

PUBLIC HEALTH REFERENCE SHEET

Legionellosis



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| Name | <i>Legionella</i> species |
| Reservoir & Transmission | Man-made water supplies that aerosolize water (e.g., showers, air conditioning cooling towers, whirlpool spas, and decorative fountains) Airborne transmission |
| Incubation Period | Legionnaires' disease: 2–14 days (often 5–6 days) Pontiac fever: 5–72 hours (often 24–48 hours) |
| Common Symptoms | Legionnaires' disease: fever, myalgia, cough, and clinical or radiographic pneumonia Pontiac fever: milder illness without pneumonia characterized by dry cough or sore throat, fever, chills, fatigue, headache, myalgia |
| Gold Standard Diagnostic Test | Antigen testing, culture |
| Risk Groups | Older age (≥ 50), cigarette smoking, diabetes mellitus, chronic lung disease, renal disease, or immunocompromised groups |
| Geographic Significance | Worldwide |

What is legionellosis?

Bacteria of the genus *Legionella* cause Legionnaires' disease (LD) and Pontiac fever (PF) and more rarely, Extrapulmonary Legionellosis (XPL), collectively referred to as legionellosis.

What is the occurrence of legionellosis?

There are at least 60 different species of *Legionella*, most of which are considered to be pathogenic. However, the majority of disease is caused by *Legionella pneumophila*, particularly serogroup 1. *Legionella* occurs naturally in freshwater environments, but generally does not cause disease. In human-made water systems, *Legionella* can grow and be transmitted to via aerosolization. Outbreaks are commonly associated with buildings or structures that have complex water systems, such as hospitals, long-term care facilities, hotels, resorts, and cruise ships. Outbreaks occur when two or more people are exposed to *Legionella* in the same place and get sick at about the same time. The most likely sources of infection include water used for showering, hot tubs, decorative fountains, and cooling towers (i.e., structures that contain water and a fan as part of centralized air-cooling systems for a building or industrial processes).

How is legionellosis transmitted?

Legionella is transmitted via inhalation of aerosolized water containing the bacteria. Less commonly, *Legionella* can also be transmitted via aspiration of drinking water. A single episode of possible person-to-person transmission of Legionnaires' disease has been reported.

Who is at risk for legionellosis?

- Age ≥ 50 years
- Smoking (current or historical)
- Chronic lung disease (such as, emphysema or COPD)
- Immune system disorders due to disease or medication
- Systemic malignancy
- Underlying illness, such as diabetes, renal failure, or hepatic failure
- Recent travel with an overnight stay outside of the home
- Recent care at a healthcare facility
- Exposure to hot tubs

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What are the signs and symptoms of legionellosis?

LD is very similar to other types of pneumonia with clinical symptoms that must include acute onset of lower respiratory illness with fever and/or cough, and may include myalgia, shortness of breath, malaise, chest discomfort, confusion, nausea, diarrhea, or abdominal pain. Headache may also occur. Cough may be nonproductive. Symptoms usually begin 2 to 14 days after being exposed to the bacteria, but it can take longer.

PF is a milder illness without pneumonia, compared to LD. Symptoms may vary but must include acute symptom onset of one or more of the following: fever, chills, myalgia, malaise, fatigue, headaches, nausea, and/or vomiting. Symptoms begin between 5 to 72 hours after being exposed to the bacteria and usually last less than a week.

What are potential complications of legionellosis?

Extrapulmonary Legionellosis (XPL) can cause disease at sites outside of the lungs (e.g., associated with endocarditis, wound infection, joint infection, graft infection).

How is legionellosis diagnosed?

Radiographic chest imaging findings are variable and may show patchy or focal areas of consolidation or bilateral involvement.

LD: Diagnosis is by culture of a lower respiratory secretions (e.g., sputum, bronchoalveolar lavage) on selected media. *Legionella* DNA is detected in respiratory samples by polymerase chain reaction (PCR), *L. pneumophila* antigens in the urine, or measure a four-fold rise in immunofluorescent antibody titer to *L. pneumophila* serogroup 1. Serological assays can be nonspecific and are not recommended in most situations. Best practice is to obtain both sputum for culture and urine for the urinary antigen test (UAT) concurrently. Sputum should be obtained prior to antibiotic administration, but antibiotic treatment should not be delayed. The UAT can detect *Legionella* infections in some cases for days to weeks after treatment.

PF: Diagnosis is by identifying symptoms consistent with the disease in the appropriate epidemiological setting. If disease is due to *L. pneumophila*, urine antigen and serological testing may be useful to confirm the diagnosis, but test sensitivity is low.

XPL: Laboratory evidence from an extrapulmonary site includes culture; nucleic acid (DNA) through PCR, sequencing, or NAAT; antigen from urine; or at least a four-fold increase of antibody titer.

How is legionellosis treated?

LD: Treatment with antibiotics is needed, and most cases can be treated successfully.

PF: PF is a self-limited illness that does not benefit from antibiotic treatment. Patients usually recover within 1 week.

How can legionellosis be prevented?

A vaccine is not available and antibiotic prophylaxis is not effective. Minimizing *Legionella* growth in complex building water systems and devices is key to preventing infection. Timely identification and reporting of legionellosis cases allow public health officials to quickly identify and stop potential clusters and outbreaks by linking new cases to previously reported ones.

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What are some public health considerations?

Responding to healthcare-associated cases and outbreaks of Legionnaires' disease depends on several factors that include but are not limited to:

- Type and size of the healthcare facility
- Existing capacity of the facility and health department
- Number of cases
- Water management program performance
- Routine environmental sampling results

Testing for healthcare-associated Legionnaires' disease is especially important if any of the following are identified in a healthcare facility:

- Patients with healthcare-associated LD diagnosed in the past 12 months
- Positive environmental tests for *Legionella*
- Current changes in water quality that may lead to *Legionella* growth (such as, low chlorine levels or nearby construction)

Case report form and instructions are available through the CDC at:

<https://www.cdc.gov/legionella/health-depts/surv-reporting/form-instructions.html>

References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions*.

<https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines>

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

"Legionella," Centers for Disease Control and Prevention (CDC), last reviewed March 25, 2021. <https://www.cdc.gov/legionella/>

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