



During the weekend of September 21st and 22nd, the New Jersey Department of Health has reported that two new human cases of Eastern equine encephalitis virus (“EEEV”) were confirmed in Union and Atlantic counties. The department confirmed the first human case of Eastern equine encephalitis in New Jersey in August, infecting a Somerset County man. The Somerset County man was hospitalized but was eventually discharged for continued rehabilitation care.

According to a New Jersey Department of Health release, 65 mosquito samples have tested positive for the Eastern Equine Encephalitis virus in the following 13 counties and the number of positive samples: Atlantic (10), Morris (9), Burlington (8), Monmouth (8), Sussex (8), Camden (7), Gloucester (5), Ocean (3), Salem (3), Cape May (1), Hunterdon (1), Union (1), and Warren (1). Last year at this time, 12 samples tested positive. Just two weeks ago, the 2019 number was 48.

Eastern equine encephalitis (EEE) is an extremely rare but serious and often fatal infection that causes encephalitis or inflammation of the brain. It is spread by the bite of a mosquito infected with EEE virus (EEEV). EEEV can also infect a wide range of animals including mammals, birds, reptiles, and amphibians. The spread of EEEV to mammals (including humans and horses) occurs through the bite of infected mosquitoes that feed on both birds and mammals. Disease transmission does not occur directly from person to person. According to the Centers for Disease Control and Prevention (CDC), in the United States, an average of 7 human cases of EEE are reported annually.

Most cases of EEEV have been reported from Atlantic and Gulf Coast states. Cases have also been reported from the Great Lakes region. Seven states have

reported 28 cases of EEEV so far this year, with Massachusetts, a historic hot spot for the virus, recording 10 cases and Michigan reporting eight. New Jersey and Rhode Island have each reported three, Connecticut has reported two, and North Carolina and Tennessee have recorded one each. Nine of the infected people have died to date.

EEEV cases occur primarily from late spring through early fall, but in subtropical endemic areas (e.g., the Gulf States), rare cases can occur in winter. The primary transmission cycle takes place in and around swampy areas. All residents of and visitors to areas where EEEV activity has been identified are at risk of infection. There is an increased risk of infection for individuals who live in or visit woodland habitats, engage in outdoor work and recreational activities in endemic areas because of greater exposure to potentially infected mosquitoes.

Eastern equine encephalitis virus (EEEV) is maintained in a cycle between *Culiseta melanura* mosquitoes and avian hosts in freshwater hardwood swamps. *Cs. melanura* is not considered to be an important vector of EEEV to humans because it feeds almost exclusively on birds. Transmission to humans requires mosquito species capable of creating a “bridge” between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species. EEEV is only spread to humans through the bite of an infected mosquito. EEE is not spread person-to-person, people to animals, or animals to people.

The incubation period for Eastern equine encephalitis virus (EEEV) disease (the time from infected mosquito bite to onset of illness) ranges from 4 to 10 days. EEEV infection can result in one of two types of illness, systemic or encephalitic (involving swelling of the brain, referred to below as EEE). The type of illness will depend on the age of the person and other host factors. It is possible that some people who become infected with EEEV may be asymptomatic (will not develop any symptoms).

The type of symptoms usually depend on the age of the person. Individuals over age 50 and younger than age 15 are at greatest risk for developing severe disease. Systemic infection has an abrupt onset and is characterized by chills, fever, malaise, joint pain, and muscle pain. The illness lasts 1 to 2 weeks, and recovery is complete when there is no central nervous system involvement. In

infants, the encephalitic form is characterized by abrupt onset; in older children and adults, encephalitis is manifested after a few days of systemic illness. Signs and symptoms in encephalitic patients are fever, headache, irritability, restlessness, drowsiness, anorexia, vomiting, diarrhea, a bluish color to the skin or mucous membrane, convulsions, and coma.

Approximately 30% of people with EEEV die from the disease. Death usually occurs 2 to 10 days after onset of symptoms but can occur much later. Of those who recover, many are left with disabling and progressive mental and physical after effects, which can range from minimal brain dysfunction to severe intellectual impairment, personality disorders, seizures, paralysis, and cranial nerve dysfunction. Many patients with severe after effects die within a few years.

No human vaccine against EEEV infection or specific antiviral treatment for clinical EEEV infections is available. Individuals with suspected EEE should be evaluated by a healthcare provider. Health care providers diagnose EEEV based on the individual's clinical symptoms and laboratory diagnosis by testing blood or spinal fluids, which will show if the virus or antibodies against the virus are present in the individual. Antibiotics are not effective against viruses, and no effective anti-viral drugs have been discovered. Severe illnesses are treated by supportive therapy which may include hospitalization, respiratory support, IV fluids, and prevention of other infections.

The most effective way to prevent infection from Eastern Equine Encephalitis virus is to prevent mosquito bites. Mosquitoes bite during the day and night. Use insect repellent, wear long-sleeved shirts and pants, treat clothing and gear, and take steps to control mosquitoes indoors and outdoors.

Here are steps an individual can take to protect themselves and their family from mosquito bites:

- Cover up. Wear long-sleeved shirts and long pants.
- Treat items, such as boots, pants, socks, and tents, with permethrin or buy permethrin-treated clothing and gear. Permethrin-treated clothing will protect an individual after multiple washings. Individuals should check product information to find out how long the protection will last.

