

West Nile virus (WNV)

Disease Category: Arboviral/vectorborne

Signs and Symptoms	<ul style="list-style-type: none"> • Serious symptoms in a few (<1%) people: meningitis, encephalitis, acute flaccid paralysis • Milder symptoms in some (~20%) people: fever, headache, weakness, muscle & joint pain, gastrointestinal symptoms, rash • No symptoms in most (~70-80%) people
Incubation	Usually 2-6 days; range 2-14 days (up to several weeks)
Case Classification	<p>Clinical criteria: For neuroinvasive disease – acute signs of central or peripheral neurologic dysfunction, as documented by a physician AND absence of a more likely clinical explanation. For non-neuroinvasive disease – fever as reported by the patients or a health-care provider AND absence of neuroinvasive disease AND absence of a more likely clinical explanation.</p> <p>Confirmed: For neuroinvasive disease – a case that meets the clinical criteria and one or more of 4 laboratory criteria (detailed below). For non-neuroinvasive disease – a case that meets the clinical criteria and one or more of 3 laboratory criteria.</p> <p>Probable: For neuroinvasive disease – a case that meets the clinical criteria and has virus-specific IgM antibodies in cerebrospinal fluid (CSF) or serum but with no other testing. For non-neuroinvasive disease - a case that meets the clinical criteria and has virus-specific IgM antibodies in serum but with no other testing.</p>
Differential Diagnosis	Common causes of aseptic meningitis and encephalitis (e.g., herpes simplex virus, enteroviruses), other arboviruses (e.g., La Crosse encephalitis virus, St. Louis encephalitis virus, Eastern equine encephalitis virus, Powassan virus)
Treatment	Supportive
Duration	Symptoms usually persist for 3-10 days (some patients experience a prolonged recovery)
Exposure	<p>Vector: Mosquitos (mainly <i>Culex</i>)</p> <p>Transmission may also occur via blood transfusion, organ or tissue transplantation, or vertically during pregnancy or breastfeeding</p>
Laboratory Testing	<p>Local Health Authority can arrange testing if an outbreak is suspected OR for contacts. Details about the West Nile virus testing performed at the Nevada State Public Health Lab may be found here:</p> <ul style="list-style-type: none"> • https://med.unr.edu/public-health-lab/disease-characteristics/clinical-analysis/west-nile
Key Partner Agencies	<ul style="list-style-type: none"> • Environmental Health • Nevada Department of Wildlife
Public Health Actions	<p>Reports of WNV cases must be made to the Local Health Authority during the regular business hours of the health authority on the first working day following the identification of the case.</p> <p>The Local Health Authority shall notify Office of State Epidemiology (stateepi@health.nv.gov) if local transmission outbreak suspected. For individual confirmed or probable cases:</p> <ul style="list-style-type: none"> • Confirm diagnosis, if possible • Identify potential exposures, particularly local exposures

- Prepare a case report and submit to the Chief Medical Officer (through OSE) within 7 days after completing the case investigation
- Identify any additional cases from potential common sources
- Identify opportunities for vector control and environmental mitigation
- Provide education about how to prevent further transmission

To the best of the local health authority's ability, each step of the investigation should be completed within one working day or in alignment with NAC 441A.

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WEST NILE VIRUS (WNV)

I. DISEASE REPORTING

A. Purpose of Reporting and Surveillance¹⁻³

1. To identify clusters/outbreaks and potential areas of ongoing transmission.
2. To identify opportunities for vector control to prevent transmission.
3. To educate affected individuals about how to reduce their risk of infection.
 - a. When the source of infection appears to pose a risk to a limited group of individuals (e.g., outdoor workers), to inform those individuals how they can reduce their risk of exposure.
4. To identify times when WNV may pose a risk to the blood supply.
5. To identify other undiagnosed or unreported cases.
6. To better characterize the epidemiology of the infection.

