

Canine Ehrlichiosis

Information for Dog Owners



Key Facts

Canine ehrlichiosis is an infection acquired from tick bites. Disease occurs globally but is more common in tropical or sub-tropical regions.

Various tick species transmit the bacteria (*Ehrlichia canis*, *Ehrlichia ewingii* and potentially *E. chaffeensis* and *E. muris eauclairensis*) that cause canine ehrlichiosis.

Dogs with ehrlichiosis can have acute, chronic or subclinical (no signs) disease. Dogs that are sick with canine monocytic ehrlichiosis (*E. canis*) most commonly have acute fever, decreased food intake, lethargy, petechiation (pin-point bleeding) or larger areas of bleeding and pallor. Dogs with *E. ewingii* commonly have lameness, stiffness, and muscle pain.

Treatment consists of appropriate antibiotics and supportive care. Chronic *E. canis* infection may require months of treatment.

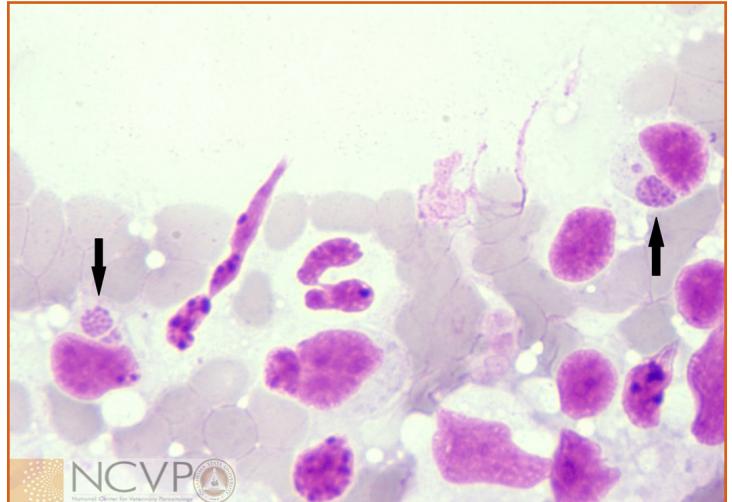
Prevention involves protecting dogs from tick bites through consistent application of veterinary-approved tick prevention products and prompt tick removal.

What is it?

Canine ehrlichiosis is typically due to infection with the tick-borne bacteria *Ehrlichia canis* or *E. ewingii*.

Tick species that can be infected with and transmit *Ehrlichia* spp. bacteria include the brown dog tick (*Rhipicephalus sanguineus*) which transmits *E. canis*, the lone star tick (*Amblyomma americanum*) which transmits *E. chaffeensis* and *E. ewingii*, and the black-legged (deer) tick (*Ixodes scapularis*) which transmits *Ehrlichia muris eauclairensis*. The American dog tick (*Dermacentor variabilis*) has also been reported to transmit *E. canis*.

Veterinarians most often diagnose ehrlichiosis after dog owners notice sudden lethargy, reduced appetite and weakness in their dog. Infected dogs frequently have a history of tick exposure (being in a tick-infested area or living with many dogs, such as a kennel or boarding facility) and lack of tick prevention.



Ehrlichia canis (arrow) within a white blood cell (monocyte) from a canine blood smear under microscopic examination (used with permission: National Center for Veterinary Parasitology)

Who gets it?

Dogs, humans and less commonly cats.

Can people get sick with ehrlichiosis?

Yes, various *Ehrlichia* spp. can cause human disease. These infections are most frequently the result of tick bites. Pets are not considered a direct source of infection to people; however, pets can bring ticks into contact with people and tick control on pets helps to reduce human disease risk. People are not believed to be infected with *E. canis*.



Brown dog tick (*Rhipicephalus sanguineus*) that transmits *Ehrlichia canis* (Public Domain: Centers for Disease Control and Prevention)

How is it spread? (Transmission & Infection risk)

Ehrlichia bacteria rely on ticks for transmission of infection to dogs. It is believed that infected ticks must be attached to a dog for at least 3-6 hours (and potentially over 24 hours) for the tick to transmit *Ehrlichia* to the dog. After tick attachment/bite, the bacteria travel through the dog's body and enter various types of immune system cells where the bacteria multiply and spread.

The highest risk of infection is in dogs who lack appropriate tick prevention and have high tick exposure (e.g. spend time outside, in forested areas, housed in densely dog populated environments with ready tick access, such as kennels). In the US, due to the tick species that transmit canine ehrlichiosis, infected dogs are most common in the southern and eastern states.

What should I look for? (Signs of disease)

Canine ehrlichiosis is known as a multi-system disease due to the bacterium's ability to travel throughout the body.

