

Legionella

What is *Legionella*?

Legionella was identified as the cause of the July 1976 outbreak of pneumonia among people at a convention of the American Legion in Philadelphia. Accordingly, this previously unknown bacteria and the disease it caused, Legionnaires' disease, were named.

Legionella are characterized as gram-negative, aerobic, unencapsulated bacilli. Fifty bacterial species with more than 70 serogroups make up this genus; 20 of the species are known to be associated with human infection.

What is Legionnaires' disease?

Legionnaires' disease, or Legionellosis, is a severe infection caused by *Legionella* species, primarily *L. pneumophila*, which is responsible for 90% of infections. The disease typically presents as pneumonia and symptoms may include a high fever, chills, cough, muscle aches, headaches, and diarrhea.

Pontiac fever is an acute, febrile, self-limited illness that has been linked to *Legionella* species. This infection is generally characterized by fever, fatigue, and muscle pain. Antimicrobial treatment does not need to be administered to treat this infection, but should be prescribed for cases of Legionnaires' disease.

What are the most common species that cause human infection?

Most reported cases of Legionnaires' disease are caused by *Legionella pneumophila*, serogroup 1. The estimated proportion of cases caused by species is:

- *L. pneumophila* (91.4%)
- *L. micdadei* (2.8%)
- *L. longbeachae* (2.2%)
- *L. dumoffii* (1.5%)
- *L. bozemanii* (1.3%)

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Where is *Legionella* found?

- Environmental water sources
- Potable water, such as that from faucets, showers, and hot water tanks
- Cooling towers and hot tubs

Who is at risk of *Legionella* infection?

Legionella infection can occur in a variety of hosts. The incidence of Legionnaires' disease depends on the degree of water contamination, the intensity of the patient's exposure to that water, and the susceptibility of the patient. The presence of the bacteria in the aforementioned sources does not in and of itself constitute a dangerous condition or disease threat to healthy individuals. *Legionella* in a hospital water system increases the risk of hospital acquired infection for:

- Immuno-compromised and those with underlying diseases
- Transplant patients are at risk for infection
- Cigarette smoking, chronic lung disease, and immunosuppressive treatment

How is *Legionella* transmitted?

- Aspiration of water contaminated with the organism
- Contaminated respiratory-therapy equipment
- Inhalation of aerosols containing *Legionella*

What are the clinical manifestations of infection?

Symptoms of infection may develop after a few days or up to two weeks after exposure to the bacterium. Pneumonia is the major clinical presentation of *Legionella* infection, typically caused by aspiration or aerosolization of water from a contaminated water source. The persistence of pulmonary infiltrates is suggestive of Legionnaires' disease. Other symptoms include fever, headache, confusion, and muscle pain. Some advanced disease symptoms may include gastrointestinal and nervous system problems.

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How is *Legionella* infection diagnosed?

- Culture of the bacteria on selective media
- Detection of *Legionella*-specific antibodies in serum (serology)
- It is necessary to conduct antibody testing of both acute- and convalescent-phase sera when diagnosing Legionnaires' disease.

What treatment is available?

There is currently no vaccine available for the disease. Antimicrobial agents such as macrolides and quinolones are effective in treating *Legionella* infections, which include:

- Azithromycin
- Clarithromycin
- Roxithromycin
- Levofloxacin
- Ciprofloxacin
- Moxifloxacin
- Gemifloxacin
- Tetracycline

How can *Legionella* be monitored and controlled in water supplies?

There are several short term and long term water treatment options to reduce *Legionella* bacteria in water systems. These include chemical treatment or repeated thermal eradication. If illness is suspected to be from *Legionella* in a contaminated water source, the water should be immediately tested. Additionally, experts should be consulted for guidance regarding treatment of the water system.

Sources

- The role of environmental surveillance in determining risk for hospital-acquired Legionellosis: a national surveillance study with clinical correlations. Stout JE, Muder RR, Mietzner S, Wagener MM, et al. *Infect Control Hosp. Epidemiol.* 2007;28:818-824.
- Community-acquired Legionnaires' disease: Implications for under diagnosis and laboratory testing. Yu VL, Stout JE. *Clin Infect Dis.* 2008; 46:1365-1367.

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