To: **CAHAN San Diego Participants**
Date: **December 16, 2020**
From: **Epidemiology and Immunization Services Branch, Public Health Services**

Health Advisory: **Leptospirosis outbreak in dogs**

This health advisory informs physician and veterinary health providers about a recent outbreak of leptospirosis in dogs.

Key Messages

- Since October 2020, over 30 cases of canine leptospirosis have been reported in San Diego County, primarily originating from the Hillcrest and Mission Hills areas.
- Boarding at kennels that allow dog-to-dog interaction is a major risk factor.
- *Leptospira* spirochetes are shed in urine and transmission to other dogs and people can occur via direct contact with mucous membranes and broken skin. Contaminated soil, water, bedding, and food can act as fomites.
- No human cases from this canine outbreak have been reported; however, vigilance is recommended especially in those presenting with fever, myalgias, negative tests for SARS-CoV-2 and influenza, and history of ill canine contact.
- Clinical signs in dogs and people are varied and can range from mild fever to renal, hepatic, pulmonary, gastrointestinal, and hemorrhagic syndromes.
- Quadrivalent *Leptospira* vaccine is recommended for dogs, especially those boarding in kennels.

Situation

Since October 2020, thirty-four confirmed and presumptive cases of leptospirosis have been reported in the local dog population in San Diego County, primarily originating from the Hillcrest and Mission Hills areas. Several cases required hospitalization and at least one dog was euthanized. Although combinations of serology and polymerase chain reaction (PCR) testing of blood and urine were used to diagnose the dogs, the causative *Leptospira* species or serovar(s) involved are not known.

A major risk factor noted in the reported canine leptospirosis cases was boarding at kennels that allow dog-to-dog interactions. Two cases had no apparent links to boarding, one of which frequented dog parks. The kennels that were linked to cases notified the owners of all potential contacts of diagnosed cases and closed for at least two weeks for cleaning and disinfection.

No human cases from exposure to the infected dogs have been reported to date.

Background

Leptospirosis is a disease caused by various species of spirochete bacteria called *Leptospira.* These bacteria can infect multiple species of mammals, including humans, dogs, rats, mice, raccoons, skunks, opossums, cows, and pigs. The bacteria are shed in the urine of infected animals (especially rodents) and may contaminate food, water, soil, or bedding. Organisms enter through direct contact with skin abrasions, mucous membranes, or drinking contaminated water.

Although leptospirosis in humans is a reportable disease in California, it is not reportable in animals, and the local incidence in canines is unknown. According to California Department of Public Health veterinary subject matter experts, outbreaks of canine leptospirosis are uncommon in the state and individual cases do not often come to the attention of public health. Only 29 canine leptospirosis cases were reported over a ten-year period in Los Angeles County, where veterinary laboratories began reporting cases in 2014.

In the United States, human leptospirosis is uncommon (100-150 cases annually) and usually occurs after recreational exposure to contaminated lakes or streams, not from canine contact. The disease more frequently occurs in Mexico and Hawaii and is considered one of the most widespread zoonotic diseases in the world, with over one million cases annually. Since 2010, there have been seven confirmed and probable cases in humans in San Diego County. No cases had onset in 2020 and two cases had onset in 2019, both acquired during foreign travel.

Canine leptospirosis has an incubation period of 5-15 days, or longer when associated with chronic infections. Dogs may have subclinical infection or present with signs that include fever, lethargy, vomiting, anorexia, and icterus. Illness can progress to renal, hepatic, pulmonary, hemorrhagic, and gastrointestinal syndromes, and death or chronic renal disease can result in untreated cases. Due to the zoonotic potential, protective clothing, especially gloves, are recommended when handling suspected cases. Cats are more resistant to infection but may exhibit mild disease.

Rodent control is an important tool to prevent leptospirosis in pets. In addition, a quadrivalent vaccine available for dogs is protective against the included or heterologous serogroups. The American College of Veterinary Internal Medicine (ACVIM) recommends annual leptospirosis vaccination for all at-risk dogs, especially those that frequently visit dog parks and nature areas or spend time outdoors, including the backyard. Infrequently, vaccine reactions can occur, but are thought to relate to other vaccine components and at a rate no different than with other vaccines. Additional diagnostic, treatment, and vaccination information on canine leptospirosis can be found in the references below.

