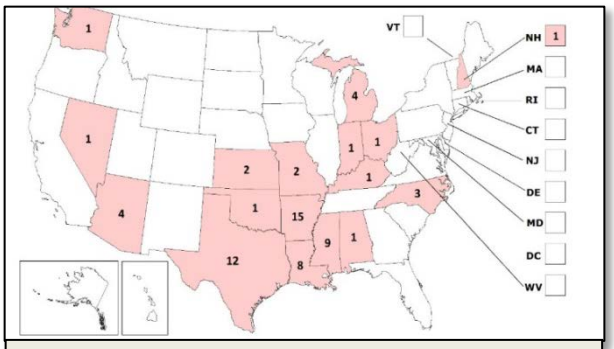
St. Louis Encephalitis Virus

FACT SHEET 18-023-0618

St. Louis encephalitis virus (SLEV) is a viral disease spread by infected mosquitoes. It is one of a number of mosquito-borne viral diseases that can affect the central nervous system including West Nile virus, Western/Eastern equine encephalitis and La Crosse encephalitis. Most people infected with SLEV have no apparent illness. Some people (most commonly older adults) may develop severe neuroinvasive disease involving encephalitis (inflammation of the brain) after infection.

Although the geographic range of the virus extends from Canada to Argentina, human cases have almost exclusively occurred in the United States. Historically, SLEV has been reported most frequently in the central and eastern U.S.



Reported cases of severe St. Louis encephalitis virus (also known as neuroinvasive disease) from 2004 to 2013.
Map: Arboviral Disease Branch, CDC

How do people become infected with St. Louis encephalitis virus?

People contract SLEV through the bite of an infected mosquito, particularly Culex mosquitoes, which are common around human habitats. These mosquitoes breed in standing water and are most active at dusk and dawn. SLEV is maintained in a cycle between mosquitoes and bird hosts (most commonly sparrows, pigeons, blue jays, and robins). People become infected by accident and are not part of the transmission cycle in nature. However, during an average year about 100 human cases of SLEV are reported. The largest outbreak of SLEV occurred in the U.S. in 1975 with nearly 2,000 cases reported, primarily from the central states in the Ohio-Mississippi river basin.

Who is at risk for contracting St. Louis encephalitis virus?

Anyone living in or visiting areas where both the virus and mosquitoes are found is at risk of contracting SLEV. SLEV is milder in children than in adults, and elderly people are much more likely to develop severe neurological symptoms.

What are the symptoms of St. Louis encephalitis virus infection?

It takes from 5 to 15 days to develop symptoms of SLEV after the bite of an infected mosquito. Less than 1% of SLEV infections cause symptoms and the vast majority of infections go unnoticed. Symptoms appear suddenly, including fever, headache, dizziness, nausea, and malaise (general feeling of discomfort). Signs and symptoms intensify over a period of several days to a week. Severe cases of SLEV, called neuroinvasive disease, affect the nervous system and can result in encephalitis. The risk of fatal neuroinvasive disease increases with age, with an overall fatality rate of 5% to 15%. Diagnosis is based on tests of blood or spinal fluid.

Photo of *Culex pipiens*, the primary mosquito which transmits SLEV in the eastern United States.
Photo: Ary Farajollahi, bugwood.com

What is the treatment for St. Louis encephalitis virus infection?

Seek medical attention if you experience the symptoms described above and have been in an area with SLEV. No vaccine or specific antiviral treatment for SLEV infection is available. Treatment is mainly supportive and directed at relieving the symptoms and preventing complications.

What can I do to reduce my risk of becoming infected with St. Louis encephalitis virus?

AVOID MOSQUITO BITES! Using the DoD Insect Repellent System provides the best protection from mosquito bites. It incorporates permethrin repellent on the uniform, DEET, picaridin or IR3535 repellent on exposed skin, a properly worn uniform and sleeping inside a permethrin-treated bed net.

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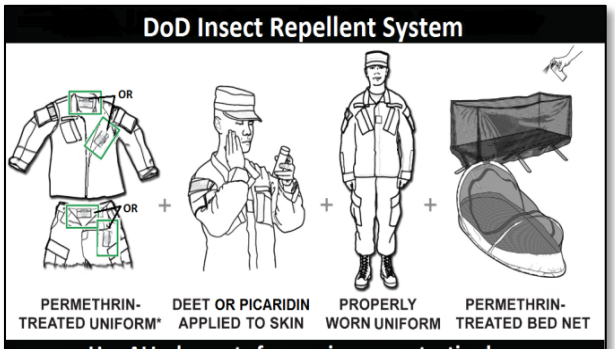
Another important preventive measure is to eliminate mosquito breeding sites. Do not allow water to accumulate in outdoor containers and drain any standing water. Stay in air-conditioned areas or make sure door and window screens are in place and do not have holes. Minimize time outdoors and wear repellents at dusk and dawn, which are the peak biting times for the mosquitoes that transmit SLEV.



Using all elements of the DoD Insect Repellent System provides maximum and safe protection from mosquito-borne diseases. Diagram: VID, APHC

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

Factory-treated permethrin Army Combat Uniforms (ACU Permethrin) and Occupational Camouflage Pattern (OCP Permethrin) are now available to all Soldiers. The ACU/OCP Permethrin trouser and coat will have a sewn-in label indicating the uniform is factory-treated with permethrin. Untreated ACUs can be treated with the IDA Kit (NSN 6840-01-345-0237), which can last up to 50 washings, or the 0.5% aerosol spray can (NSN 6840-01-278-1336), which should be reapplied after 6 weeks and the sixth washing. Always read and follow the label directions when applying permethrin. Permanently mark the uniform label with the permethrin treatment date. **Never apply permethrin to the skin**. Aerosol products containing 0.5% permethrin and permethrin factory-treated clothing are also commercially available for civilian use.

What standard military insect repellent products are available for 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 sensitive/ damaged skin**. Available military repellents are:

- **Ultrathon™ (NSN 6840-01-284-3982) 33% controlled-release DEET lotion; one application protects for 12 hours.**
- **Ultra 30 Insect Repellent Lotion (NSN 6840-01-584-8393) contains 30% Lipo DEET; one application protects for up to 12 hours.**
- **Cutter® pump spray (NSN 6840-01-584-8598) contains 23% DEET; one application protects for up to 8 hours.**
- **Natrapel® pump spray (NSN 6840-01-619-4795) contains 20% picaridin; provides protection against mosquitoes.**
- **Bullseye™ Bug Repellent (NSN 6840-01-656-7707) contains IR3535®, repels mosquitoes for 8 hours.**

All standard approved skin repellents contain the active ingredient DEET or picaridin, or IR3535 and are registered by the U.S. Environmental Protection Agency (USEPA). These products are safe to use and effectively repel mosquitoes, sand flies, fleas, ticks and other potential disease vectors and pests. Photo: VID, APHC

What is considered a "properly worn" combat uniform?

Military combat uniforms act as a physical barrier against insects, ticks and other disease transmitters and biting nuisance pests when worn properly. Wear uniforms with the sleeves rolled down as well as 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 skin repellent.

What standard bed nets are 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 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 the netting and keep loose edges off the ground by tucking them under the sleeping bag.

Where can I find more information about St Louis encephalitis virus and protection from insect-borne diseases?

- The Centers for Disease Control Prevention: http://www.cdc.gov/sle/
- Army Public Health Center, Entomology and Pest Management: http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/default.aspx

Use of trademarked name does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product.
For more information please consult the APHC website - http://phc.amedd.army.mil