquito species are present in many regions of the United States (see maps below), which creates the potential for emergence of chikungunya, dengue, and Zika viruses.

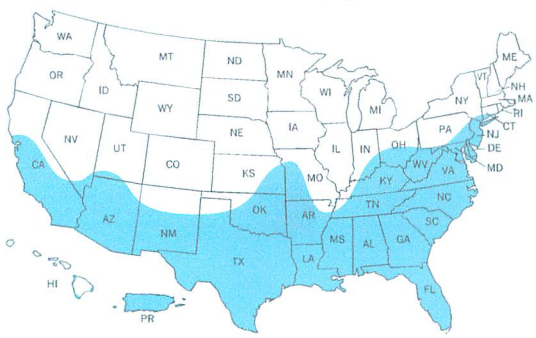
### *Aedes aegypti*

- An important vector in urban areas
- Closely associated with people and their homes
- Adult mosquitoes are commonly found indoors when housing allows (homes without window/door screens or air conditioning)
- Larval habitats are typically containers on the household premises

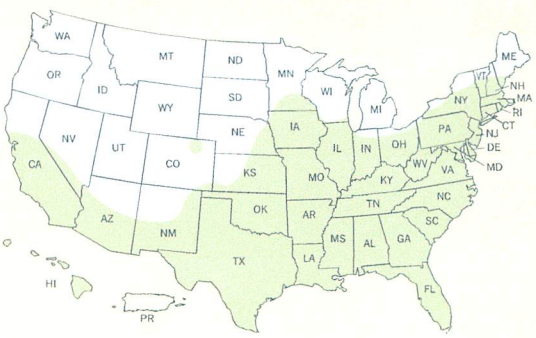
### *Aedes albopictus*

- May play a role in transmission in the United States due to its wide distribution
- Biting adults are found both indoors and outdoors, but are most commonly found outdoors
- Readily lay eggs in natural water sources like treeholes but will also use manmade containers

**Estimated range of *Aedes aegypti* in the United States, 2016**




**Estimated range of *Aedes albopictus* in the United States, 2016**




**These maps DO NOT show:**

- Exact locations or numbers of mosquitoes living in an area
- Risk or likelihood that these mosquitoes will spread viruses

**These maps DO show:**

- CDC's best estimate of the potential range of *Aedes aegypti* and *Aedes albopictus* in the United States
- Areas where mosquitoes are or have been previously found

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## Use integrated vector management (IVM) strategies for *Aedes aegypti* and *Aedes albopictus* species mosquitoes

- During a chikungunya, dengue, or Zika virus 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. Vector control efforts should target both species. Control procedures are generally similar for both.

## Conduct surveillance

- Monitor the populations of potential vectors and risk of chikungunya, dengue, or Zika virus circulation in your area.
- Implement larval surveillance programs to determine the number, type, and distribution of containers producing *Aedes aegypti* and *Aedes albopictus*.
- If not already developed, establish close lines of communication with local and state health departments to share epidemiological and ecological data and to obtain information about travel-related or locally-transmitted chikungunya, dengue, or Zika virus disease cases in the area.

## Remove larval habitats (source reduction)

- Reduce mosquito densities by removing larval habitats.
- Containers are ideal larval habitats. Remove discarded, unused, and unmaintained containers through community involvement programs or by vector control personnel.

## Control larva

- When source reduction is not feasible, apply biological or chemical larvicides to potential larval habitats.
- Use larvicides registered by the U.S. Environmental Protection Agency (EPA).

## Control adult mosquitoes

- *Aedes aegypti* and *Aedes albopictus* are crepuscular and are not effectively controlled by standard nighttime ultra-low volume (ULV) applications. Dawn or dusk ULV applications are recommended against these species.
- If case residences or areas of local transmission can be rapidly identified, ULV or barrier applications to individual residences may be warranted to further reduce the likelihood of vectors feeding on infectious people.

## Monitor for pesticide resistance

- Evaluation of pesticide susceptibility in local populations of potential chikungunya, dengue, or Zika virus vectors should be performed in advance to ensure that emergency control measures will be effective if needed.

## Prevent transmission

- There are no vaccines or medications to prevent or treat chikungunya, dengue, and Zika. Encourage the following measures to reduce the risk of human-vector contact:
- Wear long-sleeved shirts and long pants.
- Use air conditioning or window and door screens to keep mosquitoes outside.
- Treat your clothing and gear with permethrin or buy pre-treated items.
- Use EPA-registered insect repellents. When used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breastfeeding women.
- **Once a week**, empty and scrub, turn over, cover, or throw out items that hold water, such as tires, buckets, planters, toys, pools, birdbaths, flowerpots, or trash containers. Check inside and outside your home.
- People infected with chikungunya, dengue, or Zika virus should be protected from further mosquito exposure during the first week of illness to reduce the risk of local transmission.

