



Scientific Considerations on Legionnaires' Disease and Public Water Systems

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DESCRIPTION

Legionella is an opportunistic premise plumbing pathogen that causes Legionnaires' Disease (LD), a severe form of pneumonia. LD cases are increasing both domestically and internationally. *Legionella* is still considered an "emerging pathogen" despite being discovered 45 years ago. *Legionella* is regularly found in drinking water that complies with regulations and is a natural component of the ecology of a public water system. The need for drinking water utilities, regulators, and public health officials to have a thorough grasp of the complicated discussions surrounding the public water utility's role in *Legionella* exposure and LD risk is growing.

Legionella was classified as an "emerging pathogen" by the Water Research Foundation more than 40 years after it was originally discovered. In fact, during public health outbreak investigations, it is frequently stated that the public water system may be the cause of the outbreak, and water utilities may continue to be the topic of litigation as building owners test the incoming water more regularly. Public water systems have come under scrutiny as a result of a recent LD outbreak in Flint, Michigan in 2014–2015, which happened after widespread flaws in the water utility. Public water supplies have also been linked to LD outbreak investigations in other cases. It is becoming more and more important for public health professionals, drinking water regulators, and water utilities to grasp the complicated concerns of the public water utility's role in *Legionella* exposure and LD risk.

An opportunistic premise plumbing pathogen called *legionella* is the cause of legionellosis. Legionellosis is a set of illnesses that includes Pontiac fever, a sickness that is typically less severe, extrapulmonary infections, and Legionnaires' Disease (LD), a severe pneumonia that frequently requires hospital treatment. In the United States, LD hospitalizations range from 8 to 18,000

each year. In the US, *Legionella* has been found to be the main source of waterborne outbreaks.

The bacteria are frequently found in freshwater environments and thrive in warm, stagnant water (25°C–45°C) inside free-living amoebas. Inhaling aerosolized water carrying *Legionella*, generally from showers, whirlpool spas, outdoor cooling equipment, humidifiers, misters, and respiratory therapy devices, is the main human exposure route to the bacteria. Although LD cannot be spread from one person to another or by drinking contaminated water, aspiration is another key method of disease transmission. The risk of LD is increased in older adults, smokers, people with immunocompromised conditions, and people with comorbid diseases.

Legionella growth in public water

Legionella is regularly found in drinking water that complies with regulations and is a natural component of the ecology of a public water system. There are currently no national *Legionella* drinking water laws in the United States. When water utilities treat their water to get rid of *Giardia* and viruses, the United States Environmental Protection Agency (USEPA) believes that *Legionella* is under control. According to the USEPA, *Legionella* can enter a facility.

Legionella occurrence in public water utilities

Although it is acknowledged that *Legionella* is found in drinking water that complies with regulations, there is still disagreement over how common it is in distributed water and whether there should be an acceptable detection concentration. Few studies have examined the outcomes of *Legionella* samples taken from public water distribution systems, and even fewer have examined factors that may make it more likely that *Legionella* will be found in a water utility distribution.

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Received: 02-Aug-2022, Manuscript No. JTD-22-18011; **Editor assigned:** 05-Aug-2022, PreQC No. JTD-22-18011 (PQ); **Reviewed:** 22-Aug-2022, QC No. JTD-22-18011; **Revised:** 29-Aug-2022, Manuscript No. JTD-22-18011 (R); **Published:** 05-Sep-2022, DOI:10.35248/2329-891X.22.10.344.

Citation: Stenborns L (2022) Scientific Considerations on Legionnaires' Disease and Public Water Systems. J Trop Dis. 10:344.

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