

Public Health Entomology Research & Education Center



EntGuide



...A publication of Florida A & M University

West Nile Virus Fact Sheet

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**EntGuide # 11 - An extension publication of the College of Engineering Sciences,
Technology and Agriculture, Florida A&M University**

Introduction

West Nile virus (WN) is a mosquito-transmitted virus that can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). West Nile virus was first detected in the United States during 1999 in the New York metropolitan area when 62 people became sick and 7 died. During 2000, 20 people became sick and 2 people died; one in New York; one in New Jersey. In two years, WN spread to the District of Columbia and eleven states: New York, New Jersey, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, Pennsylvania, Maryland, Virginia, and North Carolina. As of the end of 2001, CDC reported 149 confirmed human cases of WN. This figure includes 18 human fatalities. During 2002 the WN virus spread south and west, reaching Texas, Nebraska, Oklahoma, North Dakota, Minnesota, West Virginia and California. The number of human cases is increasing rapidly, with [CDC reporting](#) 4,156 confirmed or probable human cases during 2002 (284 fatalities) in 40 states and Washington DC. The current figures for 2003 are 8,219 cases with 182 deaths.

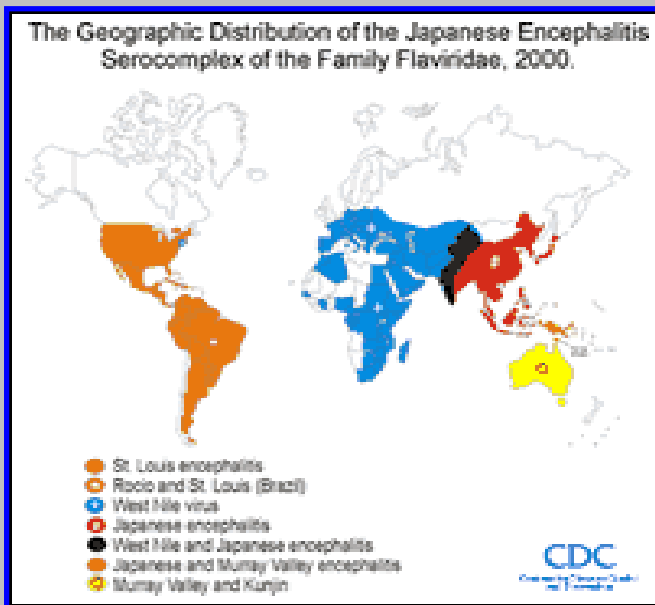
WN has been found in Florida. During 2001, twelve human WN cases and more than 400 equine WN cases were diagnosed in Florida. There were no human deaths. 28 human cases have been reported by the Florida Department of Health in Florida during 2002, with 2 deaths. WN human

cases have been reported for 2003. Because the number of cases changes frequently, please refer to the [Florida Department of Health Website](#) for current figures. Public health officials expect the virus to continue spreading. This brief extension guide summarizes basic information about West Nile virus.

History

West Nile virus was first isolated from a human case in the West Nile District of Uganda in 1937. The virus became recognized as a cause of severe human disease in elderly patients during an outbreak in Israel in 1957. Horse involvement was first recorded in Egypt and France in the early 1960s. The appearance of WN in North America in 1999, with encephalitis reported in both humans and horses, may be an important new development in the evolving history of this virus.

The Geographic Distribution of the Japanese Encephalitis Serocomplex of the Family Flaviviridae [which includes West Nile virus] is shown in the following graphic from CDC:



CLICK on the map to enlarge. Source: CDC

The Virus

West Nile virus is a member of the Family Flaviviridae, which includes St. Louis encephalitis virus and Japanese encephalitis virus. All flaviviruses share a common size (40-60 nm), symmetry (enveloped, icosahedral nucleocapsid), nucleic acid (positive sense, single stranded RNA, approximately 10,000-11,000 nucleotide bases), and appearance in the electron microscope.

