

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—2023

Background

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

Transmission

Over 150 species of mosquitoes have been known to carry WNV, but the main vector species in the U.S. are *Culex pipiens*, *Culex tarsalis*, and *Culex quinquefasciatus*. These mosquitoes are most 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. In North Carolina, currently only neuroinvasive human cases are reportable.

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 has been a total of 106 confirmed and probable neuroinvasive WNV cases in North Carolina, distributed across the state with no geographic predilection. Cases of WNV have been reported in 45% of North Carolina Counties since 2003. Note that equine WNV cases are reportable to the NC Dept. of Agriculture, and are useful as an indicator of active WNV transmission between mosquitoes and mammals, therefore prompting local vector control programs to initiate adult mosquito suppression if appropriate. There were 153 reported equine cases of WNV between 2003 and 2023.

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 on days 0 through 3 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.

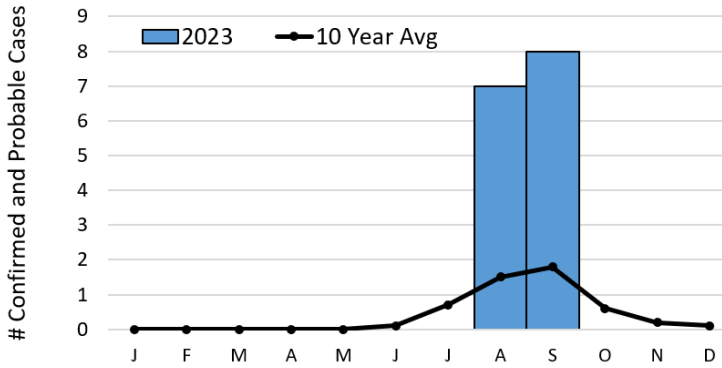
Prevention

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
- Having secure intact screens on windows and doors to keep mosquitoes out
- Reducing the number of infected adult mosquitoes through actions by local mosquito control programs

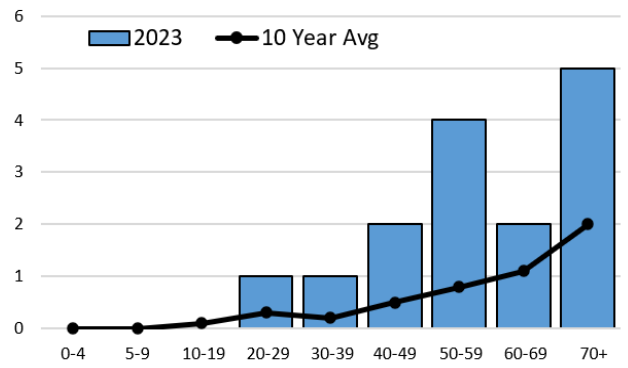
Cases by Month

Confirmed and Probable Human West Nile Neuroinvasive Cases by Month of Illness Onset, NC, 2013-2023



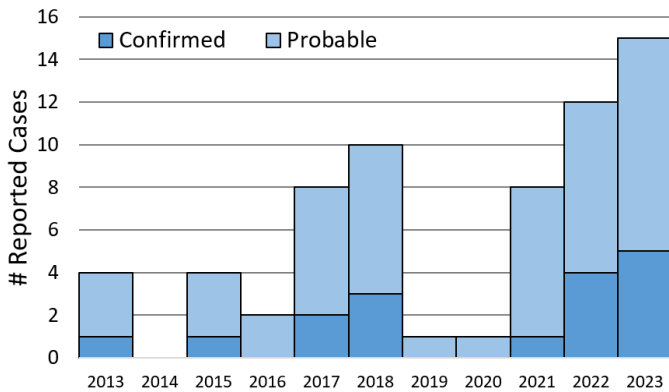
Case Demographics

Confirmed and Probable Human West Nile Neuroinvasive Cases by Age, NC, 2013-2023

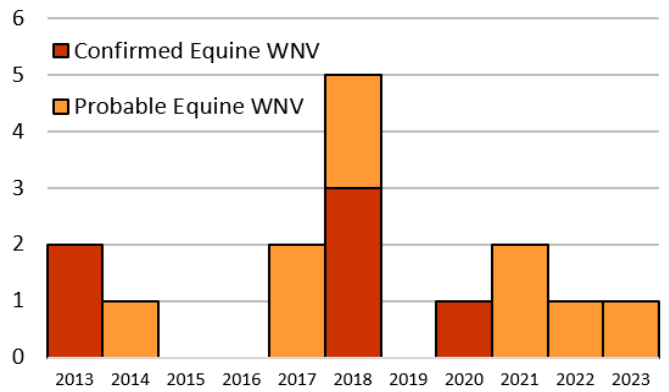


Cases by Year

Confirmed and Probable Human West Nile Neuroinvasive Cases by Year, NC, 2013-2023

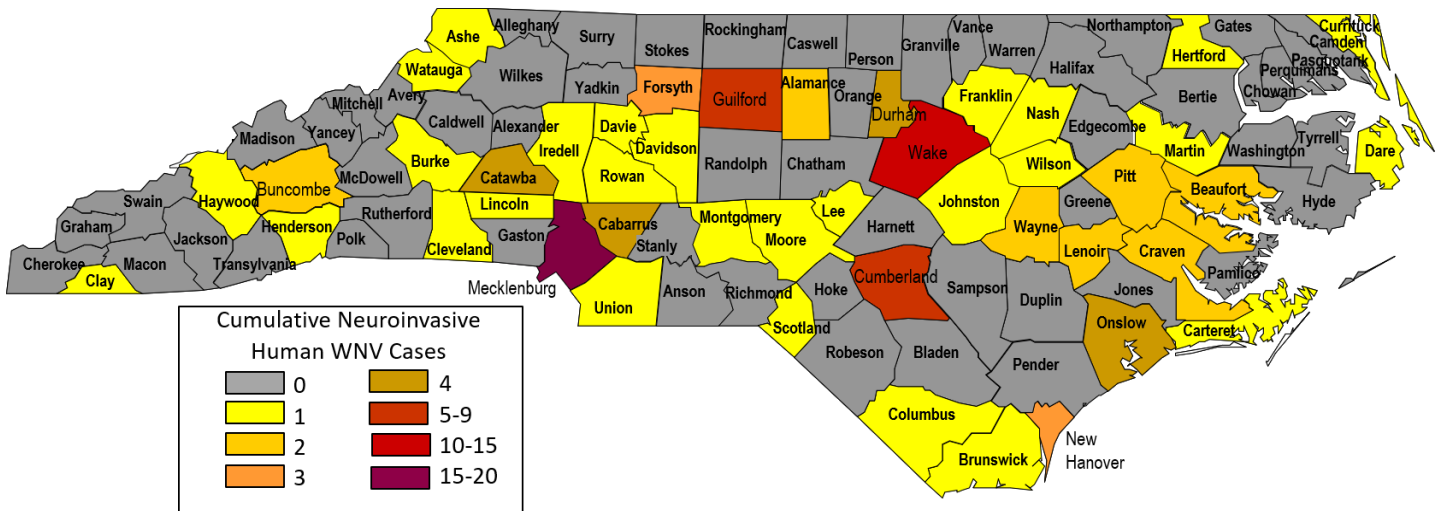


Confirmed and Probable Equine Cases of West Nile Neuroinvasive Disease by Year, NC, 2013-2023



Geographic Distribution

West Nile Virus Reported Human Neuroinvasive Cases by County of Residence, NC, 2003-23



View near-real-time national surveillance data at: <https://www.cdc.gov/westnile/statsmaps/current-season-data.html>