



Public Health West Nile Virus Emergency Response Plan



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State of Oregon
Emergency Management Plan
Annex F, Public Health and Medical Services

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1.0 INTRODUCTION

This document is the Oregon West Nile Virus Response Plan. It establishes guidance for state and local agencies in preparing for and responding to the presence of arthropod-borne viruses and the illnesses they cause. This plan outlines enhanced encephalitis surveillance systems for humans, horses and birds in cooperation with physicians, veterinarians, vector control districts and local health departments (see Tab 1).

This plan describes:

- Emergency management concepts and structures under which the Oregon Public Health Division (OPHD) will operate.
- Roles and responsibilities of federal, state and local agencies.
- Disease surveillance, emergency management, laboratory response, and communications.
- How multiple agencies will work together.

This document is part of the state of Oregon Emergency Management Plan. It is an appendix to *Annex F, Emergency Support Function 8 (ESF 8) Public Health and Medical Services*.

1.1 West Nile Virus Background

West Nile virus (WNV) is a potentially deadly disease that spreads to humans, birds and animals via infected mosquitoes. The most serious manifestation of WNV infection is fatal encephalitis (inflammation of the brain) in humans and horses, as well as mortality in certain domestic and wild birds. Commonly found in Asia and the European Mediterranean, the virus began showing up in the U.S. in 1999, when 62 severe cases of the disease and seven deaths occurred in New York. The disease has continued to spread across the country and has now been identified in each of the 48 contiguous states.

The disease is spread by mosquitoes, which become infected when they feed on infected birds. Many species of birds can be affected, but birds in the Corvid family, such as ravens, crows and jays, are highly susceptible. These migrating birds play a major role in spreading the disease.

Mosquito control and avoidance of mosquito bites are the only practical methods of protecting people and animals from infections caused by arthropod-borne viruses (arboviruses). There are no known specific treatments or cures for diseases caused by these viruses. Vaccines are not available for human use, and because most human infections do not result in clinical disease, there is little financial stimulus for their development.

1.2 West Nile Virus Phases

A phased response to the risks of arboviruses has been found to be effective in other states. Activities in a community are driven by the time of year, mosquito populations, presence of arboviruses in birds or mosquitoes, and animal or human arboviral cases. This plan groups response activities into the risk phases established by the Centers for Disease Control and Prevention (CDC) and follows the CDC guidelines for each phase, with specific activities suited to Oregon (see Tab 2). Table 1 defines these risk phases.

Table 1: West Nile Virus Risk Phases

Response Phase	Probability of Human Outbreak	Definition
Preparedness	None	<ul style="list-style-type: none"> • Off-season, climate unsuitable, October–May • Adult vectors inactive
	Low	<ul style="list-style-type: none"> • Areas with limited WNV epizootic activity in birds and mosquitoes
	Moderate	<ul style="list-style-type: none"> • Areas with initial confirmation of epizootic WNV in birds • Animal or human cases with WNV activity in birds or mosquitoes
Response	High	<ul style="list-style-type: none"> • WNV activity at a level suggesting high risk of human infection (e.g., high dead bird densities) • Sustained high mosquito infection rates, multiple positive mosquito species, horse or mammal cases indicating escalating epizootic transmission, or a human case and high levels of epizootic activity
	Outbreak in progress	<ul style="list-style-type: none"> • Potential emergency declaration (when human cases increase over 24 hours in an urban area) • Conditions favoring continued transmission to humans (e.g., persistent high infection rate in mosquitoes, continued avian mortality due to WNV)
Recovery	Outbreak over	<ul style="list-style-type: none"> • Recovery, return to preparedness activities

2.0 PURPOSE AND AUTHORITIES

2.1 Purpose

The purpose of the Oregon West Nile Virus Emergency Response Plan is to lessen the impact of West Nile virus on the residents of Oregon by providing a guide for the OPHD and local health departments for detection and response. This plan focuses on elements that are unique to a West Nile virus outbreak. Wherever response is typical of the response to any noncommunicable disease or other public health emergency, this plan refers to the appropriate section of *Annex F, ESF-8 Public Health and Medical Services* in the *Oregon State Emergency Management Plan*. Annex F can be found on the Health Alert Network (HAN) Web site (<https://www.oregonhan.org>) or can be requested by contacting the Public Health Emergency Preparedness (PHEP) program (971-673-1308).