The Disease

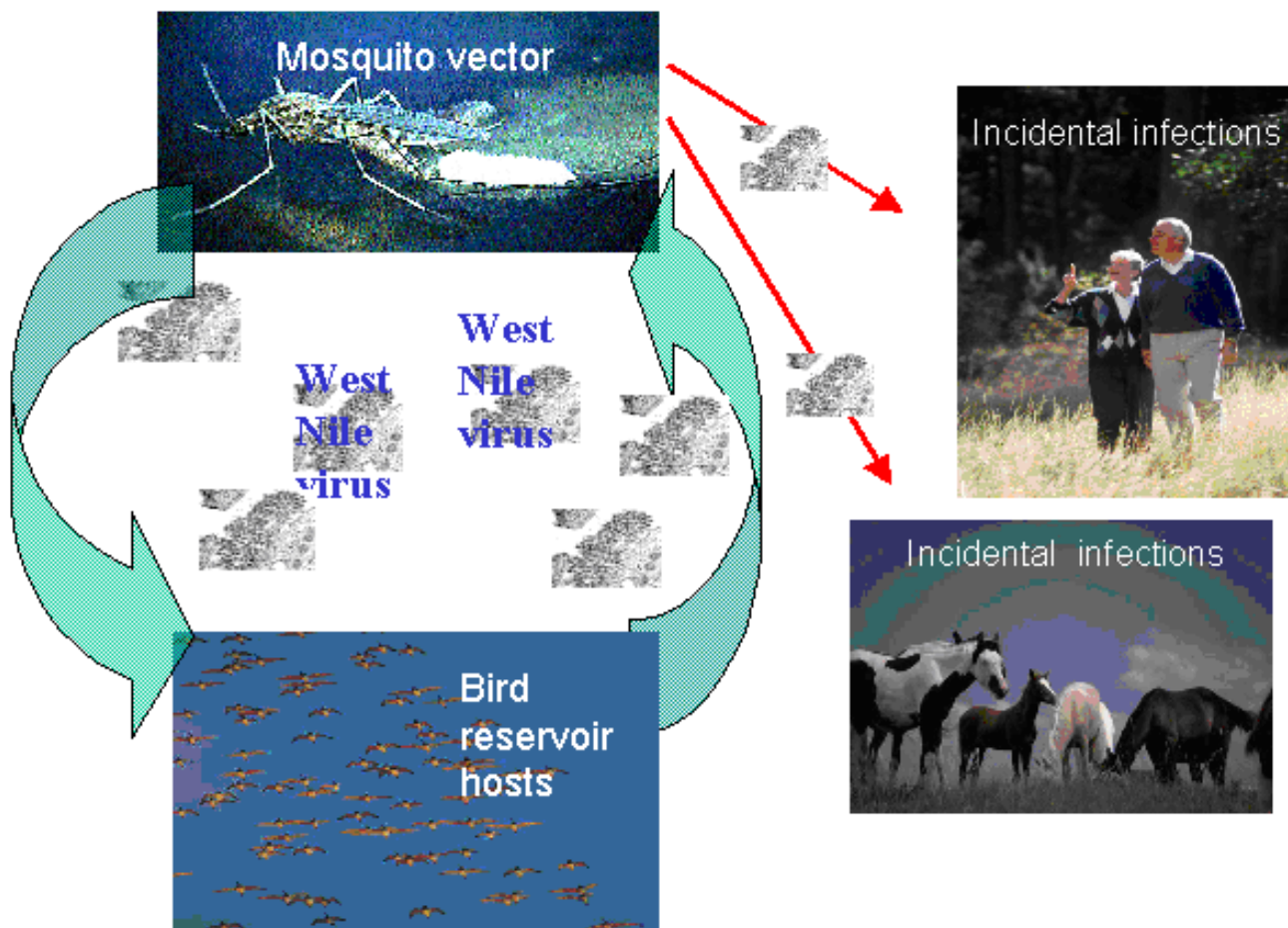
In last two years in the United States, most people who were infected with West Nile virus had no symptoms or experienced mild illness, such as fever, headache and body aches, before fully recovering. In outbreaks in other parts of the world, some persons also developed a mild rash or swollen lymph glands. In some individuals, particularly the elderly, West Nile virus can cause serious disease that affects brain tissue. At its most serious, it can cause permanent neurological damage and can be fatal. Encephalitis is inflammation of the brain and symptoms include rapid

onset of severe headache, high fever, stiff neck, confusion, loss of consciousness, and muscle weakness. Death may result.