Although human cases linked to direct contact with an infected dog are rare, care should be exercised by owners of infected dogs. The disease is not transmitted from human to human. The incubation period in people is 2-30 days but is usually 5-14 days. The disease presentation can be subtle with fever (classically biphasic) and myalgias (typically of the calves and lower back). Other symptoms may include headache, conjunctival suffusion, nausea, vomiting, diarrhea, abdominal pain, cough, and a skin rash. More severe cases are associated with transaminase and creatinine elevation. Overlap with multiple potential presentations of COVID-19 (flu-like illness, weakness, vomiting, mental confusion) is notable.

Laboratory diagnosis in humans can include urine PCR (first seven days of illness) or IgM antibody testing (low sensitivity in the first week of disease). A fourfold rise in IgG titer greater than two weeks after initial infection is confirmatory. Treatment for the milder forms of infection in adults include oral

antibiotic regimens with doxycycline, amoxicillin, or azithromycin; more severe illness is treated with parenteral ceftriaxone or penicillin G. Infectious diseases consultation is recommended for complex cases. See the Centers for Disease Control and Prevention (CDC) Fact Sheet for Clinicians for more information on presentation, diagnosis, management and prevention.

Recommendations for Veterinary Providers

- Include leptospirosis in differential diagnoses of dogs with fever of unknown origin or acute renal disease that were at kennels or dog parks within the prior 30 days.
- Use appropriate personal protective equipment and procedures while handling suspect and infected dogs; minimize urinary contamination of the environment, immediately decontaminate contact surfaces but do not pressure wash so aerosols are not created.
- Isolate infected dogs (can be at home – educate owners of appropriate preventative measures) for at least one week while being treated with appropriate antibiotics to prevent spread.
- Immunize at-risk dogs annually using a quadrivalent *Leptospira* vaccine, including those that board at kennels and frequent dog parks, streams, and lakes.
- Canine or other animal leptospirosis cases can be reported to the County Epidemiology Unit by calling 619-692-8499 during normal business hours or by sending an Animal Disease/Death Report Form by fax to 858-715-6458 or by secure email to epi-cdreporting.hhsa@sdcounty.ca.gov.

Recommendations for Medical Providers

- Consider leptospirosis in differential diagnosis of individuals presenting with febrile illness (especially with myalgia, headache, conjunctivitis, skin rash, and/or abdominal symptoms) and an exposure history to an ill dog, especially one that has been kennel boarded. Fresh water swimming exposure is also an epidemiologic clue, especially as part of overseas travel.
- Obtain appropriate laboratory leptospirosis confirmation and exclude infection with novel coronavirus and influenza. See attached CDC Fact Sheet for Clinicians for details.
- Strongly suspected milder cases could be empirically treated with oral doxycycline, amoxicillin, or azithromycin.
- Human leptospirosis cases should be reported to the County Epidemiology Unit within one week by calling 619-692-8499 during normal business hours or by submitting a Confidential Morbidity Report by fax to 858-715-6458 or by secure email to epi-cdreporting.hhsa@sdcounty.ca.gov.

Resources

- CDC Leptospirosis website (includes sections on pets and technical information for providers)
- The Center for Food Security and Public Health Leptospirosis website
- 2010 ACVIM Small Animal Consensus Statement on Leptospirosis: Diagnosis, Epidemiology, Treatment, and Prevention. 2011; J Vet Intern Med, Jan; 25(1):1-13
- Klaasen H, Adler B. Recent advances in canine leptospirosis: focus on vaccine development. 2015; Vet Med (Auckl), 6:245-260
- Brook W. Leptospirosis in Dogs. Veterinary Partner rev. 10/10/2019
- Moore GE, Guptill LF, Ward MP, Glickman NW, Faunt KK, Lewis HB, Glickman LT. Adverse events diagnosed within three days of vaccine administration in dogs. 2005; J Am Vet Med Assoc, 227(7):1102-1108.

Thank you for your participation.

CAHAN San Diego
County of San Diego Health & Human Services Agency
Epidemiology and Immunization Services Branch
Phone: (619) 692-8499; Fax: (858) 715-6458
E-mail: cahan@sdcounty.ca.gov
Secure Website: https://member.everbridge.net/892807736722952/login
Public-Access Website: http://www.cahansandiego.com

County of San Diego Epidemiology Unit
Fax (858) 715-6458
epi-cdreporting.hhsa@sdcounty.ca.gov

Animal Disease/Death Reporting Form

(if the disease you are reporting has a specific form, ideally use that form instead)

Date form completed_____

SUSPECTED DISEASE/CONDITION BEING REPORTED: _____

1. Animal Information

Type of Animal Involved ☐ Domestic Pet ☐ Livestock ☐ Wild animal
☐ Exotic ☐ Zoo animal
Number of Animals ☐ One ☐ Multiple (give number_____)
Species of Animal _____
Other Identifying Information
Breed_____ Color _____
Sex _____ Name _____
Age _____ Animal/Case ID_____

