

## Leishmaniasis in Dogs: Guidelines for Veterinarians

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Animal Biosecurity and Welfare, NSW DPI

### Summary

Leishmaniasis is a protozoal disease affecting humans and animals caused by numerous *Leishmania* spp. and transmitted primarily by phlebotomine sandflies. It is a notifiable disease in animals in NSW.

Most *Leishmania* species are zoonotic. After a variable incubation period (up to seven years in some cases), the disease manifests in a range of forms, including cutaneous and visceral syndromes.

Leishmaniasis in humans and dogs is widespread throughout Africa, parts of Asia, southern Europe, and in South and Central America. Dogs in endemic regions are commonly affected by *L. infantum*. Leishmaniasis has been confirmed in a small number of imported dogs in Australia.

Veterinary practitioners should consider leishmaniasis in the differential diagnosis of dogs imported from endemic countries presenting with skin lesions, ocular abnormalities, or epistaxis.

### Distribution

Leishmaniasis in humans and dogs is widespread throughout Africa, parts of Asia, southern Europe, and in South and Central America. Major epidemics occur in the Middle East and South America. Endemic foci are found in the Mediterranean basin countries and Africa, as well as India, parts of China and other areas of Asia.

Dogs in endemic regions are commonly affected by *L. infantum*. Asymptomatic infection in dogs in these regions is widespread and contributes to maintaining the long-term presence of the parasite in endemic regions. Dogs infected by *L. infantum* and *L. braziliensis* are considered sources of human visceral and cutaneous leishmaniasis, respectively.

The only known endemic *Leishmania* spp. in Australia is *L. australiensis*. It was first isolated in 2001 from the skin lesions of a group of captive red kangaroos (*Macropus rufus*) in the Northern Territory. To date, it has not been associated with disease in humans or in domestic animal species.

Australia is considered free from *L. infantum* although leishmaniasis has been detected in imported dogs, post quarantine. Between 2000 and 2015, there were seven detections of clinical leishmaniasis and one detection of sub-clinical leishmaniasis in Australia, exclusively in imported dogs. The detections occurred in Western Australia, New South Wales, Queensland and Victoria. The cases identified in NSW were in dogs that had been imported from Italy and Spain.

### Method of Spread

The major risk of direct or vector mediated transmission of *Leishmania* spp. appears to be associated with clinically affected vertebrate hosts.

Phlebotomine sandflies are the only proven vector of *Leishmania* spp. and are the main mode of transmission of exotic *Leishmania* spp. overseas.

The specific species of phlebotomine sandflies that have been identified as biological vectors for *Leishmania* spp. elsewhere in the world have not been found in Australia. However, the competency of Australian phlebotomine flies for exotic *Leishmania* spp. is unknown.

Day-feeding biting midges of the genus *Forcipomvia* (*Lasiohelea* spp.) have been implicated as the vector of the only known Australian *Leishmania* spp. (*L. australiensis*) in the Northern Territory. It is unknown whether a vector capable of transmitting *L. infantum* is present in Australia.

Other transmission pathways in dogs have been documented including iatrogenic, venereal, and vertical. Mechanical vectors such as ticks and fleas may also play a role in transmission in rare cases.

Investigations carried out in response to the detections of *L. infantum* in imported dogs in have revealed no evidence of transmission to susceptible animals or to people from these cases.

The likelihood of people acquiring infection in Australia is considered low, as none of Australia's phlebotomine species are recognised pests of humans and the specific species of phlebotomine sandflies that have been identified as biological vectors for *Leishmania* spp. elsewhere in the world have not been found in Australia

## Clinical signs

The clinical presentation varies from focal cutaneous disease to disseminated visceral disease, and the severity varies from subclinical to fatal. The incubation period can be as long as seven years after exposure but may be only months. Age, breed, host genetics, nutrition, concurrent diseases, and other factors may influence the progression from infection to clinical disease.

The clinical features of leishmaniasis vary widely due to the numerous pathogenic mechanisms of the disease process, the different organs affected and the diversity of immune responses. Clinical disease is associated with a marked antibody response that does not confer protection. In fact, immune-mediated mechanisms are responsible for much of the pathology in canine leishmaniosis.

Clinical disease due to *L. infantum* includes the appearance of skin lesions, ocular abnormalities, or epistaxis. These are frequently accompanied by weight loss, exercise intolerance, and lethargy. Skin lesions are seen in 80%–90% of clinically affected dogs, lymphadenomegaly in 62%–90%, ocular disease in 16%–81%, splenomegaly in 10%–53%, and abnormal nail growth (onychogryphosis) in 20%–31%. Other clinical findings may include polyuria and polydipsia due to kidney disease, vomiting, colitis, melena, and lameness due to joint, muscle, or bone lesions. The sole presenting signs of disease could be epistaxis, ocular abnormalities, or manifestations of kidney disease without skin abnormalities.

The skin lesions associated with canine leishmaniosis include exfoliative dermatitis, which can be generalized or localized over the face, ears, and limbs. Ulcerative, nodular, or mucocutaneous dermatitis are also seen. Cutaneous ulcers over the ears or other locations may be associated with considerable bleeding. A mild form of papular dermatitis has been reported in dogs with no other signs of disease. Ocular or periocular lesions include keratoconjunctivitis and uveitis.

