



Mosquito-Borne Disease

In the United States, some mosquitoes carry viruses that can cause disease in humans and animals including the following viruses: Chikungunya, Dengue, Eastern Equine Encephalitis, La Crosse Encephalitis, West Nile, and Western Equine Encephalitis. Reducing exposure to mosquitoes is the most effective prevention method for mosquito-borne diseases.

Mosquito-Borne Disease Information

Geographic Distribution and Seasonality

Mosquitoes and mosquito-borne diseases are found across the country. Cases of mosquito-borne disease are most common during warmer months (April to September), when mosquitoes are most active.

Hosts and Transmission

Mosquitoes feed on a variety of animals including: rodents and other mammals, birds, reptiles, and amphibians. Disease is spread by the bite of an infected mosquito. Some species of wildlife are affected by mosquito-borne disease as well.

Signs and Symptoms

Human symptoms of mosquito-borne illness usually appear within a few days to 2 weeks after the mosquito bite and include:

- Fever and chills
- Headache and muscle aches
- Nausea and vomiting
- Diarrhea
- Rash
- Tiredness

Prevention and Control

Reducing exposure to mosquitoes is the best prevention method for mosquito-borne diseases, especially in warmer months and during peak mosquito hours (dusk to dawn), when mosquitoes are most active. To help prevent getting mosquito-borne illness while visiting the parks:

- Wear insect repellants that contain: DEET, IR3535, Picaridin, or oil of lemon eucalyptus (Para-menthane-diol); follow label instructions and reapply as needed
- Wear long sleeves, long pants, and socks outdoors when weather permits
- Treat clothing and gear with products containing permethrin
- Help reduce the number of mosquitoes around your home or campsite by emptying standing water from buckets, pet water dishes, and other items on a regular basis.

Testing and Treatment

There is no specific treatment for many mosquito-borne viral diseases, but supportive care can improve clinical outcomes.

If you think you have the symptoms of a mosquito-borne disease and your fever does not resolve or symptoms get worse, seek medical care.



One Health & Mosquito-Borne Disease

West Nile Virus, chikungunya, dengue, and Zika virus are all non-native diseases introduced by human activity. The non-native mosquitoes that spread dengue, chikungunya, and Zika virus prefer to feed on humans and breed in man-made habitats. Human impacts on the environment, including land development and climate change, are affecting mosquito habitats and development. Some of these changes to the land, air, and water promote the transmission and spread of mosquito-borne diseases.

By protecting natural environments and their ecological properties and processes, we can help protect ourselves from mosquito-borne diseases – this is One Health in action.



CREDIT: CDC

The most effective way to avoid mosquito-borne disease is to prevent mosquito bites.

Mosquito-Borne Diseases

Chikungunya

Chikungunya was introduced into the Americas in 2013, with cases in several US territories. Many imported cases have been reported from travelers returning to the US.

Chikungunya only affects humans and is spread by non-native *Aedes* mosquitoes.

The virus most often causes fever and joint pain in humans 3-7 days after infection, and can also cause other symptoms such as headache, muscle pain, joint swelling, or rash.

Dengue

Dengue occurs in moist habitats in tropical and subtropical environments worldwide and in the southeastern US, with climate change promoting spread of the disease to the north.

Dengue primarily affects humans and is spread by non-native *Aedes* mosquitoes.

Dengue causes flu-like symptoms in some people and no visible signs of infection in others.

Zika

Zika virus was introduced into the Americas in 2015 and has spread to many US territories, with many imported cases in the US. Only 1 in 5 people infected will get sick.

Symptoms develop 3-14 days after infection and include fever, joint aches, rash, and red eyes. Zika infection during pregnancy may cause brain damage and microcephaly in the fetus. There have also been increased reports of Guillain-Barre syndrome, a paralytic condition, that may be associated with Zika infection.