Canine monocytic ehrlichiosis (CME or *E. canis* infection) infects dog cells called monocytes and macrophages, with disease occurring in acute and chronic phases. The acute phase of *E. canis* infection can last 1-4 weeks, with disease signs occurring 1-2 weeks after infection (tick bite). Appropriately treated dogs may recover completely, but untreated (or inappropriately treated) dogs may appear to recover and then go on to develop persistent (chronic) infection. In dogs who develop chronic infection, disease can last for months to years. Dogs with CME may exhibit fever, lethargy, reduced appetite and bleeding tendencies (petechiation, paleness). Other disease signs involving the eye and neurologic system can occur.

In dogs with *E. ewingii* infection, the bacterium infects cells called granulocytes and neutrophils. Common clinical signs of disease include lameness that moves from one limb to another (shifting limb lameness), stiffness, muscle pain, joint swelling, fever, lethargy and reduced appetite.

How is it diagnosed?

Your veterinarian will diagnose ehrlichiosis based on history (e.g. tick exposure, travel to an area with high ehrlichiosis risk), clinical signs and examination findings. To confirm infection, your veterinarian will obtain blood samples for a complete blood count (CBC) and tick-borne disease testing (serology for antibodies, PCR for organism). Other tests may be advised dependent on your dog's exposure history, severity of disease and whether CME or co-infections are suspected.



What is the treatment? Will my dog recover?

Treatment consists of a specific antibiotic (doxycycline) and supportive care.

Ongoing monitoring is important due to concern of persistent *E. canis* infection. Many dogs will remain seropositive (antibodies present in the blood) for years and PCR testing may be helpful to differentiate active infection from a previous infection.

Prognosis for recovery is excellent for most dogs, provided they are rapidly diagnosed and treated appropriately. Unfortunately, prognosis for dogs with chronic CME is guarded.

Co-infections (with other tick-borne bacterium) may complicate disease and make diagnosis and treatment challenging. Testing for co-infections should be considered (e.g. *Babesia*) in dogs who do not respond to therapy as expected.

How can I stop this from happening to my dog and other dogs?

Be informed and proactive. You and your veterinarian should make decisions on tick prevention dependent on the regions in which you and your dog live and travel. Consistently use appropriate, veterinary-approved tick prevention for all dogs.

Tick control is particularly important in kennels, boarding facilities, at outdoor canine group events where tick exposure is likely, and for dogs imported from an area where ehrlichiosis is common.

Dogs suspected or known to have *Ehrlichia* spp. should not be used as blood donors.

Outbreak management:

When multiple dogs in a group or with a history of being at an event become infected, it is recommended to immediately contact someone with experience in veterinary infectious disease risk assessment and outbreak management to help control the further spread of infection. This is particularly important with larger dog group events and facilities such as kennels that house large groups of dogs together.



Zoonotic (Human Infection) Alert

Similar to dogs, people can develop ehrlichiosis if bitten by an infected tick. In North America, the tick species responsible for spreading *Ehrlichia* bacteria to people include the lone star tick (*Amblyomma americanum*) and blacklegged tick (*Ixodes scapularis*). The species of *Ehrlichia* infecting people in the US include *E. chaffeensis*, *E. ewingii*, and *E. muris eauclairensis*. People with ehrlichiosis will often have fever, headache, muscle aches, and rash developing within 1-2 weeks after the bite of an infected tick. Due to tick numbers and species distribution, the greatest risk for human ehrlichiosis in the US is the southeastern and south-central region, from the East Coast extending westward to Texas (see Resources). People over 60 years of age and those with a compromised immune system (e.g. from cancer or related treatments, organ transplants, some medications) may be at increased risk for severe disease. Early treatment with antibiotics can prevent severe illness. Preventing ehrlichiosis in people involves preventing tick bites to people and preventing ticks in yards and other outdoor locations (see Resources). As pets can bring ticks into the house or close to people, preventing ticks on pets is important in reducing the risk for human ehrlichiosis.



Additional Resources

Centers for Disease Control and Prevention. Ehrlichiosis. Available at: <https://www.cdc.gov/ehrlichiosis/index.html>

Centers for Disease Control and Prevention. Ticks. Available at: <https://www.cdc.gov/ticks/>

Companion Animal Parasite Council. *Ehrlichia* spp. and *Anaplasma* spp. Available at: <https://capcvet.org/>

Evason, ME. (2019). Ehrlichiosis and Anaplasmosis. In S. Weese & M. Evason (Eds.), Infectious Diseases of the Dog and Cat: A Color Handbook (first edition, 201-204) CRC Press

Neer TM, Breitschwerdt EB, Greene RT, Lappin MR (2002). Consensus statement on ehrlichial disease of small animals from the infectious disease study group of the ACVIM. J Vet Intern Med 16(3):309-315. Available at: <https://onlinelibrary.wiley.com/doi/10.1111/j.1939-1676.2002.tb02374.x>

Stull, JW, et al. (2016), Disease prevention at canine group settings. Includes content on ectoparasite (tick) prevention. Available at: <http://vet.osu.edu/preventive-medicine/vpm-research/disease-prevention-canine-group-settings>

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