

Ehrlichiosis

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Where ever the brown dog tick is found, *Ehrlichia canis* will eventually follow and long-acting, effective tick prevention is required to prevent what is a dreadful disease in most dogs.

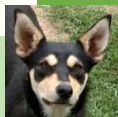
Working dog owners in the Northern Territory and the north of Western Australia should be on high alert for signs of a deadly canine disease new to Australia. In other areas, keep a lookout for the various signs, as the disease-causing bacteria is likely to spread.

The bacterium, *Ehrlichia canis*, is carried by the brown dog tick, and causes a disease called Canine Monocytic Ehrlichiosis (“Ehrlichiosis”). It is only a matter of time before infections will be seen in other locations across Australia: mainly the warmer, wetter tropical and subtropical regions, but also in some temperate areas.

Effective, long- and fast-acting tick prevention is the best way to prevent the disease in dogs once it arrives in your local area.

The bacteria affect blood cells, and often progress to be fatal. Signs of the infection are not specific to this disease and are quite variable, but are worth investigating early to increase the chance of successful treatment. While some dogs will live with the disease, they will not do well, which is not ideal for working dogs.

Cover image: Cloudiness from inflammation in the eye occurs in some *Ehrlichia*-infected dogs, but a wide variety of signs can appear, including fever, lethargy, weight loss, bruising and bleeding.
Source: Dr Alex Burleigh, Northern Territory Veterinary Services.



What signs do infected dogs show?

Generally, there are three disease stages. In the “acute” first stage of the disease, affected dogs can have a fever, be lethargic, stop eating, lose weight, have enlarged lymph nodes, a runny (including bloody) nose and eyes, inflamed cloudy eyes, bleeding or bruising causing anaemia, lameness, pain and (less commonly) nervous signs. The dogs are also more susceptible to other infections. Signs are so variable that any at-risk dogs with unexplained illness should be tested for *Ehrlichia*.

And unlike the rapid (few day) onset of tick paralysis, Ehrlichiosis takes one to three weeks after the tick bite for signs to appear. The first stage generally lasts two to four weeks and early treatment is more straightforward, less expensive and has a higher rate of success, compared to treatment in the third stage, which is often unsuccessful.

Some infected dogs will not show any signs in this first stage, and occasionally may eliminate the bacteria through their natural immune response.

Most untreated dogs progress into the “subclinical” or second stage where the initial signs subside for a time, although the bacteria is still within the dog. While this stage can last months or even years, in Australian cases to date, this stage is short. Most of these dogs will then progress to the “chronic” or third stage of Ehrlichiosis with similar signs to the acute stage, but more severe and irreversible, often proving fatal due to the bone marrow damage.

Prevention is the best option, but if this has not occurred, treat early.



Where does the disease occur?

Ehrlichiosis was first reported in Australia in the Kimberly region of Western Australia in May 2020. However, by January 2021 cases were found much further afield in Western Australia and the Northern Territory: west to Carnarvon in WA, and east to Borroloola, south to the Docker River, and north to Maningrida in NT, with many dogs already dying from the disease.

If you are in any area with brown dog ticks, it is highly likely that the *Ehrlichia* bacteria will spread into these ticks in the future. How fast this will occur is the unknown, so remain vigilant.

How is Ehrlichiosis diagnosed?

The signs of Ehrlichiosis may occur with other diseases, therefore testing is required to identify changes in the blood and to find evidence of the bacteria. Based on the combination of location, potential exposure to brown dog ticks, and the signs of illness shown by the dog, the veterinarian will collect blood for a blood smear (to see characteristic changes to the blood cells and sometimes see the bacteria) and for an antibody and molecular blood test (at a laboratory) to definitively confirm the presence of the bacteria.

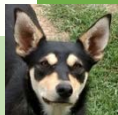
Laboratory results may take a number of days. Currently, all blood tests of suspected animals must be done at an approved laboratory.

How is Ehrlichiosis treated?

A specific antibiotic will be prescribed by the veterinarian and needs to be given continuously for at least one month. Supportive care may also be needed, particularly if treatment is not started until the chronic stage, when the outcome is far less likely to be favourable.

(Left) Figure 2: Patchy bleeding under the gums and skin is common.

Source: Dr Peter Irwin, Murdoch University.



How can the disease be prevented?

This is a notifiable disease in Australia; owners and veterinarians must report any cases to their state government, and this will help the government agencies to respond with appropriate movement regulations and education campaigns to slow the spread. There is no vaccine for this disease, so dog owners must prevent brown dog ticks from attaching to their dogs, even for a few hours.

