

What is *Legionella*?

Legionella are gram-negative, aerobic bacteria that absolutely require L-Cysteine and iron salts for growth. There are at least 50 species of *Legionella* consisting of about 70 distinct serogroups currently identified¹.



Legionellosis

Legionellosis is the name given to the group of diseases caused by *Legionella* bacteria, including Legionnaires' disease, Pontiac fever^{1,2,3}, and the more recently described Lochgoilhead fever⁴. About 90% of all Legionellosis cases are caused by a single species, *Legionella pneumophila*⁴, with about 79% of confirmed cases specifically caused by *Legionella pneumophila* serogroup 1². Legionnaires' disease was first described after an outbreak of pneumonia among people attending a 1976 American Legion Convention in Philadelphia where 34 people died and 182 patients were identified². The symptoms of Legionnaires' disease are similar to other forms of pneumonia and include a high fever, chills, cough and develop 2-14 days after exposure to the bacteria¹. The disease can only be positively identified by a chest X-ray to find the pneumonia, followed by a clinical diagnostic test to identify the presence of *Legionella* in the body⁵. The less severe Pontiac Fever usually has an incubation period of 2-3 days from time of exposure and does not result in pneumonia showing influenza-like symptoms, lasting 2-5 days without further treatment^{1,3}. Lochgoilhead fever shows similar symptoms to Pontiac Fever but has an incubation period of up to 9 days and is attributed to *Legionella micdadei*⁴.

Sources and Spread

Legionella bacteria are ubiquitous in the environment and are commonly found in lakes, rivers, creeks, and soil^{5,6}. Risk factors associated with proliferation of the bacteria include natural or artificial water at a temperature suitable for multiplication (20°C to 50°C) with a source of nutrients such as scale, algae, protozoa, or other biofilm material^{5,6,7}. A biofilm can form on surfaces and is a complex matrix of different microbes including slime forming bacteria. Biofilms provide an

ecosystem that protects the associated micro-organisms, including *Legionella*, from disinfection attempts, including biocides¹.

In order for illness to occur, the bacteria must first be inhaled and not ingested. For inhalation, a contaminated source must have the ability to form aerosols, or tiny water droplets containing *Legionella*^{1,3,5,6,7,8}.

Systems typically considered as threats for spreading *Legionella* bacteria include: cooling towers, showers, spas, decorative fountains, domestic hot water systems (maintained less than 60°C), humidifiers, respiratory therapy equipment, dental hygiene equipment, and grocery store produce misters^{1,3,5,6,7,8}.

Risk Factors

Everyone is potentially at risk of infection, but there are some risk factors that pre-dispose an individual to contracting Legionnaires disease. According to Health Canada these factors include middle aged and older men, smokers, those who abuse alcohol, diabetics, people with chronic lung or kidney disease, and people with a weakened immune system (i.e. cancer and organ transplant patients)³. Although one may be predisposed to contracting Legionnaires disease, there does not appear to be a correlation to a higher risk group for contracting Pontiac Fever^{1,3,7}.

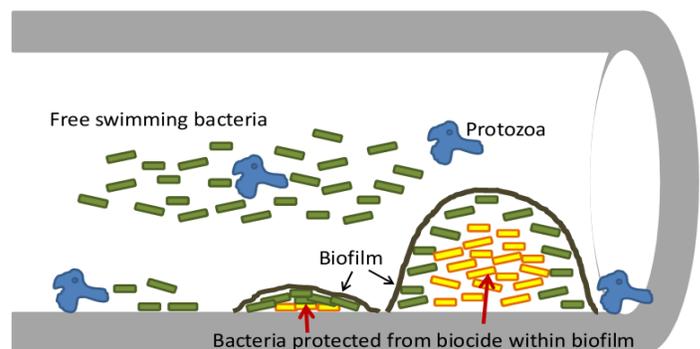


Figure of biofilm formation in a water pipe. The bacteria within the biofilm are protected from biocides.

Bibliography

- ¹ Legionella and the prevention of legionellosis, (2007) WHO Press, Geneva, Switzerland.
- ² Fields, BS, et al. (2002) *Legionella and Legionnaires' Disease: 25 Years of Investigation*. Clinical Microbiology Reviews July 2002 p. 506-526.
- ³ Legionnaires' Disease and Pontiac Fever (2012) Health Canada, http://www.hc-sc.gc.ca/hl-vs/alt_formats/pdf/iyh-vs/diseases-maladies/legionnaire-eng.pdf
- ⁴ Goldberg, DJ, et al. (1989) Lochgoilhead fever: outbreak of non-pneumonic legionellosis due to *Legionella micdadei*. Lancet 1(8633):316-8.
- ⁵ Legionnaires' disease. The control of legionella bacteria in water systems Approved Code of Practice and guidance (2000) Health and Safety Executive, www.hsebooks.co.uk
- ⁶ A Guide to Developing Risk Management Plans for Cooling Tower Systems (2001) Department of Human Services Public Health Division, Victoria, Australia
- ⁷ Legionella 2003: An Update and Statement by the Associate of Water Technologies (2003). AWT Board of Directors
- ⁸ Patient Facts: Learn More about Legionnaires' disease (2011) National Center for Immunization and Respiratory Diseases, http://www.cdc.gov/legionella/patient_facts.htm