2.2 Authorities

Additional authorities for this plan can be found in *Annex F, Base Plan*.

Table 2: Selected Legal Authorities

Oregon Revised Statute	Title
634.650–634.665	Integrated Pest Management

3.0 SITUATION AND ASSUMPTIONS

3.1 Situation

Mosquitoes are the vector for West Nile virus and transfer the disease to birds, horses and humans through their bite, with birds hosting the virus in nature. There are over 3,300 different species of mosquitoes throughout the world; about 200 occur in the United States with 50 species occurring in Oregon. While 60 of these mosquito species are documented to carry WNV, only four species in Oregon are of significant concern. *Culex tarsalis* is considered an efficient vector of WNV, while *Culex pipiens*, *Culex stigmatasoma* and *Aedes vexans* are considered moderately capable of WNV transmission. These species are found in fresh water associated with irrigation of agricultural crops, held-over floodwater and marshland.

According to the CDC, prevention and control of WNV is most effectively accomplished through integrated vector management including:

- Surveillance for WNV in mosquitoes, birds, horses, other animals and humans.
- Minimizing public exposure to mosquitoes and substances used for their control.
- Mosquito control with pesticides.

These programs are not intended to eliminate mosquitoes entirely, but rather to reduce their numbers in key areas and therefore reduce the risk of disease transmission. Many counties in Oregon have organized vector control programs that use an Integrated Pest Management program as defined in ORS 634.650 (see Tab 3 for more information).

WNV was first reported in Oregon in 2004, with confirmed cases in humans, horses and birds. In 2005, the virus continued to spread into the state, with additional confirmed cases and evidence of viral activity in sentinel chickens and mosquito pools (mosquito samples). Although the number of confirmed cases to date is low, data from other states with a longer history of WNV indicate that the number of human cases will grow over time.

In addition to transmission through mosquito bites, WNV has been shown to be transmitted via organ transplant, blood transfusion, breast milk and dialysis equipment. The disease affects all ages and both sexes, but only 10-20% of those bitten by infected mosquitoes develop symptoms. The main symptoms include headache, fever, vomiting, diarrhea and, in a few instances, a rash. One of 150 affected will develop severe neurological disease, and of those, 2-3% may die of the disease. The best protection against WNV is to avoid being bitten by mosquitoes by restricting outdoor activities when mosquitoes are active, using insect repellants, and wearing long sleeves and long pants.

3.2 Assumptions

- OPHD is the lead state agency for WNV surveillance.
- Local health departments (LHDs) have jurisdiction in their communities for public health.
- Hospital and private laboratories test suspected human cases of WNV. Positive samples are sent to the Oregon State Public Health Laboratory (OSPHL) for additional testing. Those samples testing positive at OSPHL are then sent to the California State Laboratory Division of Viral Disease for final confirmation.
- Oregon State University (OSU) Veterinary Diagnostics Laboratory tests wild and domestic birds for WNV and communicates the results to OPHD Acute and Communicable Disease Prevention (ACDP).
- In addition to human samples, OSPHL tests mosquito samples and sentinel chicken sera and communicates the results to ACDP.
- There is no vaccine for humans. (There is a vaccine for horses that provides 60-80% protection.)
- There are no approved antiviral treatments for WNV.
- The single most effective way to minimize transmission to humans is by decreasing the mosquito population.
- People can further reduce their risk of contracting WNV by preventing mosquito bites.
- Human cases of encephalitis of unknown origin are reported to ACDP from May through September.
- LHDs and county vector control agencies implement dead bird surveillance for WNV in March or early April (depending on weather) and continue through September or October.

4.0 CONCEPT OF OPERATIONS

Annex F, Public Health and Medical Services, Base Plan contains detailed information on incident management, federal, state and local response systems. In the case of a WNV outbreak, OPHD would lead the response using the base plan concept of operations to manage the event. The Public Health Emergency Preparedness program will support all other public health programs during response.

