

Leptospirosis

Surveillance Protocol

Provider Responsibilities

1. Report cases of leptospirosis within 1 week of diagnosis to the local health department.
2. Report outbreaks of leptospirosis immediately to the local health department. Outbreaks are frequently recognized after exposure to natural surface water through outdoor sports activities such as swimming or boating events or after flooding.

Laboratory Responsibilities

1. Report laboratory evidence for leptospirosis within 1 week to the local health department by submitting a copy of the laboratory report. If the laboratory is capable of reporting electronically, the report is due within 24 hours at the next scheduled download.
2. Report outbreaks immediately by phone to the local health department.

Local Health Responsibilities

1. Occupational health protections: standard precautions and routine adult vaccinations are recommended for direct contact with leptospirosis patients.
2. Educate physicians and laboratories about reporting requirements on an annual basis.
3. For all cases, complete the WVEDSS form and submit to review.
4. For outbreak-related cases, or cases that report other ill persons in association with an exposure such as during a flood or a freshwater sporting event (triathlon, jet ski race, boat race, swimming competition), contact DIDE immediately at (304) 558-5358, extension 1 or (304) 025-9946.

State Health Responsibilities

1. Report cases to CDC.
2. Report outbreaks to CDC within 24 hours.

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3. Maintain the ability to support local health department field response and outbreak response.
4. Provide consultation and support to local health departments and other stakeholders.

Disease Control Objectives

When an outbreak of leptospirosis is reported, rapidly:

1. Determine the source of infection; and
2. Eliminate the source.

Disease Prevention Objectives

Prevent cases of leptospirosis by general public health sanitation measures, including:

- reducing rodent infestations;
- maintaining general hygiene measures in facilities housing animals; and
- maintaining proper sewage and animal waste disposal.

Disease Surveillance Objectives

Detect cases and outbreaks of leptospirosis when they occur in West Virginia.

Public Health Significance

Leptospirosis is frequently described as the most widespread bacterial zoonosis on earth. Rodents are the primary reservoir and shed leptospira in their urine and contaminate the environment, especially freshwater.

In tropical areas, Leptospirosis is associated with flooding, occupational exposure in rice paddies or cattle farms, or residence in crowded and unsanitary slums. In developing nations, outbreaks have been associated with monsoons and flooding.

In developed nations, cases and outbreaks have been associated with travel and large-scale water sports events such as races or triathlons. Climate change is expected to increase precipitation and flooding and with that the risk of Leptospirosis may increase.

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Human vaccines for leptospirosis are available in China, Japan, Korea and Vietnam. Commercial vaccines for animals are available in many nations.

Clinical Description

The clinical manifestations of leptospirosis can range from asymptomatic to fatal. Asymptomatic or mildly symptomatic cases usually go unrecognized except when they are part of an outbreak.

Patients sometimes experience a ‘biphasic’ illness characterized by initially mild nonspecific flu-like symptoms (fever, headache, myalgias, nausea, vomiting, rash, and sometimes conjunctival suffusion (redness of the conjunctiva without exudate)), followed by 1-3 days of recovery, followed by relapse. The initial mild phase is caused by leptospiremia (leptospire in the bloodstream), and the second phase of illness, sometimes called the ‘immune phase’ (because antibodies appear during this phase) is caused by organ involvement.

When biphasic illness occurs, the second phase of illness has been categorized as ‘anicteric’ or ‘icteric’ (also called ‘Weil’s disease’).

The ‘icteric’ form is milder. About 80-90% of persons have CSF abnormalities thought to be due to immune response to circulating leptospire. Recovery is the norm. Uveitis (inflammation of the iris and associated structures in the front of the eye) can also occur with this form of illness.

‘Icteric’ or ‘Weil’s disease’ is much more severe. Jaundice, elevated liver enzymes, renal failure, hepatic failure, pulmonary hemorrhage, and meningitis are associated with a high fatality rate.

Etiologic Agent

Spirochetes of the genus *Leptospira*. There are at least 19 species, 7 of which are the main disease agents: *L interrogans*, *L borgspetersenii*, *L santarosai*, *L noguchii*, *L weilli*, *L kirschneri* and *L alexanderi*.

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Reservoir

Rodents are the major reservoir and can maintain high infection rates without symptoms and shed *Leptospira* in the urine. Domestic animals including pigs, cattle and dogs can also be carriers. However, virtually all mammals can become infected and carry *Leptospira* in the kidneys and shed *Leptospira* in the urine.

Some strains can also survive for a prolonged period of time in soil and fresh water at neutral pH and high temperatures (22 C). Transmission from environmental sources may occur year round in the tropics and in the summer and fall in temperate climates.

Mode of Transmission

Infection occurs when urine from an infected animal or water contaminated with urine from an infected animal enters the body through a break in the skin or through mucous membranes.

Infection can also occur due to contact with tissues of an infected animal. Veterinarians and hunters may be at risk for this type of transmission.

Incubation Period

Usually 1-2 weeks (range: 2-30 days).

Period of Communicability

Leptospirosis can be shed in the urine for prolonged periods of time; however, under usual conditions, the disease is not spread from one person to another.

Outbreak Recognition

Outbreaks of Leptospirosis in the developed world are typically recognized in association with sporting events that involve mass exposure to water, often occurring after heavy rains or flooding. Because the disease is so protean in nature, recognition of

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one or a few cases in association with a watersports or flooding event should prompt a search for additional mildly symptomatic or subclinical cases.

Laboratory Testing

Laboratory testing is difficult. Each available test offers some advantages and substantial limitations.

Culture: During the initial stage of illness, isolation of leptopires by culture is possible, but requires a high index of suspicion and specialized testing methods. In addition, growth of leptospire is slow; media should be examined for growth up to 13 weeks after inoculation. Blood, CSF and peritoneal dialysate can be cultured in the first week of illness. Urine can be cultured beginning in the second week of illness. While culture is diagnostic, the disadvantage is that results are not available in time to impact choice of therapy.

Dark field microscopy: can be used on a variety of body fluids, but is neither sensitive nor specific for the diagnosis.

Nucleic acid test (NAT): polymerase chain reaction (PCR) is useful in the acute stage of illness and is at least as sensitive as culture. The advantage to PCR is a result that is rapid enough to impact the choice of patient therapy.

Microscopic agglutination test (MAT): MAT is how most patients with leptospirosis are diagnosed. MAT is a complex test and usually only available through reference laboratories. Paired specimens are usually required for diagnosis; however, if the patient has typical signs and symptoms, a single specimen can be diagnostic. MAT may be negative early in illness.

Case Definition

Clinical Criteria

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

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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

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- Detection of pathogenic *Leptospira* DNA (e.g., by 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.

Preventive Interventions

- Prevent exposure to contaminated water.
- Workers involved in flood clean-up or other potentially hazardous occupations should use appropriate work clothing protecting the skin to avoid exposure through abrasions or cuts.
- Control rodent populations and remove trash around human dwellings.
- Sanitary disposal of sewage.

Treatment

Doxycycline and penicillin G have been used for treatment.

Surveillance Indicators

1. Proportion of cases with complete demographic information.

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2. Proportion of cases with complete clinical information.
3. Proportion of cases with complete risk factor information.

References

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