



Eastern Equine Encephalitis

EEE

FACT SHEET 18-020-0618

Eastern equine encephalitis (EEE) is a rare disease that is spread to humans and horses by infected mosquitoes. It is among the most serious in a group of mosquito-borne viral diseases that can affect the central nervous system and cause severe complications and even death. Other similar diseases are West Nile virus (WNV), Western equine encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse encephalitis. EEE is an infection found in North, Central, and South America, and the Caribbean. In the U.S., most cases have been reported from the Eastern seaboard states, the Gulf Coast, and some inland Midwestern areas.

How do people become infected with Eastern equine encephalitis?

People contract EEE through the bite of infected mosquitoes. *Aedes*, *Coquillettidia*, and *Culex* mosquitoes are responsible for transferring the virus from birds to people. After entering the body through a bite from an infected mosquito, the virus invades the central nervous system, including the spinal cord and brain. Small outbreaks of human disease have occurred in the U.S., but epidemics in horses are common during the summer and fall. EEE is a relatively rare disease; approximately 5-10 human cases of EEE are reported annually in the U.S. Those who work in or around swamps or marshy areas are exposed to bird-biting mosquitoes, and are at higher risk for contracting this disease. EEE is NOT transmitted from person-to-person. For example, you cannot get the virus from touching or kissing a person who has the disease or from a health care worker who has treated someone with EEE.



Map: Denice Adams, APHC. Source USGS disease map

Distribution of EEE in the U.S. as of 2017. States with potential EEE transmission are shaded in grey.



Photo: S. McCann

An adult female *Aedes sollicitans* mosquito, one of the many mosquito species that transmits EEE virus to humans.

Can you get Eastern equine encephalitis directly from birds or other animals?

There is no evidence that a person can get EEE from handling either live or dead infected animals. However, as a general precaution, always wear gloves when handling dead animals, including dead birds, and use double plastic bags when disposing of them.

What are the symptoms of Eastern equine encephalitis?

Many people who are infected with EEE virus show no symptoms. In other people, symptoms range from mild flu-like illness, with fever, headache and sore throat, to encephalitis (inflammation of the brain), coma, and death. Symptoms usually appear 4 to 10 days after the bite of an infected mosquito. The disease is fatal in about 35% of people who develop severe symptoms. Survivors of the disease can suffer permanent brain damage and some require lifetime institutional care.

Is there a treatment for Eastern equine encephalitis?

There is no human vaccine available against EEE, but there is a vaccine for horses. There is no specific medical treatment for EEE infection. Therapy is supportive only, directed at relieving the symptoms and preventing complications. Diagnosis is based on tests of blood or spinal fluid.

What should I do if I think I have Eastern equine encephalitis?

If you develop symptoms such as a sudden high fever, unusually severe headache, nausea, or vomiting, seek medical attention immediately. Individuals with suspected EEE illness should be evaluated by a healthcare provider.

How can Eastern equine encephalitis be prevented?

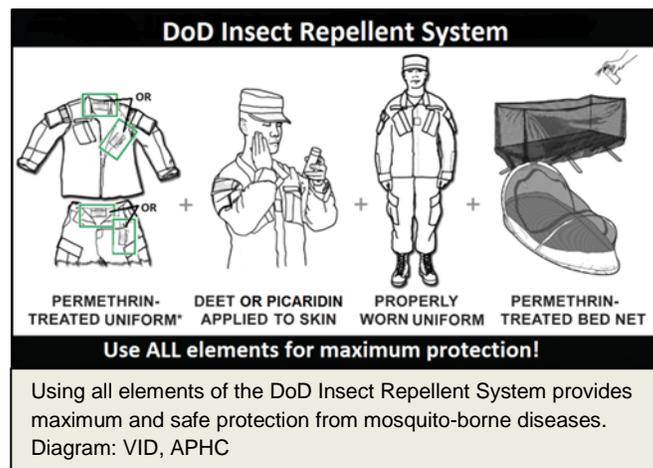
AVOID MOSQUITO BITES! Using the DOD Insect Repellent System is the best way to prevent mosquito bites. It incorporates permethrin repellent on the uniform; DEET, picaridin, or IR 3535 repellent on exposed skin; a properly worn uniform; and sleeping under a permethrin-treated bed net. Another important preventive measure is to eliminate mosquito breeding sites.