## For more information, visit:

**www.cdc.gov/chikungunya • www.cdc.gov/dengue • www.cdc.gov/zika**

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# Help Control Mosquitoes that Spread Dengue, Chikungunya, and Zika Viruses

# B Z Z Z z.

Aside from being itchy and annoying, the bite of an infected female mosquito (*Aedes aegypti or Aedes albopictus*) can spread dengue, chikungunya, or Zika viruses. People become infected with dengue, chikungunya, or Zika after being bitten by an infected mosquito.

- Female mosquitoes lay several hundred eggs on the walls of water-filled containers. Eggs stick to containers like glue and remain attached until they are scrubbed off. When water covers the eggs, they hatch and become adults in about a week.
- Adult mosquitoes live inside and outside.
- They prefer to bite during the day.
- A few infected mosquitoes can produce large outbreaks in a community and put your family at risk of becoming sick.

## Protect Yourself, Your Family, and Community from Mosquitoes

### 1. Eliminate standing water in and around your home:

- **Once a week**, empty and scrub, turn over, cover, or throw out items that hold water, such as tires, buckets, planters, toys, pools, birdbaths, flowerpots, or trash containers. Check inside and outside your home.
- Tightly cover water storage containers (buckets, cisterns, rain barrels) so that mosquitoes cannot get inside to lay eggs.
- For containers without lids, use wire mesh with holes smaller than an adult mosquito.

### 2. If you have a septic tank, follow these steps:

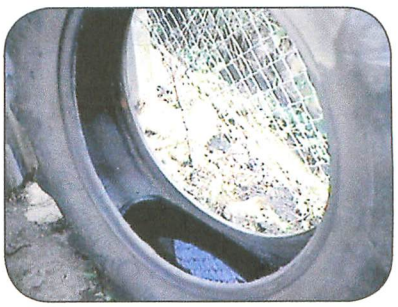
- Repair cracks or gaps.
- Cover open vent or plumbing pipes. Use wire mesh with holes smaller than an adult mosquito.

### 3. Keep mosquitoes out of your home:

- Use screens on windows and doors.
- Repair holes in screens.
- Use air conditioning when available.

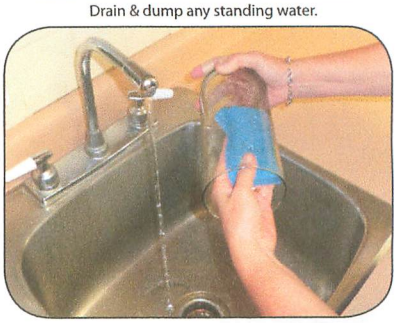
Put plants in soil, not in water.

Drain water from pools when not in use.



Recycle used tires or keep them protected from rain.

Drain & dump any standing water.



Weekly, scrub vases & containers to remove mosquito eggs.

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## 4. Prevent mosquito bites:

- Use an Environmental Protection Agency (EPA)-registered insect repellent with one of the following active ingredients. All EPA-registered insect repellents are evaluated to make sure they are safe and effective.

| **Active ingredient** Higher percentages of active ingredient provide longer protection | **Some brand name examples*** |
|---|---|
| **DEET** | Off!, Cutter, Sawyer, Ultrathon |
| **Picaridin**, also known as **KBR 3023, Bayrepel**, and **icaridin** | Cutter Advanced, Skin So Soft Bug Guard Plus, Autan (outside the United States) |
| **IR3535** | Skin So Soft Bug Guard Plus Expedition, SkinSmart |
| **Oil of lemon eucalyptus** (OLE) or **para-menthane-diol** (PMD) | Repel |

* Insect repellent brand names are provided for your information only. The Centers for Disease Control and Prevention and the U.S. Department of Health and Human Services cannot recommend or endorse any name brand products.

  - Always follow the product label instructions.
  - Reapply insect repellent every few hours, depending on which product and strength you choose.
  - Do not spray repellent on the skin under clothing.
  - If you are also using sunscreen, apply sunscreen first and insect repellent second.
- Treat clothing and gear (such as boots, pants, socks, and tents) with permethrin or purchase permethrin-treated clothing and gear.
  - Treated clothing remains protective after multiple washings. See product information to find out how long the protection will last.
  - If treating items yourself, follow the product instructions carefully.
  - Do **not** use permethrin products, intended to treat clothing, directly on skin.
- Wear long-sleeved shirts and long pants.


Keep rain barrels covered tightly.


Weekly, empty standing water from fountains and bird baths.


Keep septic tanks sealed.


Install or repair window & door screens.

For more information, visit:
www.cdc.gov/dengue, www.cdc.gov/chikungunya, www.cdc.gov/zika