



Department of Health and Social Services
Jay Livey, Commissioner

Division of Public Health
Karen Pearson, Director

Section of Epidemiology
John Middaugh, MD, Editor

3601 C Street, Suite 540, P.O. Box 240249, Anchorage, Alaska 99524-0249 (907) 269-8000
24-Hour Emergency Number 1-800-478-0084

<http://www.epi.hss.state.ak.us>

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The Threat of West Nile Virus in Alaska

Background

West Nile Virus (WNV) is a member of the family Flaviviridae, which also includes St. Louis Encephalitis and Japanese Encephalitis viruses. WNV was first detected in the United States (New York City) in the summer of 1999. In the subsequent summer and early fall seasons, WNV was detected among humans, birds, mosquitoes and horses in various other states moving from the east to west (Map 1). As of August 20, 2002, a total of 253 human cases were reported from 10 states, the District of Columbia, and New York City; 12 human fatalities were reported from Illinois (1), Louisiana (8), Mississippi (2), and Texas (1). *To date, NO cases of WNV have been diagnosed among Alaska residents or animals.*

Lifecycle of West Nile Virus

The normal lifecycle of West Nile Virus involves mosquitoes and birds. A mosquito feeds upon an infected bird and becomes infected with WNV. The mosquito then transmits the virus by feeding on another bird, human, or horse. Humans and horses represent dead end hosts; probably because the level of viremia that develops is not high enough to allow mosquitoes that subsequently bite them to become infected.

Could West Nile Virus Come to Alaska?

Theoretically, certain birds carrying WNV could migrate to Alaska. Many species of mosquitoes are known to carry and transmit WNV, some of which are endemic or have been found in Alaska (e.g. *Aedes canadensis*, *A. vexans*, *Culex pipiens*, and *C. restuans*). To establish a focus of WNV in Alaska, the correct combination of birds, mosquitoes and climatic conditions must occur. Given our short summer and mosquito seasons, experts feel that this is unlikely; however, the State still plans to develop protocols and programs for WNV testing.

Signs and Symptoms

The majority of persons infected with WNV remain asymptomatic or suffer only mild illness roughly one week after being bitten by an infected mosquito. Symptoms may include fever, a generalized maculopapular rash, headache, lymphadenopathy, myalgia, myoclonus, and weakness. Severe neurologic manifestations occur in <1% of all symptomatic patients. Persons with severe disease may develop encephalitis, meningitis, or other neurologic manifestations. Rarely, WNV infection can be deadly. Patients who develop severe disease tend to be older or have a compromised immune system. As of August 20, the median age of human cases was 53 years (range: 3–94 years).

Case Definition

A case of WNV infection is defined as a febrile illness associated with neurologic manifestations ranging from headache to aseptic meningitis or encephalitis, plus at least one of the following:

- Isolation of WNV from, or demonstration of WNV antigen or genomic sequences in, tissue, blood, CSF (cerebrospinal fluid), or other body fluid;
- Demonstration of IgM antibody to WNV in CSF by IgM-capture ELISA (enzyme-linked immunosorbent assay);
- A ≥ 4 -fold serial change in plaque-reduction neutralizing (PRNT) antibody titer to WNV in paired, appropriately timed serum or CSF samples;
- Demonstration of both WNV-specific IgM (by EIA) and IgG (screened by EIA or HI and confirmed by PRNT) antibody in a single serum specimen (2).

Treatment

There is no specific treatment for persons infected with WNV; most persons recover with supportive therapy. There is no vaccine available for use in humans.

Future Plans

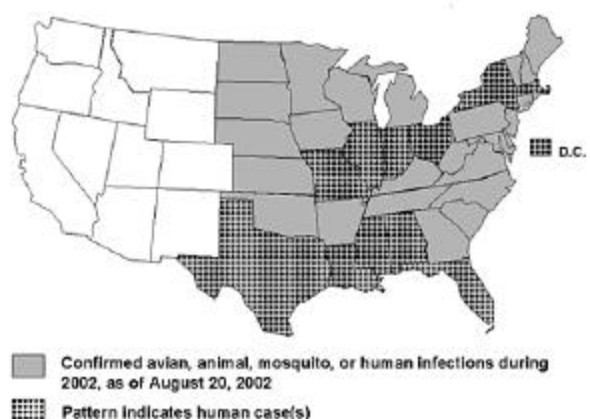
The Section of Epidemiology is working on a plan for WNV surveillance with the Section of Laboratories, Alaska Department of Fish and Game, the United States Fish and Wildlife Service, the University of Alaska – Fairbanks, and various other agencies. Part of this plan will include establishing an appropriate protocol for equine testing and dead bird mapping, collection, and shipment. Further recommendations will be published in a later *Epidemiology Bulletin* regarding reporting procedures for dead bird and equine testing.

Recommendations

1. WNV transmission can be decreased by using insect repellants containing DEET (N,N-diethyl-meta-toluamide) and, when possible, wearing long-sleeved clothes and long pants treated with repellents containing permethrin or DEET.
2. Clinicians can submit serum and CSF specimens from patients who meet one of the following diagnostic criteria:
 - a. Any patient admitted to the hospital with a presumptive diagnosis of viral encephalitis or meningoencephalitis.
 - b. Any patient admitted with presumed Guillain-Barré Syndrome or acute flaccid paralysis.

Send at least 0.5 ml of serum and at least 1 ml of CSF for testing. Do not send whole blood. Take acute serum specimens 10 days after onset of symptoms and convalescent specimens 2-3 weeks after the acute sample. Keep specimens sent for serology cool; keep specimens sent for virus isolation frozen with dry ice.
3. Please report any suspect case-patients to the Section of Epidemiology at 907-269-8000 or 800-478-0084 (after hours). We will facilitate specimen transport from the Alaska State Virology Laboratory in Fairbanks to the CDC.
4. For more information, please see www.cdc.gov/ncidod/dvbid/westnile/index.htm and http://cindi.usgs.gov/hazard/event/west_nile/west_nile.html

Map 1: States reporting confirmed West Nile virus infection in birds, mosquitoes, animals, or humans between January 1 - August 16, 2002.



References

1. Obtained from <http://www.cdc.gov/ncidod/dvbid/westnile/index.htm#prevention> on August 20, 2002.
2. Obtained from http://www.cdc.gov/ncidod/dvbid/westnile/resources/WN_Final_Plan_2000_05_26_31.pdf on August 20, 2002.