Legionella Infection Prevention and Control

Best practices guidance for residential facilities

DISEASE OVERVIEW

Legionnaires' disease is a very serious type of pneumonia (lung infection) caused by bacteria called Legionella.

Risk Factors: Risk factors for developing Legionnaires disease include:

- Renal or hepatic failure;
- Diabetes;
- Chronic lung disease;
- Systemic malignancy;
- Smoking (current or historical);
- Immune system disorders; and
- Age ≥ 65 years.

Symptoms: Legionnaires' disease is very similar to other types of pneumonia (lung infection), with symptoms that include:

- Cough
- Shortness of breath
- Fever
- Muscle aches
- Headaches

Legionnaires' disease can also be associated with other symptoms such as diarrhea, nausea, and confusion. Symptoms usually begin 2 to 14 days after being exposed to the bacteria.

Certain People Are at Increased Risk for Legionnaires' Disease

Most healthy people do not get Legionnaires' disease after being exposed to Legionella. Being 65 years or older or having certain risk factors can increase your chances of getting sick. These risk factors include:

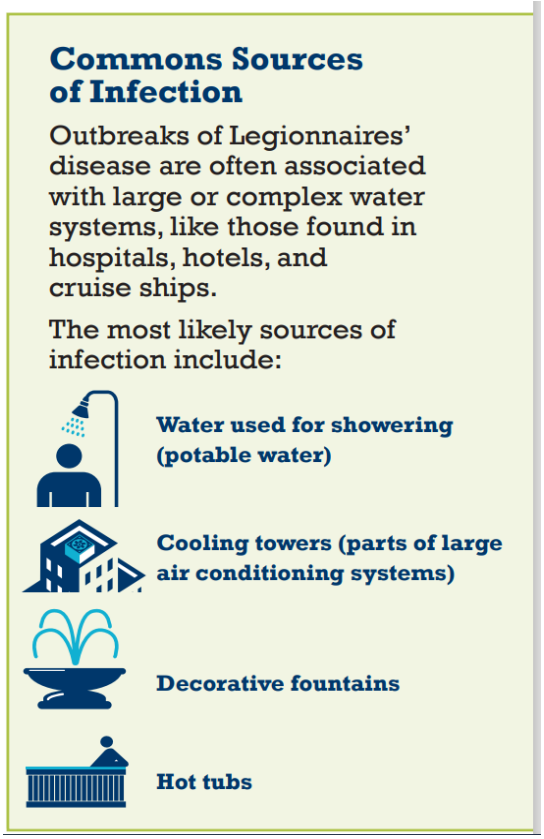
- Being a current or former smoker.
- Having chronic lung disease, such as emphysema or chronic obstructive pulmonary disease (COPD).
- Having a weakened immune system from diseases such as cancer, diabetes, or kidney failure.
- Taking medication that weakens your immune system.

Common Sources: Water is the major natural source or reservoir for *legionellae* species, which are commonly found in the natural environment. These organisms have been identified in water systems, such as hot and cold tap water, in shower heads and sink faucets, whirlpool spas, cooling towers (structures that contain water and a fan as part of centralized air-cooling systems for buildings), decorative fountains and water features, hot water tanks and heaters, and large, complex plumbing systems.

In addition, common sources include resident related equipment such as humidifiers and other respiratory therapy equipment.

Home and car air-conditioning units do not use water to cool the air, so they are not a risk for *Legionella* growth.

However, *Legionella* can grow in the windshield wiper fluid tank of a vehicle (such as a car, truck, van, school bus, or taxi), particularly if the tank is filled with water and not genuine windshield cleaner fluid.



Transmission: Legionellosis is transmitted via aerosolized water containing the bacteria. Less commonly, *Legionella* can be transmitted via aspiration of drinking water. ***Legionellosis is not transmitted from person to person.*** There is no evidence to suggest transmission of *Legionella* from auto air-conditioners or household window air-conditioning units, which do not use water as their coolant.

