

Leptospirosis in Dogs

What is leptospirosis?

Leptospirosis is an infectious disease caused by a type of bacteria called *Leptospira*. The disease causes severe damage to the kidney, liver, and other organs, and may be fatal in severe cases. Bacteria are passed in the urine of infected animals and can survive in the environment for long periods in warm, stagnant water or moist soil. Dogs can get the infection from other animals, including skunks, raccoons, opossums, rats, wolves, and other dogs.

The bacteria that cause leptospirosis, commonly called leptospires, thrive in water and have a helical or spiral shape with a characteristic hook on one or both ends. There are many species and serovars (strains) of *Leptospira*, some of which cause disease in dogs. Leptospirosis in cats is very rare and infected cats rarely show disease.

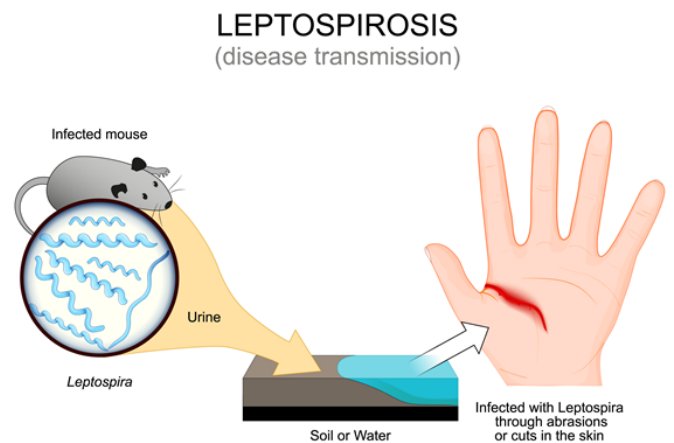
How common is leptospirosis?

Leptospirosis is uncommon in areas where dogs are routinely vaccinated. However, disease outbreaks are still seen occasionally because vaccines protect against only the four most prevalent strains of *Leptospira*. Leptospirosis was once more common in rural, wooded areas, but it is now commonly found in urban settings.

How are dogs infected?

Leptospira bacteria are carried mainly by rats and other rodents but can be carried by almost any mammal, including people. Infected or recovered carrier dogs may act as a source of the infection.

Leptospira bacteria is shed in the urine of infected animals that then contaminates soil or water. In wet conditions, the bacteria reproduce, resulting in higher numbers of infective organisms. Infection most commonly occurs when contaminated water or soil contacts an animal's mucus membranes (i.e., gums) or damaged or diseased skin.



For instance, if a dog were to walk in contaminated mud, they may become infected through their skin if they have any skin lesions on or around their feet. Infection can also occur animal-to-animal through bite wounds, by ingestion of an infected animal (predation), sexual transmission, and transmission in utero from mother to pups. The incubation period (from infection to onset of clinical signs) is usually four to twelve days.

What are the signs of leptospirosis?

Many *Leptospira* infections go undetected, but other cases can be life-threatening. Certain strains of *Leptospira* are more likely to be associated with disease than other strains.

The most common clinical signs associated with leptospirosis are those caused by acute (sudden) kidney injury and liver dysfunction, although the bacteria can also affect other organs and functions, such as the lungs, and may cause uncontrolled bleeding, which can lead to many different clinical signs. Common signs of leptospirosis include reduced or no appetite, lethargy, and high fever.

Signs of acute kidney injury include:

- vomiting, diarrhea
- increased drinking, increased urination
- abdominal pain
- absence of urination

Signs of liver dysfunction include:

- vomiting, diarrhea
- icterus or jaundice (yellowing of the gums and the whites of the eyes or skin)

Signs of other affected systems:

- abnormal thickening/hardening of the skin (calcinosis cutis)
- abortion
- bloody urine, feces, vomit, or sneezing
- coughing blood
- edema causing swelling of the limbs
- elevated/increased/rapid breathing
- fluid around the lungs (pleural effusion) or in the abdomen (ascites)
- pain, stiffness, or reluctance to move
- redness and/or discomfort (squinting) in the eyes
- small hemorrhages or bruises in the mouth, on the skin, or in the whites of the eyes



How is leptospirosis diagnosed?

Clinical signs are variable and easily confused with other diseases, so a definitive diagnosis can be difficult. Diagnosis starts with a thorough discussion of your dog's clinical signs and a physical examination. Based on this investigation, additional diagnostics often include a complete blood count (CBC), biochemistry profile and urinalysis, chest radiographs (X-rays), abdominal ultrasound, and coagulation testing (tests to determine how well blood clots).

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so a definitive diagnosis can be difficult."**

Based on the results of these tests, your veterinarian may recommend specific testing for leptospirosis, which includes running a combination of tests: a DNA-PCR test that looks for genetic material from the *Leptospira* bacteria in the blood or urine, and two separate microscopic agglutination tests (MATs), run two weeks apart, that test for the presence of antibodies formed against leptospirosis. Each of these tests has unique benefits and disadvantages.

A single test finding of *Leptospira* antibody may not mean that the dog has leptospirosis, even if the blood level (titer) is high, because infection with less harmful strains can still result in high antibody levels. See handout "Testing for Leptospirosis in Dogs" for more information.

What is the treatment?

Antibiotics such as penicillin, ampicillin, and amoxicillin are reasonably effective against the acute stages of leptospirosis if they are started early. These antibiotics treat the early stages of infection, making the dog feel better, although most affected dogs require intensive care in the veterinary hospital.

Other supportive treatments may be needed based on your dog's clinical signs, including hospitalization and intravenous fluids, oxygen therapy, plasma transfusion, and hemodialysis. Your veterinarian may recommend referral to a facility that specializes in critical care.

An extended course of antibiotics, typically doxycycline, is then prescribed in the recovery period to ensure that all the *Leptospira* bacteria are cleared and the dog does not become a chronic carrier. Follow-up may include serial blood and urine monitoring to ensure parameters are improving in response to treatment. Your veterinarian will let you know when and how often this should occur.

How can leptospirosis be prevented?

The leptospirosis vaccine is recommended as a routine vaccination for all dogs. Your veterinarian will consider the risks and options for your pet. Annual re-vaccination is needed to maintain the best immunity. The four-serovar vaccine is currently the only vaccine recommended by experts. Modern vaccines are highly effective and safe. Recent studies of vaccine adverse events show no difference in probability of vaccine reaction from leptospirosis vaccination than from distemper-parvovirus or rabies vaccination. Talk to your veterinarian about any concerns you have.

Even dogs who have been treated for leptospirosis should be vaccinated, since it is unknown how long protection from natural infection (acquired immunity) lasts. You can also reduce infection risk by preventing access to areas where infection is more likely to occur and preventing access to wildlife, especially rodents.

Can humans get leptospirosis?

Leptospirosis can be transmitted to people and is considered the most common zoonotic infection in the world. The U.S. Center for Disease Control (CDC) warns that infection risk for people and animals is increased after hurricanes, heavy rain, or flooding.

If your dog may have the disease, avoid contact between your bare skin and the dog's urine, and wear rubber gloves when cleaning any areas the dog has soiled. Disinfect any areas where the dog has urinated. The organism is readily killed by household disinfectants or a dilute bleach solution. If you feel ill, contact your doctor for further advice.

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