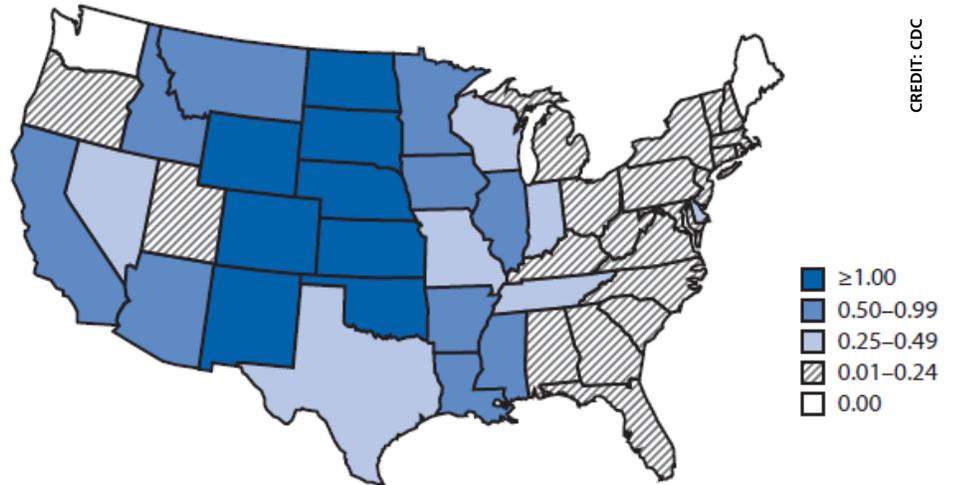
Zika is spread by non-native *Aedes* mosquitoes, sexual transmission, and from a mother to fetus. Wildlife do not play a role in maintaining or transmitting the virus.

Eastern Equine Encephalitis (EEE)

Eastern Equine Encephalitis (EEE) is a viral mosquito-borne disease occurring in wooded wetland habitats in the Gulf Coast and Atlantic states and Great Lakes region of the US.

The disease affects humans and animals including birds, horses, and sometimes other mammals including deer.

Most humans do not develop any symptoms of EEE. Less commonly, severe EEE can cause seizures, confusion and life-threatening swelling of the brain in humans.



CREDIT: CDC

Incidence of reported human cases of West Nile virus neuroinvasive disease, by state — United States, 2013. States with the highest incidence rates included North Dakota (8.9 per 100,000), South Dakota (6.8), Nebraska (2.9), and

La Crosse Encephalitis

La Crosse Encephalitis occurs in forests in the Midwestern, mid-Atlantic, and southeastern US.

The disease affects humans and small rodents and is caused by a virus spread by the eastern treehole mosquito (*Aedes triseriatus*).

La Crosse Encephalitis virus causes no visible signs of infection in most people and flu-like symptoms in some.

Serious cases, most often in children younger than 16 years old, can cause swelling of the brain, which is life threatening and requires emergency medical treatment.

West Nile Virus

West Nile Virus (WNV) occurs throughout the world and is carried by many species of mosquitoes.

The disease is transmitted to humans, birds, and other animals including horses by the bite of infected mosquito.

The majority of infected humans do not develop any symptoms from WNV, although some experience flu-like symptoms and few develop serious neurologic illness.

Birds such as raptors are very susceptible to the disease and often develop severe illness and die. WNV has decreased bird populations in many areas.

Report dead birds to a park ranger as they may indicate that WNV is circulating between birds and mosquitoes.

Western Equine Encephalitis

Western Equine Encephalitis (WEE) is found in grassy, wetland habitats and the plains regions of the western and central US.

The disease affects humans and animals including birds, horses, and sometimes other mammals such as deer.

Most humans do not develop any symptoms of WEE. Less commonly, severe WEE can cause seizures, confusion and life-threatening



CREDIT: CDC

Aedes aegypti is a non-native mosquito and primary vector for dengue, chikungunya, and Zika transmission.

More Information

Biological Resources Division
and
Office of Public Health
1201 Oakridge Drive, Suite 200
Fort Collins, CO 80525

www.nature.nps.gov
PublicHealthprogram@nps.gov

<http://www.cdc.gov/features/stopmosquitoes/>