West Nile Virus

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CAUSE

West Nile virus (WNV) is a virus in the family *Flaviviridae* and the genus *Flavivirus*.

DISEASE SIGNIFICANCE

West Nile virus is estimated to have caused the deaths of thousands of wild birds. It is thought to have been involved in the declines of numerous songbird species in some areas of the United States, and may have population-level impacts on some species of raptors and gamebirds. The impacts of this virus on wild mammals and reptiles are considered minimal.

HOST SPECIES

West Nile virus most commonly infects birds, which are the natural reservoir host of the virus. Virus has been detected in over 300 bird species and all North American bird species that have been experimentally infected are susceptible to infection. However, some do not develop disease and others develop severe disease. Of the species tested, American crows and greater sage-grouse are the most susceptible, with 100% mortality when experimentally infected. Mortality is also observed in other corvid species (e.g. blue jays and ravens). Infections of mammalian wildlife (squirrels, chipmunks, deer, and bats) and alligators have also been reported, but are less common.

GEOGRAPHICAL DISTRIBUTION

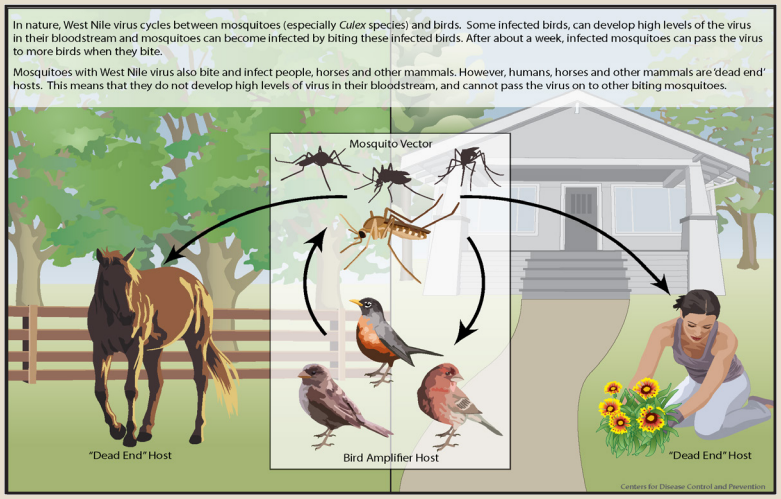
WNV is commonly found in Africa, Europe, the Middle East, North America, and West Asia. In its original range, WNV was prevalent throughout Africa, parts of Europe, Middle East, West Asia, and Australia. It was introduced into New York in 1999 and has since spread throughout the United States and much of the Western Hemisphere. It is now widely established from Canada to Venezuela. No cases in humans or animals have been reported in Alaska, Hawaii, or Guam.

TRANSMISSION

West Nile virus is primarly transmitted by mosquitoes, which become infected when they feed on the blood of infected birds. Once the virus has been ingested, it can eventually spread to the mosquito's salivary glands. During later blood meals (when mosquitoes bite), the virus may be injected into humans and animals. Transmitting mosquitoes are primarily in the genus *Culex*, but virus has been detected in numerous mosquito species in the United States. Experimentally, bird-to-bird transmission has also been observed and may occur through ingestion of contaminated food and/or water.

FIELD SIGNS

Birds infected with West Nile virus may not show any signs, may show nonspecific signs, may be severely affected and show neurologic signs, or may die rapidly without showing any signs. Nonspecific signs can include lethargy, poor nutritional condition, or abnormal molting. Typical neurologic signs include tremors, head tilt, abnormal pupil size, poor balance, seizures, and difficulty standing.



Left: *Culex pipiens* mosquito, one of the most common implicated vectors for West Nile Virus.
Right: West Nile virus transmission cycle. Source: Centers for Disease Control and Prevention

RISK TO HUMANS & DOMESTIC ANIMALS

Humans can be infected with West Nile virus primarly through a bite from an infected mosquito. In addition, it may be possible for humans to become infected through contact with secretions or tissues from infected birds. Rarely, infected humans can experience severe neurologic disease and even death. West Nile virus can also cause severe disease and death in horses.

PREVENTION & MANAGEMENT

No prevention or management plans exist for West Nile virus in wildlife. Potential approaches involve mosquito control and vaccination, but both are difficult to implement on the large scale of this disease system. Vaccines have been developed for horses. No vaccine is available for people, so recommended prevention measures include reducing the risk of mosquito transmission (taking personal measures to avoid bites and reducing mosquito breeding sites) and taking precautions when handling potentially infected animals.

REFERENCES

World Health Organization: https://www.who.int/news-room/fact-sheets/detail/west-nile-virus

Centers for Disease Control and Prevention: https://www.cdc.gov/westnile/index.html

Southeastern Cooperative Wildlife Disease Study. 2021. Field Manual of Wildlife Diseases in the Southeastern United States. Fourth edition, Athens, GA.

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