2. Animal Owner (if applicable)

Name(s)
Address
City, ZIP
Telephone
Is it okay for Public Health to call the owner(s) to ask more about the history? ☐ **YES** ☐ **NO**

3. Animal Location (where in community animal originated, if not same as owner)

Name(s)
Address
City, ZIP

4. Reporting Veterinary Clinic or Shelter

Name of Veterinarian or Technician
Vet Clinic Name
Address
City, ZIP
Telephone Fax E-mail

5. History

Date of onset of first symptoms_____ Date of presentation_____
Date of death(s), if applicable_____
History (include vaccine history, if applicable):

Fax form to: (858)715-6458 or email to epi-cdreporting.hhsa@sdcounty.ca.gov

12/15/2020

6. Clinical Findings

Highest Body Temperature _____

Physical Examination

	Normal		Comments
General	☐ Yes	☐ No	_____
Skin	☐ Yes	☐ No	_____
Head Area	☐ Yes	☐ No	_____
Respiratory	☐ Yes	☐ No	_____
Cardiovascular	☐ Yes	☐ No	_____
Abdomen/digestive	☐ Yes	☐ No	_____
Reproductive/Urogenital	☐ Yes	☐ No	_____
Musculoskeletal	☐ Yes	☐ No	_____
Nervous	☐ Yes	☐ No	_____
Lymph nodes	☐ Yes	☐ No	_____
Other	☐ Yes	☐ No	_____

7. Treatment.

Please describe treatment given, particularly antibacterial, antiviral, antifungal, antiparasitic.

Treatment Date	Describe Treatment
1. _____	_____
2. _____	_____
3. _____	_____

8. Laboratory Results

Please fax all laboratory results to us along with this form.

9. Additional Comments.

Please use an additional sheet if needed.

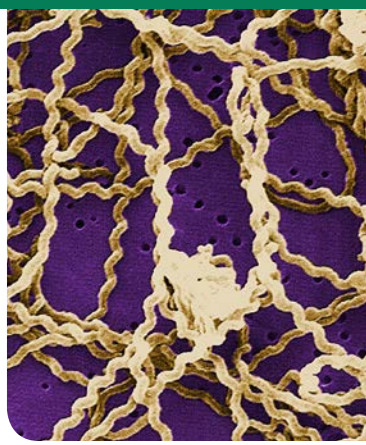
Fax form to: (858) 715-6458 or email to epi-cdreporting.hhsa@sdcounty.ca.gov

LEPTOSPIROSIS
Fact Sheet for Clinicians

Background

- Leptospirosis is a disease that is caused by spirochete bacteria in the genus *Leptospira*. There are 10 pathogenic species, and more than 250 pathogenic serovars.
- While leptospirosis occurs worldwide, it is more common in tropical or sub-tropical climates.
- It is estimated that more than 1 million cases occur worldwide annually, including almost 60,000 deaths.
- In the United States, approximately 100–150 leptospirosis cases are reported annually. Puerto Rico reports the majority of leptospirosis cases, followed by Hawaii.
- Outbreaks of leptospirosis tend to occur after heavy rainfall or flooding in endemic areas, especially areas with poor housing and sanitation conditions.

Transmission



Leptospira spp. bacteria

- Leptospires are spread by the urine of infected animals (rodents, dogs, livestock, pigs, horses, wildlife).
- The bacteria can survive for weeks to months in urine-contaminated water and soil.
- People can be infected through
  - » Direct contact with the urine or reproductive fluids from infected animals
  - » Contact with urine-contaminated water (floodwater, rivers, streams, sewage) and wet soil
  - » Ingestion of food or water contaminated by urine or urine-contaminated water
- Transmission occurs through mucous membranes, conjunctiva, and skin cuts or abrasions.
- Human-to-human transmission is very rare but has been documented through sexual intercourse and breastfeeding. Transmission has also rarely occurred through animal bites.
- High-risk activities can include wading, swimming, or boating in floodwater or freshwater (rivers, streams, lakes) that may be contaminated with animal urine. Some actions like prolonged immersion in, submerging head in, or swallowing contaminated water can particularly increase risk.
- Other high risk activities can include direct contact with animals and activities that can lead to skin abrasions and water or soil exposure, such as clearing brush, trekking, and gardening.

