

LEPTOSPIROSIS

(Weil's Disease, Pretibial (Fort Bragg) Fever, Swineherd's Disease, Swamp Fever, Mud Fever, Hemorrhagic Jaundice, Canicola Fever)

REPORTING INFORMATION

- **Class B:** Report by the close of the next business day after the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism:
 - The Ohio Disease Reporting System (ODRS) should be used to report lab findings to the Ohio Department of Health (ODH). For healthcare providers without access to ODRS, you may use the Ohio Confidential Reportable Disease Form (HEA 3334, rev. 1/09 <http://www.odh.ohio.gov/pdf/forms/hea3334.pdf>)
 - The Centers for Disease Control and Prevention (CDC) [Leptospirosis Case Report Form](#) (52.26, rev 6/13) is required for completion by the local health department. Information collected from the form should be entered into the Ohio Disease Reporting System (ODRS) **and** faxed to the Ohio Department of Health (ODH) – Outbreak Response & Bioterrorism Investigation team 614-564-2456. The mailing address for this form is: ODH Outbreak Response & Bioterrorism Investigation Team (ORBIT), 246 N. High St., Columbus, OH 43215
- Key fields for ODRS reporting include: import status (whether the infection was travel-associated or Ohio-acquired), date of illness onset, and all the fields in the Epidemiology module.

AGENT

All pathogenic leptospires belong to the species *Leptospira interrogans* (a bacterium). There are more than 300 serovars grouped into about 23 serogroups.

CASE DEFINITION

Clinical Description

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

Clinical presentation includes history of fever within the past two weeks and at least two of the following clinical findings: myalgia, headache, jaundice, conjunctival suffusion without purulent discharge, or rash (i.e. maculopapular or petechial); OR at least one of the following clinical findings:

- Aseptic meningitis
- GI symptoms (e.g. abdominal pain, nausea, vomiting, diarrhea)
- Pulmonary complications (e.g. cough, breathlessness, hemoptysis)
- Cardiac arrhythmias, ECG abnormalities
- Renal insufficiency (e.g. anuria, oliguria)
- Hemorrhage (e.g. intestinal, pulmonary, hematuria, hematemesis)
- Jaundice with acute renal failure.

Laboratory Criteria for Diagnosis

Diagnostic testing should be requested for patients in whom there is a high index of suspicion for leptospirosis, based either on signs and symptoms, or on occupational, recreational or vocational exposure to animals or environments contaminated with animal urine.

Supportive:

- *Leptospira* agglutination titer of ≥ 200 but < 800 by Microscopic Agglutination Test (MAT) in one or more serum specimens, *or*
- Demonstration of anti-*Leptospira* antibodies in a clinical specimen by indirect immunofluorescence, *or*
- Demonstration of *Leptospira* in a clinical specimen by darkfield microscopy, *or*
- Detection of IgM antibodies against *Leptospira* in an acute phase serum specimen.

Confirmed:

- Isolation of *Leptospira* from a clinical specimen, *or*
- Fourfold or greater increase in *Leptospira* agglutination titer between acute- and convalescent-phase serum specimens studied at the same laboratory, *or*
- Demonstration of *Leptospira* in tissue by direct immunofluorescence, *or*
- *Leptospira* agglutination titer of ≥ 800 by Microscopic Agglutination Test (MAT) in one or more serum specimens, *or*
- Detection of pathogenic *Leptospira* DNA (e.g. by polymerase chain reaction [PCR]) from a clinical specimen.

Epidemiologic Linkage

Involvement in an exposure event (e.g. adventure race, triathlon, flooding) with associated laboratory-confirmed cases.

Case Classification

Probable: A clinically compatible case with at least one of the following:

- Involvement in an exposure event (e.g. adventure race, triathlon, flooding) with known associated cases, *or*
- Presumptive laboratory findings, but without confirmatory laboratory evidence of *Leptospira* infection.

Confirmed: A case with confirmatory laboratory results, as listed above.

Comment

Although leptospirosis became nationally notifiable in 2014, it was already on Ohio's reportable disease list.

SIGNS AND SYMPTOMS

Clinical picture can vary, with many individuals having unapparent or subclinical infections. In general, two clinical types are distinguished: anicteric and icteric.

1. Anicteric: Initial symptoms last 4-7 days and may mimic flu, including fever, myalgia, conjunctivitis, neck stiffness, nausea and sometimes vomiting. In the second or immune stage of anicteric leptospirosis, fever is usually not present or is low-grade. Headaches, meningitis, myalgia, nausea, vomiting and abdominal pain are also common in this stage. Patients usually recover in about a month, although leptospiruria may continue for several months.
2. Icteric: Only 5-10% of cases have this severe form of leptospirosis (Weil's Disease),

in which the infection progresses to hepatitis, nephritis, meningitis, respiratory distress and hemorrhagic tendencies, with associated jaundice and azotemia. Convalescence may take several months.

DIAGNOSIS

Culture and serology are available through private laboratories.

Culture

Leptospire can be isolated from the blood (first 7 days) or CSF (days 4-10) during the acute illness. Afterwards, it can be isolated from the urine. It will be difficult to culture the organism once antibiotic treatment is initiated.