For working dogs in brown dog tick-infested areas, it will not be sufficient to check and remove ticks after the day's work because the *Ehrlichia* bacteria can be transmitted in as little as three to six hours of the tick feeding.

Residual (long-acting) tick preventative treatments that repel or cause most ticks to drop off and die very rapidly should be used to rid the dog of ticks. All effective tick preventatives will reduce the incidence of this disease at a community level; however, many are not fast enough to prevent all transmission of the bacteria when a tick is feeding before it is killed.

Tick preventative products available in Australia have targeted the paralysis tick (*Ixodes holocyclus*; common along the eastern Australian coastal strip). A rapid kill of these paralysis ticks (within a few hours) is not essential as they take a few days of feeding to cause paralysis, and the products, when used correctly, are generally able to rid the dog of ticks before this occurs.

However, with the rapid transfer of *Ehrlichia canis* from the feeding tick, the fastest acting products are the products of choice. Products containing either permethrin or flumethrin in long-acting formulations (not sprays or rinses) have been shown to kill ticks fast enough on an ongoing basis to prevent all or most transmission of the *Ehrlichia* bacteria.

These faster-acting products are currently only available as the Seresto® collar (flumethrin; four months action), or Advantix® spot-on (permethrin; four weeks action [but only two weeks for paralysis ticks]). These are the best current products, but no products are completely infallible, especially under very high tick pressure. Both products are unaffected by dogs swimming. The Seresto collars have a safety mechanism that widens or opens if the collar is caught on an object. The collars must stay in loose contact with the skin and fur. When choosing a product, also consider other parasites you may want to prevent: paralysis ticks, fleas, heartworm and mites, as different products contain different combinations of active ingredients and formulations. Seek advice from your veterinarian.

Brown dog ticks can live their entire life cycle inside houses, kennels and other buildings. Ideally, these structures should be treated to eliminate ticks when preventative treatment starts or if there is a recurring problem. There are quite a number of products suited to this task, which will not be covered here, however, when choosing a product, note that some may contain permethrin, which is toxic to cats. Likewise, Advantix® contains permethrin, and should never be applied to cats (cats are also not affected by *Ehrlichia*).

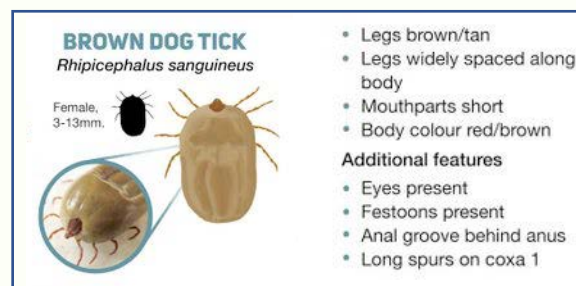
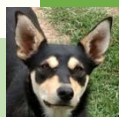


Figure 3: The brown dog tick, *Rhipicephalus sanguineus*.

Source: Constantin Constantinoiu, TickBoss



What is *Ehrlichia canis*?

Ehrlichia canis is from a unique bacterial group called Rickettsia, which spread by fleas, ticks, lice and mites, although *Ehrlichia* is only spread by the brown dog tick. In a matter of hours *Ehrlichia* bacteria can be transferred when a tick is feeding on a dog: either from an infected tick to a dog or from an infected dog to a tick.

Where did the disease come from?

The brown dog tick is widespread in northern Australia and worldwide. The *Ehrlichia canis* bacteria is also worldwide in warmer, wetter climates, but was only recently found in Australia.

Investigations continue into how *Ehrlichia* bypassed Australia's stringent quarantine procedures, but with it now in the native tick population, eradication is considered impossible. Movement restrictions simply aim to slow the speed of its inevitable spread into other areas where the brown dog tick (*Rhipicephalus sanguineus*) is found.

How will it spread to other areas?

The disease spreads with dogs already infected or that are carrying infected brown dog ticks when these dogs are taken to different properties for stock work, or are sold into new areas, or are travelling the country with their owners. While the dog is the preferred host for these ticks, they can occasionally latch onto other animals, spreading the tick and the bacteria further. Nevertheless, the dog (and other canids) are the key means of spread.

As of January 2021, the Western Australian Government had already imposed movement restrictions on dogs travelling from north to south in Western Australia in an attempt to slow the spread. Other states may follow with their own restrictions. It can also be spread via blood transfusions from an infected donor dog to an uninfected dog receiving the blood.

Can humans or other animals be infected?