Incubation Period: The incubation period for Legionnaires' disease is most commonly 5 to 6 days from the time of exposure to symptom onset, with a range of 2-to-14-day days.

INFECTION PREVENTION AND CONTROL RECOMMENDATIONS

Implementation of, and adherence to, environmental infection control practices are key to preventing the transmission of infectious diseases in all residential facilities.

Legionnaires' disease is not transmitted person to person, therefore residents with Legionnaires' disease can be cared for using Centers for Disease Control and Prevention (CDC) Standard Precautions, with an emphasis on strict adherence to hand hygiene and appropriate glove use.

1. **Standard Precautions** are used for all residents' care. They're based on a risk assessment and making selection of appropriate personal protective equipment (PPE) that protect caregivers and employees from infection and prevent the spread of infection from patient to patient. General infection control

measures including Standard Precautions can be found at: Standard Precautions for All Patient Care | Basics | Infection Control | CDC

- ***Hand hygiene*** **is the single most effective measure to prevent the spread of all infections.** Strict adherence to hand hygiene protocols must be maintained. Hand hygiene should be performed:

    - Before and after touching residents.
    - After touching blood, body fluids, secretions, excretions, and contaminated items.
    - Immediately after gloves are removed, between resident contacts, and when otherwise indicated to avoid transfer of microorganisms to other residents or environments.
    - When hands are visibly soiled with blood or other body fluids.

  Both staff and visitors should wash their hands with soap and water after resident care, and prior to leaving the room of a resident. Hands should be dried with a dry, disposable paper towel, and faucets should be turned off using a paper towel. **The use of a waterless, alcohol-based hand antiseptic is as effective as soap and water for residents with legionellosis, is not harmful to hands, and may improve compliance.** However, these products are not a substitute for handwashing in the event of visible contamination.

- ***Gloves:*** **Don gloves upon entry into the room or cubicle.** Gloves (clean non-sterile gloves are adequate) should be worn when providing care that involves substantial personal contact (e.g., changing clothes, toileting, bathing) or contact with items that may be contaminated with bodily fluids. If, during the course of resident care, gloves become soiled with potentially infectious material (e.g., urine, stool), they should be changed before further contact with clean surfaces, the resident, or other staff. Remove the gloves after caring for the resident and wash hands with soap and water or use an alcohol-based hand sanitizer before leaving the room. Gloves alone do not guarantee prevention of transmission. Never wash gloves for the purpose of reuse.

- ***Gowns, mask and N95 respirators:*** Facilities should use appropriate infection control measures, including isolation precautions and appropriate PPE selection when providing care for potentially infectious persons. For further guidance refer to this link: Isolation Precautions | Guidelines Library | Infection Control | CDC

2. ENVIRONMENTAL FACTORS

- **Hot tubs**

About half of Legionnaires' disease patients reported using a hot tub. To help reduce the risk of *Legionella* in hot tubs, facility or property owners and managers should:

- **Monitor and maintain** adequate disinfectant levels (3-10 ppm for free chlorine or 4-8 ppm for bromine) and pH (7.2-7.8), **even when the hot tub is not in use**.
- **Follow** manufacturer recommendations for cleaning or scrubbing the hot tub (e.g., daily inspection for and removal of biofilm), replacing the filter and water, and practicing all other maintenance activities.
- **Consider** installing an automatic disinfectant system for the hot tub rather than handfeeding disinfectant.

- **Follow** any applicable local, state, territorial, federal, or tribal laws, which may differ from CDC recommendations.
- If you are concerned about Legionella growth or if you have been made aware of residents diagnosed with Legionnaires' disease after using a hot tub at one of your properties, arrange for water samples to be collected and tested for Legionella. After those water samples have been collected, disinfect the hot tub. Contact your state or local public health agency for next steps and recommendations. Additional guidance on hot tub sampling and disinfection procedures are available in the Disinfection of Hot Tubs guidance.

