

West Nile Virus Disease in Equids (horses, mules, donkeys, and zebras).

What it is

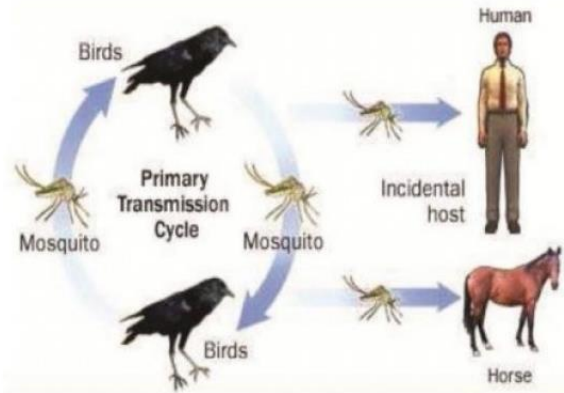
West Nile Virus (WNV) causes a brain and spinal cord infection, medically known as encephalomyelitis. Prior to entry into North America more than 20 years ago, WNV was first found in Uganda in 1937 in the blood of a person, and thereafter was identified as the cause of infrequent outbreaks in Africa, the Middle East, Asia, and Europe. By the mid-1990s WNV had spread across much of Europe. Today it is still a moderate human and equine health burden in Africa and Europe. In North America, WNV was first detected in New York in 1999, and by 2003 the virus had spread to all contiguous US states, southern Canada, including Alberta, and northern Mexico. By 2008, WNV was the most widespread insect-borne virus globally.

How the virus is spread

The virus is mosquito-borne and certain species of mosquito are typically responsible for transmission of the virus in different geographic areas. In Alberta, the most important species for transmission of the virus is *Culex tarsalis*, a mosquito that can survive Alberta's winters.

This mosquito can transmit the virus to many animal species, but it preferentially circulates between mosquitoes and birds. Infected birds can spread the virus into new areas and noticeable die-offs of birds may signal the presence of WNV in an area. Certain families of birds are severely affected (e.g., corvids: crows, grey jays, blue jays, magpies, and ravens), while some birds are very resistant to disease but may still carry the virus (e.g., robins). Once a bird of a suitable species is infected, the amount of virus circulating in their bloodstream becomes extremely high. Mosquitoes feeding on these birds may become infected with the virus and subsequently transmit it.

In horses and humans, the amount of virus in the bloodstream does not become high enough for it to infect a feeding mosquito; therefore, it does not spread from horses or humans. This is why horses and humans are referred to as "incidental hosts" or "dead end hosts" and why horses do not need to be quarantined when they are affected.



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A note about ambient temperature: After a mosquito feeds on a bird and picks up WNV, the virus is NOT immediately available to be transmitted by the mosquito. The virus must replicate and travel within the mosquito (from its midgut to its salivary glands) for a period of time before it is present in the saliva and available to be transmitted during its blood meal. The time required for replication and travel is temperature dependent; the virus will not develop within the mosquito below 14.3°C. At 18°C it takes around 30 days for *Culex tarsalis* to be able to transmit the virus, and at 30°C it takes less than 7 days. Monitoring ambient temperature can help with annual predictions of where and when the virus will appear.

Why you should be concerned

1. **WNV affects all equids: horses, mules, donkeys, and zebras.**

Of all the provinces in Canada, Alberta is home to the largest population of horses. Precise numbers are difficult to obtain, but in 2010 [Equestrian Canada](https://www.equestriancanada.com/) estimated that there were 963,500 horses in Canada, with 32.5 per cent or 313,500 in Alberta. Alberta also has vast areas of farmland which is an ideal environment for *Culex tarsalis* to proliferate.

In a joint project between researchers at the University of Montreal and the Canadian Food Inspection Agency (CFIA), Levasseur et. al. (2021) examined the history of 842 Canadian WNV cases from 2003 to 2019 and noted that 279 cases (or 33 per cent) were from Alberta.

Once an infected mosquito bites a horse and transmits the virus, it can replicate in the horse and potentially cross into the brain and spinal cord. Inflammation of these tissues, called encephalomyelitis, is responsible for the neurological signs seen in some affected horses.

It takes about one to two weeks for the horse to show signs of infection; this is known as the incubation period.

An infected horse may not show any signs and may recover completely without intervention, or they may show:

- Mild, flu-like signs
- Moderate to severe neurological signs including:
 - Fever
 - Incoordination
 - Stumbling
 - Falling
 - Weakness
 - Muscle twitching
 - Seizures
 - Drooping lips/lip smacking
 - Heading drooping
 - Teeth grinding
 - Abnormal sensitivity to touch or sound
- Some horses may be so severely affected that they are unable to rise (they are recumbent)



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Most horses will not show any signs or only very mild flu-like signs, but eight to ten per cent of WNV-infected horses will develop neurological signs. Outcomes for horses with neurologic signs is guarded; the risk of death ranges from 22 to 44 per cent, and animals that do recover may have enduring neurologic signs.