The Virus Transmission Cycle

Mosquitoes transmit West Nile virus, but they must first get the virus from an infected source. Birds are the reservoir (source) of West Nile virus. In New York, it was bird deaths that first alerted public health officials to the presence of virus in the transmission area. The virus is transmitted from infected bird to uninfected bird by the bite of an infected female mosquito. If an infected mosquito bites a person, the virus may be transmitted. If an infected mosquito feeds on an animal other than bird or human, the virus may be transmitted. Horses are infected in this way. Humans and horses are not considered to be significant sources of infection for other animals, nor for long-term maintenance of the virus.

West Nile Virus Transmission Cycle



CDC
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

Many species of birds have been found to harbor WN. Crows and blue jays have been found to be particularly susceptible. Crow deaths have been an important measure of WN activity in New York and New Jersey.

Several mosquito species have been implicated in the transmission of WN. No single species is considered the culprit. It is possible, even likely, that additional mosquito species will be implicated as the virus spreads to additional states. Mosquitoes of the Culex pipiens complex have played an important role in the northeast and are being closely monitored as possible vectors of WN.

Prevention

Mosquito bite prevention is emphasized because there is no cure for West Nile. There is no specific treatment for WN infection and no vaccine against it.

Active sampling (surveillance) for West Nile virus in mosquito and bird populations will greatly enhance state and local governments' early detection systems. When virus activity is first detected in a community, prior to the occurrence of human disease, rapid mosquito control measures, such as targeted application of adulticides and larvicides, should be implemented. Personal protection measures are also appropriate.

It all comes down to not getting bitten by mosquitoes. Avoid mosquitoes by wearing appropriate clothing, screening your house, and using repellents containing DEET.

Stay indoors at dawn, dusk, and in the early evening when mosquitoes are most active.

- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Spray clothing with repellents containing permethrin or DEET since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35% DEET (N,N-diethyl-meta-benzamide). DEET in concentrations greater than 35% provides no additional protection and may cause skin irritation in sensitive persons. The American Pediatric Society recommends no greater than 10% DEET be applied to children.
- Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands of children.
- Whenever you use an insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product¹
- Note: Vitamin B, citronella, and "ultrasonic" devices are **NOT** effective in preventing mosquito bites²

1. Whenever you use an insecticide or insect repellent such as DEET, be sure to carefully read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the pesticide product label. If you have health-related questions or concerns about insect repellents (DEET) or insecticide products used to control mosquitoes in and around the home, contact the National Pesticide Information Center (NPIC) at 800-858-PEST (800-858-7378), or visit <http://npic.orst.edu> and click on "West Nile Virus Resource Guide".

2. For other information about pesticides used to control mosquitoes, contact the National Pesticide Information Center (NPIC) at 800-858-PEST (800-858-7378), visit <http://npic.orst.edu/> and click on "West Nile Virus Resource Guide", or visit the Environmental Protection Agency's (EPA) website at <http://www.epa.gov/pesticides/factsheets/skeeters.htm>

What should I do if I find dead birds?

The Florida Fish & Wildlife Conservation Commission is cooperatively working with the Florida Department of Health to maintain a wild bird mortality database. This project was initiated to support surveillance for bird die-offs and to aid in monitoring for West Nile virus (WN). During the initial outbreak biologists documented an unusually large number of dead crows.

Please help us monitor wild bird populations in Florida. If you notice dead birds, especially crows, please let your local health department know by filling out the form that can be downloaded from their Web site, listed in the references below.

Dead birds should be reported to the local health department.

More Information

There is abundant on-line information about West Nile virus, but because the topic is so new to North Americans and because new information becomes available frequently, the sources listed below from the World Wide Web are a good source of up-to-date, factual information.