Eliminate mosquito breeding sites.

Search for and remove items that collect water such as plastic containers, flower pots, vases, children's toys, old tires or any other items that can hold water. All standing water is potential mosquito breeding habitat.

How do I know if my uniform is treated with permethrin repellent?

Factory treated permethrin Army Combat Uniforms (ACU Permethrin) or Operational Camouflage Pattern uniforms (OCP Permethrin) are now available to all Soldiers. The ACU Permethrin and OCP trouser and coat will have a sewn-in label indicating the uniform is factory-treated with permethrin. If not factory-treated, Soldiers can field-treat using either the IDA kit (NSN 6840-01-345-0237), which can last up to 50 washings, or the 0.5% aerosol spray can (NSN 6840-01-2781336), which should be reapplied after 6 weeks and the sixth washing. When applying permethrin, always read and follow the label directions. Permanently mark the uniform label with the permethrin field-treatment date. **NEVER APPLY PERMETHRIN TO THE SKIN!** Aerosol products containing 0.5% permethrin and clothing factory-treated with permethrin are also commercially available for civilian use.



What are the standard military insect repellent products available for use on exposed skin?

Approved military insect repellents for use on exposed skin come in a variety of formulations. Always refer to the label to determine frequency of repellent application based on activity. **Do not apply repellent to eyes, lips, or to sensitive or damaged skin.** Available military repellents are:

- **Cutter® pump spray** (NSN 6840-01-584-8598) contains 25% DEET; repels mosquitoes up to 10 hours.
- **Bullseye™ Bug Repellent pump spray** (NSN 6840-01-656-7707), contains 20% IR3535®; provides protection for up to 8 hours.
- **Natrapel® pump spray** (NSN 6840-01-619-4795) contains 20% picaridin; up to 12 hours of protection against ticks and mosquitoes.
- **Ultra 30™ Insect Repellent Lotion** (NSN 6840-01-584-8393) contains 30% Lipo DEET; repels sand flies, mosquitoes, ticks, chiggers, biting flies, and fleas.
- **Ultrathon™** (NSN 6840-01-284-3982) contains 33% controlled-release DEET; one application protects for 12 hours.



What is considered a “properly worn” uniform?

The ACU/OCP is a physical barrier against insects, ticks and other disease vectors and biting nuisance pests when worn properly. Wear ACU/OCP with the sleeves rolled down and tuck pants into boots and undershirt into pants. Wear uniform loosely since mosquitoes can bite through fabric that is pulled tight against the skin. A permethrin-treated uniform does not provide protection to exposed skin. Protect exposed skin with an approved insect repellent.

What are the standard bed nets available to help protect Soldiers from mosquito bites while sleeping?

Treated bed nets provide a barrier between a sleeping Soldier and pests (e.g., mosquitoes/ticks). Lightweight, self-supporting, pop-up bed nets factory-treated with permethrin are available in coyote brown (NSN 3740-01-518-7310) or green camouflage (NSN 3740-01-516-4415) or the Egret bed net (NSN 3740-01-644-4953). Untreated mosquito bed nets (NSN 7210-00-266-9736) should be treated with 0.5% permethrin aerosol spray and assembled properly on a cot. Check for holes in netting and keep loose edges off the ground by tucking them under the sleeping bag. Mosquito netting can be used to cover babies younger than 2 months old in carriers, strollers, or cribs.

Where can I find more information on EEE?

- Centers for Disease Control and Prevention (CDC): <https://www.cdc.gov/EasternEquineEncephalitis/>
- United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS): https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/horse-disease-information/sa_encephalitis/ct_ee_index

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