B. Legal Reporting Requirements

A report to the health authority may be made by telephone; telecopy, in the form prescribed by the health authority; or any form of electronic communication identified by the health authority, in the form and manner specified by the health authority (see [Appendix A](#) for contact information).⁴

1. *Health Care Providers and Health Care Facilities*

- Where to report:
 - Notifiable to the local health authority having jurisdiction where the health care facility or office of the health care provider is located.^{5,6}
- Timeframe to report:
 - During the regular business hours of the health authority on the first working day following the identification of the case.⁴

2. *Laboratories*

- Where to report:
 - For laboratories located in Nevada: Results indicating the presence of West Nile virus are notifiable to the health authority having jurisdiction where the office of the health care provider who ordered the test is located or to an electronic clearing house approved by the health authority.⁷
 - For laboratories located outside of Nevada performing testing on specimens collected in Nevada or from residents of Nevada: Results indicating the presence of West Nile virus are notifiable to the Chief Medical Officer.⁷ In

practice, reporting to the Chief Medical Officer occurs via the Office of State Epidemiology.

- Timeframe to report:
 - During the regular business hours of the health authority on the first working day following the identification of the case.⁴

3. Local Health Authority

- The local health authority shall prepare a case report for each case of WNV reported in its jurisdiction. The report must be made on a form approved or provided by OSE within 7 days after completing the investigation of the case.⁸ There are no additional reporting requirements specific to West Nile virus.

4. Blood Banks

- Where to report:
 - Results of any test or examination of a specimen from the human body that suggest the presence of West Nile virus are reportable to the health authority having jurisdiction where the blood bank is located.⁹

C. Local Health Authority Investigation Responsibilities^{10,11}

1. Receive initial case report and confirm the diagnosis.
2. Notify the health care provider who ordered the test and discuss the circumstances of the case before initiating an investigation or notifying the case (if possible).
3. Complete the Nevada EpiTrax case report form (known in EpiTrax as the Confidential Morbidity Report, or CMR) for all confirmed and probable cases within 7 days after completing the investigation of the case.
 - a. Collect information from all cases, to include: demographic data, symptoms, exposure to mosquitos/travel history, hospitalization/death status, and other variables as requested by OSE or CDC (see the [Collect Data](#) section below for more detail about the data that should be collected).
4. Monitor case reports to identify additional cases and possible outbreaks of West Nile virus and investigate if identified. Notify the Nevada Department of Public and Behavioral Health (DPBH) as soon as possible.
5. Determine the need for measures to prevent, suppress, or control the spread of infection.

II. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

West Nile virus disease is caused by the West Nile virus, a single-stranded RNA virus of the family Flaviviridae and of the genus Flavivirus. Other arboviruses (arthropod-borne viruses) in this family include Dengue, St. Louis Encephalitis, and Powassan.

B. Description of Illness^{2,12}

Approximately 70%-80% of human cases of West Nile virus are asymptomatic.

Non-neuroinvasive disease (aka West Nile fever)

About 1 in 5 cases of West Nile virus develop mild to moderate symptoms including fever, headache, body aches, joint pains, vomiting, diarrhea, or rash. Symptoms usually last 3 to 10 days. Individuals who experience mild/moderate symptoms usually fully recover but may experience fatigue and weakness for weeks to months.

Neuroinvasive disease

Less than 1% of people who are infected with the virus develop a severe illness that affects the central nervous system (e.g., encephalitis, meningitis, acute flaccid paralysis). Symptoms of severe illness may include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. Recovery from severe illness might take several weeks or months, and some effects to the central nervous system may be permanent.

1. *Mortality*

About 10% of people who develop neuroinvasive disease (<1% of all cases) die.

C. Epidemiology^{2,13,14}

As of 2024, West Nile virus is the leading cause of mosquito-borne disease in the continental United States. As a result of periodic epidemics, the annual number of reported cases of WNV can fluctuate widely.

1. *Geographic Distribution*

WNV was first reported in the U.S. in 1999 when an outbreak occurred in New York City.¹⁵ Cases have been reported in all U.S. states, but the Great Plains states (Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado, Kansas, New Mexico, Texas, Oklahoma) had the highest density of counties with the highest incidence per 100,000 population between 1999-2023.¹⁶ See the [Nevada Office of State Epidemiology Communicable Disease Dashboard](#) for Nevada specific data on West Nile virus (Zoonotic & Vector-Borne section).

2. *Data¹⁷*

West Nile virus was first detected in Nevada in 2003/2004. It has now been reported in all counties in the state. Generally, there are low numbers of cases of WNV detected in Nevada each year, with outbreaks occurring every few years when case counts surge. In some years, southern Nevada is more affected, and in other years, northern Nevada and rural Nevada are more affected.

