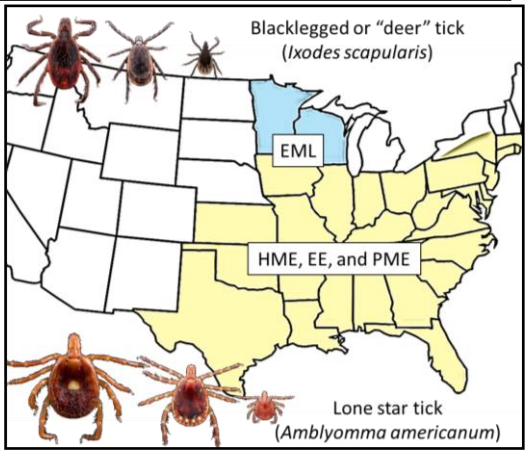
Human Ehrlichiosis

FACT SHEET 18-013-0317

What are the different types of human ehrlichiosis and what ticks transmit them?

In the U.S., human monocytic ehrlichiosis (HME, caused by *Ehrlichia chaffeensis*), and *Ehrlichia ewingii* ehrlichiosis (EE), are both carried by the lone star tick, *Amblyomma americanum.* This tick also carries Panola Mountain *Ehrlichia* (PME), which has recently been associated with a case of human ehrlichiosis. Roughly 1,000-2,000 cases of ehrlichiosis are reported annually, with most cases occurring in the southeastern U.S., where the lone star tick is found. The blacklegged or deer tick, *Ixodes scapularis*, carries another species, *Ehrlichia muris eauclairensis* or *Ehrlichia muris*-like agent (EML). Infection with this *Ehrlichia* has only been seen in patients in Wisconsin and Minnesota, and in *I. scapularis* from those areas.



What are the symptoms of human ehrlichiosis?

Symptoms begin 1-2 weeks following infection. The most common symptoms are fever, headache, chills, myalgia, malaise and nausea. Rash is infrequent in adult patients (less than 33%), but is more common in children (up to 60%). In severe cases, HME can cause neurological problems, respiratory distress, liver and kidney failure, and bleeding disorders. HME can be fatal, even to healthy young people, if left untreated or treated incorrectly. The estimated case fatality rate for HME is approximately 3%; 50%-60% of patients are hospitalized. No deaths have yet been reported from EE, PME, or EML. People with compromised immune systems may develop more severe disease. Transmission of ehrlichiosis via transplants and transfusions can also occur. People bitten by ticks should be alert for the above symptoms appearing 1-2 weeks after tick-bite and visit a health care provider if ehrlichiosis is suspected. It is important to remember to report the tick bite to the physician.

The bite of both lone star and blacklegged ticks often produces a mild allergic reaction (red, itchy lesion) within the first 48 hours of attachment. This is not an indication of disease transmission.

How is human ehrlichiosis diagnosed?

Laboratory confirmation of ehrlichiosis may take weeks to complete. Treatment should be initiated based on clinical suspicion and consistency with epidemiologic risk factors (such as tick bite or exposure to areas where tick may be found). Routine blood tests, such as a complete blood cell count or a chemistry panel, may reveal characteristics associated with ehrlichiosis: low platelet count, low white blood cell count, or mildly elevated liver enzyme levels. After a clinical diagnosis and treatment has begun, specialized laboratory testing should be used to confirm the diagnosis.

During the first week of illness ehrlichial DNA may be detected in whole blood, or cerebrospinal fluid (CSF) in cases with CNS involvement using polymerase chain reaction (PCR). The most common diagnostic test for ehrlichiosis is indirect immunofluorescence assay (IFA) using *E. chaffeensis* antigen. For confirmation, IFA specific for the IgG antibody should be performed on paired serum samples to demonstrate a four-fold rise in antibody titers. The first sample is taken in the first week of symptoms, and the second sample is taken 2 to 4 weeks later. Treatment should never be delayed pending laboratory test results, or be withheld on the basis of an initial negative serologic test result, because in the first week of illness, serology is often negative. Microscopic examination of blood smears, and serologic tests based on enzyme immunoassay (EIA) may also be used to confirm ehrlichiosis.

If serology for Rocky Mountain spotted fever (RMSF) is performed on a patient with clinical signs of a tick-borne illness, ehrlichiosis may be misdiagnosed as RMSF. Lone star ticks commonly carry *Rickettsia amblyommatis*, a non-pathogenic organism closely related to *Rickettsia rickettsii*, the agent of RMSF, which can cross-react in the RMSF serology.

How is human ehrlichiosis treated?

