

West Nile Virus

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What is West Nile virus and how does it affect humans?

West Nile (WN) virus is carried by mosquitoes and if transmitted to humans, can cause serious encephalitis. It is closely related to St. Louis encephalitis (SLE) virus which is sometimes a problem in Florida. West Nile virus was first reported in 1937 from a woman in the West Nile province of Uganda in Central Africa. Epidemics of WN have occurred in Israel, France, South Africa, and Romania. West Nile virus was first documented in the United States in New York City (NYC) during an epidemic in August 1999.

The disease caused by the virus is known as encephalitis and can be severe in the elderly, but it is usually mild in healthy adults and children. Humans infected with WN virus can experience mild to severe symptoms including elevated fever that comes on quickly and lasts from 5 to 6 days. Other symptoms include severe headache, a rash, swollen lymph nodes, gastrointestinal problems and pain associated with the eyes, muscles, and back. In serious cases, the symptoms of encephalitis can cause death. Mortality rates in humans range from 5 – 13%. In domestic animals, some of the signs of disease have been observed in horses, but most of the infections have only resulted in a low grade fever.

How does the virus get into humans?

Mosquitoes obtain the virus from feeding on infected birds. The virus is then passed along to humans when an infected female mosquito takes a second blood meal from a human instead of a bird. As they are feeding on human blood, they release saliva that contains the virus. The virus enters the human bloodstream along with the mosquitoes' saliva.

The mosquito species responsible for the 1999 NYC outbreak have not yet been identified with certainty. The most likely candidates, however, are members of the *Cx. pipiens* species complex. Members of this complex have been implicated in WN outbreaks elsewhere in the world, and they are among the most common mosquitoes in NYC during the summer. These particular mosquitoes lay their eggs in catch basins, sewers, cisterns, and waters with high organic pollution. The peak time for blood-feeding of this mosquito species is during the time between sunset and sunrise.

How would West Nile virus be introduced into Florida?

Factors that may facilitate dispersal of WN include the movement of infected humans, infected vectors (ticks and mosquitoes), and infected domestic, wild resident, and wild migratory birds. It is not difficult to envision ways in which this virus may

quickly move around the country. Many urban centers have large populations of vector mosquitoes capable of transmitting this virus. These include members of the *Culex* species complex; *Cx. pipiens* in the northern half of the country and its close relative *Cx. quinquefasciatus* in the south. *Culex tarsalis* in the west and *Cx. nigripalpus* in the deep south are also likely vectors since they transmit SLE virus. These species of mosquitoes are certainly among the most likely North American candidates to transmit WN to birds and humans. If WN is introduced into another region of the USA, it will, in time be observed in domestic avian populations.

Is West Nile virus in Florida?

West Nile Virus has not yet been seen in the State of Florida. However, because it has recently caused an epidemic in the United States, officials are monitoring for the presence of West Nile Virus in Florida. Mosquito and vector control programs throughout the USA already have considerable experience monitoring WN's close relative, SLE. St. Louis encephalitis has been a continuing problem particularly in the upper midwest, Florida, Louisiana, Texas, and California where there have been many severe outbreaks.

It is only through vigilant surveillance that the potential for epidemics can be recognized. Accurate risk assessment of a potential vector borne epidemic will give public health authorities time to institute control strategies and public awareness campaigns that will reduce the impact of an epidemic. It is essential that the most efficient and effective control or risk management strategies be applied. Authorities will make their decisions about what strategies to use based on scientific information about the virus and vectors

involved, and local or regional environmental conditions.

Should the virus appear in birds or humans, there will be official notification from Health and Consumers agencies through Public Service Announcements and press releases. In the event of such notification, several precautions should be taken for protection by the public.

What if West Nile Virus is reported in Florida?

It is generally accepted that it would be enormously costly and very difficult to vaccinate large human populations to prevent a vector borne epidemic, even if vaccines for these viruses available. Vaccines are not currently available for the vast majority of arthropod-borne pathogens including WN and SLE.

Personal protection against biting arthropods, particularly when they are infected with dangerous pathogens, remains one of the most important ways to avoid disease. Avoid mosquitoes. Make sure screens are in good repair to prevent mosquitoes from entering houses. If you must enter areas where there is a threat of encountering infected mosquitoes, wear protective clothing.

Finally, use a personal insect repellent that provides a reasonable Complete Protection Time (CPT). The CPT is the total time following repellent application that the treated individual will remain bite free. For example, under normal conditions the CPT for a 5% formulation of DEET (diethyl toluamide, presently the most effective insect repellent) is approximately 2 hours. The CPT for a 24% DEET formulation is more than 4 hours. For more information on repellents, refer to the University of

Florida/IFAS fact sheet “Avoiding and Repelling Mosquitoes” by Morris and Day.

Fortunately, the USA has some of the best mosquito and arthropod control programs in the world. Vector control and personal protection against vectors and the diseases they carry are the best way to avoid infection with vector-borne pathogens. For example, strategies that might be effective against WN in NYC include: source reduction of mosquito breeding sites; focal applications of insecticides directed against adult and immature mosquitoes; Public Service Announcements to educate residents about the vector, the disease, and disease avoidance; tips to help prevent home-invasion by infected vectors; and information about the most effective means of personal protection. Recent SLE epidemics and outbreaks in Florida have proved that one of the most effective means of reducing human infection is to widely disseminate accurate information through the media to educate the public. An individual's first line of defense during a vector-borne disease emergency is knowledge and personal protection.

Personal Protection

- ▶ Avoid exposure to mosquitoes – stay indoors whenever possible during peak biting time.
- ▶ If you must be outside during peak biting time, wear long sleeves and pants.
- ▶ Wear mosquito repellents when outside during peak biting time. Use mosquito repellents containing DEET. Be sure to follow the directions on the label.
- ▶ Make sure window and door screens are in good repair to prevent mosquitoes from entering houses.
- ▶ Remove unnecessary sources of water outside the home that may provide breeding places for mosquitoes.
- ▶ Flush out the water in bird baths and outdoor pet dishes often.
- ▶ Remove leaf litter, standing water and debris from roof gutters and boat covers.

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