4.1 Operational Priorities

- Quickly diagnose WNV in humans.
- Reduce transmission of the virus from mosquitoes to humans.

4.2 Activation of the OPHD Emergency Management Organization

Decisions regarding WNV control measures will be based on the evaluation of surveillance data. The ACDP Manager, in consultation with ACDP staff and OPHD management, will decide the level of activation of the emergency management organization based on a number of risk factors:

- Environmental conditions
- Adult mosquito vector abundance
- Virus isolation rates in tested mosquitoes
- Sentinel chicken seroconversion rates
- Magnitude of infection in horses
- Human cases of WNV disease
- Proximity of detected virus activity to populated regions (especially urban or suburban)

4.3 Agency Operations Center

If the WNV risk phase reaches High or Outbreak in Progress, OPHD staff will likely activate the Agency Operations Center (AOC) to coordinate public health response.

For more information see Annex F, Base Plan.

5.0 ROLES AND RESPONSIBILITIES

This section outlines the roles and responsibilities of the federal, state and local agencies involved in WNV surveillance and response.

5.1 Federal

5.1.1 Centers for Disease Control and Prevention

5.1.1.1 Preparedness Phase

- Provide national surveillance data to state health departments.

5.1.1.2 Response Phase

- Assist in the laboratory confirmation of human WNV cases.
- Provide expertise regarding the management of human WNV cases.
- Provide consultation to state and local agencies if epidemic conditions exist.
- Provide additional funding to state health departments when there is an outbreak and an emergency has been declared.

5.2 State

5.2.1 Oregon Public Health Division

5.2.1.1 Preparedness Phase

All Staff

- Participate in preparing plans.
- Participate in exercises.
- Participate in appropriate training.

Acute and Communicable Disease Prevention

For humans, horses and birds:

- Maintain a database of all specimens tested.
- Post weekly surveillance test results on the ACDP Web site (<http://www.oregon.gov/DHS/ph/acd/diseases/wnile/survey.shtml>).
- Send surveillance results to the CDC and communicate regularly on surveillance and control activities.
- Coordinate equine and dead bird surveillance programs for WNV and other arboviruses with local county health departments.
- Immediately notify local vector control agencies and local health departments when evidence of viral activity in any species is found in a jurisdiction.
- Provide results to the counties of cases tested.
- Communicate and assist with press releases.
- Produce public information materials.
- Act as subject matter experts for training.

For mosquitoes:

- Ensure sufficient funding for the testing of mosquito samples.
- Collate adult mosquito abundance data submitted by local agencies and provide a summary of data to local agencies.
- Coordinate the submission of specimens for virus testing.
- Assist local jurisdictions with decisions about control measures.

Oregon State Public Health Laboratory

- Test mosquito samples for virus.
- Test sentinel chicken sera for viral antibodies.
- Test human samples for evidence of West Nile virus antibodies.

Public Health Emergency Preparedness

- Coordinate public health planning, response and recovery.
- Help with local health department planning.
- Coordinate the design of exercises.

Public Information/Risk Communications

The Risk Communication Team consists of the Oregon DHS Public Health Information Officer, the OPHD Risk Communication Section and a content expert from ACDP. Public Information will:

- Compile contact information for state and local public health spokespeople and local vector control subject matter experts (see Tabs 7, 8 and 9).
- Prepare messages that raise awareness of WNV surveillance and protection measures for state and local public health, hospitals, businesses, individuals and families, community organizations, and schools (see Tab 5).
- Prepare fact sheets, FAQs and other communication materials on WNV for distribution to health care providers, other first responders, the media and the public in the event of a WNV outbreak (see Tab 6).
- Participate in communication planning and exercises with WNV emergency response partners.
- Incorporate WNV outbreaks into Joint Information System/Joint Information Center (JIS/JIC) exercises.

For more information, see Annex F, Attachment C, *Public Information and Risk Communication*.

