



## West Nile Virus Fact Sheet

### Definition

West Nile Virus (WNV) is one of several viruses that may be transmitted to people and animals via insect bites. WNV, a member of the genus *flavivirus*, is carried primarily by birds and is transmitted from bird to bird by mosquitoes. Birds in the "enzootic cycle" are relatively resistant to disease and serve to maintain the virus in the avian population. Susceptible avian species, other animals and people may also be infected when bitten by a mosquito carrying the virus. Horses and humans have proven to be the mammalian species most likely to become ill following WNV infection, although there have been occasional reports of illness and even death in many other species, including dogs, cats, rabbits, sheep, alpacas and llamas.

### Significance

In the past five years, WNV associated illness has been diagnosed in over 14,000 people in the United States, with over 500 deaths. In the same time period, over 20,000 horses have been affected with a mortality rate of approximately 35 percent. Although mosquito bites are the most likely means of human infection, virus transmission through blood transfusion, breast milk and organ transplantation has also been reported.

### History

WNV was first identified in a woman in Uganda in 1937. Since then, the virus has caused outbreaks of illness in people and animals in other parts of Africa, the Middle East, Western Asia and Eastern Europe. In the summer of 1999, WNV was identified as the cause of encephalitis (inflammation of the brain) in a cluster of human patients and in several native and exotic birds in the New York City area. This was the first time the virus had been identified in the Western Hemisphere. The virus has continued to spread across North America, first along the East Coast of the United States, then west, reaching the Pacific Coast for the first time in 2003, including Canada and Mexico. WNV is probably now permanently established in the Western Hemisphere.

### Infection in Humans

Although the numbers of reported cases of human illness associated with WNV over the past five years may be alarming, it is believed that most people who are bitten by a WNV-carrying mosquito will show no symptoms at all. One in five will develop mild "flu-like" symptoms that last a few days. Signs of headache, fever and lethargy are all associated with the syndrome "West Nile Fever." A very small number, one in 150, of infected individuals will exhibit more serious signs of "West Nile Neuroinvasive Disease," with encephalitis or meningitis (inflammation of the covering of the brain or spinal cord). Symptoms in these cases may include severe headache, stiff neck, disorientation, tremors, extreme muscle weakness, paralysis, and/or seizures. Elderly patients have the highest risk of developing serious illness from WNV infection.

### **Infection in Horses**

Horses have proven uniquely susceptible to WNV infection, comprising more than 99 percent of veterinary mammalian cases. Clinical signs in affected horses include weakness, incoordination, depression, fever and muscle twitching, especially of the face and muzzle. The course of illness varies from a few days to a few weeks and may be rapidly or slowly progressive. Horses that become recumbent have a poor prognosis for recovery. Most horses that reach this stage are euthanized or die. The majority of horses, however, completely recover from the infection.

### **Infection in Birds**

Birds in the family *Corvidae*, which includes crows, blue jays and ravens, have proven to be the most highly susceptible to illness following WNV infection among avian species, thus becoming the focus of WNV surveillance efforts by regional and federal health agencies across the United States and Canada. Identification of infected corvids through testing of blood, tissue and swabs of oral cavities or droppings has been used to forecast virus activity in humans and horses.

WNV infection has been identified in over 200 avian species during the North American outbreak. Although this list includes over 150 native North American birds, crows and blue jays account for between 50 and 90 percent of reported avian cases. During the summer of 2002, significant numbers of raptor species (owls, hawks, etc.), especially in the Midwestern United States, were infected with the virus. Domestic poultry (chickens and turkeys) and pet birds (budgerigars, cockatoos, cockatiels) seem fairly resistant to WNV disease. Most infected corvids are simply found dead or show signs of uncoordinated flying or walking, weakness, lethargy, tremors and abnormal head posture.

### **Prevention**

Limiting exposure and improving strategies to diminish or eliminate mosquito numbers are the best ways to protect humans and animals from WNV disease. Vaccines are commercially available for horses and are under development for humans and birds.