



# West Nile Virus

*Minimizing the threat to humans and birds*

**Department of Defense  
Partners in Flight**

Fact Sheet #7  
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**Department of Defense  
Partners in Flight Program**

## Mission

*To conserve migratory and resident birds and their habitats on Department of Defense lands.*



The Strategic Plan can be found at [www.dodpif.org](http://www.dodpif.org), or through the contact information on next page.

## Background

West Nile Virus (WNV) is a flavivirus commonly found in Africa, West Asia, and the Middle East. It is closely related to the St. Louis encephalitis virus found in the U.S. WNV was first isolated in 1937 in Uganda. There have been outbreaks in Israel (1951-1954), France (1962, 2000), and South Africa (1974). It appeared in Western Europe in the mid-1990's, traveled to the U.S. in 1999, and has since spread across the entire country. The virus can infect humans, birds, mosquitoes, horses, and other mammals.

## Transmission

WNV exists in nature through a transmission cycle that involves mosquitoes and birds. Mosquitoes become infected with WNV when they feed on infected birds, which may carry the virus in their blood for a few days. Mosquito bites (36 different mosquito species have been documented as vectors of WNV) then spread the disease to other bird or mammalian hosts. The virus is also able to pass directly from adult mosquitoes to their eggs, thus safely overwintering and surviving control efforts aimed at adults. Birds, because of their mobility and migratory nature, serve as the mechanism for long distance transport of the disease. Since transmission is linked to mosquito activity, most cases in the temperate zone occur in the spring and summer months, while transmission occurs year-round in tropical and subtropical zones.

## Symptoms in Humans

Most individuals infected with WNV will not have any symptoms or signs of illness. Those who do may experience **mild** symptoms such as fever,

headache, and body aches; occasionally a skin rash and swollen lymph glands. Symptoms generally appear within 3-14 days of the bite from an infected mosquito. Less than 1% of victims will develop more severe symptoms (high fever, neck stiffness, stupor, disorientation, coma, tremors, muscle weakness, paralysis, and rarely, death), with increased risk to persons over 50 years of age, and the greatest risk to persons over 80 years of age.

## Risk Reduction

To reduce risk of exposure, stay indoors, when possible, at dawn or early in the evening. Avoid mosquito bites as much as possible by wearing protective clothing (long sleeves, long pants, socks) and using DEET repellants (30% DEET;  $\leq$  10% DEET on children), with repeated applications over time. Apply liberally to clothing, but sparingly to exposed skin. Ensure that all doors and windows in your home contain functional insect screens. Eliminate all water holding devices and debris around homes and businesses, and correct any drainage problems that create mosquito-breeding habitat (mosquitoes can breed in as little as 1/4 inch of water).

## West Nile Virus Transmission Cycle

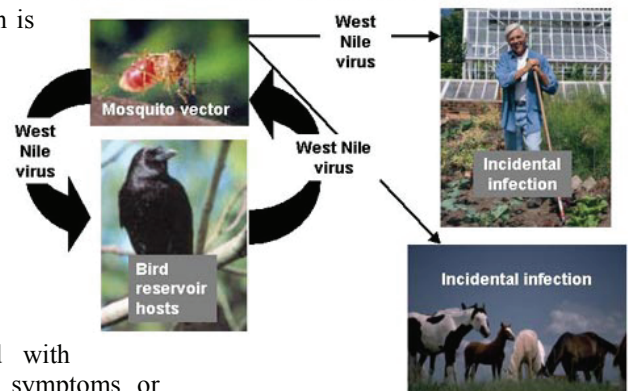


Image: CDC

### Bird Handling Precautions

While there are no documented cases of ornithologists or bird banders contracting WNV from handling live or dead birds, there really hasn't been any surveillance of these groups to determine the prevalence of the disease. It has been confirmed that WNV may be shed from the cloacal and oral cavities. Therefore, bites from birds or contact with droppings, soiled feathers, or the cloaca may result in exposure to WNV. Avoid contact with bird feces, if possible. If bitten, or in contact with feces, wash with an antiseptic (not an antibacterial or antimicrobial) or a small amount of fresh bleach. Neither refrigeration nor freezing will kill the virus. Take extra precautions when collecting blood samples, or when dissecting dead birds. Consider wearing gloves and a mask, if feasible, and decontaminate field gear (with 70% ethanol) to avoid bird-to-bird transmission. Avoid using bird bags or other holding devices for multiple bird uses until they can be laundered.

### Species Affected

While birds are the primary carriers of this disease, WNV has also affected a number of mammal species, such as horses, squirrels, chipmunks, bats, skunks, rabbits, mountain goats, seals – and humans. Infection with WNV is not fatal for all birds, but certain groups are apparently more susceptible than others, including corvids (crows & jays) and raptors (hawks, owls, eagles & vultures). Over 140 different species of birds are known to be affected by WNV as of spring 2003. Exotic and captive species, such as those found in zoo collections, are affected as well as wild ones.



Priority species with low populations, like the Piping Plover, are more threatened by WNV. Photo: Richard Kuzminski

### USGS National Wildlife Health Center

West Nile Virus page:

[http://www.nwhc.usgs.gov/disease\\_information/west\\_nile\\_virus/index.jsp](http://www.nwhc.usgs.gov/disease_information/west_nile_virus/index.jsp)

### Center for Disease Control

WNV Home Page:

<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

Link to State and Local government WNV web sites:

[http://www.cdc.gov/ncidod/dvbid/westnile/city\\_states.htm](http://www.cdc.gov/ncidod/dvbid/westnile/city_states.htm)

### BIRDNET–Ornithological Council

WNV–What Ornithologists and Bird Banders Should Know:

<http://www.nmnh.si.edu/BIRDNET/documents/WNV&H5N1-FactSheet.pdf>

### Armed Forces Pest Management Board

<http://www.afpmb.org/>



Although West Nile Virus can pose a threat to human health, wide-spread spraying of pesticides can be a greater health hazard. Photo: New York Times

### Ecological Consequences

Because WNV is not fatal in all animals, we expect that most species will adapt over time. However, even partial declines of vulnerable and extremely rare endangered species (such as the California Condor) could be quite detrimental. Innoculation with vaccines may be necessary in some instances. Other ecological consequences could include exponential increases in rodent populations after raptor die-offs, or increases in pest species such as House Sparrows following crow die-offs. Impacts in the tropics could be magnified greatly due to other stressors and the likelihood of year-round transmission. Another set of negative ecological consequences may arise from the large-scale application of insecticides – sprayed for both adult and larval mosquitoes. Several conservation groups are calling for the application of integrated pest management practices instead, such as breeding habitat reduction, targeted use of larvicides, and the substitution of bacteria-based products for chemical larvicides.

### Reporting of Dead Birds

Residents or military personnel at installations should contact the Pest Control Coordinator, the Base Medical Clinic, or the natural resources staff. If none of these exist at the installation, contact your state or local health department for their policy on the reporting or collection of dead birds. See the CDC web site link above for state and local contact information.



The House Sparrow is a key species in the propagation of WNV to other species. Photo: Lang Elliot

### For more information:

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