- If an individual is treating their own items, they should follow the product instructions.
- Do not use permethrin products directly on skin. In some places, such as Puerto Rico, where permethrin products have been used for years in mosquito control efforts, mosquitoes have become resistant to it. In areas with high levels of resistance, use of permethrin is not likely to be effective.
- Dress children in clothing that covers arms and legs.
- Dispose of tin cans, plastic containers, ceramic pots or similar water-holding containers. Mosquitoes lay eggs near water.
- Individuals should remove and recycle all discarded tires on their property. Used tires are a significant mosquito-breeding site.
- Drill holes in the bottoms of recycling containers that are kept outdoors.
- Make sure roof gutters drain properly and clean clogged gutters in the spring and fall.
- Remove leaf debris from yards and gardens.
- Turn over wading pools and wheelbarrows when not in use.
- Change the water in birdbaths twice weekly.
- Clean vegetation and debris from edges of ponds.
- Clean and chlorinate swimming pools, outdoor saunas, and hot tubs.
- Drain water from pool covers.
- Use landscaping to eliminate standing water that collects on the property.
- Make sure window and door screens fit properly and are in good condition
- Cover crib, stroller, and baby carrier with mosquito netting.
- Keep mosquitoes outside: Use air conditioning, or window and door screens. Repair holes in screens to keep mosquitoes outside.
- If an individual is not able to protect themselves from mosquitoes inside their home or hotel, they should sleep under a mosquito bed net if air conditioned or screened rooms are not available or if sleeping outdoors.
- Tightly cover water storage containers (buckets, cisterns, rain barrels) so that mosquitoes cannot get inside to lay eggs. For containers without lids, use wire mesh with holes smaller than an adult mosquito.
- Use larvicides to treat large containers of water that will not be used for drinking and cannot be covered or dumped out.

- For those who have a septic tank, repair cracks or gaps. Cover open vent or plumbing pipes. Use wire mesh with holes smaller than an adult mosquito.
- Use an outdoor insect spray made to kill mosquitoes in areas where they rest.
- Mosquitoes rest in dark, humid areas outdoors like under patio furniture, or under the carport or garage. When using insecticides, always follow label instructions.
- To kill mosquitoes inside the home, use an indoor insect fogger or indoor insect spray and treat areas where they rest. These products work immediately, and may need to be reapplied. When using insecticides, always follow label directions. Only using insecticide will not keep your home free of mosquitoes.
- Mosquitoes rest in dark, humid places like under the sink, in closets, under furniture, or in the laundry room.
- Most importantly, use insect repellent. When used as directed, Environmental Protection Agency (EPA)-registered insect repellents are proven safe and effective, even for pregnant and breastfeeding women. Use an EPA-registered insect repellent with one of the following active ingredients:
 - DEET
 - Picaridin
 - IR3535
 - Oil of lemon eucalyptus (OLE)
 - Para-menthane-diol (PMD)
 - 2-undecanone

When using insect repellent:

- Always follow the product label instructions.
- Reapply insect repellent as directed.
- Do not spray repellent on the skin under clothing.
- If an individual is also using sunscreen, apply sunscreen first and insect repellent second.
- Always follow instructions when applying insect repellent to children.
- Do not use insect repellent on babies younger than 2 months old.

- Do not apply insect repellent onto a child's hands, eyes, mouth, and cut or irritated skin. Adults should spray insect repellent onto their hands and then apply to a child's face.
- Do not use products containing oil of lemon eucalyptus (OLE) or para-menthane-diol (PMD) on children under 3 years old.
- You can reduce your risk of being infected with EEE by using insect repellent, wearing protective clothing, and staying indoors while mosquitoes are most active. If you think you or a family member may have EEE, it is important to consult your healthcare provider for proper diagnosis.

According to the CDC and the EPA, since the effectiveness of repellents not registered with EPA or natural insect repellents are not known, use an EPA-registered insect repellent. Choosing an EPA-registered repellent ensures the EPA has evaluated the product for effectiveness.

Find the appropriate insect repellent by using EPA's search tool by visiting www.epa.gov/insect-repellents/find-repellent-right-you.

Vaccines are available to help protect horses from getting sick from the EEEV. Horse owners should also minimize exposure to infected mosquitoes by frequently changing water in troughs and buckets and eliminating other standing water sources. For more information about EEEV in horses, owners should talk to their veterinarian.

Attached is a fact sheet from the New Jersey Department of Health on eastern equine encephalitis to post/network to your personal and professional contacts.

Even though mosquito samples have not currently tested positive for EEEV in Bergen and Hudson counties, it could happen and individuals are encouraged to take steps to reduce their risk of being infected. The Bergen-Hudson Chronic Disease Coalition, administered by the Bergen County Department of Health Services, and grant-funded from the New Jersey Department of Health Office of Cancer Control and Prevention (OCCP), dedicated to the prevention of chronic diseases, encourages individuals to take precautionary measures by using insect repellent, wearing protective clothing, and staying indoors while mosquitoes are most active.

It is also very important for individuals who think they or a family member may have EEEV, to consult their healthcare provider for proper diagnosis.

For more information on Eastern Equine Encephalitis Virus (EEEV), visit the website of The Centers for Disease Control and Prevention (CDC) at <https://www.cdc.gov/easternequineencephalitis/index.html>.

Be well.

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