Serology

Enzyme-linked immunosorbent assay (ELISA) and MAT are the most commonly available serological tests. MAT has the best serovar/serogroups specificity. MAT will include a small panel of commonly occurring serovars. Even with MAT, though, cross reactivity with other serovars is possible, especially early in the course of infection. There is also the possibility that if the serovar is missing from the panel, that the serodiagnoses will be inaccurate or there will be a false negative. Since serology cannot differentiate between current, recent or past infections, two consecutive serum samples taken several weeks apart are ideal. A single high titer may be diagnostic, although the exact cut off value will be lab dependent.

EPIDEMIOLOGY

Source

Most wild and domestic animals can serve as reservoirs for leptospirosis. Swine, cattle, rodents, dogs and many wild animals can shed the organism in their urine, contaminating soil and surface water.

Occurrence

Leptospirosis occurs worldwide in both humans and animals. There are about 100-200 human cases reported each year in the United States. Several occupational groups are particularly at risk, including workers in rice fields, mines, sewer systems and slaughterhouses, as well as animal caretakers and veterinarians. Hunters and summer vacationers can be exposed while swimming and camping.

Mode of Transmission

Infection in humans and animals is contracted directly or indirectly, through the skin and the nasal, oral, and conjunctival mucosa. Indirect exposure through water, soil, or foods contaminated by urine from infected animals is the most common route. Person-to-person transmission is rare even though excretion in the urine may continue for up to 11 months.

Period of Communicability

Direct transmission from person to person is rare. Leptospire may be excreted in the urine for a month, but urinary excretion in humans and animals has been reported for up to 11 months.

Incubation period

Usually 5-14 days, with a range of 2-30 days.

PUBLIC HEALTH MANAGEMENT

Case

Investigation

Search for the source of infections, such as exposure to contaminated waters and animal contact. Complete the CDC Leptospirosis Case Investigation Report.

Treatment

Penicillin in large doses, streptomycin, tetracycline, doxycycline, erythromycin and chloramphenicol are leptospirocidal in vitro. Evidence concerning the influence of drugs on leptospirosis in humans is conflicting and for best response should be given before the fourth day of illness. Penicillin G and amoxicillin may be effective as late as seven days into the illness.

Isolation and Follow-up Specimens

Standard precautions. Convalescent serum obtained ≥ 2 weeks after acute serum.

Public Health Significance

Transmission is usually through contact with wild or domestic animals and contaminated water. When a case is identified and potential mode of transmission is determined, education should be provided to others with similar environmental or occupational exposure.

Contacts

Contacts should be alerted to the symptoms in case they have a history of exposure to infected animals or contaminated waters by virtue of being in one of the high-risk occupations or by similar exposure as the case.

Prevention and Control

Follow-up Specimens

Generally, no environmental specimens are indicated. Public education about the mode of transmission and control of reservoir animals, especially raccoons, opossums, skunks and rodents, should be considered. Drainage of potentially contaminated waters and soil can be recommended, if feasible.

Vaccination

There are no effective vaccines for humans. Vaccines for domestic livestock and canines give protection for specific serovars, but do not provide cross protection to other existing or newly emerging serovars.

Additional Information

See <http://www.cdc.gov/leptospirosis/>.

What is leptospirosis?

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*. In humans it causes a wide range of symptoms, and some infected persons may have no symptoms at all. Symptoms of leptospirosis include high fever, severe headache, chills, muscle aches, and vomiting, and may include jaundice (yellow skin and eyes), red eyes, abdominal pain, diarrhea, or a rash. If the disease is not treated, the patient could develop kidney damage, meningitis (inflammation of the membrane around the brain and spinal cord), liver failure, and respiratory distress. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

How do people get leptospirosis?

Outbreaks of leptospirosis are usually caused by exposure to water contaminated with the urine of infected animals. Many different kinds of animals carry the bacterium; they may become sick but sometimes have no symptoms. *Leptospira* organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing urine from these infected animals. This may happen by swallowing contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

What are the symptoms of leptospirosis?

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. If untreated, Leptospirosis can result in respiratory distress, kidney damage and liver failure.

How long after exposure before symptoms appear?

Usually 5-14 days; range 2-30 days.

Where is leptospirosis found and who is at risk?

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, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The Center of Disease Control and Prevention (CDC) estimates that there are between 100 and 200 cases of Leptospirosis in humans each year in the United States, over half of these occur in Hawaii. In Ohio, 11 human cases were reported between 2000 and 2014.

How is leptospirosis treated?

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

Once you recover from Leptospirosis are you immune?

No, there are many distinct types of leptospira. You may have some immunity to the one you were infected with, but you could still become infected with the others if exposed.

Can leptospirosis be prevented?

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine. Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

For more information please visit the following websites.

CDC Leptospiroses Information: <http://www.cdc.gov/leptospirosis/>

CDC Leptospirosis and Your Pet:

<http://www.veterinarypartner.com/Content.plx?P=A&C=15&A=1745&S=1>