

NC DEPARTMENT OF  
**HEALTH AND  
HUMAN SERVICES**

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Developed by the North Carolina Division of Public Health, Communicable Disease Branch

## **West Nile Encephalitis Surveillance, North Carolina, 2012—2021**

### **Background**

West Nile virus (WNV) is transmitted to humans and horses by the bite of infected mosquitos. It is in the genus *Flavivirus*, family Flaviviridae.

### **Transmission**

Over 150 species of mosquitos have been known to carry WNV, but the main vector species in the U.S. are *Culex pipiens*, *Culex tarsalis*, and *Culex quinquefasciatus*. These mosquitos are active at night, and most cases of infection occur during the summer and early fall months. In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and during pregnancy from mother to baby. It is not spread person-to-person or from animal-to-person by casual contact.

### **Symptoms**

Most people infected with WNV will have no symptoms. About 20% of people who are infected will have symptoms such as fever, headache, body aches, vomiting, diarrhea, and rash. Approximately 1% of people will develop serious disease that can include high fever, convulsions, paralysis and sometimes lasting neurological effects. Severe WNV neuroinvasive disease may include encephalitis (inflammation of the brain) or meningitis (inflammation of the membranes that surround the brain and spinal cord). Ten percent of severe WNV cases are fatal. Severe disease occurs most often in people over 60 years of age.

### **Epidemiology**

WNV is the most common arboviral disease in the United States, and second most common (after La Crosse encephalitis virus) in North Carolina. Since its introduction to the U.S. in 1999, WNV has spread throughout the continental U.S. with most cases occurring in the upper Midwestern states and the northern Plains states. In North Carolina, neuroinvasive WNV was first documented in 2002. Since then, there have been a total of 76 confirmed and probable neuroinvasive WNV cases in North Carolina, distributed across the state with no geographic predilection. Cases of WNV have been reported in 41% of North Carolina Counties since 2003. Additionally, there were 151 reported equine cases of WNV between 2003 and 2021.

### **Diagnosis and Treatment**

Diagnosis of neuroinvasive WNV is based on signs and symptoms in combination with the presence of IgM antibodies in serum or cerebrospinal fluid (CSF), virus, or viral antigens. Antibodies begin to be detectable 3 to 8 days after onset of illness. Testing before that time may result in a false negative test. The presence of antibodies in blood or CSF provides good evidence of WNV infection, however cross-reactivity with other flaviviruses is possible. No specific anti-viral treatments for WNV are available. Therefore, in severe cases necessitating hospitalization the only available treatment is supportive care.

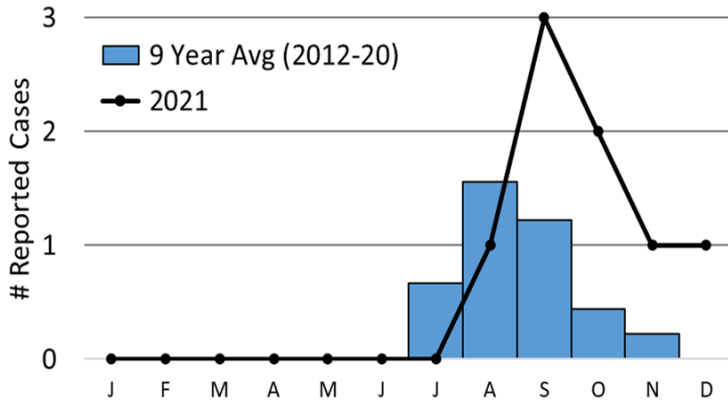
### **Prevention**

There are no vaccines available for WNV in humans, however a vaccine is available for horses. The best method to prevent WNV infection is to avoid mosquito bites, such as:

- Using repellents containing DEET, picaridin, IR3535, or oil of lemon eucalyptus
- Eliminating mosquito breeding sites by emptying standing water from flower pots, buckets, barrels, tires and other containers at least weekly, or by drilling holes so water drains out;
- Wearing long sleeves, pants and socks when weather permits.

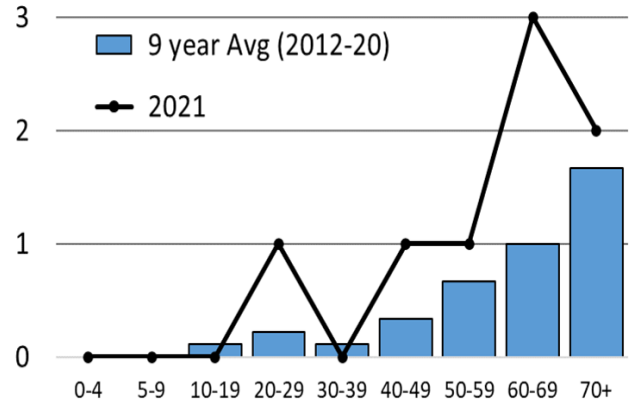
### Cases by Month

Confirmed and Probable Human West Nile Neuroinvasive Cases by Month of Illness Onset, NC, 2012-2021



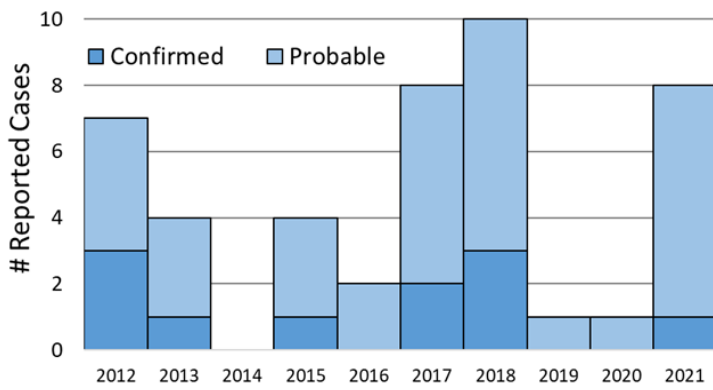
### Case Demographics

Confirmed and Probable Human West Nile Neuroinvasive Cases by Age, NC, 2012-2021

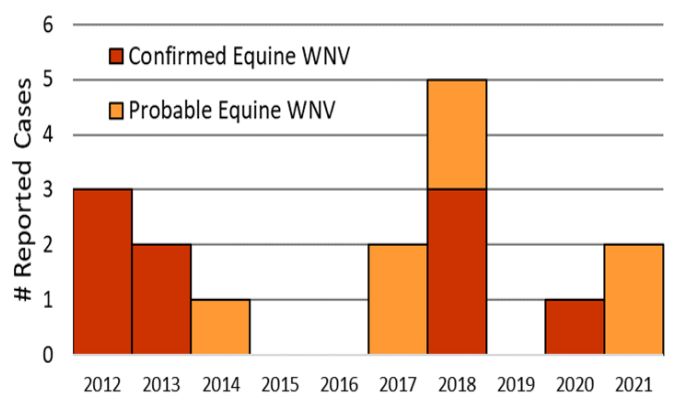


### Cases by Year

Confirmed and Probable Human West Nile Neuroinvasive Cases by Year, NC, 2012-2021



Confirmed and Probable Equine Cases of West Nile Neuroinvasive Disease by Year, NC, 2012-2021



### Geographic Distribution

West Nile Virus Reported Human Neuroinvasive Cases by County of Residence, NC, 2003-21

