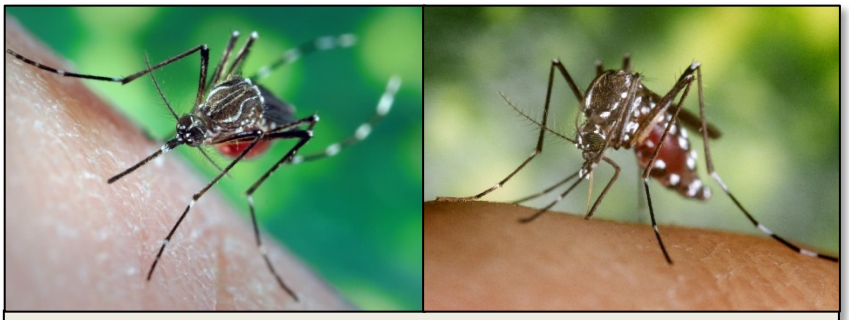
Dengue

FACT SHEET 18-019-0618

Dengue virus (DENV) [pronounced "DEN-ghee"] is a flu-like viral disease spread by the bite of infected mosquitoes. Dengue is caused by one of the four related viruses (DEN 1, DEN 2, DEN 3 and DEN 4). All types of dengue viruses are r e-emerging worldwide and causing larger and more frequent epidemics, especially in cities in the tropics. The emergence of DENV as a major public health problem has been most dramatic in the Western Hemisphere. Dengue has reached epidemic levels in Central America and is a threat to the United States. It is endemic in Puerto Rico, the U.S. Virgin Islands, Samoa and Guam. Outbreaks have occurred in Hawaii, Florida, and Texas. It is also found in Africa, Asia, the Pacific, Australia and South America.

How do people become infected with DENV?

Dengue is most often spread to people by the yellow fever mosquito (*Aedes aegypti)* and the Asian tiger mosquito (*Aedes albopictus),* while *Aedes polynesiensis* and *Aedes scutellaris* can sometimes serve as vectors. They are aggressive daytime biters with peak activity at dawn and dusk. They will bite indoors, around the outside of homes, and even at night if the lights are on. A mosquito can transmit DENV to others after it feeds on an infected person. People cannot become sick through physical contact with a dengue-infected person. In rare cases, DENV has been transmitted through organ transplants and blood transfusion from infected donors, and there is evidence of transmission from an infected pregnant mother to her fetus. Dengue is most common in cities, but can also be found in rural areas. It is rarely found in mountainous areas above 4,000 feet elevation. Most U.S. cases occur in travelers returning from abroad, but the DENV risk is increasing for people living along the Texas-Mexico border and in other parts of the southern U.S.



Aedes aegypti (left) and *Aedes albopictus* (right). These mosquitoes are important transmitters of dengue. Both are aggressive daytime biters which readily feed on humans. *Ae. aegypti* is the most important vector in tropical climates and *Ae. albopictus* plays a more significant role in temperate areas. Photos: CDC

What are the signs and symptoms of DENV and dengue hemorrhagic fever?

Dengue symptoms usually start suddenly with a high fever and at least two of the following: severe headache, severe pain behind the eyes, muscle and/or bone pain, rash, and joint pain. The severity of the joint pain has given dengue the name "breakbone fever". Nausea, vomiting, and loss of appetite are common. A rash usually appears three to four days after the start of the fever. The illness can last up to 10 days, but complete recovery can take as long as a month. Older children and adults are usually sicker than young children. Most DENV infections result in relatively mild illness, but some can progress to dengue hemorrhagic fever. In this form of the disease, the blood vessels start to leak, causing bleeding from the nose, mouth, and gums. Bruising can be a sign of bleeding inside the body. Without prompt treatment, the blood vessels can collapse, causing shock (dengue shock syndrome). Dengue hemorrhagic fever is fatal in about five percent of cases, mostly among children and young adults. Infection with DENV does not build immunity against a second infection, and actually puts personnel at greater risk for developing dengue hemorrhagic fever if infected again.

Is there a treatment for DENV and dengue hemorrhagic fever infections?

There is no vaccine to prevent infection with DENV and there is no specific treatment for DENV infection. Infected individuals or people exhibiting symptoms should be kept away from mosquitoes to protect others. Supportive care for dengue hemorrhagic fever includes rest and replacing lost fluids. Some patients may need transfusions to control bleeding.

What should I do if I think I have DENV?

Seek medical attention if you experience the symptoms described above and have traveled to an area where DENV occurs. Be sure to tell your health care provider your recent travel history. Avoid mosquito bites to prevent the virus from spreading to others if you think you have DENV.

How soon do symptoms appear after exposure?

It usually takes 4 to 7 days for symptoms to start after being bitten by a DENV-infected mosquito, but symptoms can start as quickly as 3 days, or take as long as 14 days to appear. An infected person cannot spread the infection to other people through contact, but can be a source, or reservoir, of DENV for mosquitoes. This reservoir period begins shortly before the person starts to experience symptoms and lasts for about 5 days.

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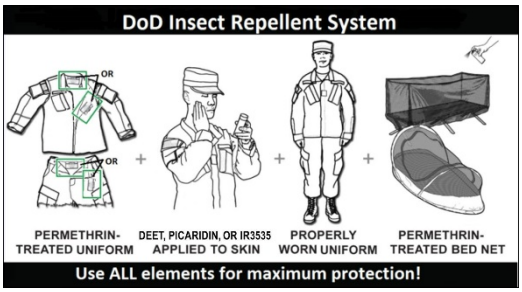
What can I do to reduce my risk of becoming infected with DENV?

The best way to prevent diseases spread by mosquitoes is to protect yourself from mosquito bites by using the DoD Insect Repellent System. 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.



Another important preventive measure is to eliminate mosquito breeding sites. Do not allow water to accumulate in containers. Outdoors, mosquitoes breed in man-made containers like discarded tires, flowerpots, old oil drums, and water storage containers close to human dwellings. Indoors, look for standing water, such as flower vases or lucky bamboo. Water containers should be emptied at least once a week to prevent mosquito development. Stay in air-conditioned areas or make sure your door and window screens do not have holes. Minimize time outdoors around dawn and dusk, which are the peak biting times for the *Aedes spp*. mosquitoes that transmit dengue.

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. 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 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 to sensitive or damaged skin**. Available military repellents are:

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

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 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 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). The newly-released Egret bed net (NSN 3740-01-644-4953) will also protect against mosquitoes and has a higher ceiling. 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 get more information on DENV?

- The Armed Forces Pest Management Board Technical Guide 47 – *Aedes* Mosquito Vector Control https://www.acq.osd.mil/eie/afpmb/docs/techguides/tg47.pdf
- Centers for Disease Control and Prevention dengue website - http://www.cdc.gov/dengue/
- World Health Organization (WHO), Dengue Epidemiology - http://www.who.int/denguecontrol/epidemiology/en/