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BWC SAFETY BULLETIN

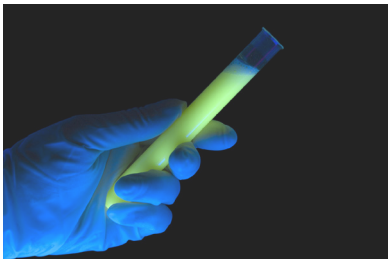
The Connection between Legionnaires' Disease and COVID-19

Legionnaires' Disease

With the reopening of buildings in the wake of COVID-19, a major concern is Legionnaires' Disease, a type of pneumonia caused by *Legionella* bacteria. Stagnant water, which can allow *Legionella* to flourish, is more likely to be present when a building's water system is rarely used and when cleaning of such systems is deferred, both of which are more common occurrences as a result of COVID-19.

Background

The number of Legionnaires' Disease cases in the U.S. is increasing, with reported cases nine times higher in 2018 than in 2000. This increase may represent a rise of *Legionella* bacteria in the environment, increased susceptibility to *Legionella* bacteria, expanded testing due to awareness, or a combination of factors. These numbers may underestimate the disease's impact, as it is likely underdiagnosed. While the disease can occur any time of year, more cases are usually seen in summer and early fall.



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Routes of Exposure and Symptoms

Legionella bacteria can become harmful when it enters building water systems, as it spreads via water droplets small enough to inhale and, less commonly, by breathing *Legionella*-contaminated water into the lungs when drinking. Person-to-person spread is uncommon. Most people who are exposed do not develop Legionnaires' Disease, but certain populations are at increased risk, such as older people, those who are immunocompromised, and those with chronic health conditions, especially conditions pertaining to the lungs. Infection usually develops 2-10 days following exposure, with initial symptoms including headache, muscle aches, and fever, followed by additional symptoms the next 1-2 days, such as shortness of breath, chest pains, coughing, gastrointestinal issues, and confusion and other mental changes.

Best Practices

Legionella bacteria flourish in water temperatures between 68-140°F, so it's crucial that water systems (e.g., cooling towers and domestic hot and cold-water systems) keep water temperature out of this range.

Cooling Towers

Cooling towers, fluid coolers, and evaporative condensers all use water evaporation, fostering ideal conditions for *Legionella* bacteria growth and potential introduction into the air. To limit the growth and spread of *Legionella* bacteria, ensure these systems are easy to clean and consider these design features:

- Equip water collection areas ("sumps") with drains and supply treated make-up water to reduce dissolved solids that facilitate *Legionella* growth.
- Keep sump water temperatures low (below 68°F) to prevent *Legionella* growth.
- Use high-efficiency drift eliminators to limit water vapor release and remove water droplets from steam.

Clean cooling towers according to manufacturers' recommendations, as well as when they have been out of service for an extended time period, or if they are new, to remove residual building material.

Domestic Hot-Water Systems

Domestic hot-water systems may have cool zones where scale and sediment can build, creating conditions for *Legionella* growth. In addition, capped or altered piping to prevent water flow can allow water to stagnate, further promoting *Legionella* growth. To limit growth, consider these design aspects:

- Utilize point-of-use water heaters in rarely used lines and ensure water systems recirculate water.
- Insulate water lines to ensure water temperatures stay hot.
- Install water lines that have the capability to trace and maintain the temperature of the hot water.

These cleaning procedures may help limit the chance of *Legionella* bacteria growth in hot water lines:

- Raise the water temperature to at least 160°F for at least 24 hours and flush water lines for at least 20 minutes.
- Periodically chlorinate and/or introduce biocidal metal ions to the water.
- Drain and clean water tanks with a chlorine solution to remove scale and sediment.
- Periodically remove and clean (or eliminate) silicone and rubber gaskets.

Domestic Cold-Water Systems

Legionella typically does not grow in cold water, but high bacteria levels have been found in ice machine water lines, and water lines that see a disproportionate amount of bacterial growth, such as dental water lines and grocery store produce mister lines. To limit growth, consider these design specifications:

- Cover water tanks to prevent contamination and eliminate tanks that allow cold water to stagnate.
- Insulate cold water lines and protect the tanks from temperature extremes.
- Design cold water tanks to limit storage times to less than 24 hours.

Hyperchlorination can be used to combat *Legionella* growth in cold water systems via this procedure:

- Add chlorine to the water lines and ensure the level of free chlorine remains between 20-50 ppm.
- Run the faucets until a chlorine/chloramine odor is present to ensure the hyperchlorinated water reaches the entire system.
- Continue the treatment for two hours at 20 ppm or one hour at 50 ppm, and then let the water stay in the lines for two hours before flushing completely.

Hyperchlorination involves compounds much stronger than household bleach. Follow all chemical label directions to prevent hazardous inhalation, skin, and eye exposures. For domestic (potable) water systems, ensure chlorine levels are no higher than 4 ppm for the water to be considered safe for drinking.

For more information on proper recommendations for reopening buildings to help limit *Legionella* growth, please refer to the Ohio Department of Health's (ODH) recommendations for flushing and disinfection to reduce *Legionella* growth, as well as ODH's *Legionella* resources and trainings.

Have questions about safety? We can help. We provide on-site consultation services to employers at no additional cost. You can request our services at www.bwc.ohio.gov or at 1-800-644-6292.

We also offer the Public Employment Risk Reduction Program, which focuses on the unique safety needs of Ohio public employers (1-800-671-6858) and the OSHA On-Site Consultation Program, which focuses on safety and health assistance for small to medium sized, high-hazard private employers (1-800-282-1425).

Other Resources

- Updated *Legionella* Guideline- ASHRAE
- Centers for Disease Control and Prevention page on *Legionella*
- Occupational Safety and Health Administration's (OSHA) page on Legionellosis Standards
- OSHA's page on Legionellosis (Legionnaires' Disease and Pontiac Fever) Control and Prevention
- Washington State Dept. of Health Guidance for *Legionella* and Building Water System Closures

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