5.2.1.2 Response

All Staff

- Participate in the AOC, if activated, and coordinate deployment of appropriate public health resources.

Acute and Communicable Disease Prevention

- Provide subject matter expertise.
- Immediately notify local vector control agencies and LHDs when evidence of viral activity is found in a jurisdiction.
- Communicate with the CDC regarding surveillance and control.
- Coordinate and participate in a regional emergency response in conjunction with Oregon's Office of Emergency Management and with the Washington and California Offices of Emergency Services.

Oregon State Public Health Laboratory

- Continue testing mosquito samples for virus.
- Continue testing sentinel chicken sera for viral antibodies.
- Continue testing human samples for evidence of West Nile virus.

Public Health Emergency Preparedness

- If necessary, activate the AOC and participate in the state Emergency Communications Center.
- Coordinate with other state and federal agencies on ESF-8 (Public Health and Medical) issues.
- Coordinate with local health departments and other local partners on appropriate health responses.

Public Information/Risk Communications

- Activate the public health JIS/JIC to ensure information flow to local health departments, medical providers, veterinarians and other health care partners.
- Send technical information about WNV and reporting requirements to local health departments, hospitals, clinicians and veterinarians.
- As soon as the first human case of WNV has been confirmed by the OSPHL, issue a press release.
- If wide-spread spraying of pesticides is planned, provide information on the chemicals used and the application schedules (see Tab 4 for a detailed list of activities).
- Distribute fact sheets, FAQs and other informational materials via the news media, e-mail lists, HAN, the JIS/JIC, AlertOregon and the public health emergency broadcast fax system.

5.2.1.3 Recovery**All Staff**

- Participate in an After Action Report and work on necessary improvements.
- Continue to be subject matter experts.

5.2.2 Oregon Department of Agriculture

All Phases

- Notify veterinarians and veterinary diagnostic laboratories about WNV testing facilities available at Oregon State University.
- Provide outreach to the general public and livestock producers on the monitoring and reporting of equine encephalitis.
- Facilitate equine sample submission from the field (see Tab 16).
- Assist in confirmation of equine WNV cases.
- Provide expertise regarding management of equine WNV cases.
- Assist in the collection of dead birds.

5.3 Oregon State University Veterinary Diagnostic Laboratory

All Phases

- Provide tests to identify a wide range of viruses from equine, bird or arthropod vectors.
- Maintain an interactive Web site for dissemination of mosquito-borne virus information and data.
- Maintain inventory of antigens, antisera and viruses to detect the introduction of exotic viruses.
- Confirm tests done by local or state agencies.
- Assist in mosquito sample testing.

5.4 Local Health Departments

5.4.1 Preparedness

- Refer human cases to ACDP and to OSPHL for further confirmatory testing.
- Refer bird and equine specimens to OSU (after consulting with ACDP or ODA).
- Assist in the collection and submission of dead birds for testing (see Tab 15 for dead bird collection guidelines).
- Act as subject matter experts for medical professionals.
- Educate the public in their jurisdiction.
- Keep the community informed of local WNV activity by various media channels.
- Participate in decisions regarding control measures.
- Identify organizations with mosquito control capabilities within their jurisdiction and determine if adequate capability exists, particularly in areas with known vectors or a history of mosquito-borne disease.
- Conduct dead bird surveillance from May to September, with emphasis on Corvids (crows, ravens, jays and magpies).
- Assist OPHD in passive human surveillance.

5.4.2 Response

- Investigate reported human cases.
- Assist OPHD in active surveillance once human cases have been identified.
- Notify the local medical community, including hospitals and laboratories, if there is evidence of viral activity by case investigation.
- Participate in emergency response.
- Based on the number of human cases, declare a local emergency after consultation with county commissioners, the local health officer, and the OPHD Health Officer.

5.5 Local Mosquito Control Agencies

Mosquito control districts, long established in some counties, are valuable partners to LHDs, OPHD and other organizations. Depending on their size and capabilities, districts help train local personnel. They also provide information to jurisdictions that are considering the expansion or formation of a mosquito-control district.