CS287535B January 30, 2018

Clinical Findings

- Incubation period is 2–30 days; most illnesses occur 5–14 days after exposure.
- Most infections are thought to be asymptomatic.
- Approximately 90% of clinical illnesses present as a non-specific acute febrile illness, while approximately 10% progress to severe, potentially fatal illness with multi-organ dysfunction.
- Illness may be biphasic, with the patient briefly recovering from mild illness, but then developing more severe illness.
- Symptoms can include fever, headache, myalgia (typically of the calves and lower back), conjunctival suffusion, nausea, vomiting, diarrhea, abdominal pain, cough, and sometimes a skin rash.
- Severe symptoms can include jaundice, renal failure, hemorrhage (especially pulmonary), aseptic meningitis, cardiac arrhythmias, pulmonary insufficiency, and hemodynamic collapse. Combined renal and liver failure associated with leptospirosis is referred to as Weil's disease.
- Leptospirosis during pregnancy can cause fetal complications including fetal death or abortion.
- The case fatality rate for leptospirosis is approximately 5%–15% among patients with severe illness. Among patients with severe pulmonary hemorrhagic syndrome, the case fatality rate can exceed 50%.

Treatment

Early treatment may decrease the severity and duration of disease. In patients with a high clinical suspicion of leptospirosis, initiating antibiotic treatment as soon as possible without waiting for laboratory results is recommended.

- For patients with mild symptoms, doxycycline is the drug of choice (100 mg orally, twice daily), if not contraindicated. Other options include azithromycin (500 mg orally, once daily), ampicillin (500-750 mg orally, every 6 hours), amoxicillin (500 mg orally, every 6 hours).
- For patients with severe disease, IV penicillin is the drug of choice (1.5 MU IV, every 6 hours), and ceftriaxone (1 g IV, every 24 hours) can be equally effective.

Laboratory Testing

- Antibodies for leptospirosis develop between 3-10 days after symptom onset, thus any serologic test must be interpreted accordingly – negative serologic test results from samples collected in the first week of illness do not rule out disease, and serologic testing should be repeated on a convalescent sample collected 7-14 days after the first.
- In the acute phase of illness, leptospires are present in the blood (septicemia) for approximately the first 4–6 days of illness. Leptospires may be shed intermittently in the urine after approximately the first week of illness onset. Due to the transience of leptospires in body fluids, a negative PCR test does not rule out leptospisosis.
- It is best to submit as many specimen types as possible. Recommended specimens based on collection timing:
  - » Acute illness (first week): whole blood and serum
  - » Convalescent illness (after first week): serum +/- urine

Supportive Diagnostic Tests

• IgM-based commercial assays, such as » ELISA IgM » ImmunoDOT » Lateral flow tests	• IgM assays are screening tests and results should be confirmed using one of the confirmatory methods below.

Confirmatory Diagnostic Tests

1. Microscopic agglutination test (MAT) — confirmatory serologic testing, available at CDC
   - » Acute and convalescent serum samples collected 7–14 days apart is ideal.
   - » If only one serum sample can be sent for testing, a sample collected after the first 7–10 days of illness is preferred.
2. Polymerase chain reaction (PCR) – available at CDC and some commercial labs

   Recommended samples
   - » Whole blood collected in the first week of illness (in the first 4 days is ideal)
   - » Urine (collected at least 1 week after symptom onset is ideal)
   - » Cerebrospinal fluid from a patient with signs of meningitis
   - » Fresh frozen kidney and/or liver (if available from deceased patients) — kidney preferred
3. Pathology (immunohistochemistry) — available at CDC
   - » Formalin-fixed tissues: from the kidney (preferred), liver, lung, heart, or spleen

Sample Submission

To submit specimens to CDC for confirmatory testing, or if you have questions regarding leptospirosis diagnostic testing, contact CDC-INFO at 800-232-4636. Information on sample submission, including the sample submission form (DASH Form 50.34) and shipping instructions can be found at: http://www.cdc.gov/ncezid/dhcpp/bacterial_special/zoonoses_lab.html.

Unless authorized to send directly to CDC, all specimens should be sent and processed through the state/territorial public health laboratory.

Prevention

- The first line of leptospirosis prevention is to avoid exposure.
- Avoid wading, swimming, bathing, swallowing, or submersing head in potentially contaminated freshwater (rivers, streams) especially after periods of heavy rainfall or flooding.
- Avoid contact with floodwater, and do not eat food contaminated with floodwater.
- If exposure cannot be avoided, wear appropriate personal protective equipment (PPE) (rubber boots, waterproof coveralls/ clothing, gloves). Cover open wounds with waterproof dressings.
- Treat unsafe or potentially contaminated drinking water by boiling or chemically treating.
- Keep rodent populations (rats and mice) or other animal pests under control. Do not eat food that may have been exposed to rodents and possibly contaminated with their urine.
- Some studies have shown that chemoprophylaxis with doxycycline might be effective in preventing clinical disease and could be considered for people at high risk and with short-term exposures.

