

Leptospirosis

(Also known as Weil Disease, Hemorrhagic Jaundice, Mud Fever, Swineherd Disease, Canicola Fever)



Section 1:

ABOUT THE DISEASE

A. Etiologic Agent

Leptospirosis is a bacterial disease caused by spirochetes, *Leptospira interrogans*, which is subdivided into multiple serovars. More than 200 pathogenic serovars have been reported. Serovars commonly reported in the U.S. include icterohaemorrhagiae, canicola, autumnalis, hebdomadis, ustralis, and pomona.

B. Clinical Description

The clinical course of leptospirosis often consists of two phases. Onset is usually abrupt, with nonspecific symptoms of fever, chills, headache, severe muscle pain (calves and thighs), conjunctival suffusion (pink eye), and malaise. Gastrointestinal symptoms and rash can also occur.

Subsequently, the patient can have hepatic involvement (abnormal liver function tests, enlargement of the liver, jaundice, and liver failure), renal involvement (abnormal urinalysis and renal failure), cardiovascular involvement (myocarditis), hemolytic anemia, hemorrhage into skin and mucous membranes, pulmonary involvement (with or without coughing up of blood), and central nervous system involvement (aseptic meningitis and altered mental status). Inflammation of certain muscle groups is common. Conjunctival suffusion, the most characteristic physical finding, occurs in less than half of patients.

Asymptomatic infections can occur, and disease severity depends on serotype. “Weil’s disease” refers to severe leptospirosis with jaundice. Duration of illness varies from less than one week to three weeks or longer. Antibiotics appear to shorten the course of illness and to reduce the frequency of convalescent leptospiruria (shedding the agent in the urine). Without treatment, recovery may take several months. The case-fatality rate is low, but it increases with age.

C. Vectors and Reservoirs

Wild and domestic animals are the reservoirs for leptospirosis. Many animals have asymptomatic infections with prolonged shedding of leptospiruria in urine (leptospiruria). In general, the infection is common in rodents, livestock (cattle, horses, sheep, goats, swine), canines, and wild mammals.

D. Modes of Transmission

After a short period of circulating high levels of the spirochete in their blood (leptospiremia), infected animals shed the spirochete in their urine, contaminating the environment. Transmission to humans and animals is through direct or indirect contact of nasal, oral, or eye mucosal membranes or through contact of abraded or traumatized skin with contaminated urine or carcasses of infected animals. Indirect exposure through water, soil, or foods contaminated

by urine from infected animals is the most common route. Inhalation of droplet aerosols of contaminated fluids can occasionally occur. Person-to-person transmission is rare.

E. Incubation Period

The incubation period is usually 10 days, with a range of 4–19 days.

F. Period of Communicability or Infectious Period

Person-to-person transmission of leptospirosis is considered extremely rare. Infected animals can spread the disease during the leptospiruria phase, which can be prolonged (1–3 months or longer). Humans with leptospirosis usually excrete the organism in urine for 4–6 weeks, but leptospiruria has been observed in humans and in animals for as long as 11 months after acute infection.

G. Epidemiology

In the U.S., 100–200 cases of leptospirosis are identified annually, with about 50% of the cases occurring in Hawaii. The disease is considered to be under-diagnosed. Although the incidence of disease in the U.S. is relatively low, leptospirosis is considered to be the most widespread zoonotic disease in the world, particularly in tropical areas with heavy rainfall and neutral or alkaline soils, which promote survival of leptospire in the soil. The greatest numbers of cases are seen in the summer months after heavy rainfalls or periods of flooding.

Leptospirosis is an occupational hazard for people who work outdoors or with animals (e.g., farmers, sewer workers, veterinarians, slaughterhouse workers, or military personnel). It is a recreational hazard for campers and those who participate in outdoor sports in contaminated areas. Infection has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers.

H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.



Section 2:

REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report any suspect case of leptospirosis based on a health care provider's medical opinion or a positive laboratory result indicating leptospirosis.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH State Laboratory Institute (SLI) does not perform testing for leptospirosis but can forward specimens to the Centers for Disease Control and Prevention (CDC). Serum specimens from patients with suspected leptospirosis should be sent to the SLI Reference Laboratory, along with a complete case history. Paired serum specimens are preferred but not required.