See the [Nevada Office of State Epidemiology Communicable Disease Dashboard](#) for Nevada specific data on West Nile Virus (Zoonotic & Vector-Borne section).

3. *Seasonality*

Cases of WNV occur during mosquito season, which starts in the summer and continues through the fall. Most cases occur in the months of July-October, with August as the peak.

4. *Risk Factors*

People who are at greater risk of infection include:

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- All residents and visitors to areas where WNV activity is occurring, particularly people who engage in outdoor work and recreational activities, as these people are more likely to be bitten by an infected mosquito.

People who are at greater risk for severe illness, if infected, include those:

- Over 60 years old
- With certain medical conditions like diabetes, hypertension, kidney disease,
- Who have received organ transplants

D. Reservoirs²

Birds are the animal reservoirs of West Nile virus. The mosquito vectors that transmit the virus to “dead end” hosts like horses and humans become infected when they feed on infected birds. “Dead end” hosts do not develop high enough levels of the virus in their blood to be able to infect other biting mosquitos, thus ending the transmission cycle. Some types of birds, especially crows and jays, are known to get sick and die from the infection, but most birds survive.

E. Sources and Routes of Transmission²

West Nile virus is most commonly spread to people by the bite of an infected mosquito. Mosquito species in the *Culex* genus are the primary vectors of the disease.

In a very small number of cases, West Nile virus has been spread through:

- Exposure in a laboratory setting
- Blood transfusion and organ transplant
- Vertical transmission from mother to baby (during pregnancy, delivery, or breast feeding)

There is no evidence that a person can get infected with WNV from handling live or dead infected birds, but it is still recommended that people avoid bare-handed contact with dead animals, including birds.

F. Incubation Period²

The incubation period for WNV disease is 2-6 days, but the range is 2-14 days (up to several weeks in immunocompromised people).

G. Period of Communicability^{2,13}

Human-to-human transmission of WNV can occur via blood transfusion, organ transplantation, or rarely, intrauterine transmission or via breast milk. People with WNV infection are advised to not donate blood for 120 days after their diagnosis. Evidence suggests that vertical transmission is most likely to occur if the mother was infected days to weeks before birth and that transmission from organ or tissue transplantation is most likely to occur if the donor was infected days to weeks before the donation.

III. EPIDEMIOLOGIC CASE INVESTIGATION

According to Nevada Revised Statutes (NRS) 441A.160 (1), “A health authority who knows, suspects or is informed of the existence within the jurisdiction of the health authority of any communicable disease that poses a risk to the health of the public and is in an infectious state, at risk of developing into an infectious state or at risk of developing into a progressed state that endangers the health of the person with the communicable disease shall immediately investigate the matter and all circumstances connected with it, and shall take such measures for the prevention, suppression and control of the disease as are required by the regulations of the Board or a district board of health.”¹⁸

Therefore, the public health authority should begin investigating the case of West Nile virus within one working day of notification. A disease investigator from the public health authority will be assigned to investigate the case based on their availability and on the workload distribution among the entire disease investigation team.

Beyond the disease investigation staff required to investigate the case (likely one investigator, possibly more if there is a cluster/outbreak or if there are many potentially exposed contacts), few other public health resources would be required. If implementation of targeted vector control activities became necessary, partner organizations would lead these efforts.

A. Step 1: Review relevant information about the disease.

1. *Review scientific information in Control of Communicable Diseases Manual, most current edition.*

2. *Review Arboviral Diseases, Neuroinvasive and Non-neuroinvasive Case Definition (2015 CDC).*¹⁹

A surveillance case definition is a set of uniform criteria used to define a disease for public health surveillance. Surveillance case definitions enable public health officials to classify and count cases consistently across reporting jurisdictions. Surveillance case definitions are not intended to be used by healthcare providers for making a clinical diagnosis or determining how to meet an individual patient’s health needs.

It is important to note that there is not an individual case definition for WNV from the CDC; however, WNV belongs to the family of arbovirus, and therefore the case definition for Arboviral diseases developed by CDC applies to WNV disease.

a) Clinical Criteria

A clinically compatible case of arboviral disease is defined as follows:

Neuroinvasive disease

- Meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, as documented by a physician, AND
- Absence of a more likely clinical explanation. Other clinically compatible symptoms of arbovirus disease include: headache, myalgia, rash, arthralgia, vertigo, vomiting, paresis and/ or nuchal rigidity.

