



# Legionnaires' Disease

An Online Continuing Education Course for Engineers

**Course Number: H-3001**

**Credit: 3 Hours / 3 PDH / 3 CPD**

# Legionnaires' Disease

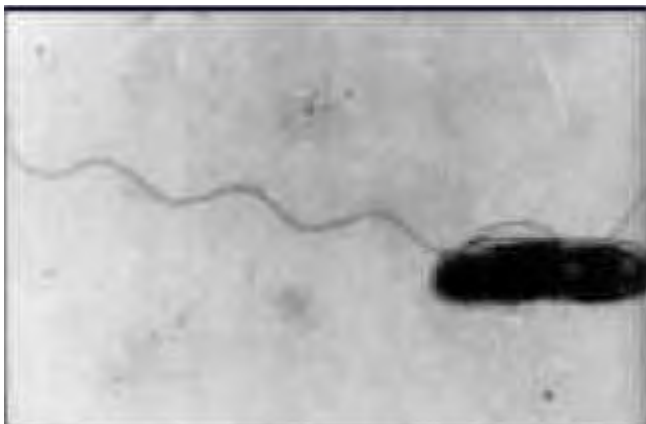
## Section 1: What is Legionnaires' disease?



Legionnaires' disease is a common name for one of the several illnesses caused by Legionnaires' disease bacteria (LDB). Legionnaires' disease is an infection of the lungs and is a form of pneumonia. More than 43 species of Legionella have been identified and more than 20 linked with human diseases. Legionellosis is the term for the diseases produced by LDB. In addition to Legionnaires' disease, the same bacteria also cause a flu-like disease called Pontiac fever.

The Centers of Disease Control and Prevention (CDC) first identified Legionella pneumophila in 1977 as the cause of an outbreak of pneumonia that caused 34 deaths at a 1976 American Legion Convention in Philadelphia. *L. pneumophila* had undoubtedly caused previous pneumonia outbreaks, but the organism's slow growth and special growth requirements prevented earlier discovery. The species of Legionella that have been associated with cases of Legionnaires' disease are called Legionnaires' disease bacteria (LDB).

- *L. pneumophila* is a gram -negative rod that exists in a number of distinguishable serogroups.
- Other species of Legionella cause legionellosis but *L. pneumophila* causes the majority of cases.
- *L. pneumophila* is also implicated in wound infections, pericarditis, and endocarditis without the presence of pneumonia.



**Fig. 1: Legionella pneumophila Bacterium**

Legionnaires' disease sources may include almost any warm water system or device including man-made or natural, that disseminates water, particularly as aerosols, sprays or mists and provides favorable conditions for LDB growth and amplification.

LDB are widely present at low levels in lakes, streams, rivers, freshwater ponds, and mud. However, the levels of LDB that are found in the natural environment are so low that it is unlikely that an individual will contract the disease from these sources.



**Fig. 2: Levels of LDB are low in natural environments.**

- The risk of exposure increases when high concentrations of the organism grow in water systems.
- Legionnaires' disease only occurs in the presence of a contaminated water source.
- Domestic (potable water) plumbing systems, cooling towers, and warm, stagnant water can provide ideal conditions for the growth of the organism.

Disease transmission is most likely to occur via:

- Inhalation: of aerosols, fine sprays, mists or other microscopic droplets of water contaminated with LDB, providing direct access into the lungs.
- Aspiration: such as may occur when choking or spontaneously during the drinking, ingesting, swallowing process. This allows oral fluids and particles to by-pass natural gag reflexes and enter into the respiratory tract and lungs instead of the esophagus and stomach.
- There is no evidence that the diseases are transmitted from one person to another.



**Fig. 3: Transmission may occur via inhalation or aspiration.**

### **What are the symptoms?**

Legionellosis is associated with two distinct illnesses: Legionnaires' disease, which is characterized by fever, myalgia, cough, pneumonia, and Pontiac fever, a milder illness without pneumonia.

Legionnaires' disease has an incubation period (the time from exposure to the onset of symptoms) of 2 to 10 days. Severity ranges from a mild cough and low fever to rapidly progressive pneumonia, coma, and death. Not all individuals with Legionnaires' disease experience the same symptoms.

Early symptoms include slight fever, headache, aching joints and muscles, lack of energy or tiredness, and loss of appetite.

Later symptoms include:

- High fever (102° to 105° F, or 39° to 41 ° C)
- Cough (dry at first, later producing phlegm)
- Difficulty in breathing or shortness of breath
- Chills
- Chest pain
- Common gastrointestinal symptoms include vomiting, diarrhea, nausea, and abdominal pain.



**Fig. 4: Early symptoms may include fever, headache, and tiredness.**

Pontiac fever is a non-pneumonia disease with a short incubation period of one to three days. Full recovery usually occurs in two to five days without medical intervention and no deaths have been reported.

- Pontiac fever produces flu -like symptoms that may include fever, headache, tiredness, loss of appetite, muscle and joint pain, chills, nausea, and a dry cough.
- Pontiac fever has been associated with exposure to non-viable LDB and may be a hypersensitivity response to bacterial or other antigens rather than an infection.

#### **What are the incidence rates and risk factors?**

The likelihood of contracting Legionnaires' disease depends on the level of contamination in the water source, the susceptibility of the person exposed, and the intensity of exposure. Unlike Legionnaires' disease, which occurs in approximately 5 percent or less of people who are exposed, Pontiac fever will occur in approximately 90 percent of those exposed. The factors that cause the same organism to produce two illnesses with major differences in "attack rate" (the fraction of exposed persons who become infected) and severity are not known.

In the United States, Legionnaires' disease is fairly common and serious. LDB are one of the top three causes of non-epidemic, community-acquired pneumonia.

- It is estimated that over 25,000 cases of the illness occur each year and cause more than 4,000 deaths.
- The fatality rate is similar to that of other forms of pneumonia, approximately 15 percent.
- It is difficult to distinguish this disease from other forms of pneumonia; so many cases go unreported.



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pneumonia.

The Centers for Disease Control and Prevention (CDC) defines a confirmed case of Legionnaires' disease as a clinically compatible case that is confirmed by a laboratory. A confirmed case requires a physician's diagnosis of pneumonia based on a chest x-ray and positive laboratory test results. A laboratory test is necessary for confirmation because the symptoms and x-ray evidence of Legionnaires' disease resemble those of other types of pneumonia.