

Leptospirosis

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To better understand the epidemiology of leptospirosis in Washington State.
2. To identify sources of infection (e.g., animals or contaminated water) and educate people about how to reduce their risk of infection.

B. Legal Reporting Requirements

1. Health care providers: notifiable to local health jurisdiction within 24 hours.
2. Health care facilities: notifiable to local health jurisdiction within 24 hours.
3. Laboratories: *Leptospira* species notifiable to local health jurisdiction within 24 hours; specimen submission is on request only.
4. Veterinarians: Suspected human cases notifiable within 24 hours to the local health jurisdiction; animal cases notifiable to Washington State Department of Agriculture (see: <http://apps.leg.wa.gov/WAC/default.aspx?cite=16-70>).
5. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Communicable Disease Epidemiology Section (CDES) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Facilitate the transport of specimens to Washington State Public Health Laboratories for confirmatory testing when necessary.
2. Report all *confirmed* and *probable* cases to Communicable Disease Epidemiology Section (see definition below). Complete the leptospirosis report form (<http://www.doh.wa.gov/notify/forms/lepto.pdf>) and enter the data into the Public Health Issues Management System (PHIMS).
3. Leptospirosis in an animal can be reported to the DOH Zoonotic Disease Program (360-236-3385). A canine leptospirosis case report form is available at: <http://www.doh.wa.gov/ehp/ts/Zoo/leptoreportform.pdf>.

2. THE DISEASE AND ITS EPIDEMIOLOGY

Background

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, dairy farmers, rice and sugarcane field workers, or military personnel. It is a recreational hazard for those who participate in outdoor sports in areas with contaminated water and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers.

A. Etiologic Agent

The infection is caused by bacteria (spirochete) of the genus *Leptospira*. The bacteria can be associated with animal hosts or be free-living; they persist well in water, soil, and mud. Multiple pathogenic species exist, including *Leptospira interrogans*, and are subdivided into serovars. More than 200 serovars have been identified within these species. Common pathogenic serovars in the United States included in the *L. interrogans* species are *pomona*, *icterohaemorrhagiae*, *canicola*, and *autumnalis*.

B. Description of Illness

Clinical presentation can range from a self-limited febrile illness to a severe illness associated with renal failure, liver failure, meningitis, or respiratory failure. Infections can also be asymptomatic. Symptoms of leptospirosis include fever of sudden onset, headache, and chills. Severe muscle aches (calves and lumbar region) and conjunctival suffusion are specific clinical findings but are seen less commonly. Severe manifestations include aseptic meningitis, pulmonary hemorrhage, respiratory insufficiency, myocarditis, and impaired hepatic and renal function. Clinical illness lasts a few days to 3 weeks or longer. The illness generally has two phases: the acute or leptospiremic phase (5–7 days), followed by the convalescent or immune-mediated phase with severe symptoms (4–30 days). Phases may be separated by 3–4 days; some patients only present in the second phase. If untreated, recovery may take several months.

C. Leptospirosis in Washington State

DOH receives 0 to 5 reports of leptospirosis per year. Some of the cases are related to recreational water exposure in other countries, but there have been cases exposed in Washington. In Washington, reservoirs include both wild and domestic animals.

Leptospirosis has also been diagnosed in dogs in Washington. No human illness has been linked to the reported animal infections in Washington.

D. Reservoirs

Many different kinds of animals carry the bacteria and may become sick but sometimes have no symptoms. *Leptospira* organisms are shed in urine of infected animals including cattle, pigs, horses, dogs, rodents, and many wild animals. In carrier animals with chronic renal infections, leptospiuria persists for long periods or for life. Leptospire shed in urine may survive in water or moist soil for weeks to months.

E. Modes of Transmission

Leptospirosis is transmitted by exposure of skin (especially if abraded) or mucous membranes (e.g. eyes, mouth or nose) to urine or tissues from infected animals, or, more commonly, by contact with water or soil contaminated with the urine of infected animals. These water or soil exposures typically occur during recreational (e.g., swimming, wading, camping, rafting) or occupational activities. Infection can also occur by swallowing contaminated water or food. Person-to-person transmission is rare.

F. Incubation Period

The incubation period is typically 5–14 days (range: 2–30 days).

G. Period of Communicability

Direct transmission from person to person is rare. Leptospire may be excreted in the urine, usually for 1 month, but leptospiruria has been observed in humans for months, even years, after the acute illness.

H. Treatment

Leptospirosis should be treated with appropriate antibiotic therapy.

Note: Jarisch-Herxheimer reactions may occur with antibiotic treatment.

3. CASE DEFINITIONS

A. Clinical Criteria for Diagnosis

An illness characterized by fever, headache, chills, myalgia, conjunctival suffusion, and less frequently by meningitis, rash, jaundice, or renal insufficiency. Symptoms may be biphasic.

B. Laboratory Criteria for Diagnosis

Confirmatory:

- Isolation of *Leptospira* from a clinical specimen; OR
- Fourfold or greater increase in *Leptospira* agglutination titer between acute- and convalescent-phase serum specimens obtained ≥ 2 weeks apart and studied at the same laboratory; OR
- Demonstration of *Leptospira* in a clinical specimen by immunofluorescence.

Supportive:

- A *Leptospira* agglutination titer of ≥ 200 in one or more serum specimens.

C. Case Definition (1997)

Probable: a clinically compatible case with supportive serologic findings.