Non-neuroinvasive disease

- Fever as reported by the patient or a health-care provider, AND
- Absence of neuroinvasive disease, AND
- Absence of a more likely clinical explanation. Other clinically compatible symptoms of arbovirus disease include: headache, myalgia, rash, arthralgia, vertigo, vomiting, paresis and/or nuchal rigidity.

b) Laboratory Criteria for Diagnosis²

Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, OR

- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, OR
- Virus-specific IgM antibodies* in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, OR
- Virus-specific IgM antibodies* in CSF or serum.

*It is important to note that a positive IgM test may result from cross-reactive antibodies.

Contact the [Nevada State Public Health Lab](#) (see [Appendix A](#)) for guidance on appropriate sample types for West Nile virus and for guidance on proper sample collection.

c) Case Classification

Probable:

Neuroinvasive disease

A case that meets the above clinical criteria for neuroinvasive disease and the following laboratory criteria:

- Virus-specific IgM antibodies in CSF or serum but with no other testing.

Non-neuroinvasive disease

A case that meets the above clinical criteria for non-neuroinvasive disease and the laboratory criteria for a probable case:

- Virus-specific IgM antibodies in serum but with no other testing.

Confirmed:

Neuroinvasive disease

A case that meets the above clinical criteria for neuroinvasive disease and one or more of the following laboratory criteria for a confirmed case:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, CSF, or other body fluid, OR
- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, OR
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen, OR

- Virus-specific IgM antibodies in CSF, with or without a reported pleocytosis, and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred.

Non-neuroinvasive disease

A case that meets the above clinical criteria for non-neuroinvasive disease and one or more of the following laboratory criteria for a confirmed case:

- Isolation of virus from, or demonstration of specific viral antigen or nucleic acid in, tissue, blood, or other body fluid, excluding CSF, OR
- Four-fold or greater change in virus-specific quantitative antibody titers in paired sera, OR
- Virus-specific IgM antibodies in serum with confirmatory virus-specific neutralizing antibodies in the same or a later specimen.

d) *Comments:*

Interpreting arboviral laboratory results:

- Serologic cross-reactivity: In some instances, arboviruses from the same genus produce cross-reactive antibodies. In geographic areas where two or more closely-related arboviruses occur, serologic testing for more than one virus may be needed and results compared to determine the specific causative virus. For example, such testing might be needed to distinguish antibodies resulting from infections within genera, e.g., flaviviruses such as West Nile, St. Louis encephalitis, Powassan, Dengue, or Japanese encephalitis viruses.
- Rise and fall of IgM antibodies: For most arboviral infections, IgM antibodies are generally first detectable at 3 to 8 days after onset of illness and persist for 30 to 90 days, but longer persistence has been documented (e.g., up to 500 days for West Nile virus). Serum collected within 8 days of illness onset may not have detectable IgM and testing should be repeated on a convalescent-phase sample to rule out arboviral infection in those with a compatible clinical syndrome.
- Persistence of IgM antibodies: Arboviral IgM antibodies may be detected in some patients months or years after their acute infection. Therefore, the presence of these virus-specific IgM antibodies may signify a past infection and be unrelated to the current acute illness. Finding virus-specific IgM antibodies in CSF or a fourfold or greater change in virus-specific antibody titers between acute- and convalescent-phase serum specimens provides additional laboratory evidence that the arbovirus was the likely cause of the patient's recent illness. Clinical and epidemiologic history also should be carefully considered.
- Persistence of IgG and neutralizing antibodies: Arboviral IgG and neutralizing antibodies can persist for many years following a symptomatic or asymptomatic infection. Therefore, the presence of these antibodies alone is only evidence of previous infection and clinically compatible cases with the presence of IgG, but not IgM, should be evaluated for other etiologic agents.
- Arboviral serologic assays: Assays for the detection of IgM and IgG antibodies commonly include enzyme-linked immunosorbent assay (ELISA), microsphere immunoassay (MIA), or immunofluorescence assay (IFA). These assays provide a

presumptive diagnosis and should have confirmatory testing performed. Confirmatory testing involves the detection of arboviral-specific neutralizing antibodies utilizing assays such as plaque reduction neutralization test (PRNT).