Surveillance and Reporting

- Leptospirosis is a nationally notifiable disease.
- The Council of State and Territorial Epidemiologists (CSTE) leptospirosis case definition can be found at: https://wwwn.cdc.gov/nndss/conditions/leptospirosis/case-definition/2013/. Please note the difference between laboratory tests that are "supportive" of a "probable" case classification versus those that provide evidence for a "confirmed" case classification.
- Please report confirmed and probable cases of leptospirosis to CDC via your state/ territorial health department using the CDC leptospirosis case report form found at: https://www.cdc.gov/leptospirosis/health_care_workers/index.html

For more information about leptospirosis, call 1-800-CDC-INFO or visit www.cdc.gov/leptospirosis.

Leptospirosis in Dogs

What is leptospirosis?

- A bacterial disease that affects humans and animals, including dogs.
- Symptoms can vary and might include fever, decreased energy, lack of appetite, conjunctivitis, vomiting, and diarrhea, and might progress to more severe illness.

How is it spread?

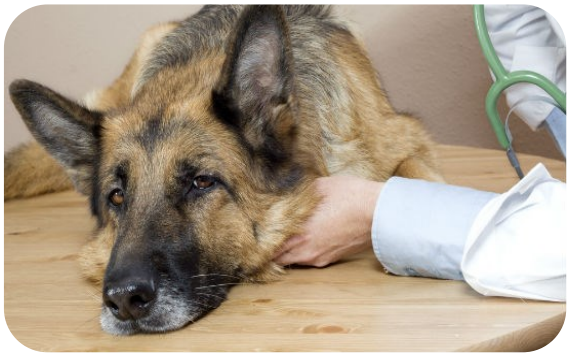
- In the urine and birthing fluids of infected animals.
- Dogs and people can be exposed to the bacteria through contact with contaminated urine, and urine-contaminated water, soil, bedding, or food.

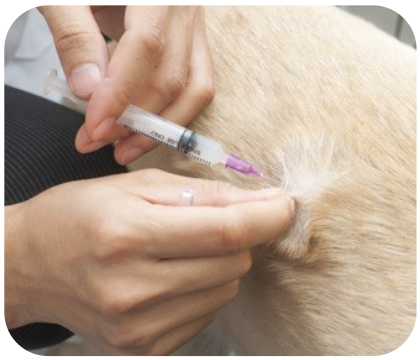
What is the risk to dogs and people?

- The bacteria can be shed intermittently in the urine of infected dogs, including those that are not showing signs of being sick. It can be spread from dog to dog and, rarely, to people. The bacteria can be present in a dog's urine for several months after recovery from illness if not properly treated with antibiotics. The shedding period can be shorter if the dog is treated with antibiotics.

COUNTY OF SAN DIEGO HHSA HEALTH AND HUMAN SERVICES AGENCY

LIVE WELL SAN DIEGO





Recommendations

- Infected dogs should be placed in floor-level cages, if possible, and housed away from high-traffic areas to limit urine-contamination.
- Kennels should be clearly marked with warning label to alert people to the presence of a leptospirosis positive dog.
- Pregnant or immunocompromised staff should avoid contact with infected dogs.
- Staff should wear gloves when handling an infected dog, and additional protective equipment such as a face shield and a gown when cleaning up the dog's urine.
- Staff should wash their hands after handling an infected dog, the dog's urine, or anything that may have been contaminated by the dog's urine.
- Avoid pressure-washing areas where infected dogs are housed, to avoid aerosolization of bacteria.
- Infected dogs should be walked in a designated and easy to clean area, with hard, non-permeable surfaces, away from other dogs.
- Disinfectants, such as a 1:10 bleach solution (1 part bleach, 9 parts water), should be used to clean areas where infected dogs are housed and where they have urinated.
- Normal laundering of urine-contaminated bedding and towels will inactivate the bacteria.
- Ask owners if their dog has been recently ill or been previously vaccinated against leptospirosis.
- Notify public health if staff that have been caring for infected dogs develop signs of illness.

For more information visit cdc.gov/leptospirosis
To report canine and human cases, please contact the County of San Diego Epidemiology Unit at (619) 692-8499, or Epi-CDReporting.HHSA@sdcounty.ca.gov

12/15/2020