

# Arboviral Infections

## Traveler Summary

This article discusses Rift Valley fever, Ross River fever, equine encephalitides (EE), Powassan encephalitis, and Mayaro fever.

See also: *Chikungunya*, *Yellow Fever*, *Dengue*, *Japanese Encephalitis*, *Tick-Borne Encephalitis*, *West Nile Virus*, *Viral Hemorrhagic Fevers*, and *Zika*.

## Key Points

- Arboviral infections, such as Rift Valley fever (RVF), equine encephalitides (EE), Ross River fever (RRF), Powassan encephalitis (PE), and Mayaro fever (MF), are viral infections occurring worldwide, acquired through the bite of mosquitoes or ticks or contact with the blood or tissue of infected animals.
- Risk is difficult to predict but is generally low for travelers.
- Symptoms include fever, chills, eye redness and pain, muscle and joint pain, and arthritis.
- Consequences of infection include brain damage, vision loss, liver damage, and clotting abnormalities that may result in severe or fatal bleeding.
- Prevention includes observing personal protective measures against mosquito and tick bites.
- No vaccine or preventive drugs are available.

## Introduction

Arboviral infections such as RVF, EE, RRF, PE, and MF are caused by viruses worldwide and may be transmitted to humans through the bite of mosquitoes, ticks, or sand flies. RVF virus can also be transmitted via contact with infected animal or animal products. Most human infections are mild and transient, but some may cause serious disease. Many of these infections result in small, localized epidemics that occasionally involve travelers; others may be transported accidentally from one region to another and become established when transmission conditions are favorable. Immunity after human infection is usually lifelong.

## Risk Areas

The viruses causing arboviral infections often live and multiply in animal hosts, which remain infective for life. Outbreaks of human infections are often local and seasonal and are affected by climate changes that result in flooding and warm temperatures.

## Rift Valley Fever

RVF is a viral disease affecting cattle, goats, and sheep throughout Africa and Saudi Arabia.

## Equine Encephalitides

EE are common in North America, with epidemics associated with heavy summer rainfall, flooding, and swampy areas. St. Louis encephalitis (SLE) occurs mainly during the late summer or early fall in temperate states and throughout the year in the southern states of the US; the range of infection extends from Canada to Argentina; however, human cases have occurred mainly in the US, especially in the eastern and central states. Western equine encephalitis and Venezuelan equine encephalitis (VEE) viruses are also found in the Americas. Human VEE cases have been reported in Central and South American countries, including Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Peru, and Venezuela, as well as in Mexico and the US.

## Ross River Fever

RRF virus is present in most areas of Australia and Fiji. Barmah Forest virus, which causes a similar illness, is common in the Northern Territory and the states of Queensland and Western Australia.

## Powassan Encephalitis

Powassan virus infections have been identified in Canada, Russia, and the US. In the US, cases occur from late spring to mid-fall season, mainly in the northeastern states and the Great Lakes region.

## Mayaro Fever

Mayaro virus is circulating in Central and South America, especially in the Amazon region. Infections have also been reported in Ecuador, French Guiana, Haiti, and Peru.

## Transmission

RVF virus is mainly transmitted to humans through contact with blood, bodily fluids, or tissues of infected animals (e.g., during slaughter, meat preparation, or while on hunting safaris) or through the bite of an infected mosquito. The virus lives and multiplies in sheep, goats, cattle, rodents, birds, horses, and donkeys, as well as in the mosquitoes carrying the disease.

Arboviruses causing Eastern equine encephalitis (EEE), SLE, RRV, and MF are transmitted to humans via mosquito bites, whereas Powassan virus is transmitted through the bite of ticks.

## Risk Factors

Risk of exposure to arboviral infections is variable; mosquitoes differ in their breeding sites and biting times. Risk is generally low for most travelers but higher for persons staying in accommodations or visiting places that are not protected against mosquitoes.

## Rift Valley Fever

Risk is low for most travelers but increased for travelers sleeping outdoors in areas where outbreaks among animals are occurring. Risk is also high for hunters, veterinarians, slaughterhouse workers, and herdsmen.

## Equine Encephalitides

Risk is high among residents but low among travelers (except during periods of outbreaks among animals) and is associated with outdoor activities, including work and recreation, especially in woodland and swampy areas.

## Ross River Fever

Risk exists among travelers going to rural and peri-urban areas and at water reservoirs and is associated with exposure to mosquitoes.

## Powassan Encephalitis

Risk is associated with exposure to ticks during outdoor activities, mainly from late spring to mid-fall.

## Mayaro Fever

Risk is associated with rural exposure, mainly with activity in tropical rainforests, although recent cases from French Guiana indicate possible expansion of viral circulation to peri-urban and urban areas.

## Symptoms

Persons with arboviral infections may be symptom-free or may have either mild or severe symptoms. Symptoms most commonly appear a few days to 1 month following exposure and include fever, weakness, rash, headache, depression, eye redness and pain, muscle and joint pain, sensitivity to light, and arthritis. Jaundice (yellowing of the skin and eyes), confusion, convulsions, and shock may also occur.

## Consequences of Infection

Arboviral infections can lead to liver damage, brain damage, loss of vision, or clotting abnormalities, which may result in severe or fatal bleeding.

## Need for Medical Assistance

Most arboviral infections require no medical attention, but severe symptoms will require hospitalization and investigation. Treatment is supportive. No vaccine or preventive drugs are available.

## Prevention

### Nonvaccine

Personal protective measures are the main prevention strategy. Apply repellent during peak mosquito biting activity times and treat outer clothing, boots, tents, and sleeping bag liners with permethrin (or other pyrethroid) when traveling in a very high-risk area for arboviral infections. Avoid places where an epidemic is occurring or where recent flooding and high temperatures encourage mosquito breeding. Remove containers with stagnant water (which can serve as breeding sites for mosquitoes) from the proximity of human habitation whenever possible. In areas with RVF, avoid contact with animal blood, bodily fluids, and tissue and avoid consuming unpasteurized milk or raw meat. Wear long, light-colored trousers tucked into socks when traveling in an area with risk for tick-borne diseases; light-colored clothing makes it easier to spot ticks. Remove attached ticks immediately.

See *Insect Precautions*.

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