

# *epi*TRENDS

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## Arboviral Diseases

A large number of viruses can be transmitted by arthropods such as mosquitoes, sandflies, ticks, or midges. Arthropod-borne viral infections often have global importance. Note that arthropod vectors can carry non-viral pathogens which can be of considerable public health concern, such as the malaria parasite carried by mosquitoes.

### Major Arboviral Diseases

About 150 arboviral diseases of humans are known with diverse syndromes and distributions. Clinical presentation can include:

- Acute central nervous system (CNS) illness
- Short duration, uncomplicated fever, sometimes with rash
- Hemorrhagic fever
- Polyarthritis and rash, sometimes with fever
- Birth defects

A few vaccines exist, but other than avoiding exposure, supportive care for severe symptoms is the main intervention for arboviral diseases.

Globally, the arboviral conditions of most concern are mosquito-borne, occurring primarily in tropical climates. Transmission is typically highest during and after rainy seasons. Increases in temperatures and flooding from severe storms can increase mosquito populations and therefore disease transmission. Even droughts can contribute if water is stored in containers not secured against mosquito entry. Of concern are outbreaks of arboviral infections in urban areas, reflecting urbanization, spread of vector mosquitoes without effective control measures, and international air travel facilitating spread of agents to new areas.

Dengue is the most common mosquito-borne disease worldwide, with about half the world's population living in endemic areas. Dengue virus infection can be asymptomatic or have symptoms ranging from a mild to life-threatening hemorrhage and shock. Outbreaks of dengue are occurring in Central and South America, Mexico, the Caribbean, Africa, the Middle East, Asia, and the Pacific Islands. There have been a record high number of cases reported globally in 2024.



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Chikungunya virus infection most commonly causes fever with severe pain in multiple joints. Rare complications include involvement of organs such as the eye, heart, liver, or brain, and hemorrhagic disease. Recent outbreaks have occurred in parts of Africa, South America, and Asia.

Zika virus infection is usually asymptomatic. Rare neurologic complications can occur, but the major risk is adverse outcomes of pregnancy including impaired fetal brain development. Recent outbreaks have occurred in parts of Africa, the Americas, Asia, and the Pacific.

Yellow fever is typically asymptomatic, but some cases develop a fever and a small number have hepatitis (causing jaundice with yellowing of eyes and skin) and hemorrhagic disease. The disease occurs in parts of Africa and the Americas, and has increased in both continents in the past decade.

Japanese encephalitis usually causes no or few symptoms. Rare cases result in encephalitis. The disease is present in parts of Asia and the western Pacific.

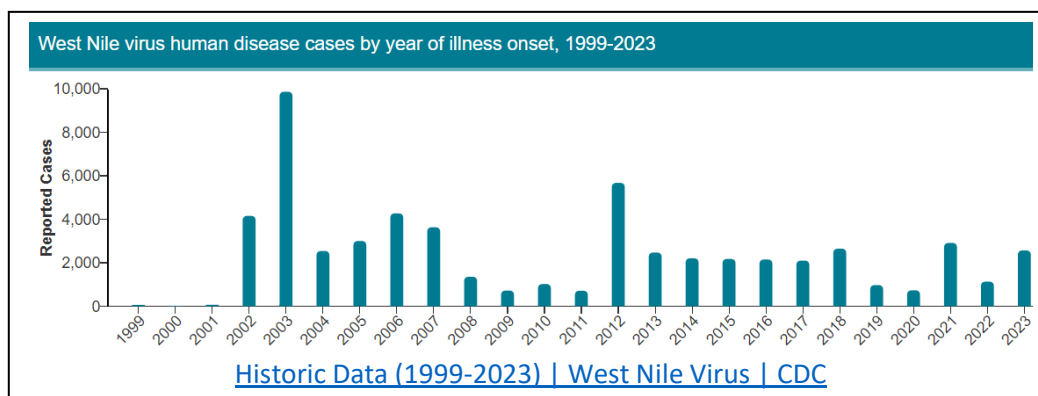
West Nile virus is usually asymptomatic but can cause fatal neurological disease. Outbreaks have occurred in parts of Europe, the Middle East, Africa, West Asia, Australia, and North America.