- Other information to consider. Vaccination history, detailed travel history, date of onset of symptoms, and knowledge of potentially cross-reactive arboviruses known to circulate in the geographic area should be considered when interpreting results.

e) *Nevada Guidance for Case Determination*

There is no Nevada-specific guidance for case determination.

B. Step 2: Begin investigating the case.

1. Contact Reporting Source and/or Reported Case

Upon receiving an initial case report, review lab test results and available clinical details and epidemiologic factors. Before initiating the investigation, contact the health care provider who initiated the case report/ordered the test to confirm the diagnosis and discuss the circumstances of the case or suspected case. If, after a reasonable effort, the disease investigator is unable to contact the health care provider before the time when an investigation must be initiated to protect the public health, the disease investigator may proceed with the investigation, including contacting the case or suspected case.²⁰

Next, if necessary, contact the case or suspected case directly to conduct an interview to obtain additional data needed to complete the investigation.

Document all attempts to contact a reporting source and/or reported case.

2. Collect Data

Use the State of Nevada Confidential Morbidity Report (CMR) Form to gather accurate information about the case. Filling out an electronic version of the CMR on EpiTrax is preferred, but if needed, a PDF version of the form is available [here](#). If used, the completed PDF version should be attached to the CMR in EpiTrax. The CMR/case report form should be completed within 7 days of completing the investigation of the case.

When completing the CMR, fill in all relevant data fields (for WNV, this includes all possible data fields in the “Demographic”, “Clinical”, “Investigation”, and “Administrative” tabs on EpiTrax and all possible data fields in the “Source”, “Facility Type”, “Patient Demographic Data” and “Morbidity Data” sections of the paper/PDF form). As needed, also complete data fields on other tabs in the EpiTrax CMR.

a) *Priority Data for Investigation of West Nile virus Cases*

To allow for further investigation of potential sources of infection, the investigator should be sure to obtain:

- A detailed travel history from the case
- Information about any potential mosquito exposures in the past 2 weeks
 - This might include asking the case about their outdoor activities, or whether they have seen mosquitos around the home.
- Whether the case has received or donated blood, organs, or tissue

b) Quality Assurance

If a form specific to arboviral diseases is not yet published in EpiTrax, a form may need to be created to conduct the investigation. The investigator would not require additional training beyond standard EpiTrax training and training on how to use any arboviral-specific form.

3. Special Considerations

a) ArboNET Reporting (2024)

West Nile Virus cases are reported through the National Notifiable Diseases Surveillance System (NNDSS) and the CDC's ArboNet database, which is accessed via the CDC's Secure Access Management Services (SAMS) system.

To report cases of WNV to OSE, LHAs previously utilized the ArboNet Tracking Log, an Excel-based spreadsheet provided by the Office of State Epidemiology (OSE) Disease Investigation Team (rurals@health.nv.gov). Moving forward, this Tracking Log process will transition to REDCap for streamlined data collection. Once an LHA submits a completed Tracking Log, a member of the OSE Disease Investigation Team will manually assign an ArboNet number to the case. The data from the Tracking Log will then be manually entered into the CDC's ArboNet system by OSE staff.

Overview of ArboNET

ArboNET is the national arboviral surveillance system managed by CDC and state health departments. ArboNET maintains data on arboviral infections among humans, presumptive viremic blood donors, veterinary disease cases, mosquitoes, dead birds, and sentinel animals.

Access to ArboNET Reporting

To report data through ArboNET, Local Health Authorities (LHAs) in Nevada must:

- Obtain a State of Nevada REDCap Account: LHAs must have an active REDCap account to participate in the reporting process. Staff(s) must request the "Redcap User Agreement And Account Application/Modification Survey" Link from rurals@health.nv.gov. Or go to <https://dpbhrdc.nv.gov>
- Request Access to the LHA ArboNET Project (PID 504): LHAs must request access to the project by contacting the Office of State Epidemiology (OSE) Disease Investigation team at rurals@health.nv.gov.