5.5.1 Preparedness

- Gather, collate and interpret regional weather data.
- Map mosquito habitat and location of vector species.
- Monitor abundance of immature and adult mosquitoes.
- Collect and identify mosquitoes and report new species identified in their area to ACDP and local health officials.
- Collect and submit mosquito samples for virus isolation.
- Participate in the dead bird surveillance network.
- Maintain sentinel chicken flocks, obtain blood samples, and send them to OSPHL.
- Conduct routine control of immature mosquitoes.
- Conduct control of adult mosquitoes when needed, emphasizing areas where surveillance indicates human risk.
- Test for pesticide resistance in areas where pesticides have been applied and pesticide resistance is suspected.
- Educate the public on mosquito avoidance.
- Report surveillance findings to ACDP and local health officials.

5.5.2 Response

- At the first confirmation of WNV activity in mosquitoes within the vector control district, issue a WNV advisory for that location.
- Coordinate with LHDs during emergency response.
- Intensify adult mosquito control when needed.
- If large-scale adulticiding is required, notify county commissioners, local health departments and local government leaders in treatment areas.
- Monitor efficacy of spraying on target mosquito populations.

5.6 Hospitals and Health Care Systems

- Clinicians must report suspected or confirmed human cases of WNV within 24 hours to the LHD for the jurisdiction in which the patient resides (see Tabs 11 and 12).
- Hospital or private laboratories must submit all suspected WNV samples for confirmation to the OSPHL within one working day (see Tabs 13 and 14).

5.7 Veterinarians

- Veterinarians must report equine encephalitis cases of unknown origin to the Oregon Department of Agriculture (see Tab 16).

6.0 VULNERABLE POPULATIONS

While everyone is at risk of getting bitten by mosquitoes, the CDC identifies four populations with a higher risk of contracting WNV (CDC, 2003, p. 37):

- People over age 50: While people of any age can be infected with WNV, U.S. surveillance data indicate that people over age 50 are at higher risk for severe disease and death due to WNV infection.
- People at greater risk of being bitten by WNV-infected mosquitoes are statistically more likely to have disease symptoms. These groups include:
 - People with outdoor exposure: While conclusive data are lacking, it is reasonable to infer that persons engaged in extensive outdoor work or recreational activities are at greater risk of being bitten by WNV-infected mosquitoes.
 - Homeless people: Extensive outdoor exposure and limited financial resources in this group present special challenges.
 - People who live in residences lacking window screens: The absence of intact window/door screens is a likely risk factor for exposure to mosquito bites.
 - Immune suppressed patients.

7.0 PLAN MAINTENANCE

This plan will be revised every other year with specific attention to comments from the previous years' exercises or emergencies.

8.0 WEB SITES

The links in this section were correct as of April 2007.

Centers for Disease Control and Prevention

West Nile virus: www.cdc.gov/ncidod/dvbid/westnile/index.htm

U.S. Environmental Protection Agency

Pest Management: www.epa.gov/pesticides/health/mosquitoes/

Oregon Department of Human Services

Oregon Health Alert Network: <https://www.oregonhan.org>

(Note that the HAN Web site requires a user account and password.)

ACDP West Nile virus Web site:

www.oregon.gov/DHS/ph/acd/diseases/wnile/wnile.shtml

State of Oregon

Oregon Emergency Management Plan:

www.oregon.gov/OOHS/OEM/docs/library/or_emp_volum_2_emerg_oper.pdf

Oregon Revised Statutes: www.leg.state.or.us/ors/

9.0 REFERENCES

Centers for Disease Control and Prevention. 2003. *Epidemic/Epizootic West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control*.

<http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf>.

Eldridge, B.F. 1987. Strategies for surveillance, prevention, and control of arbovirus diseases in western North America. *Am J Trop Med Hyg*, **37**(3 Suppl), 77S-86S.

Eldridge, B.F. and J.D. Edman. (Eds.) 2000. Surveillance for arthropod-borne diseases. In *Medical entomology: a textbook on public health and veterinary problems caused by arthropods*. Boston: Kluwer Academic Publishers.