## Clinical laboratory findings

Clinical laboratory findings include:

- mild to moderate nonregenerative or, more rarely, regenerative anemia
- thrombocytopenia
- serum hyperproteinemia with hyperglobulinemia and hypoalbuminemia, frequently expressed by a decreased albumin:globulin ratio
- increased liver enzymes or azotemia are found in some infected dogs.

## Sample collection and testing

The recommended minimum diagnostic samples required from live dogs is:

- 5 ml of whole EDTA blood for polymerase chain reaction (PCR)
- 5 ml of clotted blood for serology
- Moist (saline) swab to the conjunctiva of both eyes (single swab both eyes) for PCR.

If lymph nodes are enlarged, fine needle aspirate (FNA) of a range of enlarged lymph nodes may improve diagnostic sensitivity. Multiple aspirates should be taken from each lymph node to yield the following:

- Aspirate material on sterile swab (which should be pre-moistened with saline and submitted without transport media)
- Smear of aspirate (or smears if possible) for cytology.

Spleen and bone marrow aspirates may also improve test sensitivity but are relatively invasive and expensive and may not be necessary if less invasive techniques provide a diagnosis with sufficient confidence.

Note that not all samples may be processed initially depending on the results of preliminary samples

## Sample submission

Specimens must be sent to the State Veterinary Diagnostic Laboratory (SVDL), Elizabeth Macarthur Agricultural Institute, Woodbridge Road, Menangle NSW 2568. A [specimen submission form](#) must accompany specimens submitted to the laboratory.

Please contact the SVDL to arrange a courier or to obtain further advice, during business hours on 1800 675 623 or at [laboratory.services@dpi.nsw.gov.au](mailto:laboratory.services@dpi.nsw.gov.au).

The department will pay the laboratory fees for testing dogs suspected of leishmaniasis. The department will pay for transport of the specimens if the department preferred couriers are used. Any additional costs are the responsibility of the dog owner.

## Diagnosis

Laboratory investigation of a suspect case of leishmaniasis is undertaken at the Australian Animal Health Laboratory (AAHL) and includes:

1. definitive diagnosis to the level of *Leishmania* through the combination of morphology (organisms seen histologically or in cytological smear) and serology (*Leishmania* indirect fluorescent antibody tests).
2. definitive diagnosis with differentiation of exotic *Leishmania* spp. from endemic *L. australiensis* and potentially other Australian *Leishmania* spp. via species-specific tests, such as polymerase chain reaction (PCR) and sequencing; and 3. when relevant, the exclusion of the differential diagnosis of *Ehrlichia canis* using serology tests.

The sensitivity of commonly used diagnostic tests is poor in animals with sub-clinical leishmaniasis. Negative test results in such animals do not indicate freedom from infection.

Owners of exposed animals should be advised that infection may still be present (but undetectable) and that clinical disease could develop up to seven years after the last potentially infectious exposure.

## Case definition

An animal is a **suspect case** where:

- serological results indicative of *Leishmania* infection **or**
- *Leishmania* spp. identified histologically or cytological smears **or**
- clinical signs are consistent with leishmaniasis **or**
- there is epidemiological evidence that the animal has been exposed

An animal is a **confirmed case** where:

- apolymerase chain reaction (PCR) positive assay on diagnostic samples (e.g. blood, bone marrow, lymph node aspirates, conjunctival swabs or skin biopsies) **or**
- positive culture of the particular *Leishmania* spp. (However is not be routinely attempted as it is extremely difficult)

## Veterinary investigation

When leishmaniasis is confirmed in a dog a veterinary investigation will be undertaken by a Local Lands Services vet to determine the likely source of infection and to identify whether other animals may have been exposed. Exposed animals may include:

- dogs sourced from the same overseas kennel as infected dogs
- companion dogs of infected dogs
- bitches mated with infected dogs, or inseminated with semen from an infected dog
- offspring of infected bitches
- dogs that have received blood transfusions or bites from infected dogs

Owners of dogs that are suspected or known to have been exposed to infection should be advised to seek veterinary advice should their animals develop clinical signs consistent with leishmaniasis.

Testing of other exposed animal species may be considered if vector transmission to dogs is suspected or demonstrated.

## Veterinary recommendations for owners of dogs diagnosed with Leishmaniasis

The private veterinary practitioner should discuss with the owner:

- the zoonotic risk and recommend that they contact the Public Health Unit of their Local Health District (1300 066 055) for further advice on protecting themselves from infection
- the prognosis
- the options for treatment of the animal, including drug therapy to reduce parasitaemia, use of impregnated collars to inhibit bites from potential biological and mechanical insect vectors
- desexing to prevent breeding, and
- euthanasia of the dog which may be considered for both animal welfare and disease management reasons.

Where owners are not willing or able to undertake measures to reduce risk to an acceptable level, the Department of Primary Industries will review the risk and may decide to apply legal measures to quarantine, treat or euthanase the animal, or may require ongoing monitoring of the animal and its management.

## NSW Legislation

Leishmaniasis in any species is a notifiable disease under the *Biosecurity Act 2015*. You can report suspected or confirmed leishmaniasis in animals in one of the following ways:

- Phone your Local Land Services on 1300 795 299; or
- Contact a NSW Department of Primary Industries by an email to [biosecurity@dpi.nsw.gov.au](mailto:biosecurity@dpi.nsw.gov.au)

## More information

- See information on laboratory submissions at <http://www.dpi.nsw.gov.au/about-us/services/laboratory-services/sample-submission>.
- For general biosecurity information phone 1800 680 244

## Acknowledgments

Animal Health Committee Leishmaniasis Response Policy

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