

West Nile Virus and Mosquito-Borne Viruses in Colorado: Frequently Asked Questions

What are the mosquito-borne viruses In Colorado?

There currently are four viruses in Colorado that are transmitted by mosquitoes.

Western equine encephalitis (WEE) is distributed across the central and western United States. St. Louis encephalitis (SLE) is found throughout the continental United States. California encephalitis viruses are a group of several viruses found throughout the U.S.

West Nile (WN) virus historically occurred in parts of Asia, Eastern Europe, Africa, and the Middle East. This virus was first detected in the United States in 1999 during an outbreak in New York City.

How are people and animals infected with these viruses?

These viruses are transmitted to people and animals by bites from infected mosquitoes. Only certain species of mosquitoes carry the virus and very few mosquitoes actually are infected. In Colorado, these viruses are transmitted to people by a species called *Culex tarsalis*, a medium-sized mosquito that feeds in the few hours around dawn and dusk. During the day they rest in shady, secluded areas, such as under porches, roof overhangs, tall grass, shrubs, and storm sewers. They breed in almost any source of standing water, including irrigated fields, old tires, hoof prints, flowerpots, tree holes, or any puddle of water that lasts for more than a few days.

These viruses are maintained in a bird-mosquito-bird cycle. Mosquitoes are infected by feeding on a bird with virus in its blood. The virus is transmitted to a new host in the mosquito's saliva when the insect bites another person or animal. Humans and horses are incidental dead-end hosts in that they cannot infect other mosquitoes. Person-to-person transmission does not occur. These viruses are prevalent from May to September when mosquitoes are most abundant, but the risk to humans occurs primarily from August through early September.

What are the symptoms?

Most people who are infected with mosquito-borne viruses do not become ill and have no symptoms. For persons who do become ill, the time between the mosquito bite and the onset of symptoms, known as the incubation period, ranges from 5-15 days.

Two clinically different types of disease occur in humans: (1) viral fever syndrome, and (2) encephalitis, an inflammation of the brain. Symptoms of the viral fever syndrome include fever, headache, and malaise. These symptoms persist for a about 2-7 days.

In rare cases, the virus can cause a more serious brain infection such as aseptic meningitis or encephalitis. These infections begin with a sudden onset of high fever and a headache, and then may progress to stiff neck, disorientation, tremors, and coma. Severe infections can result in permanent brain damage or death. Most deaths occur in persons over 50 years of age. There is no specific treatment for infection with these viruses except supportive care.

Which animals get infected with these viruses?

An infected mosquito can bite any animal, but not all animals will become ill. As the reservoir host of these viruses, birds are most often infected, but other animals can be infected and become ill as well.

Birds

Mosquitoes acquire the viruses from wild birds. Infection has been reported in more than 70 bird species. With WEE and SLE, infected birds will not appear ill or die. However, WN virus is new to this country and does cause illness and death in native birds that have no natural resistance to infection. The highest death rates are seen among birds in the corvid family, which includes crows, magpies, ravens, and jays. American crows constitute the majority of birds reported positive for WN virus.

Horses

Horses are susceptible to infection with WEE and WN viruses, but not SLE. Another virus, eastern equine encephalitis (EEE) is not found in Colorado, but could be a problem if a horse travels to the eastern U.S. These diseases do not seem to be specific to a particular breed or age of horse. Clinical signs in a horse can include lack of coordination or muscle control, weakness of limbs, inability to rise, and death. Fever has been detected in less than one-quarter of all confirmed cases of WN virus. WEE, EEE, and WN virus vaccines are available for horses through veterinarians.

Components of the Colorado Mosquito-Borne Virus Surveillance Program Local health departments and the Colorado Department of Public Health and Environment have conducted a statewide mosquito-borne encephalitis surveillance program since 1988 for WEE and SLE. In 2001, the program expanded to detect WN virus.

Sentinel Chicken Testing

Chicken flocks are strategically placed throughout the state and are tested bi-weekly during the mosquito season to detect evidence of infection with WEE, SLE, and WN viruses.

Mosquito Surveillance

Mosquitoes are collected to monitor the abundance and type of mosquitoes in the area and some are sampled for the presence of WN, WEE, and SLE viruses.

Dead Corvid Testing

Colorado began to test dead corvids (includes crows, magpies, ravens, and jays) for WN virus in 2001. Birds that have died within the previous two days are collected and submitted to the state laboratory by the local health department or animal control agency. Persons finding a dead crow should use gloves when handling a carcass. Information on the collection and submission of a dead corvid is available on the [Colorado Department of Public Health and Environment Web site about zoonotic diseases](#).

Equine Case Surveillance

Horses can become ill and die from infections with WEE and WN. The occurrence of horse cases in an area indicates significant virus transmission and can indicate an increased risk to humans. Veterinarians are required to report suspect cases and are encouraged to submit blood samples for testing.

Human Case Surveillance

Cases of encephalitis suspected of being caused by these viruses are physician- reportable conditions under Colorado law. The Colorado Department of Public Health and Environment lab offers testing for WEE, SLE, and WN virus on any suspected cases.

Mosquito-Borne Virus Prevention and Control

To decrease exposure to mosquitoes and the viruses they may carry:

- Limit outside activity around dawn and dusk when *Culex tarsalis* mosquitoes feed. This is particularly important for elderly adults and small children.
- Wear protective clothing such as lightweight long pants and long sleeve shirts when outside.
- Apply insect repellent to exposed skin when outside. Repellents with DEET are effective, but should be applied sparingly.
- Products with 10% or less of DEET are recommended for children. Make sure that doors and windows have tight-fitting screens. Repair or replace screens that have tears or holes in them.
- Drain all standing water on private property, no matter how small an amount.
- Stock permanent ponds or fountains with fish that eat mosquito larvae. Change water in birdbaths or wading pools and empty flowerpot saucers of standing water at least once a week.
- Check around faucets and air conditioner units and repair leaks or puddles that remain for several days.
- Make sure roof gutters drain properly and remove any standing water under or around structures or on flat roofs.
- Remove items that could collect water such as old tires, buckets, empty cans, and food and beverage containers.
- Eliminate seepage and standing water from cisterns, cesspools, septic tanks, and animal watering tanks.
- Do not over-water lawns and gardens to prevent standing water.

For additional information or to report a dead corvid, contact your local county health department.

Colorado surveillance data for mosquito-borne viruses is available on the following [Colorado Department of Public Health](#)

[and Environment Web site.](#)

For more information on mosquito control larvicides, adulticides, synergists, and repellents, visit the National Pesticide Information Center web site at:

<http://npic.orst.edu/>

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