<http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount03.htm>

CDC Website for current case count

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

CDC Division of Vector-Borne Infectious Diseases Web site on West Nile virus

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

West Nile Virus Transmission Cycle: CDC Flowchart

<http://www.ci.nyc.ny.us/html/doh/html/wnv/wnvfaq1.html>

New York City Department of Health frequently asked questions about WNV

http://www.doh.state.fl.us/disease_ctrl/epi/htopics/arbo/links.htm

Florida Department of Health information about West Nile virus

<http://www.usgs.gov/wnvfactsheet.html>

USGS, West Nile Fact Sheet

<http://wld.fwc.state.fl.us/bird/>

Bird Mortality Data. This Web site posts the form for reporting dead birds.

<http://www.mosquito.org>

American Mosquito Control Association Web site. Up-to-date information from many States.

<http://www.ipmalmanac.com/solutions/200106/virus.asp>

Integrated Pest Management Solutions: "Holding off the West Nile Virus"

<http://pherec.org/TallahasseeDem/WestNileStory.htm>

"Knowing the Enemy is the first step" Article from the Tallahassee Democrat

<http://pherec.org/TallahasseeDem/mosqmagnet/mosqmagnet.html>

Something homeowners can do about the mosquitoes in their own yard.

http://pherec.org/News_Herald/SE_Conf.htm

Living in the state of Florida and working in the healthcare profession, one must be aware of the various viruses spread by mosquitoes. Report of a training conference sponsored by PHEREC.

<http://www.ipmalmanac.com/solutions/200110/nile.asp>

West Nile Virus continues to spread, even as research continues

<http://www.pherec.org/nwfdailynews/arbovirusprogram.html>

A description of PHEREC's arbovirus surveillance program.

<http://www.pherec.org/NewsHerald/sept2000/newsarticle.html>

"What Bugs Mosquitoes?" An article about mosquito repellents.

The [Centers for Disease Control and Prevention](#) is the source of the graphics used in this document.

More Questions? Need to Call?

For more information on arboviral reporting and/or surveillance, please contact your local county epidemiologist or the following state agency representatives:

Name	Title	Phone	Issues
Caroline Collins	State Arbovirus Surveillance Coordinator - FLDoH	850-245-4444 ext. 2437 850-922-8473 [FAX]	Surveillance and Data questions
Carina Blackmore, Ph. D.	State Public Health Veterinarian - FLDoH	850-245-4732 850-922-8473 [FAX]	General information Public policy
Terry McElroy	FDACS Communications office	850-488-3022	Press Releases
Lillian Stark, Ph. D.	Department of Health Laboratories - Tampa	813-974-5990 813-871-7465	Laboratory questions
Tim Brealt	Assistant Director, Division of Wildlife Florida Fish & Wildlife Conservation Commission	850-488-3831	Suspicious bird die-offs
Wayne Gale	FDACS - Coordinating Council on Mosquito Control	850-922-7071	Mosquito Control Mosquito Surveillance
Bill Jeter	FDACS - Division of Animal Industry	850-410-0942 850-410-0946 [FAX]	Horse cases
Fred Scheer	Bay County DoH	850-872-4660 ext. 269	Epi-Team, Bay Co.
John P. Smith, Ph. D.	PHEREC-FAMU-CESTA	850-872-4184 ext. 23	Mosquito & Wild Bird Surveillance

FLDoH = Florida Department of Health

FDACS = Florida Department of Agriculture and Consumer Services

PHEREC = Public Health Entomology Research and Education Center

FAMU = Florida A&M University

CESTA = College of Engineering Sciences, Technology and Agriculture

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Publication date: April 30, 2001 Revised: August 8, 2001 Revised: August 28, 2001 Revised: September 28, 2001
Revised: October 5, 2001 Revised: October 15, 2001 Revised: October 29, 2001 Revised: December 4, 2001
Revised: February 25, 2002 Revised: June 25, 2002 Revised: August 5, 2002 Revised: September 10, 2002
Revised: September 16, 2002 Revised: November 7, 2002 Revised: February 14, 2003 Revised: March 7, 2003
Revised: June 20, 2003 Revised: November 12, 2003 Revised: November 24, 2003 Revised February 18, 2004