While global endemic arboviral areas are well defined, cases may be diagnosed in non-endemic countries due to exposures during travel. If competent mosquito vectors are present in a non-endemic country, returning travel-associated cases can result in sporadic locally acquired infections; if a competent reservoir and vector are both present, a virus could become established.

### ***Epidemiology in the United States***

In the late 17<sup>th</sup> century yellow fever was introduced into North America and became endemic, resulting in urban outbreaks with high mortality; an outbreak during 1793 may have killed about 10% of Philadelphia’s population. New Orleans had repeated outbreaks until 1905, the country’s last yellow fever outbreak. Mosquito eradication eliminated the disease in the United States.

Arboviral infections in the United States can be imported due to exposure during travel, locally acquired from arthropod bites, or result from receipt of blood or organ transplants. In the United States, the most common arboviral disease is West Nile virus. The disease was first identified in 1999 in New York City. In under a decade cases of the disease spanned the continent with thousands of cases occurring in the United States in most years (Figure).



Dozens to hundreds of dengue infections are reported annually in the United States, almost all due to travel. However, rare locally acquired cases have also been identified over several years in Hawaii, Florida, Texas, Arizona, California, and New York. Dengue is common in six US territories and freely associated states including Puerto Rico, American Samoa, US Virgin Islands, the Federated States of Micronesia, the Republic of Marshall Islands, and the Republic of Palau.

Other conditions reported as acquired in the United States include La Crosse virus disease, Jamestown Canyon virus disease, Powassan virus disease, St. Louis encephalitis virus disease, and eastern equine encephalitis disease. During 2024 media covered severe cases of several diseases.

In 2024, Oropouche virus infections were reported in the United States among travelers exposed in areas experiencing outbreaks, with most cases reporting travel to Cuba. This arbovirus has been endemic to the Amazon Basin, with recent spread to new areas including the Caribbean. The virus is maintained in transmission cycles involving wildlife and a mosquito vector, but it also circulates in urban environments where the disease is spread among people via the bite of infected midges. This year Brazil reported the first deaths associated with this virus and evidence of vertical transmission leading to fetal death or congenital abnormalities.

Washington has endemic transmission of West Nile virus, typically with 0-13 human cases annually. In addition, rare cases of locally acquired St. Louis encephalitis and Western equine encephalitis have been reported in the state. Travel-associated cases of dengue, chikungunya, and Zika have been reported, with travel-associated dengue cases rising due to outbreaks occurring in other countries. Other rare travel associated arboviral cases have been reported among Washington residents, including Colorado tick fever, Japanese encephalitis, and St. Louis encephalitis.

### **Prevention**

Avoiding infection is key because there are no specific treatments for arboviral infections. Travelers going to endemic areas should consult guidance for their risks of exposure to arboviral diseases (and other vector-borne infections) in the region and season of travel. Vaccines are available against Japanese encephalitis, yellow fever, and chikungunya..

It is important to take appropriate prevention measures for the area (e.g., topography or time of day when mosquito bites commonly occur). Reduce risk of exposure during travel and at home by:

- Wearing clothing that covers exposed skin
- Using screens on windows and doors
- Using EPA-registered insect repellents or permethrin treated clothing
- Sleeping under a net, even during the day if mosquitoes are active

Those living in areas endemic for arboviruses should reduce egg-laying habitats for mosquitoes by removing containers or habitats where water can collect. Mosquito control districts are active in parts of Washington and Washington State Department of Health partners with mosquito control districts and local health jurisdictions to conduct mosquito surveillance in the state.

Arboviral disease risks vary by season and geographic location. People should consider and understand the disease vectors present where they live or travel and take appropriate precautions to prevent illness. Providers should know of arboviral disease risks by region and provide guidance to travelers as well as appropriate diagnostic testing and care for those with symptoms and exposures consistent with arboviral diseases. As changing environmental conditions and importation of arboviruses impact the distribution and incidence of arboviral diseases, continued surveillance is essential to define areas of risk and inform prevention and control efforts.

### **Resources**

Department of Health: [Arboviral Disease | Washington State Department of Health](#)

CDC guidance for travelers: [Travelers' Health | CDC](#)