Doxycycline is the most effective antibiotic to prevent severe complications from developing if it is started early in the course of disease. If the patient is treated within the first 5 days of the disease, fever generally subsides within 24-72 hours. Recommended dosage for adults is 100 mg every 12 hours, and for children under 45 kg (100 lbs): 2.2 mg/kg body weight given twice a day. Patients should be treated for at least 3 days after the fever subsides and until there is evidence of clinical improvement. Standard duration of treatment is 5-7 days. The use of doxycycline to treat suspected ehrlichiosis in children recommended by both CDC and the AAP Committee on Infectious Diseases, and has not been shown to cause staining of permanent teeth. Healthcare providers should use doxycycline as the first-line treatment for suspected ehrlichiosis in patients of all ages.

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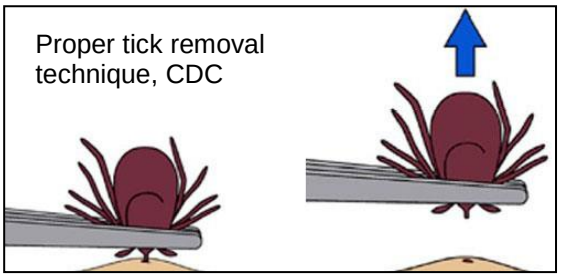
Should I take antibiotics immediately after noticing a tick bite?
Antibiotic treatment following a tick bite is not recommended as a means to prevent ehrlichiosis. There is no evidence this practice is effective, and this may simply delay onset of disease. Instead, persons who experience a tick bite should be alert for symptoms suggestive of tickborne illness and consult a physician if fever, rash, or other symptoms of concern develop.


Proper tick removal technique, CDC

How can ehrlichiosis be prevented?
AVOID TICK BITES! Use the DoD Insect Repellent system to protect yourself from ticks and mosquitoes. The system includes using permethrin repellent on the uniform; applying DEET, picaridin, or IR3535 repellent to exposed skin; wearing uniforms properly; and sleeping inside a permethrin-treated bed net in tick habitat. Routinely check your skin and clothing for ticks while in tick habitat, and carefully check your whole body once you come indoors. Use the buddy system to help check areas you cannot see. Remove attached ticks as soon as they are found; use sharp tweezers to hold the tick as close to your skin as possible, apply steady upward pressure. Put dry clothes in a dryer on high heat for 10 minutes to kill ticks.

What can I use to treat my clothing with permethrin?
Army Combat Uniforms (ACUs) that are factory-treated with permethrin (ACU Permethrin) are now available to all Soldiers. The ACU Permethrin will have a sewn-in label on both the trouser and the blouse indicating the uniform has been factory-treated with permethrin. If not factory-treated, apply permethrin to uniforms in the field before wearing using either the IDA Kit (NSN 6840-01-345-0237), which can last up to 50 washings, or aerosol can (NSN 6840-01-278-1336), which can be reapplied after the sixth washing. Other aerosol products containing 0.5% permethrin, and permethrin-impregnated garments are also commercially available for civilian use.

Is it safe for Soldiers who are pregnant, nursing or trying to get pregnant to wear permethrin-treated ACUs?
The ACU with permethrin is safe to wear; however, if you are pregnant, nursing or trying to get pregnant you are authorized to temporarily wear an ACU without permethrin. If your uniform is not treated with permethrin (maternity or have a profile) and you and your healthcare provider decide that wearing an ACU with permethrin is the best choice, you can learn how to treat your ACU by following the directions in the question above.

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:

- 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 eight hours.
- Natrapel® pump spray (NSN 6840-01-619-4795) contains 20% picaridin; provides improved protection against Anopheles mosquitoes (carriers of malaria).
- Bullseye™ Bug Repellent pump spray (NSN 6840-01-656-7707) contains 25% IR3535®; provides protection for up to eight hours.
  NOTE: Do not apply repellent to the eyes or lips, or to sensitive or damaged skin.

All standard approved skin repellents contain the active ingredient DEET, IR3535 or picaridin, and are registered by the U.S. Environmental Protection Agency (USEPA). These products are safe to use and effectively repel the ticks that carry ehrlichiosis. Photo: VID, APHC

What is considered a "properly worn uniform"?
Worn properly, your uniform acts as a physical barrier against ticks and insects. Wear the sleeves rolled down. Close all openings in your clothing that might provide access to insects: tuck your pants into your boots and your undershirt into your pants.

What are the standard bed nets available to help protect Soldiers from tick bites while sleeping?
Lightweight, Self-Supporting, Pop-Up Bed Nets factory-treated with permethrin are available in Coyote Brown (NSN 3740-01-518-7310) or OD Green (NSN 8415-01-516-4415). Tick may crawl under mesh bed nets that do not fully enclose the sleeper.