Cases occur in other canid (dog-type) species including wolves and foxes; as such, it is expected to infect and spread via dingoes, wild dogs, and foxes in Australia. While there have been cases recorded internationally in non-canid species, this is extremely rare. These cases have resulted from the humans or animals having been bitten directly by the tick. There has never been a case where a human has been infected from a dog.

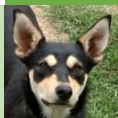
How can you be prepared?

- Determine whether brown dog ticks occur in the area your dogs work or play.
- If they are present, keep abreast of the news of where the disease has spread to in Australia.
- If your dog is in or will visit an area where (or near to where) the disease is known to occur, start tick prevention using one of the recommended products.
- Keep on the lookout for the disease signs in your dogs and seek veterinary advice early if these signs occur.
- Follow any movement restrictions to help prevent spread of the disease.
- Find out whether dogs you plan to obtain come from a potential Ehrlichiosis-risk area; if so, seek veterinary advice in advance.
- Let your fellow working dog owners know about this new disease risk.

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- Dr Alex Burleigh, Northern Territory Veterinary Services
- Dr Sheridan Lathe, Vet Tails
- Dr Samantha English



References and further information

Video and poster:

AMRRIC Ehrlichiosis animation

<https://www.amrric.org/resources/view/ehrlichiosis-animation/>

AMRRIC Ehrlichiosis poster

<https://www.amrric.org/resources/view/tick-sickness-ehrlichiosis-poster/>

Journal articles:

Comparative efficacy of oral administrated afoxolaner (NexGard™) and fluralaner (Bravecto™) with topically applied permethrin/imidacloprid (Advantix®) against transmission of *Ehrlichia canis* by infected *Rhipicephalus sanguineus* ticks to dogs. Jongejan F, Crafford D, Erasmus H, Fourie JJ, Schunack B. *Parasit Vectors*. 2016 Jun 17;9(1):348. doi: [10.1186/s13071-016-1636-9](https://doi.org/10.1186/s13071-016-1636-9).

The efficacy of Advantix® to prevent transmission of *Ehrlichia canis* to dogs by *Rhipicephalus sanguineus* ticks. Fourie JJ, Luus HG, Stanneck D, Jongejan F. *Parasite*. 2013;20:36. doi: [10.1051/parasite/2013037](https://doi.org/10.1051/parasite/2013037). Epub 2013 Oct 21.

A comparative laboratory trial evaluating the immediate efficacy of fluralaner, afoxolaner, sarolaner and imidacloprid + permethrin against adult *Rhipicephalus sanguineus* (sensu lato) ticks attached to dogs. Burgio F, Meyer L, Armstrong R. *Parasit Vectors*. 2016 Dec 3;9(1):626. doi: [10.1186/s13071-016-1900-z](https://doi.org/10.1186/s13071-016-1900-z).

Application of 10% imidacloprid/50% permethrin to prevent *Ehrlichia canis* exposure in dogs under natural conditions. Otranto D, Paradies P, Testini G, Latrofa MS, Weigl S, Cantacessi C, Mencke N, de Caprariis D, Parisi A, Capelli G, Stanneck D. *Vet Parasitol*. 2008 May 31;153(3-4):320-8. doi: [10.1016/j.vetpar.2008.02.008](https://doi.org/10.1016/j.vetpar.2008.02.008). Epub 2008 Feb 16.

State government and other webpages:

National pest & disease outbreaks

<https://www.outbreak.gov.au/current-responses-to-outbreaks/ehrlichiosis-dogs>

Department of Primary Industries and Regional Development, WA

<https://www.agric.wa.gov.au/ehrlichiosis>

Business Queensland

<https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/livestock/animal-welfare/pests-diseases-disorders/canine-ehrlichiosis>

Department of Primary Industries, NSW

https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0005/1235174/Primefact-Ehrlichia-canis-v2.pdf

Agriculture Victoria

<https://agriculture.vic.gov.au/biosecurity/animal-diseases/general-livestock-diseases/ehrlichiosis>

Department of Primary Industries and Regions, SA

https://pir.sa.gov.au/biosecurity/animal_health/ehrlichiosis_disease_in_dogs

Agriculture, NT

<https://nt.gov.au/industry/agriculture/livestock/animal-health-and-diseases/ehrlichiosis-disease-dogs>

Biosecurity Tasmania

<https://dpiwve.tas.gov.au/biosecurity-tasmania/animal-biosecurity/animal-health/ehrlichiosis>

Wildlife Health Australia

https://wildlifehealthaustralia.com.au/Portals/0/Documents/FactSheets/Mammals/Canine_ehrlichiosis_in_Australia.pdf