Contact the SLI Reference Laboratory at (617) 983-6607 for additional information on submission of specimens.



Section 3:

REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- ◆ To assess the magnitude of the disease in different areas and among different risk groups.
- ◆ To identify outbreaks as soon as possible.
- ◆ To identify animal sources of infection.
- ◆ To design more effective control and prevention methods.

B. Laboratory and Health Care Provider Reporting Requirements

Leptospirosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of leptospirosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Leptospira* infection shall report such evidence of infection directly to the MDPH within 24 hours.

C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities

Reporting Requirements

MDPH regulations (*105 CMR 300.000*) stipulate that leptospirosis is reportable to the LBOH and that each LBOH must report any confirmed case of leptospirosis or suspect case of leptospirosis, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS) using a MDPH *Generic Confidential Case Report Form* (found at the end of this chapter). Refer to the *Local Board of Health Timeline* at the end of this manual's *Introduction* section for information on prioritization and timeliness requirements of reporting and case investigation.

For questions related to leptospirosis in animals or to report a suspect case of leptospirosis in an animal, contact the Massachusetts Department of Agricultural Resources (MDAR), Division of Animal Health, Dairy Services, and Biosecurity (DAH) at (617) 626-1795.

Case Investigation

1. It is the responsibility of the LBOH to complete a MDPH *Generic Confidential Case Report Form* (found at the end of this chapter) by interviewing the case and others who may be able to provide information. Much of the information required on the form can be obtained from the case's health care provider or from the medical record.

2. Use the following guidelines to assist in completing the form:
 - a. Accurately record the demographic information.
 - b. Accurately record clinical information, including “leptospirosis” as the disease being investigated, date of symptom onset, symptoms, whether hospitalized, and hospital and clinician contact information.
 - c. Include all available diagnostic laboratory test information.
 - d. Information relevant to prevention and control: Use the incubation period range for leptospirosis (2–26 days). Specifically, focus on the period beginning a minimum of 2 days prior to the case’s onset date back to no more than 26 days before onset for the following exposures:
 - i. Travel history: Determine the date(s) and geographic area(s) traveled to by the case.
 - ii. Animal contact: Ask the case about potential direct or indirect pet, occupational, or recreational exposures to animals. This information can be documented in the “Comments” section.
 - e. Include any additional comments regarding the case.
 - f. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason(s) why it could not be filled out completely.
3. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked “Confidential”) to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to confirm receipt of your fax. The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
305 South Street, 5th Floor
Jamaica Plain, MA 02130
Fax: (617) 983-6813

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.



Section 4:

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

None.

B. Protection of Contacts of a Case

There is no immunization or prophylaxis for contacts of a case. Since a patient with leptospirosis usually excretes the organism in urine for 4–6 weeks, proper precautions (gloves, handwashing, etc.) should be used when handling urine or any articles soiled with urine.

C. Managing Special Situations

Reported Incidence Is Higher Than Usual/Outbreak Suspected

If the number of reported cases of leptospirosis in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle, such as contaminated water, should be sought, and applicable preventive or control measures should be instituted. Consult with the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

D. Preventive Measures

Environmental Measures

- ◆ To prevent illness, prevent contamination of living, working, and recreational areas by urine of infected animals.
- ◆ Control rodent populations in areas of human habitation.
- ◆ Domestic animal owners should take necessary precautions to minimize their animal's potential contact with wildlife (e.g., do not feed pets outside or allow animals to roam unsupervised).
- ◆ Do not allow animals to urinate in or near ponds, pools, or puddles.
- ◆ Keep animals away from gardens, playgrounds, sandboxes, and other places children may play.
- ◆ Among domesticated animals, vaccination of swine, cattle, and dogs does not provide 100% protection. Vaccines are generally effective in preventing symptoms of disease in animals, but do not protect against all serotypes and do not protect completely against infection or prevent shedding of organisms in the urine.

