WHEN SHOULD LEPTOSPIROSIS BE SUSPECTED IN A DOG?

- Leptospirosis can cause a variety of clinical problems in dogs, ranging from subclinical infections to sudden death with no preceding clinical signs. The most common problem is acute renal failure (also called acute kidney injury [AKI]), but leptospirosis can also cause liver disease, ocular disease (uveitis), vasculitis, abnormal bleeding, muscle pain, polyuria, or polydipsia.
- Leptospirosis should always be considered in any dog that is presented with AKI, including dogs that previously had chronic kidney disease (CKD), sometimes called “acute-on-chronic” kidney disease. Leptospirosis should be suspected in dogs with AKI until testing has proved that something else caused the kidney damage.

WHICH TEST RESULTS INCREASE SUSPICION OF LEPTOSPIROSIS?

- In addition to AKI manifesting as increased serum concentrations of creatinine and blood urea nitrogen, canine leptospirosis can also cause mild decreases in platelet counts (thrombocytopenia); increased liver enzymes, particularly alkaline phosphatase; and increased bilirubin concentrations. Urinalysis may show a low urine specific gravity, the presence of blood or casts, and sometimes glucosuria despite a normal serum blood glucose concentration.

WHICH TESTS CAN DIAGNOSE LEPTOSPIROSIS IN DOGS?

- The disease can be diagnosed by either finding evidence of the organism in the blood or urine, or by detecting an antibody response in the blood. Many tests, including dark-field microscopy, immunofluorescent antibody tests, and polymerase chain reaction (PCR), can potentially detect leptospires in urine; however, because none of these tests are perfect, it is important to bear in mind that a negative test (eg, a PCR) does not rule out the diagnosis of leptospirosis; a very low number of leptospires may be present, or the organisms may not have been present in the blood or urine at the time of sampling. Although false positives are possible with any test, a positive result for leptospirosis on a PCR should be taken seriously, as this is a zoonotic disease.
- The most common test for antibodies is the microscopic agglutination test (MAT). This is a simple blood test that can confirm whether the dog has been exposed to Leptospira spp bacteria. It is important to consider vaccination history when interpreting results of this test. Be sure to perform acute and convalescent MAT tests, which involve 2 samples taken approximately 2 weeks apart, particularly if the first sample is negative. A negative first sample does not rule out leptospirosis.

Leptospires are primarily transmitted through direct or indirect contact with urine. The organism can also be present in other bodily fluids, but these are a less common source of exposure.
What to Do When Leptospirosis Is Suspected

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Make sure that the veterinary healthcare team is familiar with the common and uncommon manifestations of leptospirosis so that potential cases are recognized. Educate the team about the precautions necessary to avoid spreading the disease to humans.

MANAGE THE PATIENT

- Any dog with AKI should be a suspected leptospirosis patient until an alternate diagnosis has been proven, bearing in mind that not all dogs with leptospirosis have AKI.

- If hospitalized, the patient should be housed in a low-traffic area of the practice, preferably in a floor-level cage. If necessary, use a gurney or cart to move the patient.

- Identify the patient with a clearly visible cage card or warning sign that alerts team members to the presence of a patient suspected to have leptospirosis.

- Dogs with AKI often require urinary catheterization with a closed collection system to manage their renal failure. Wear protective clothing when placing or manipulating the catheter or emptying the urine bags. The urine should be mixed with bleach before disposal in the drain; use a 1:1 mixture of urine with a 10% bleach solution. If the dog urinates in its cage or urine cannot be contained, consider placing an indwelling urinary catheter with a closed collection system. If this is not an option, consider using absorbent pads. Wear protective equipment when disposing of the pads.

- Dogs that are not catheterized should urinate only in a designated area that can be disinfected after use. A hard, nonpermeable surface is preferred.

- If any urine spills occur, immediately clean and disinfect the area while wearing protective equipment.

- Consider bathing dogs that have urine-soaked fur. Wear protective equipment when bathing, particularly eye and mouth protection.

