

PUBLIC HEALTH REFERENCE SHEET

Ehrlichiosis and Anaplasmosis



Name	<i>Anaplasma phagocytophilum</i> , <i>Ehrlichia chaffeensis</i> , <i>Ehrlichia ewingii</i>
Reservoir & Transmission	White-tailed deer, dogs, small rodents, ruminants, and field rodents Tick bite: <i>A. phagocytophilum</i> : black-legged tick (<i>Ixodes scapularis</i>) and western black-legged tick (<i>Ixodes pacificus</i>). <i>E. chaffeensis</i> and <i>E. ewingii</i> : lone star tick (<i>Amblyomma americanum</i>) in North America and <i>Amblyomma cajenense</i> in Southern and Central America On rare occasions, known to be transmitted through blood transfusions and organ transplants
Incubation Period	7–14 days
Common Symptoms	Fever plus one or more of the following: headache, myalgia, malaise, anemia, leukopenia, thrombocytopenia, or elevated liver enzymes
Gold Standard Diagnostic Test	Polymerase Chain Reaction (PCR) assay
Risk Groups	Individuals participating in outdoor activities in wooded, bushy, or grassy areas. Older and immunocompromised individuals are likely to suffer more serious infection.
Geographic Significance	North America, Europe, Asia

Ehrlichiosis

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. Human ehrlichiosis is a disease caused by at least three different ehrlichial species in the United States: *Ehrlichia chaffeensis*, *Ehrlichia ewingii*, and a third *Ehrlichia* species provisionally called *Ehrlichia muris-like* (EML).

How is ehrlichiosis transmitted?

Ehrlichiae are transmitted to humans by the bite of an infected tick. The lone star tick (*Amblyomma americanum*) is the primary vector of both *Ehrlichia chaffeensis* and *Ehrlichia ewingii* in the southeastern and southcentral United States. This disease poses a risk to be transmitted through blood transfusions and organ transplants.

What are the signs and symptoms of ehrlichiosis?

Ehrlichiosis often causes fever, headache, chills, malaise, muscle pain, nausea/vomiting/diarrhea, confusion, conjunctival injection (red eyes), and rash (in up to 60% of children, less than 30% of adults). In severe cases, individuals may have difficulty breathing or bleeding disorders. The symptoms caused by infection with these *Ehrlichia* species usually develop 1–2 weeks after being bitten by an infected tick. The tick bite is usually painless, and about half of the people who develop Ehrlichiosis may not remember being bitten by a tick.

How is ehrlichiosis diagnosed?

The diagnosis of ehrlichiosis must be made based on clinical signs and symptoms and can later be confirmed using specialized confirmatory laboratory tests. Rash is not considered a common feature in ehrlichiosis and should not be used to rule in or rule out infection. Do not delay treatment pending the receipt of laboratory test results. Do not withhold treatment based on an initial negative laboratory result.

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How is ehrlichiosis treated?

Doxycycline is the first line treatment for adults and children of all ages and should begin immediately whenever ehrlichiosis is suspected.

Use of antibiotics other than doxycycline and other tetracyclines is associated with a higher risk of fatal outcome for some rickettsial infections. Doxycycline is most effective at preventing severe complications from developing if it is started early in the course of disease. Therefore, treatment must be based on clinical suspicion alone and should always begin before laboratory results return.

If the patient is treated within the first 5 days of the disease, fever generally subsides within 24–72 hours. Failure to respond to doxycycline suggests that the patient's condition might not be due to Ehrlichiosis. Severely ill patients may require longer periods before their fever resolves. Resistance to doxycycline or relapses in symptoms after the completion of the recommended course have not been documented.

How can ehrlichiosis be prevented?

The best way to prevent ehrlichiosis and other tick-borne diseases is preventive measures against ticks year-round.

- Walk in the center of trails and avoid woody and bushy areas.
- Use repellants that contain 20% to 30% DEET on exposed skin for protection that lasts up to several hours.
- Use products that contain permethrin on clothing.
- Services members should wear uniforms treated with permethrin (factory or individually treated).
- Bathe as soon as possible, preferably within 2 hours, to more easily find ticks that may be on the body.

Anaplasmosis

Anaplasmosis is a tick-borne disease caused by the bacterium *Anaplasma phagocytophilum*. It was previously known as human granulocytic ehrlichiosis (HGE) and has more recently been called human granulocytic anaplasmosis (HGA).

How is anaplasmosis transmitted?

Anaplasmosis is transmitted to humans by tick bites primarily from the black-legged tick (*Ixodes scapularis*) and the western black-legged tick (*Ixodes pacificus*). Of the four distinct phases in the tick lifecycle (egg, larvae, nymph, adult), nymphal and adult ticks are most frequently associated with transmission of anaplasmosis to humans. This disease poses a risk to be transmitted through blood transfusions and organ transplants.

What are the signs and symptoms of anaplasmosis?

Anaplasmosis often causes fever, headache, chills, malaise, muscle pain, nausea/abdominal, confusion, and rash (rare). In severe cases, individuals may have difficulty breathing, hemorrhage, renal failure, or neurological problems. The first symptoms of anaplasmosis typically begin within 1–2 weeks after the bite of an infected tick.

How is anaplasmosis diagnosed?

The diagnosis of anaplasmosis must be made based on clinical signs and symptoms and can

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later be confirmed using specialized confirmatory laboratory tests. Treatment should **never** be delayed pending the receipt of laboratory results or be withheld based on an initial negative laboratory result.

What are some public health considerations?

- Document relevant travel and deployment history occurring within the incubation period.
- Document the circumstances under which the case patient was exposed to ticks including duty exposure, occupational activities, environmental exposures, or other high-risk activities.
- Specify the etiologic agent.

NOTE: For acute and convalescent testing, the first serum should be taken in the first week of illness.

MilTICK is a free tick testing and identification service available for ticks removed from Department of Defense (DoD) personnel and their dependents. For more information about services provided, including identifying tick species, assessing how long the tick has been attached, and testing the tick for human pathogens, and contact information, go to:

<https://ph.health.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx>.

References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events Guidelines and Case Definitions*.

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Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington DC: APHA Press.

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