

Zika virus

**MIT CAB/ESCRO Meeting
March 10, 2016**

Description

- First isolated in 1947 in Zika forest, Uganda, from a sentinel rhesus monkey that developed a fever.
- Zika virus (ZIKV) was thought to only rarely cause disease in humans until a decade ago.
- Zika virus is a flavivirus and has a positive sense single-stranded RNA genome and is enveloped.
- Zika virus causes Zika virus disease, also referred to as Zika fever.

Natural transmission

- Zika virus can be transmitted between humans and monkeys with mosquitos of the genus *Aedes* acting as a vector*.

Aedes aegypti



CDC Public Health Image Library #9534

Aedes albopictus

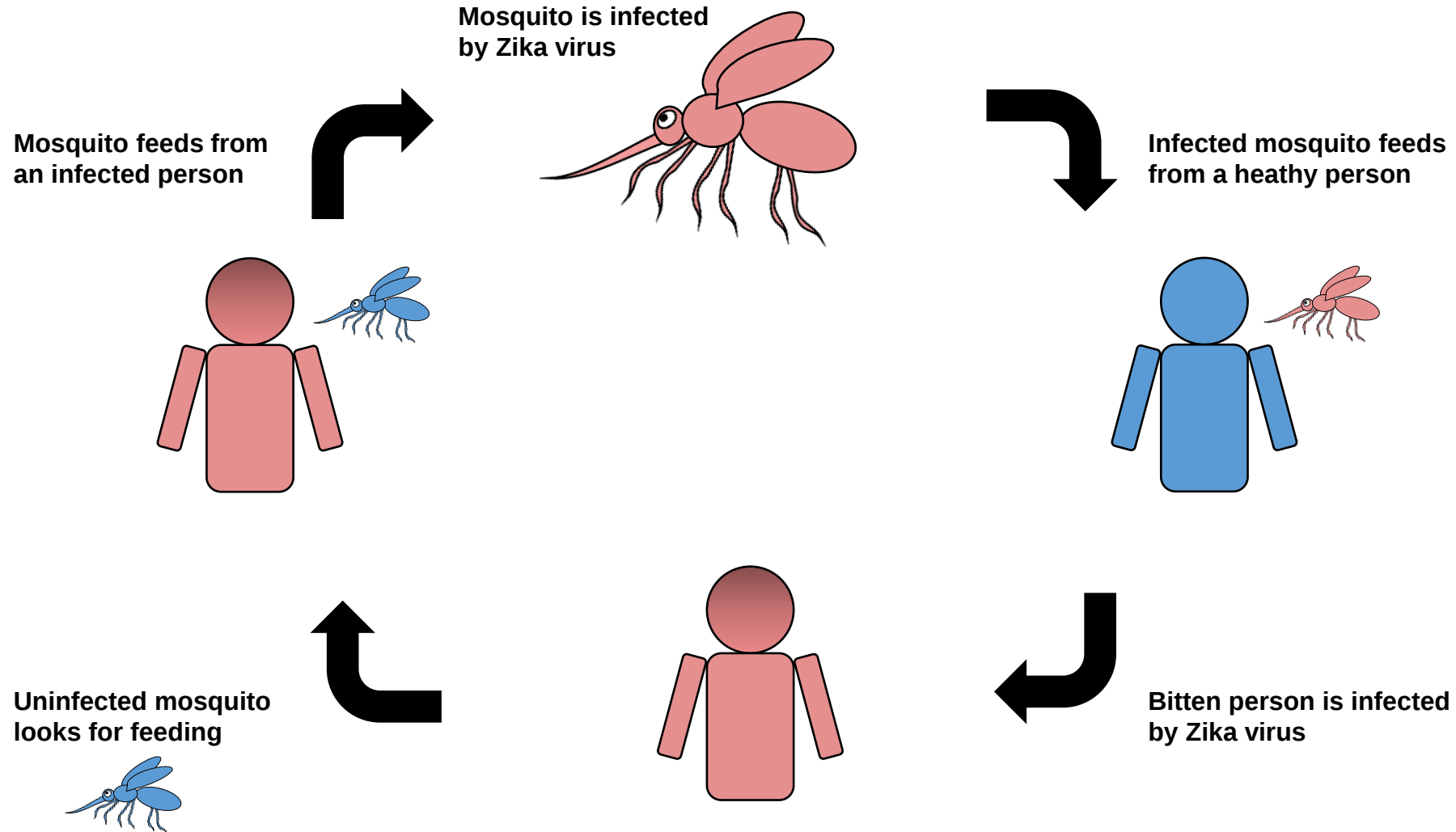


CDC Public Health Image Library #1969

- Direct contact with infected material, such as during blood transfusion, contact with mucous membranes.
- Sexual contact.
- Vertical transmission from mother to child *in utero* or during birth.
- Zika virus has been detected by RT-PCR and immunofluorescence in brain tissue of newborn with microcephaly who died shortly after birth

*Recent findings suggest that *Culex* mosquitos can carry Zika virus in their salivary glands in a laboratory setting, but whether they can transmit the virus is still unknown.