Leptospires are killed by most routine disinfectants, including bleach, ethanol, and quaternary ammonium compounds. They are also killed by many detergents, sunlight, dessication, and freezing.

(continued)
Any team member handling the patient should wear a disposable gown and gloves.

PROTECT THE TEAM

- Leptospirosis patients do not need to be isolated. Protecting team members who handle the dog or any bodily fluid is the main concern, which can be achieved without isolation. These patients are also often critically ill, and are better served by being readily visible to the team.

- Any team member handling the patient should wear a disposable gown and gloves. Protective eyewear and a face mask are recommended whenever there is a risk of splashing of urine or other bodily fluids (eg, when handling wet bedding, bathing the patient). Wash hands thoroughly after removing protective clothing. The organisms are transmitted through cuts and abrasions on the skin, or through mucous membranes of the eyes or mouth.

- Avoid needlestick injuries and direct contact with the patient’s blood.

- Wear protective equipment, particularly for the eyes and mouth, when cleaning cages, runs, and soiled bedding. Avoid pressure-washing runs, which will aerosolize the organisms.

- Team members who are pregnant or immunosuppressed should not handle patients suspected to have leptospirosis, their urine, or other bodily fluids.

- Educate all team members and laboratory technicians who may handle blood, urine, or other bodily fluid samples from the patient.

- Be aware that clinically healthy dogs have the potential to shed leptospires in urine; team members and laboratory technicians should therefore always wear gloves and cover bare skin when handling any dog wastes.
Because of the threat of zoonotic transmission, much of our communication regarding canine leptospirosis should center on protection for team members and clients. The role of every team member is to educate, support, and provide written resources that will offer balance between caution and overreaction.

**CLIENTS WITH LEPTOSPIROSIS-POSITIVE DOGS**
Advise clients whose dogs have leptospirosis to take the following steps to avoid the spread of the disease:

- Avoid direct contact with the dog’s urine until the course of antibiotics is completed, because bacteria are spread mainly through the urine of infected animals.
- Always wear gloves or wash hands thoroughly after touching the infected dog or anything that might have urine on it.
- To prevent spread of the disease and reinfection, keep the patient away from vegetable gardens, wading pools, playgrounds, and groundwater.

**WRITTEN DISCHARGE INSTRUCTIONS**
Leptospirosis can be intimidating for the client. Provide a client handout (see *Frequently Asked Questions: Canine Leptospirosis*, page 31) along with written patient discharge instructions to create a safe comfort level for the client. Consider including these points in discharge instructions:

- Symptoms that indicate the patient is not responding to treatment as well as expected, and when to call your office
- Directions for when to return for a follow-up visit for the second MAT (antibody) test if necessary
- Diet and exercise instructions
- Medication information, including the warning to give as directed and to complete the entire course
- Direction that the patient should, if possible, urinate on a surface that can be disinfected using a 3%–10% (1:30 or 1:10) dilution of bleach, until directed otherwise
- Phone numbers of the emergency practice in your area if your practice does not provide 24-hour services
- Recommendations for protective equipment for home care, as well as a home-care kit.

*Keep the patient away from vegetable gardens, wading pools, playgrounds, and groundwater.*
Team Workflow

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ALL TEAM MEMBERS
✓ Always greet clients warmly, introduce yourself, and acknowledge the patient by name.
✓ If leptospirosis is suspected, limit hands-on interaction to members of the patient’s care team.
✓ If leptospirosis is included on the list of diseases to be ruled out, ensure that the team is notified.

RECEPTIONIST
✓ Immediately welcome the client and patient, and escort them into an examination room.

TECHNICIAN/ASSISTANT
✓ Review the patient’s status or progress.
✓ Take the patient’s vital signs using the appropriate protective equipment, such as gloves, goggles, and a mask.
✓ Restrain and document in the medical record according to practice procedures.