Reporting Process

Once access to the ArboNET REDCap Project has been granted, LHAs will follow these steps:

- Data Entry: LHAs are responsible for entering the required arboviral data into the REDCap project. Under the "LHA Uploader Information" form, LHAs must ensure that they select "YES" for the question, "LHA ready to publish to CDC ArboNET." This indicates to the OSE Disease Investigation Team that the data is complete and ready for submission to the CDC's ArboNET system.
- ArboNET Tracking Number: *Upon submission, the REDCap project will automatically generate an ArboNET tracking number for each case.*
- Data Modification: LHAs have the ability to edit their ArboNET entries if corrections or updates are needed prior to the OSE Disease Investigation Team's submission to

ArboNET. Any modifications made will override the previously submitted information provided to the OSE and CDC. To ensure that updates are accurately recorded, LHAs must document any changes in the "Additional Note not captured by fields" section under the "Laboratory Results" form. This ensures all revisions are properly captured and reviewed before final submission.

OSE Data Management

- The *OSE Disease Investigation team will receive the completed ArboNET tracking logs from LHAs.*
- OSE will review the submissions and ensure that all necessary information is included.
- Upload to CDC ArboNET: The OSE Disease Investigation team will upload the data from REDCap to the CDC's ArboNET system - <https://sams.cdc.gov/>

Contact Information

For assistance or inquiries regarding ArboNET reporting, LHAs can contact the OSE Disease Investigation team at rurals@health.nv.gov.

C. Step 3: Notify OSE's working partners and begin necessary coordination.

1. Roles and Responsibilities

a) Partner Divisions/Programs (within DPBH)

Depending on the nature of the case/outbreak investigation, coordination with other DPBH divisions or programs may be warranted. These divisions/programs include:

- Environmental Health (coordinate with external partner agencies on vector control activities)

b) Partner Agencies (outside DPBH)

Depending on the nature of the case/outbreak investigation, coordination with other programs or agencies may be warranted. These programs/agencies include:

- Nevada Department of Agriculture (testing of dead birds)
- Nevada Department of Wildlife (reporting of sick or dead animals, vector control activities)
- Nevada State Public Health Lab (specimen testing)

Partner contact information may be found in [Appendix A](#).

D. Step 4: Analyze & disseminate data.

The disease investigator should provide regular updates to the OSE Communicable Disease team and work with the team to determine analytic and reporting needs based on the scope of the investigation. Additional OSE staff may be pulled in as needed to help with analyses and reporting to OSE leadership and to discuss the need for public communications.

E. Step 5: Identify potential source of infection²

The investigation should focus on data collected about specific exposures, including:

1. Mosquito bite from environmental exposure (in the 14 days before onset)
 - a. Ascertain the patient's travel history and any history of mosquito bites.
 - i. Information about travel history, outdoor activities, or observations of mosquitos around the home may help identify opportunities in the case's life for exposure to mosquitos.
 - b. Obtain any available environmental surveillance data for geographic areas of interest.
 - i. Reporting and testing of dead birds may be a useful source of surveillance data to detect the presence of West Nile virus in the environment, but is not consistently done in Nevada.
2. Receipt or donation of any blood products, organ transplants, or tissue transplants (in the 30 days before onset)
 - a. Determine if the patient received or donated blood products, tissues or organs up to 30 days prior to their WNV infection.
 - i. If yes, immediately contact the blood or tissue bank of the potential source.

F. Step 6: Initiate control measures (see [Control of Case](#), [Control of Contacts](#), and [Control of Carriers](#) sections below).

IV. CONTROL OF CASE

It is essential that data be used to determine the scope of the epidemiologic investigation and the potential for spread and that any intervention/control measures be based on those determinations and public health judgement.

1. *Cases With Specific Circumstances*

a) *Case in a Medical Facility*

Hospitalized patients may be treated with standard precautions, and isolation is not required for cases.

b) *Case in a Pregnant or Lactating Person*

Infected pregnant or lactating people should be advised to discuss their diagnosis with their health care provider.

2. *All Other Cases*

Provide education materials (see [Education/Prevention](#) section).²¹ People with WNV infection should be advised not to donate blood, tissues, or organs for at least 120 days following recovery.^{2,10}

3. Immunity

Most people who are infected with West Nile virus develop lifelong immunity and are protected from future infection. Individuals with weakened immune systems may experience waning immunity. There is currently no vaccine for WNV.²

V. CONTROL OF CONTACTS

A. Review Contact Definition

1. Contact²²

“Contact” means a person or animal that has been exposed to a case or carrier, or to an environment known to be contaminated with an infectious agent of a communicable disease, in a manner likely to cause transmission of the infectious agent. For example, a person who is a household member of a confirmed or a probable case, a person with intimate contact with a confirmed or a probable case, or a person who shares a common source of infection with a confirmed or probable case.