Transmission cycle



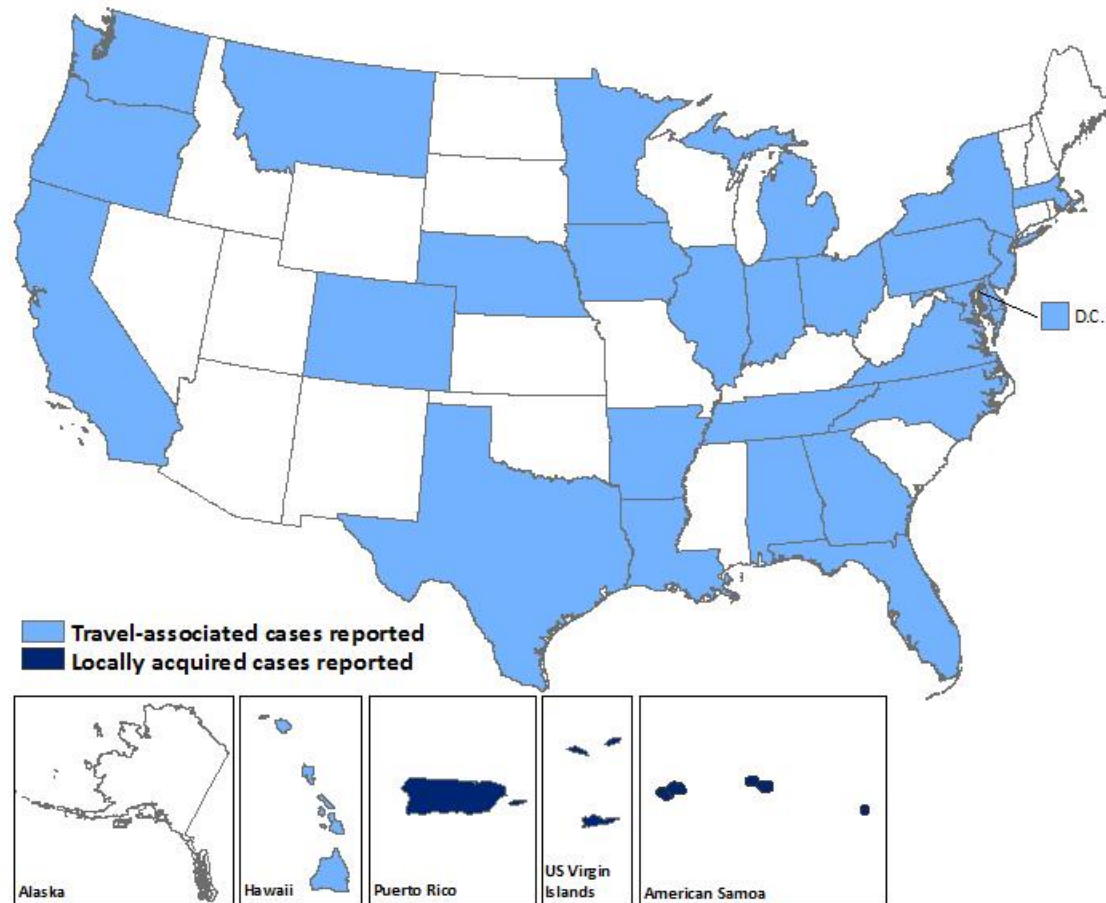
Active Zika virus transmission regions



CDC, as of February 29, 2016



Zika virus in the USA



USA States:

- 153 Travel associated cases reported.
- 0 locally acquired vector-borne cases reported.

USA Territories:

- 1 Travel associated cases reported.
- 107 locally acquired vector-borne cases reported.

CDC, as of March 2, 2016

Symptoms and treatment

Symptoms:

- The incubation period varies from 3 to 12 days and symptoms typically last 2 to 7 days.
- Fever
- Rash
- Joint and muscle pain
- Conjunctivitis

*Many infected patients are asymptomatic

Treatment:

- No specific treatment is available for Zika virus disease and usually focuses on addressing the symptoms.
- No vaccine available.

Working with Zika virus in the lab

- Experiments can be performed using a biosafety cabinet and BSL2 practices.
- Personal protective equipment (Safety glasses, gloves and lab coat) should be used when working with Zika virus.
- All personnel working in rooms or sharing equipment where Zika virus is used should be made aware of the ongoing research.

Risk of samples from patient containing other virus.

- Regions with active cases of Zika virus transmission often also have active transmission of Dengue virus and Chikungunya virus, which are all transmitted by the same types of mosquitos.
- Patients can be infected with more than one of these viruses.
- Samples should be tested by RT-PCR for the presence of Zika virus, Dengue virus and Chikungunya virus prior to conducting experiments where the viruses could replicate, such as infecting insect cells or infecting animals.

Occupational health concerns

- Use of needles or sharps should be avoided when possible when working with Zika virus.
- Zika virus disease has been linked to cases of Guillain-Barré syndrome, an autoimmune disease in which nerve cells are damaged leading to muscle weakness and in severe cases paralysis.
- Zika virus has been linked to cases of microcephaly. Pregnant women and women of child bearing age should be very cautious when working with Zika virus.