Confirmed: a clinically compatible case that is laboratory confirmed.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

1. Serologic tests: The diagnosis of leptospirosis is most commonly confirmed by ELISA or MAT. Antibodies develop during the second week of illness. An acute serum specimen should be collected when the diagnosis is suspected and the convalescent serum specimen should be collected at least 10-14 days after the acute specimen.
2. Culture: Requires special media. Leptospire can be isolated from whole blood (within 7 days of onset), cerebrospinal fluid (CSF) during the acute illness (4-10 days from onset), and from urine (after the 7th day and only if inoculated into special media within 2 hours of voiding). Clinical or autopsy specimens (e.g. punch biopsy of kidney) should be submitted fresh or frozen.

3. Immunofluorescence (IF) and immunohistochemistry (IHC) techniques are used for detection of leptospires in clinical and autopsy specimens (e.g., kidney, liver). Tissue should be formalin fixed or paraffin embedded.

B. Services Available at the Washington State Public Health Laboratories (PHL)

Serologic testing and culture for leptospirosis is not performed at PHL but specimens will be forwarded by PHL to the Centers for Disease Control and Prevention (CDC) for testing. Contact Communicable Disease Epidemiology Section to arrange for testing, especially for cultures in order to request special media.

Note that PHL require all clinical specimens have two patient identifiers, a name **and** a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

C. Specimen Collection

Please enclose a completed PHL Serology form (<http://www.doh.wa.gov/EHSPHL/PHL/Forms/SerVirHIV.pdf>) with serum specimens.

5. ROUTINE CASE INVESTIGATION

Interview the case and others who might provide pertinent information.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory results. Because leptospirosis rarely occurs in Washington, we prefer to confirm the diagnosis at CDC. If possible, arrange for diagnostic specimens (e.g., acute and convalescent sera) to be shipped to the Public Health Laboratories. Ensure that appropriate specimens are collected at the appropriate times (see Section 4A above).

B. Identify Potential Sources of Infection

Ask the case about contact with potentially infected animals and contaminated water (e.g., recreational water exposures, drinking untreated water, etc.) Report animal-associated cases to the DOH Zoonotic Disease Program (360-236-3385).

C. Identify Potentially Exposed Persons

Identify persons potentially exposed to the same source as the patient and educate them about symptoms of the disease to facilitate prompt diagnosis and treatment.

D. Environmental Evaluation

Report recreational water associated cases to the local environmental health division.

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations

Hospitalized patients should be cared for using standard precautions.

B. Case Management

No follow up needed.

C. Contact Management

None since the infection is not routinely spread person-to-person.

D. Management of Other Exposed Persons

Persons exposed to the same source as the case should be educated about symptoms of leptospirosis to facilitate early diagnosis. Doxycycline may be effective in preventing leptospirosis in adults exposed in high-risk areas. In Washington, prophylaxis would rarely be warranted.

Sehgal SC, Sugunan AP, Murhekar MV, Sharma S, Vijayachari P. Randomized controlled trial of doxycycline prophylaxis against leptospirosis in an endemic area. *International Journal of antimicrobial agents*. 2000;13(4):249–255.

E. Environmental Measures

If a site of exposure is determined, (e.g., contaminated lake) consider posting signs in the area to warn others of the risk and prevent further illness.

7. MANAGING SPECIAL SITUATIONS

A. Leptospirosis in an Animal

Consult with the DOH Zoonotic Disease Program (360-236-3385) regarding management of an infected animal.

B. Outbreaks

Determine if the case is associated with or potentially associated with an outbreak.

If an outbreak is suspected, notify the Communicable Disease Epidemiology Section immediately: 1-877-539-4344.

8. ROUTINE PREVENTION

A. Immunization Recommendations

No licensed vaccine for people exists in the United States.

B. Prevention Recommendations:

Prevention involves avoiding contact with potentially infected animals and contaminated water and soil.

1. Persons should not swim or wade in water that might be contaminated with animal urine.
2. Persons with occupational or recreational exposure to potentially infected animals, water or soil should wear protective clothing, boots, and gloves.
3. Persons should not feed wildlife or attract wildlife to their backyards to prevent transmission to pets and people.
4. Persons should rodent-proof their homes.
5. Get your pet vaccinated against leptospirosis. The vaccine for pets does not provide 100% protection, because the vaccine does not provide immunity against all strains of *Leptospira*. It is important to get your pet vaccinated even if it gets leptospirosis because it can still get infected with a different *Leptospira* strain.

6. Dispose of animal carcasses properly.
7. Persons should drain potentially contaminated waters and soil when possible.

For additional information, see:

http://www.who.int/csr/don/en/WHO_CDS_CSR_EPH_2002.23.pdf

ACKNOWLEDGEMENTS

This document is a revision of the Washington State Guidelines for Notifiable Condition Reporting and Surveillance published in 2002 which were originally based on the Control of Communicable Diseases Manual (CCDM), 17th Edition; James Chin, Ed. APHA 2000. We would like to acknowledge the Oregon Department of Human Services for developing the format and select content of this document.

UPDATES

May 2008: Severe symptoms were added to section 2B.

July 2008: Sections 1C and 7A were updated to include information regarding the reporting and management of leptospirosis in animals.

January 2011: The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision. The disease epidemiology and laboratory testing guidance were updated (Sections 2 and 4).