B. Identification of Contacts or Potentially Exposed Persons

- Household members of people infected with WNV may be potential contacts if they have a shared mosquito exposure history with the primary case, but do not require additional investigation.
- Persons with recent mosquito bites in areas where WNV is circulating are potential contacts, but do not require additional investigation.
- Persons who received or potentially received a blood transfusion, tissue donation, or organ donation from a confirmed case are considered contacts.
- If a pregnant person near the end of gestation or a lactating person is a confirmed case, the risk of transmission from mother to baby during gestation or breastfeeding is low, but the infant is considered a contact.

C. Notification of Contacts or Potentially Exposed Persons

- Individual notification of persons with recent mosquito bites in areas where WNV is circulating is not feasible. OSE will determine the need for public communications depending on case volume.
- Work with the blood/tissue/organ bank of the potential source to identify and notify individuals who were potentially exposed.

D. Management of Contacts or Potentially Exposed Persons

- Household members of people infected with WNV do not need to quarantine.
- Instruct persons with recent mosquito bites in areas where WNV is circulating to seek medical care if they develop fever, headache, rash, or stiff neck.
- Instruct persons who received or may have received a blood transfusion, tissue donation, or organ donation from a confirmed case to seek medical care if they

develop fever, headache, rash, or stiff neck and to inform their healthcare provider that they were exposed to WNV.

- If an infant is born to a mother with confirmed WNV, inform the parent(s) that the infant should receive a detailed evaluation from a medical provider.²³
 - Breastfeeding women with WNV should talk to their doctor about continuing to breastfeed because the benefits of breastfeeding outweigh the risk of WNV disease in breastfeeding infants.²⁴ No additional monitoring is needed for infants in this scenario.

VI. CONTROL OF CARRIERS

A. Review Carrier Definition

1. *Carrier*²⁵

“Carrier” means a person or animal: 1. Known or diagnosed by a health care provider or reported pursuant to the provisions of this chapter to have a communicable disease or infectious agent of a communicable disease in the absence of discernible clinical symptoms; and 2. Who may serve as a potential source of infection.

B. Identification of Carriers

A human carrier state has not been documented.

VII. MANAGEMENT OF SPECIAL SITUATIONS/OUTBREAK CONTROL

A. Transmission Linked to Blood Transfusion/Organ or Tissue Donation

While transmission linked to blood transfusion or organ donation is unlikely due to current screening practices, it is possible. If blood/tissue/organ donation is identified as a suspected source of infection:

- Immediately contact the blood/tissue/organ bank of the potential source and work with them to provide patient education and identify exposed contacts.

B. Transmission Linked to a Lab Exposure

- Follow normal case control process as outlined in the [Control of Case](#) section above.
- Work with the lab to ensure that the Occupational Safety and Health Administration (NVOSHA) is notified (see APPENDIX A: PARTNER CONTACT INFORMATION).
- Educate the lab where the potential exposure took place that Biosafety Level 2 precautions are recommended for diagnostic WNV specimens and Biosafety Level 3 precautions are needed for WNV cultures.²⁶

C. Apparent Outbreak Due to Environmental Exposure

- Work with partners at local health authorities, Environmental Health, the state Department of Agriculture, the state Department of Wildlife, and the State Public Health Lab to determine the need for targeted mosquito sampling and develop a vector control plan if needed.

VIII. TREATMENT/PROPHYLAXIS

There are no vaccines to prevent or medications to treat WNV infections in humans. Antibiotics do not treat viruses.

In patients with mild symptoms, rest, fluids, and over-the-counter pain medications may relieve some symptoms.

In severe cases, patients often need to be hospitalized to receive supportive treatment, such as intravenous fluids, pain medications, and nursing care.²

A. Treatment of Case

1. Refer to Red Book, most current edition, for additional treatment guidelines.
2. Provide most current treatment guidelines from Red Book to the healthcare provider.
3. Refer case to physician for treatment of West Nile virus.

