



Malaria

FACT SHEET 18-040-1018

What is Malaria?

Malaria is a serious mosquito-borne illness caused by a microscopic parasite that infects red blood cells. There are four primary species of malaria parasites that can infect humans: *Plasmodium falciparum*, *P. malariae*, *P. ovale*, and *P. vivax*. There are other species of *Plasmodium* that infect animals. In recent years, a fifth species, *P. knowlesi*, has been shown to cause human malaria in Southeast Asia. While infection with any of the malaria species can make a person very ill, *P. falciparum*, the predominant strain of malaria in Africa, causes severe disease and, without treatment, death.

How is malaria spread?

Malaria parasites are spread by the bites of infected female *Anopheles* mosquitoes.

Where is malaria found?

Malaria is most prevalent in warmer regions of the world – typically tropical and subtropical areas, including over 100 countries in Central and South America, Hispaniola (Haiti and the Dominican Republic), Africa, the Indian subcontinent, Southeast Asia, the Middle East, and Oceania. Although risk-free for many years, and despite its more temperate climate, the Korean peninsula is again experiencing malaria along the demilitarized zone (DMZ).

How many people get malaria?

In 2016 an estimated 216 million cases of malaria occurred worldwide and 445,000 people died, mostly children in the African Region. About 1,700 cases of malaria are diagnosed in the United States each year. The vast majority of cases in the United States are in travelers and immigrants returning from countries where malaria transmission occurs, many from Sub-Saharan Africa and South Asia.

What is the malaria life cycle?

In humans, malaria parasites develop and multiply first in the liver and then in the blood, rupturing liver cells and red blood cells in the process. When a female mosquito feeds on the blood of the infected human, it picks up certain “gametocyte” forms (the male and female forms) of the blood-stage parasites. If the parasite is picked up by an *Anopheles* mosquito, the gametocytes will develop and multiply into sporozoites, which ultimately reside within its salivary glands. When the *Anopheles* mosquito feeds on another human, the sporozoites are transferred with the mosquito’s saliva into the new human, and the infectious cycle starts over.

Can malaria be transmitted from person-to-person?

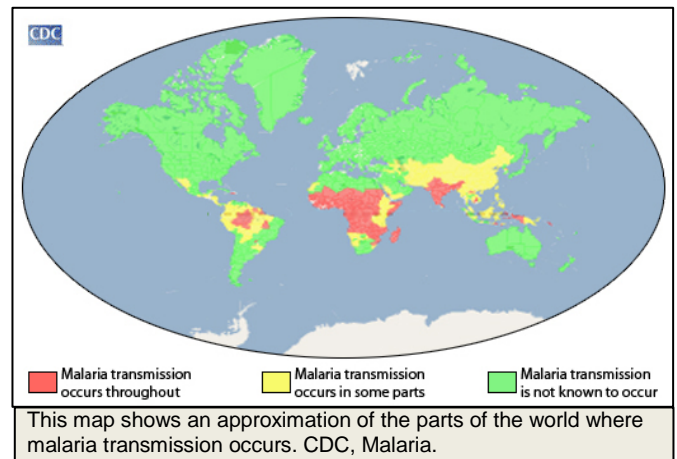
No. Malaria cannot be transmitted from person-to-person like a cold or the flu. You cannot get malaria through casual contact with an infected person (e.g., touching or kissing a person with the disease). Mosquito bites are the primary method of malaria transmission. Other, rare means of infection include blood transfusion, organ transplant, use of needles or syringes contaminated with blood, or congenital transmission (infected mother passing the parasite to her fetus during pregnancy).

What are the symptoms of malaria and how quickly do they appear?

Symptoms generally include the following at the onset of illness: fever, shaking chills, sweats, headache, muscle aches, exhaustion, nausea, vomiting and diarrhea. Infection with *P. falciparum*, if not promptly treated, may advance to complicated (severe) malaria and lead to kidney failure, seizures, coma, acute respiratory distress condition, and death. Symptoms usually appear within 7-30 days after being bitten by an infected mosquito, but can take up to 1 year to develop.

How is malaria diagnosed and treated?

Anyone sick with flu-like symptoms suspects they may have malaria should seek immediate medical attention. Malaria is diagnosed based on symptoms, followed by laboratory confirmation. The most widely used test is microscopy. In this test, a drop of the patient’s blood is smeared across a slide, stained with a special dye, and then examined under a microscope for presence of the malaria parasites. If diagnosed early, malaria can be effectively treated with a variety of prescription drugs. Treatment should happen as early as possible to keep it from becoming life-threatening.



How long does a person remain infected with malaria?

If the correct drugs are administered for the proper length of time, malaria can be cured and all the parasites eliminated from the body. However, if the disease is improperly treated, relapses can occur and parasites can persist in the blood for years or decades.

How can malaria be prevented?

There is no vaccine for malaria. However, there are oral prescription drugs that can prevent travelers from getting sick while visiting malaria-endemic areas. Talk to your physician about preventive medications (chemoprophylaxis) for malaria. It is very important to continue to take medication for the full proscribed amount of time, even after returning home, because most malaria medications only treat the blood stage parasite. If the parasite is still in the liver stage when you stop taking the medication, you will get sick after you get home.

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.

Another important preventive measure is to eliminate mosquito breeding sites. *Anopheles* larvae are adapted to a variety of aquatic habitats, but occur predominantly in ground waters, ranging from small collections of water such as animal footprints and puddles that lack vegetation, to large bodies of water such as rice fields, swamps and river margins sheltered by vegetation. A number of species thrive in both fresh- and brackish-water habitats and some inhabit only brackish-water pools. Stay in air-conditioned areas or make sure your door and window screens do not have holes. Minimize time outdoors at night and during twilight periods, which are the peak biting times for the *Anopheles spp.* mosquitoes that transmit malaria.

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

Factory-treated permethrin Army Combat Uniforms (ACU) and Occupational Camouflage Pattern (OCP) uniforms are now available to all Soldiers. The ACU/OCP 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 six weeks and the sixth washing. Always read and follow the label directions when applying permethrin. 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 civilians.

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:

- Cutter® pump spray (NSN 6840-01-584-8598) contains 25% DEET; one application protects for up to 10 hours.
- Ultra 30™ Insect Repellent Lotion (NSN 6840-01-584-8393) contains 30% Lipo DEET; one application protects up to 12 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; one application protects for up to 8 hours.
- Ultrathon™ (NSN 6840-01-284-3982) contains 34% controlled-release DEET lotion; one application protects for up to 12 hours.

What bed nets are available to protect Soldiers from 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 larger Egret bed net (NSN 3740-01-644-4953) that fits a full-sized cot inside. 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 malaria and protection from insect-borne diseases?

- The Centers for Disease Control Prevention: <https://wwwnc.cdc.gov/travel/diseases/malaria>
- Army Public Health Center, Entomology and Pest Management: <https://phc.amedd.army.mil/topics/envirohealth/epm/Pages/APHC-Entomology-Products.aspx>

