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## Arboviruses

Arbovirus is a term used to describe a group of viral infections transmitted to humans from a group of insects known as arthropods. There are many strains of arbovirus.

The viruses range in severity from no symptoms to mild flu-like symptoms to very severe symptoms. Avoiding insect bites is key to preventing these nasty viral infections.

Insects that can infect humans with arboviruses include fleas, ticks, gnats, and mosquitoes. There are over 130 different arboviruses that affect humans.

### Common types of arbovirus

There are many types of arboviruses. The different types of arbovirus are broken down into specific genera.

The three main genera for arboviruses that cause infections in humans are as follows:

- flavivirus
- togavirus
- bunyavirus

Types of flavivirus include the following:

- yellow fever
- West Nile virus

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- Zika virus
- dengue fever
- Japanese encephalitis

Types of togavirus include the following:

- Ross River virus
- Eastern equine virus
- Western equine virus

Types of bunyavirus include the following:

- California encephalitis
- La Crosse virus
- Jamestown Canyon virus

## **Transmission**

The arboviruses spread mainly through insect bites. The most common insect that spreads arboviruses is the mosquito. However, other arthropods such as ticks, fleas, and gnats can also spread these diseases if they bite a human.

While insect bites are the most common way arboviruses are transmitted, the viruses can also spread through:

- blood transfusion
- organ transplant

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- sexual contact
- pregnancy and childbirth from mother to child

Human to human transmission of most arboviruses through casual, everyday contact has not been documented.

## Symptoms

Most infections caused by arboviruses do not have symptoms. However, when they do, symptoms can range from a mild flu-like illness to encephalitis, a potentially life-threatening inflammation and swelling in the brain.

The clinical characteristics and symptoms are divided into two subgroups: neuroinvasive and non-neuroinvasive.

**Neuroinvasive** diseases cause symptoms indicating that the disease can infect the nervous system, while non-neuroinvasive diseases do not.

Neuroinvasive arboviruses often cause meningitis or encephalitis. Symptoms of neuroinvasive arboviruses include the sudden onset of fever accompanied by the following:

- headache
- stiff neck
- muscle pain
- confusion or disorientation
- weakness in the arms and legs

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- seizures

Non-neuroinvasive arboviruses differ slightly in their symptoms. The nervous system is not affected, so they do not typically cause altered mental state, such as confusion or seizures.

However, non-neuroinvasive arboviruses can cause a fever in addition to the following symptoms:

- headache
- muscle aches
- joint pain
- upset stomach
- nausea, vomiting, or diarrhea
- rash

## Diagnosis

The majority of people infected with an arbovirus will have no symptoms and will not be diagnosed.

However, certain groups of people, such as women who are pregnant or planning to become pregnant and have traveled to areas where certain arboviruses such as Zika are common, can have **a blood test** to find out whether they have an infection.

People who develop symptoms from an arbovirus should seek a diagnosis to ensure they receive proper treatment and that public health concerns are recorded.

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**A doctor will check to see if a person with suspected arbovirus meets certain clinical criteria.** The clinical criteria differ according to whether or not the arbovirus is neuroinvasive or non-neuroinvasive.

### **Neuroinvasive arbovirus**

To be diagnosed with a neuroinvasive strain of arbovirus, a person must exhibit:

- encephalitis, meningitis, or other signs of neurological dysfunction
- other symptoms of neuroinvasive arbovirus

In addition to these requirements, a doctor must rule out other, more likely causes of a person's symptoms.

### **Non-neuroinvasive arbovirus**

In order for a doctor to diagnose non-neuroinvasive arbovirus, a person must present all of the following clinical signs:

- a fever
- the absence of a neuroinvasive disease
- other symptoms of a non-neuroinvasive arbovirus
- lack of a more likely clinical explanation

After a physical evaluation that supports the diagnosis of a particular strain of arbovirus, a doctor will likely order blood work. The blood test can identify the presence of arbovirus by isolating a single virus, antibodies, or antigens.

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If the results of the blood tests show the presence of neuroinvasive arbovirus, the doctor will probably recommend testing the person's cerebrospinal fluid to confirm the diagnosis.

### Prevention

- While **effective vaccines** are available for some arboviruses, including Japanese encephalitis and yellow fever, there is not a vaccine for all arboviruses. Many other vaccines for arboviruses are currently being developed, however.
- The best way to prevent arboviral infections is by **preventing insect bites**, particularly in areas that have high incidences of arboviruses.

A person can help prevent insect bites by:

- using insect repellent
- wearing clothing that covers the limbs when outdoors
- tucking pants into socks
- wearing light colored clothing, so that insects are easy to spot

A person can also take steps to reduce the mosquito population in their home and yard.

- keeping pools and outdoor hot tubs clean and chlorinated
- putting away children's pools or wheelbarrows when not in use

Reducing the tick population will lessen the risk of tick borne arbovirus.