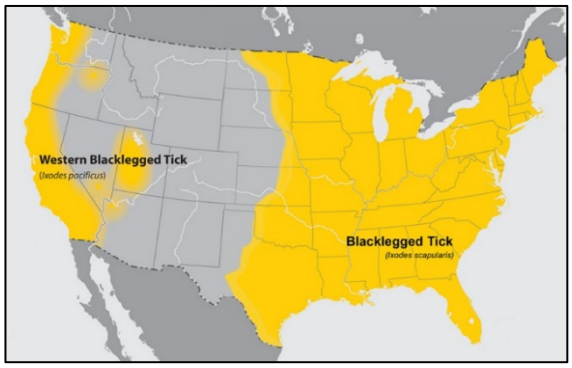
Human Granulocytic Anaplasmosis

FACT SHEET 18-091-0319

What is anaplasmosis?

Anaplasmosis, also known as human granulocytic anaplasmosis (HGA), is a tick-borne disease caused by the bacterium *Anaplasma phagocytophilum*. It is usually transmitted to people via the bite of an infected tick. In the Northeast and Midwestern United States, *Anaplasma phagocytophilum* is carried by blacklegged ticks (*Ixodes scapularis*), and on the West Coast it is carried by the Western blacklegged tick (*Ixodes pacificus*). An infected tick needs to be attached for at least 24-48 hours to transmit the bacteria that causes HGA. Therefore, removing an attached tick promptly can decrease the chances of being infected. In some rare cases, anaplasmosis has also been transmitted by blood transfusion.

Blacklegged or deer tick (*Ixodes scapularis*)
Left to right: female, male, nymph



Blacklegged and Western blacklegged tick range maps, CDC

What are some risk factors for HGA?

Geography: HGA cases are most frequently reported from the upper Midwestern and Northeastern United States, where blacklegged ticks are most common. The range of the blacklegged tick is expanding along the Hudson River valley, and into Michigan and Virginia.

Seasonality: HGA cases can occur during any month of the year, but the majority of cases (>50%) occur during the summer months with a peak in June and July. There is also a smaller peak in the number of cases during October and November corresponding with the period of adult blacklegged tick activity.

Environment: Blacklegged ticks live on the ground in wooded areas or areas with lots of brush. The ticks search for hosts at or near ground level and grab onto a person or animal as they walk by.

People at Risk: The frequency of reported HGA cases is higher among males, people over 40, people with weakened immune system (due to being on immune suppressant drugs, HIV infection, cancer treatment), and people who live or spend time in tick habitats.

What are the symptoms of HGA?

Early HGA symptoms are similar to a mild viral infection, and usually occur within 1-2 weeks after the bite of an infected tick. They include a fever, chills, a severe headache, muscle aches, and gastrointestinal symptoms (nausea, vomiting, diarrhea, loss of appetite). Rash occurs in less than 10% of cases and might be a sign of co-infection with another tick-borne illness such as Lyme disease. If left untreated, the infection may progress to a late-stage illness. Signs and symptoms of this late-stage illness can include liver damage, kidney failure, bleeding in the gastrointestinal tract, and death (in less than 1% of cases).

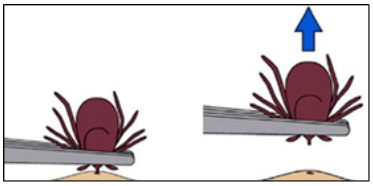
How is HGA diagnosed?

Initial diagnosis of anaplasmosis is made by a healthcare provider based on exposure, signs and symptoms, and routine blood test to reveal low white blood cell counts, low platelet counts, and elevated levels of specific liver enzymes. The diagnosis can be confirmed by identifying the presence of *A. phagocytophilum* DNA using polymerase chain reaction (PCR), visualization of morulae on a peripheral blood smear, or identification of antibodies specific to *A. phagocytophilum* using an indirect immunofluorescence assay (IFA).

How is HGA treated?

It can take days or weeks to confirm the diagnosis using PCR or IFA, but if anaplasmosis is suspected based on routine blood tests, symptoms, and/or a history of outdoor activities, treatment should not be delayed. It has been shown that early treatment of anaplasmosis with doxycycline antibiotic improves outcomes and prevents severe complications. Seek medical attention if you experience the symptoms described above.

Army Public Health Center, Entomological Sciences Division
8252 Blackhawk Road, APG, MD 21010-5403
COM 410-436-3613 / DSN 312-584-3613 / Website: http://phc.amedd.army.mil

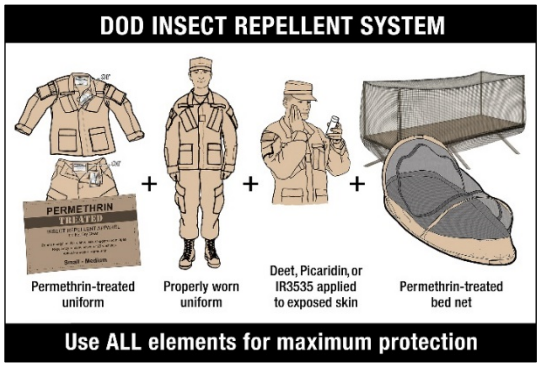


How can HGA be prevented?

The best way to prevent anaplasmosis is to avoid tick bites. Use the DoD Insect Repellent System when in tick habitat (tall grass, weeds, scrubby areas, woods, and leaf litter). 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. It is also important to routinely check your skin and clothing for ticks while in tick habitat, and to carefully check your whole body once indoors. A friend or a mirror can help you check areas you cannot see. Attached ticks should be removed as soon as they are found by using sharp tweezers to grasp the tick as close to the skin as possible and applying steady upward pressure. Clothes can be put in a dryer on high heat for 10 minutes to kill ticks. Wet clothes may require more time. Ticks that are removed can be folded in a piece of sticky tape and discarded, or saved for identification and testing. Ticks removed from military personnel, their dependents, or DoD Civilians can be submitted for identification and disease testing through the APHC's DoD Human Tick Test Kit Program: http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx

What can I use to treat my clothing with permethrin?

Permethrin-treated Army Combat Uniforms (ACU) and Operational Camouflage Pattern (OCP) uniforms are available to all Soldiers. The ACU and OCP 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 6 weeks and the sixth washing. Other aerosol products containing 0.5% permethrin, and permethrin-impregnated garments 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 insect 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 for up to 12 hours.
- Bullseye™ Bug Repellent pump spray (NSN 6840-01-656-7707) contains 20% IR3535®; one application protects 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.

All approved insect repellents for exposed skin contain the active ingredient DEET, IR3535, or picaridin, and are registered by the U.S. Environmental Protection Agency. Photo: VID, APHC

What standard bed nets are 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) and OD Green (NSN 8415-01-516-4415), and a larger Egret bed net (NSN 3740-01-644-4953) is now available 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. Ticks may crawl under mesh bed nets that do not fully enclose the sleeper.

References:

- Centers for Disease Control and Prevention: https://www.cdc.gov/anaplasmosis/index.html
- Army Public Health Center: DoD Insect Repellent System, https://phc.amedd.army.mil/PHC%20Resource%20Library/DoD_Insect_Repellent_System_FS_18-009-0317.pdf