WNV is not the only disease that can cause encephalomyelitis in horses therefore it is important to consult with your veterinarian if you suspect a neurological disease in your horse. Your veterinarian will be able to perform a physical exam and draw blood to help diagnose WNV.

2. WNV affects birds.

Birds are the main reservoir host for WNV; all species are likely susceptible to infection, but the extent to which they contribute to infection of mosquitos differs. For more information on WNV and wild birds go to Alberta's [West Nile Virus and wildlife](#) webpage or go to the [Canadian Wildlife Health Cooperative](#) webpage. Domesticated poultry are generally much less susceptible to disease, although some geese and ducks may succumb. For more information on WNV and Poultry go to the on-line [Merck Veterinary Manual](#).

3. WNV affects humans.

A zoonotic disease is a disease that is transmitted from animals to humans; however, WNV is not transmitted directly, but rather through the bite of an infected mosquito, referred to as vector. For more information on WNV and people go to Alberta's [West Nile Virus and surveillance](#) webpage or go to the [Public Health Agency of Canada](#) webpage.

4. The risk may increase due to climate change.

Establishment and expansion of WNV to new areas may be exacerbated by climate change due to an increased number of warm days available for development. Additionally, another species of mosquito known as the northern house mosquito (*Culex pipiens*) that has been implicated in transmission of WNV in eastern Canada and BC has been detected in Alberta (in 2018 in Edmonton and in 2023 in Calgary); this mosquito also can survive Alberta winters. A research team at the University of Calgary working with large municipalities (Edmonton and Calgary) is monitoring this mosquito population to determine what role it has in the transmission of WNV in horses (see information from the [University of Calgary](#) on *Culex pipiens*).

Preventing WNV disease in your horse

1. Vaccination:

Levasseur et. al. (2021) examined the vaccination status of 250 WNV cases reported to the CFIA between 2015 and 2019 and 238 or **96 per cent of the cases were unvaccinated**. This strongly supports vaccination as a key prevention tool and Equestrian Canada, after consultation with Canadian equine veterinarians, has recommended that West Nile Virus be a core vaccine. Your veterinarian can provide guidance on which vaccine to use and when to administer it for maximum benefit.



2. Control of mosquitoes or exposure to mosquitoes:

Reduce mosquitoes in your yard by removing any shallow standing water (puddles, bird baths, etc.) and keeping grass short. Check on the [Government of Canada](https://www2.gov.bc.ca/gov2/gov/health/communicable_diseases/west_nile_virus/) website for tips on how to limit mosquito habitat.

WNV transmission to horses and humans in Alberta mainly occurs in the late summer, as early as July and as late as September. It is especially important to prevent mosquito exposure during these months.

Culex tarsalis has its peak feeding during dusk and dawn, therefore it is recommended that you move your horses indoors at dusk and dawn. The use of screens and even fans can be beneficial because a strong breeze makes it difficult for mosquitoes to fly. There are mosquito repellent sprays appropriate for use on horses and smudges may also be useful.

How to stay informed

The [Equine Diseases Dashboard](https://www2.gov.bc.ca/gov2/gov/health/communicable_diseases/west_nile_virus/) maintained by the [Canadian Animal Health Surveillance System](https://www2.gov.bc.ca/gov2/gov/health/communicable_diseases/west_nile_virus/) is an important source of up-to-date information on cases of West Nile Virus in Canada.

Reference: Levasseur A, Arsenault J, Paré J. Surveillance of West Nile virus in horses in Canada: A retrospective study of cases reported to the Canadian Food Inspection Agency from 2003 to 2019. *Can Vet J.* 2021 May;62(5):469-476. PMID: 33967285; PMCID: PMC8048205.

If you suspect West Nile Virus disease in your horse, donkey, or mule call your veterinarian within 24 hours because WNV is a [provincially notifiable disease](https://www2.gov.bc.ca/gov2/gov/health/communicable_diseases/west_nile_virus/) under Alberta's [Animal Health Act](https://www2.gov.bc.ca/gov2/gov/health/communicable_diseases/west_nile_virus/) and must be monitored.

All suspected or confirmed cases must be reported within 24 hours to the:

Office of the Chief Provincial Veterinarian

Hours: 8:15AM-4:30PM
Open Monday-Friday, closed statutory holidays

Phone: 780-427-3448
Toll free: dial 310-0000 before the phone number in Alberta
Fax: 780-415-0810