



NC DEPARTMENT OF  
**HEALTH AND  
HUMAN SERVICES**

ROY COOPER • Governor

MANDY COHEN, MD, MPH • Secretary

BETH LOVETTE, MPH, BSN, RN • Acting Director, Division of Public Health

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

## **Eastern Equine Encephalitis Surveillance, North Carolina, 2012—2018**

### **Background**

Eastern equine encephalitis virus (EEEV) is transmitted to humans and horses by the bite of an infected mosquito. It is a member of the genus *Alphavirus*, family *Togaviridae*

### **Transmission**

EEEV is maintained through a cycle between mosquitoes and birds. Transmission of the virus to humans, although often fatal, is rare because the primary mosquito vector *Culiseta melanura* (the “black-tailed mosquito”) feeds almost exclusively on birds. Horses are also susceptible to EEEV infection, and are infected more commonly than humans due to being exposed to mosquitoes for long periods. Both horses and humans are considered to be “dead end” hosts because neither develops enough virus in their blood to infect mosquitoes and continue a transmission cycle. EEEV is not spread person-to-person or from animal-to-person by casual contact.

### **Symptoms**

The Incubation period of Eastern Equine Encephalitis (EEE) disease ranges from 4—10 days and infection can result in either systemic or encephalitic (inflammation of the brain) disease. Systemic infection is characterized by chills, fever, malaise, stiffness, joint pain, and muscle aches lasting 1-2 weeks. In comparison, encephalitic disease is characterized by fever, headache, irritability, drowsiness, vomiting, diarrhea, cyanosis, convulsions, and possibly coma. Approximately one third of human EEE cases are fatal.

### **Epidemiology**

Human EEE disease cases are relatively infrequent with an average of 7 cases reported annually across the United States. Most cases of EEE have been reported from Florida, Massachusetts, New York, and North Carolina. From 2012–2018, there have been 6 cases total reported in North Carolina, located primarily in counties in the southeastern part of the state where the preferred habitat of vector mosquitoes can be found. Those over age 50 or under age 15 are at greatest risk for developing severe disease. Additionally, those who engage in outdoor activities in endemic areas are at increased risk of infection. Equine (horse, donkey and mule) EEE cases are relatively more common, with a total of 64 equine cases reported between 2012–2018.

### **Diagnosis and Treatment**

Diagnosis is usually based on signs and symptoms, patient history, and testing for the presence of EEE-specific IgM antibodies in serum and cerebrospinal fluid (CSF). No specific anti-viral treatments for EEE are available for humans. Suspected EEE cases should be evaluated by a healthcare provider, resulting in appropriate case work-up and supportive treatment.

### **Prevention**

There are no vaccines available for EEE in humans, however an equine vaccine is available. The best prevention is to avoid mosquito bites by:

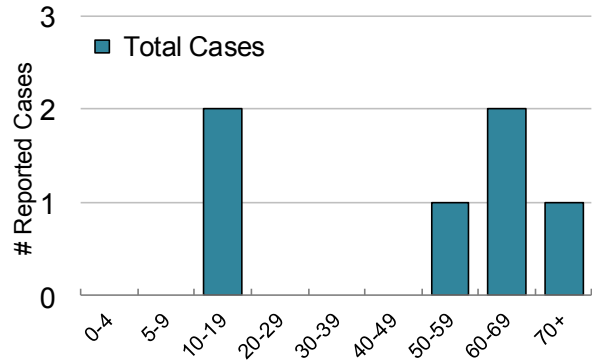
- Using repellents containing DEET, picaridin, IR3535, or oil of lemon eucalyptus
- Eliminating mosquito breeding sites by emptying standing water from flower pots, buckets, barrels, tires and other containers at least weekly, or by drilling holes so water drains out;
- Wearing long sleeves, pants and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

## Case Demographics

Sex	Case Demographics	
	7 Year Total (2012-2018)	
	No. of Cases	% of total
Male	6	100%
Female	0	0%

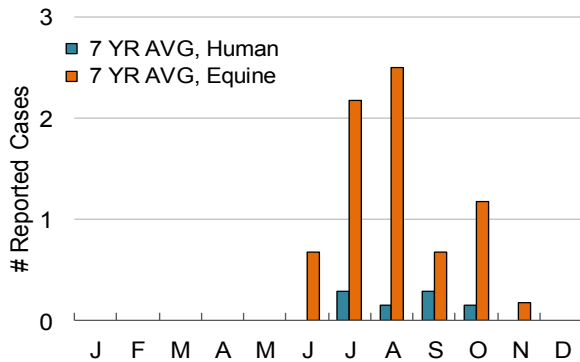
Outcomes	7 Year Total (2012-18)	
	No. of Cases	% of Total
	Hospitalized	6
Fatalities	2	33%

Confirmed and Probable Eastern Equine Encephalitis Cases by Age Range, NC, 2012-2018

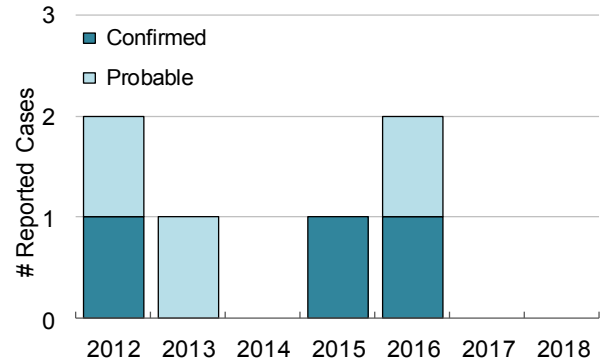


## Case by Month and Year

Avg. Confirmed and Probable Eastern Equine Encephalitis Cases by Month, NC, 2012-2018



Confirmed and Probable Cases of Eastern Equine Encephalitis by Year, NC, 2012-2018



## Geographic Distribution

Confirmed and Probable Cases of Eastern Equine Encephalitis by County of Residence, NC, 2012-2018

