

West Nile Virus

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West Nile virus (WNV) is a mosquito-borne arbovirus (arthropod-borne virus) that was originally isolated from a woman in the West Nile Province (which it is named after) of Uganda in 1937. The virus was first introduced into the United States in New York City in 1999 and resulted in 62 human cases and 7 fatalities. West Nile virus can now be found in the 48 contiguous states, the District of Columbia, Canada, Mexico, the Caribbean, and Central and South America, with most of its spread being attributed to infected migratory birds. West Nile virus is predominantly a pathogen of birds but can be transmitted through the bite of an infected mosquito to other animals including humans. Humans and other animals are known as “dead end” hosts because a mosquito is unable to become infected by taking a bloodmeal from a sick human or animal. As opposed to other encephalitic arboviruses where birds are the primary reservoir of the pathogen (i.e. St. Louis encephalitis, western equine encephalitis, eastern equine encephalitis), WNV infection results frequently in death of the bird host. The percentage of mortality ranges depending on the susceptibility of the host to the virus and the species of birds. West Nile virus season in Texas ranges from early spring (April-May) to late fall (October-November), with the majority of human cases occurring in late July and August.



The southern house mosquito (*Culex quinquefasciatus*) is the primary vector of West Nile virus.

In a healthy human being it takes 4 to 10 days after being bitten by an infected mosquito for symptoms of WNV to manifest. However, in the majority of human cases, they do not become ill or develop any of the symptoms related to WNV. These cases are known as “asymptomatic” cases and the infected person rarely if ever knows he or she even had WNV. When WNV symptoms do present themselves, the disease is classified by whether or not the central nervous system (CNS) is involved. The more common form of the disease is called West Nile Fever (WNF) and consists of cases that do not involve the CNS. The WNF symptoms are flu-like in nature and include fever, headaches, sore throat, fatigue, swollen lymph glands, eye pain (occasional), skin rash (occasional), nausea and vomiting. The more virulent form of the disease is called West Nile Neuroinvasive Disease (WNND) and includes cases that affect the CNS. The symptoms of WNND include encephalitis (swelling of the brain), meningitis (swelling of the membranes surrounding the brain and spinal cord), meningoencephalitis (swelling of both the brain and surrounding membranes), respiratory problems, paralysis, coma, and may result in death. Long term effects for WNV include decreased motor and memory functions that may give cause for the affected individual to never fully return to normal. Currently, there is no human vaccine registered for use against WNV; so, the primary treatment for WNV is supportive therapy and treating the various symptoms as they arise.



Mosquito control personnel checking a typical breeding (oviposition) habitat for *Culex quinquefasciatus* larvae.

The primary vector of WNV in Texas is the southern house mosquito or *Culex quinquefasciatus*. This mosquito prefers to feed on avian hosts, but can and will feed on other animal hosts (e.g., humans, dogs) when the opportunity arises, making it an ideal vector of the WNV pathogen. *Cx. quinquefasciatus* mosquitoes feed primarily during the crepuscular periods (dawn and dusk) of the day, but will feed all night long. This mosquito is closely associated with standing water that is fouled with organic material (i.e. decaying vegetation, human or animal waste); and it utilizes this kind of septic water as oviposition (egg laying) sites and larval development habitat. *Cx. quinquefasciatus* mosquitoes develop from egg to adult in 7 to 10 days during the summertime and can produce multiple generations of offspring as long as standing septic water is present.

The best defense against contracting WNV is to practice the four “Ds” of mosquito control. These include:

- Drain – dump, clean, turn over, or cover all containers that can hold water for over three days;
- Dusk and Dawn – avoid being outside during periods of peak mosquito activity;
- Dress – wear loose fitting, light colored, long sleeved shirts and pants when outside;
- DEET – use mosquito repellents during outside activities.

Further information on this disease and fact sheets on mosquito biology and ecology can be found on the Agricultural and Environmental Safety website (www-aes.tamu.edu) or from m-johnsen@tamu.edu.

