

LEPTOSPIROSIS

Fact Sheet for Clinicians

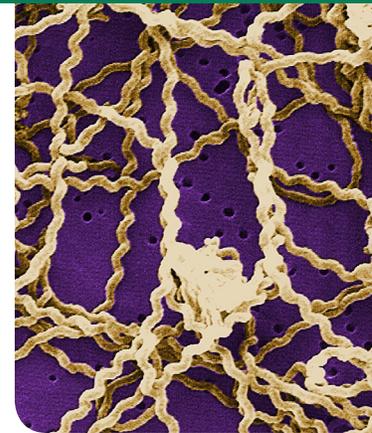
Background

- 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

- Leptospire 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.



Leptospira spp. bacteria



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.

Leptospire may be shed intermittently in the urine after approximately the first week of illness onset. Due to the transience of leptospire in body fluids, a negative PCR test does not rule out leptospirosis.

- 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.