VETERINARIAN
✓ Perform the physical examination using the appropriate protective equipment.
✓ Discuss treatment options with the client.
✓ Counsel the client on health risks to anyone who has been in contact with the patient or the patient’s environment.
✓ Confirm that all the client’s questions have been answered.

TECHNICIAN/ASSISTANT
✓ Provide and review all written handouts and treatment plans.
✓ Prepare the cage area if the patient is being admitted, and choose the patient team.
✓ Thoroughly disinfect the examination room and equipment used on the patient.

VETERINARIAN OR TECHNICIAN/ASSISTANT
✓ Provide daily patient updates to the client.
✓ Supervise any patient visits by the client and his or her family for proper infection control.
✓ Schedule a recheck appointment following discharge.
### Team Roles

**Jessie Merritt, CVPM, SPHR**  
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Portland, Oregon

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<th>TEAM MEMBER</th>
<th>ROLE</th>
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| **RECEPTIONIST**  | Ambassador of the practice and master of organization | ✓ Create a bonding experience for clients by welcoming, interacting, listening, and assuring them your entire team is there to help.  
✓ Guide the client through the process of the visit, making sure he or she knows what to expect while minimizing potential exposure or contamination to other clients, patients, or environments. |
| **TECHNICIAN/ASSISTANT** | Client educator and patient caregiver | ✓ Instill clients with trust and confidence by demonstrating professionalism and compassion.  
✓ Anticipate the needs of the veterinarian regarding equipment, supplies, and restraint. |
| **VETERINARIAN**  | Educator, medical expert, and team mentor | ✓ Provide clients access to knowledge and treatment options.  
✓ Lead the team on how to offer guidance, and be accountable for appropriate patient care and zoonotic protocols. |

All team members should be aware of a likely zoonotic patient to manage the appointment and protect other clients, patients, and each other. This is not the time to play “Pass the Puppy” (even though she may be incredibly cute).
Reducing the risk of exposure when handling a suspected or confirmed leptospirosis patient begins with a solid zoonotic protocol and team training, even before the patient walks in the door.

**TEAM**
- Which team members handled this patient before the potential diagnosis of leptospirosis? Consider them exposed and counsel accordingly. There should be specific team members assigned to each patient; only they handle treatments, supplies, and cleanup.
- These team members should be required to wear gloves and gowns when handling the patient, and face masks, goggles, or shields whenever there is a risk of exposure to urine or bodily fluids. This should be for the duration of hospitalization or until an alternate diagnosis is confirmed.
- If these team members must also treat other patients, they should treat the leptospirosis patient last.
- Pregnant and immunosuppressed team members should be discouraged from being part of this patient care team.

**PATIENT**
- If possible, place the dog in a floor-level cage without direct neighbors.
- The cage should be clearly marked as a patient with suspected leptospirosis.
- Dedicate specific floor space in front or to the side of the patient cage for supplies. Use newspaper or disposable puppy pads to place supplies (eg, fluids, sharps, urine collection bags). These supplies should never reach the general population area. All supplies brought into the patient’s area should be disinfected or sealed in a biohazard bag before leaving the area. Sealed bags should be turned over to a hazardous waste company.

**ENVIRONMENT**
- Clean all nonporous surfaces with dilute (3%–10%) bleach or disinfectant.
- Clean lawn, gravel, pavement, or wood with dilute bleach when possible, and section off until completely dry.

**CLIENT**
- Educate the client about the risk of exposure. Has the patient been to daycare, a boarding or grooming facility, or a neighbor’s house recently? Any human exposed to the patient needs to be counseled about the risk and encouraged to contact his or her medical care provider for advice.
- If clients are permitted to visit their pet, gloves and gowns should be required.
- Identify all laboratory samples as high risk for zoonosis.