Personal Preventive Measures/Education

To prevent leptospirosis, the public needs to be educated on how the disease is transmitted and the importance of proper food storage and garbage disposal. They should also be counseled to minimize their contact with fresh water, mud, and vegetation that might be contaminated with the urine of infected animals. If their occupation or recreational activities require such exposure, education on use of personal protective measures (i.e., proper clothing, footwear, and gloves) should be given. Additional preventive measures include:

- ◆ Always wash hands thoroughly after touching items potentially soiled by an animal's urine.
- ◆ Use a disinfectant cleaning solution or a solution of one part bleach in ten parts water to clean areas or items soiled by the animal's urine.
- ◆ Doxycycline is effective post-exposure prophylaxis (200 mg once a week) and should be considered for high-risk occupational groups during periods of high exposure. (See Section 1G for examples of high-risk occupations.) However, indications for doxycycline use in children have not been established. There is no licensed vaccine to prevent leptospirosis in humans.

A *Leptospirosis in Dogs and People* Public Health Fact Sheet is available from the MDPH Division of Epidemiology and Immunization or on the MDPH website at www.mass.gov/dph. Click on the "Publications and Statistics" link, and select the "Public Health Fact Sheets" section under "Communicable Disease Control."



ADDITIONAL INFORMATION

The following is the formal CDC surveillance case definition for leptospirosis. It is provided for your information only and should not affect the investigation or reporting of a case that fulfills the criteria in Section 2A of this chapter. (The CDC and the MDPH use the CDC case definitions to maintain uniform standards for national reporting.) For reporting to the MDPH, always use the criteria outlined in Section 2A.

Note: The most up-to-date CDC case definitions are available on the CDC website at www.cdc.gov/epo/dphsi/casedef/case_definitions.htm.

Clinical Description

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

Laboratory Criteria for Diagnosis

- ◆ Isolation of *Leptospira* from a clinical specimen;
- ◆ 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.

Case Classification

Probable	A clinically-compatible case with supportive serological findings (i.e, a <i>Leptospira</i> agglutination titer of ≥ 200 in one or more serum specimens).
Confirmed	A clinically-compatible case that is laboratory-confirmed.



REFERENCES

- Acha P.N., Szyfres B. *Zoonoses and Communicable Diseases Common to Man and Animals, 3rd Edition Vol. I, Bacterioses and Mycoses*. Pan American Health Organization (PAHO). Scientific and Technical Publication #580, 2003.
- American Academy of Pediatrics. [Leptospirosis.] In: Pickering L.K., ed. *Red Book: 2003 Report of the Committee on Infectious Diseases, 26th Edition*. Elk Grove Village, IL, American Academy of Pediatrics; 2003: 403–405.
- CDC. Case Definitions for Infectious Conditions under Public Health Surveillance. *MMWR*. 1997; 46(RR-10).
- Heymann, D., ed. *Control of Communicable Diseases Manual, 18th Edition*. Washington, DC, American Public Health Association, 2004.
- “Leptospirosis: Frequently Asked Questions.” Centers for Disease Control and Prevention. October 12, 2005. <www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm>.
- MDPH. *Regulation 105 CMR 300.000: Reportable Diseases, Surveillance, and Isolation and Quarantine Requirements*. MDPH, Promulgated November 4, 2005.



FORMS & WORKSHEETS

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LBOH Action Steps

This form does not need to be submitted to the MDPH with the case report form. It is for LBOH use and is meant as a quick-reference guide to leptospirosis case investigation activities.

LBOH staff should follow these steps when leptospirosis is suspected or confirmed in the community. For more detailed information, including disease epidemiology, reporting, case investigation and follow-up, refer to the preceding chapter.

- Notify MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850 to report any suspect or confirmed case(s) of leptospirosis.
- To report a case or suspect case of leptospirosis in an animal, contact the Massachusetts Department of Agricultural Resources (MDAR), Division of Animal Health, Dairy Services, and Biosecurity (DAH) at (617) 626-1795 or fax the information to the DAH at (617) 626-1850.
- Assist MDPH with obtaining clinical specimens needed for laboratory confirmation, if necessary.
- Identify potential exposure sources, such as a water source.
- Identify other potentially exposed persons.
- Fill out a MDPH *Generic Confidential Case Report Form* (attach laboratory results).
- Send the completed case report form (with laboratory results) to the MDPH Bureau of Communicable Disease Control, Office of Integrated Surveillance and Informatics Services (ISIS).