B. Prophylaxis of Contacts

- None recommended

IX. EDUCATION/PREVENTION

A. For cases & contacts

Instruct persons with recent mosquito bites in areas where WNV is circulating to seek medical care if they develop fever, headache, rash, or stiff neck. Household members of a person infected with WNV do not need to quarantine, but should monitor for symptoms and seek medical care if they develop symptoms.

The investigator shall provide educational materials for the prevention and control of West Nile virus to the case or parent/guardian of the case. If possible, ask someone at the public health authority with access to a database like UpToDate (or any similar clinical guidance database product) to help pull current educational resources.

The investigator can also search for the most recent online educational materials about the disease from the CDC. Keep in mind that the disease investigator would be sending these to a case/case's guardian, so don't provide so many that it's overwhelming!

B. For the public

The investigator should work with the disease investigation supervisor to ensure the State Epidemiologist is aware of the status of the investigation and can determine the need for the release of public education materials.

The best way to prevent West Nile virus is to protect oneself from mosquito bites. The best ways to do that are to:²¹

- Use insect repellent
- Wear loose-fitting, long-sleeved shirts and pants
- Take steps to control mosquitos indoors and outdoors:
 - Remove standing water around the outside of your home
 - Install or prepare and use window and door screens when leaving your windows or doors open
 - Use insecticides as warranted
- Remember mosquito bite prevention when traveling overseas

While there is no evidence that a person can get infected with WNV from handling live or dead infected birds, it is still recommended that people avoid bare-handed contact with a dead animal like a bird. People who must handle a dead bird are advised to use gloves or a plastic bag.²

The investigator should search for the most recent online public educational materials about the disease from the CDC. The [Nevada OSE website](#) also contains information about WNV, as does the [One Health Nevada website](#).

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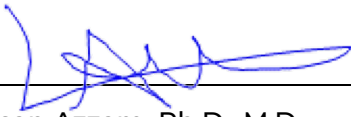
XI. ACKNOWLEDGEMENTS

This document was developed based on the content and format of the disease investigation guidelines of several state and local health jurisdictions:

- Arizona Department of Health Services West Nile Virus and St. Louis Encephalitis Virus Protocol
- Washington State Department of Health West Nile Virus Reporting and Investigation Guideline
- Washoe County District Health Department (now Northern Nevada Public Health), Communicable Disease Control Program – Investigation of Communicable Disease Manual

The Nevada Office of State Epidemiology would like to acknowledge the work of these great partners.

XII. UPDATE LOG



Ihsan Azzam, Ph.D., M.D.
Chief Medical Officer

10/9/24

Chief Medical Officer Approval Date

XIII. APPENDIX A: PARTNER CONTACT INFORMATION

Local Health Authorities in Nevada		
<u>Carson City Health and Human Services (CCHHS)</u>	Disease reporting	(775) 887-2190 (775) 887-2138 (confidential fax)
	After-hours phone	(775) 887-2190
<u>Central Nevada Health District (CNHD)</u>	Churchill Office	(775) 867-8181
<u>Northern Nevada Public Health (NNPH)</u>	Epidemiology and Public Health Preparedness (EPHP)	(775) 326-6055
	24-hour communicable disease reporting	(775) 328-2447 (775) 328-3764 (confidential fax)
<u>Southern Nevada Health District (SNHD)</u>	Epidemiology	(702) 759-1300 (702) 759-1414 (confidential fax)
	STDs, HIV, and AIDS	(702) 759-0727 (702) 759-1454 (confidential fax)
	Tuberculosis	(702) 759-1015 (702) 759-1435 (confidential fax)
	After hours & public health emergencies	(702) 759-1100
DPBH Partners		
<u>Environmental Health Section</u>	Main office line	(775) 684-5280
External Agency Partners		
<u>Nevada Department of Agriculture</u>	Main Office	(775) 353-3601
<u>Nevada Department of Wildlife</u>	Reno Headquarters	(775) 688-1500
<u>Nevada Occupational Safety and Health Administration (NVOSHA)</u>	Las Vegas Office	(702) 486-9020
	Reno Office	(775) 688-3700
<u>Nevada State Public Health Lab</u>	Administrative	(775) 784-6063
	Clinics/Patients	(775) 982-1000

XIV. APPENDIX B: OSE CONTACT INFORMATION

Nevada DPBH Office of State Epidemiology	
Disease reporting	(775) 684-5911
	(775) 684-5999 (confidential fax)
After-hours duty officer	(775) 400-0333