Hui, L., Husted, S.R., Reisen, W.K., Myers, C.M., Ascher, M.S., Kramer, V.L. 1999. Summary of reported St. Louis encephalitis and western equine encephalomyelitis virus activity in California from 1969 – 1997. *Proc. Calif. Mosq. Vector Control Assoc.*

Reeves, W. 1990. *Epidemiology and control of mosquito-borne arboviruses in California, 1943-1987*. Sacramento: California Mosquito Vector Control Association, Inc.

Reeves, W. 2000. The threat of exotic arbovirus introductions into California. *Proc. Calif. Mosq. Vector Control Assoc.*

Reisen, W. 1995. Guidelines for surveillance and control of arbovirus encephalitis in California. In *Interagency guidelines for the surveillance and control of selected vector-borne pathogens in California* (pp. 1-34). Sacramento: California Mosquito Vector Control Association, Inc.

Walsh, J. 1987. *California's mosquito-borne encephalitis virus surveillance and control program*. Sacramento: California Department of Health Services.

10.0 ACRONYMS AND GLOSSARY

10.1 Acronyms

ACDP	Acute and Communicable Disease Prevention
AOC	Agency Operations Center
CDC	Centers for Disease Control and Prevention
DHS	Department of Human Services
ECC	Emergency Coordination Center
EOC	Emergency Operations Center
ESF	Emergency Support Services
HAN	Health Alert Network
JIC	Joint Information Center
JIS	Joint Information System
LHD	local health department
ODA	Oregon Department of Agriculture
OEM	Office of Emergency Management
OPHD	Oregon Public Health Division
OSPHL	Oregon State Public Health Laboratory
OSU	Oregon State University
PHEP	Public Health Emergency Preparedness Program
WNV	West Nile virus

10.2 Glossary

Adulticide. The application of chemicals to kill adult mosquitoes.

Antibodies. Large proteins used by the immune system to identify and neutralize foreign objects such as viruses. Each antibody recognizes a specific **antigen**.

Antigen. Substances that are recognized by the immune system and induce an immune reaction.

Arbovirus. A virus that uses arthropods as vectors (from “arthropod-borne virus”).

Arthropod. Organisms having a hard, jointed exoskeleton and paired jointed legs, including mosquitoes, many species of which are important medically as parasites or as vectors of organisms capable of causing disease in humans.

Emergency Support Function. A functional area of response activity established to facilitate the delivery of federal assistance required during the immediate response phase of a disaster to save lives, protect property and public health, and to maintain public safety.

Encephalitis (pl. encephalitides). Inflammation of the brain.

Epizootic. An epidemic outbreak of disease in an animal population, often with the implication that it may extend to humans.

Etiology. The causes or origin of a disease or disorder.

Health Alert Network (HAN). An Internet program used to communicate health and emergency messages.

Joint Information Center (JIC). A facility established to coordinate all incident-related public information activities. It is the central point of contact for all news media.

Joint Information System (JIS). Integrates incident information and public affairs into a cohesive structure to provide consistent, coordinated, timely information during an incident.

Larvicide. The application of chemicals or biological agents to kill mosquito larvae or pupae.

Morbidity. The incidence or prevalence of a disease in a population.

Mosquito pool. A collection of mosquitoes (usually about 50) of any given species or group (e.g., *Culex tarsalis*) that is likely to carry and possibly transmit a virus.

Sentinel chickens. A flock of chickens placed in an area for an extended period of time and routinely tested for the presence of antibodies to West Nile virus.

Seroconversion. The development of detectable specific antibodies to microorganisms in the blood.

Surveillance. The collection, analysis and dissemination of data about a disease.

Vector. An invertebrate animal (e.g., tick, mite, mosquito, bloodsucking fly) capable of transmitting an infectious agent among vertebrates.

11.0 RECORD OF CHANGES

Date	Summary of Change
7/27/06	Initial release of 2006 plan.
8/21/06	Clarifications to WNV Phases (section 1.2 and Tab 2).
4/18/07	Additional changes to WNV Phases; other minor formatting changes.