**WORDS FROM THE WISE**
Suggested resources for learning more about leptospirosis:
- Leptospirosis Zoonotic Infection in a Veterinary Technician in North County: [sdcvma.org/leptospirosis-zoonotic-infection-veterinary-technician-north-county](sdcvma.org/leptospirosis-zoonotic-infection-veterinary-technician-north-county)
- 2010 ACVIM Small Animal Consensus Statement on Leptospirosis: Diagnosis, Epidemiology, and Treatment: [acvim.org/publications/consensusstatements.aspx](acvim.org/publications/consensusstatements.aspx)
Frequently Asked Questions: Canine Leptospirosis

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1. How did my dog get leptospirosis?
The exact source of infection cannot be determined in a specific patient, but the infection usually comes from contact with infected urine from wild animals. This could be from a contaminated water source such as a pond or stream, or just from wild animals passing through the backyard.

2. My dog never swims or goes in the water and only goes outside to eliminate. How could he possibly get exposed to leptospirosis?
Unfortunately, your dog was probably just in the wrong place at the wrong time. If an infected wild animal happened to urinate in your backyard, and your dog later sniffed or licked that area, then he could have been infected at that time.

3. But I always thought this was mainly a disease of outdoor and hunting dogs?
No. Any dog is susceptible, and many veterinarians see cases in small breed dogs, indoor dogs, and “lap dogs” that rarely go outside.

4. Which wild animals carry leptospirosis?
Many animals can carry the infection, including those that we commonly see in our backyards and neighborhoods. Examples include skunks, opossums, raccoons, foxes, moles, mice, rats, deer, and squirrels.

5. Can people get leptospirosis?
Yes, it is a zoonotic disease, meaning that it can be transmitted to people from animals.

6. Can I catch leptospirosis from my dog?
There is a risk, but it is decreased once your dog starts antibiotic therapy. Humans can also catch leptospirosis from contaminated water sources, from non-companion domestic animals, and from wild rodents. Because of the potential risk, it is important to take precautions once your pet comes home.

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What precautions should I take?
Until the course of antibiotics is finished, wash your hands thoroughly after handling your pet and his or her bedding, food, and water bowls. Do not allow your dog to lick your face. Wear gloves and use bleach or other household disinfectants to clean up any urine accidents in the house. Minimize contact between your pet and anyone who is pregnant or immunosuppressed (eg, receiving immunosuppressive drugs, infected with HIV) until the course of antibiotics is finished. You should also consult with your family physician.

Can I safely pet my dog?
Yes, just petting your dog should not put you at great risk if you are otherwise healthy, but wash your hands afterward, and always avoid direct contact with urine.

What should I do to make my backyard safer?
It is not really possible to eliminate infection from the backyard. If you see your dog urinate on a hard surface outside, spray the area with a disinfectant or bleach, and continue to spray until the antibiotics are finished. The organisms are killed by sunlight and by freezing temperatures, so depending on your climate, they may not survive for long. You should not encourage wildlife to visit your yard by feeding them, although it is not possible to eliminate all animal visitors that may pass through the neighborhood.

What about my other dogs? They are not sick, but could they get leptospirosis also?
Provided your affected dog completes the antibiotic course, your other dogs probably will not get leptospirosis. However, if all your dogs spend time in the same environment, others may have been exposed. Depending on the risk of infection, your veterinarian may elect to treat these dogs preventively.

How will I know if I have leptospirosis?
People with leptospirosis exhibit a variety of symptoms, including flu-like symptoms and liver or kidney disease. A veterinarian cannot make the diagnosis or give you medical advice, but may strongly recommend you consult your physician if you have any symptoms of illness, particularly if you are pregnant or have a suppressed immune system.

Should all dogs be vaccinated against leptospirosis?
All dogs are potentially susceptible to leptospirosis, and the risks and benefits of vaccination should be discussed with your veterinarian. There is evidence that vaccines provide protection for at least one year.

What else should I know?
You must complete the course of prescribed antibiotics to ensure that the infection is properly eliminated. Bring your dog back for follow-up testing, which may help prove or disprove that your dog has leptospirosis and allow his or her recovery to be monitored.