Below are additional resources on hot tub maintenance to help protect your residents and community from Legionnaires' disease:

- Operating Public Hot Tubs
- Controlling Legionella in Hot Tubs
- Disinfection of Hot Tubs that Contain Legionella
- Residential Pool or Hot Tub Owners Disinfection & Testing

- **Shower heads:** Legionella can grow in and spread through shower heads if they have not been used regularly (e.g., a week or more), if they have not been replaced or cleaned in a long time (e.g., there is visible buildup on the aerators), or if there are low disinfectant levels in the water.

- **Unoccupied rooms or properties:** Low or irregular occupancy decreases water flow and can decrease disinfectant levels in water. If faucets or showerheads have not been used for a week or more, flush them shortly before residents arrive. Additional instructions are available on how to flush faucets and shower heads

- **Decorative fountains**: Operate and maintain all fountains according to manufacturer recommendations. Minimum cleaning frequency recommendations vary by fountain size and can be found in the Legionella Control Toolkit. Exposure to warm air, heat-generating submerged lights, or other factors can increase the water temperature into the range favorable for Legionella growth (77–113°F). Additional strategies for controlling Legionella, such as adding disinfectant, will be required.
- **Large plumbing system** generally include:
  - Recirculating systems, which are favorable - Recirculate hot water continuously, if possible. Store and circulate cold water at temperatures below the favorable range for Legionella (77–113°F, 25–45°C); Legionella may grow at temperatures as low as 68°F (20°C). Ensure a disinfectant residual is detectable throughout the potable water system. See below link.
    i. https://www.cdc.gov/legionella/wmp/control-toolkit/potable-water-systems.html#:~:text=Recirculate%20hot%20water%20continuously%2C%20if,throughout%20the%20potable%20water%20system.
  - Mixing values to blend hot and cold water together, which can be problematic. The concern Is location of the mixing value and the downstream pipes run distances. Does a Temperature Mixing Valve (TMV) prevent legionella in water? Not particularly. A TMV can ensure a controlled stream of water from a tap or shower at a safe, consistent temperature. However, blended water downstream of a TMV may provide an environment in which legionella can multiply, thereby increasing the risk of exposure.

- **Water supply:**
  Below are considerations to lower the risk of Legionella growth in your property's plumbing system.

    - **Public water system (municipal water, water utility**): Events that disrupt the delivery of water to the plumbing system (e.g., water main breaks, water utility repairs) can allow dirt to enter the system and use up disinfectant. Sign up (opt-in) for local alerts to stay informed about such public water system events and follow water advisory recommendations.

    - **Well water:** To maintain safe drinking water, private well owners are responsible for testing the quality of their drinking water and maintaining their own wells. For more information and technical assistance on well construction, maintenance, water quality, and water treatment issues, contact your state or local health department, a local agricultural extension agency, or a private well contractor.

    - **Water softeners and filters:** Follow the manufacturer recommendations to properly maintain and operate water softeners and filters. Some filters, like those typically found on faucets or devices like ice machines, use carbon to get rid of disinfectant residual to improve the taste of the water. Legionella can still grow in these filters if not properly maintained.

    - **Water heater:** Managing water temperatures to minimize the growth of Legionella and keeping residents safe from burns due to hazardous water temperatures is a difficult balance.

Water may reach hazardous temperatures in hand sinks, showers, tubs, and any other source or location where hot water is accessible to a resident. Many residents in long-term care facilities have conditions that may put them at increased risk for burns caused by scalding. The degree of injury depends on factors including the water temperature, the amount of skin exposed, and the duration of exposure.

According to the Centers for Medicare and Medicaid Services (CMS), State Operations Manual, Appendix PP – Guidance to Surveyors for Long Term Care Facilities, third degree burns can occur at 120 degrees Fahrenheit/48 degrees Celsius in just 5 minutes. The hotter the temperature the less time it takes to develop a third -degree burn, for example, at 155 degrees Fahrenheit/68 degrees Celsius it would only take 1 second to develop such a burn. The manual notes that 100 degrees Fahrenheit/37 degrees Celsius is considered a safe temperature for bathing. It also notes that burns can occur even at water temperatures below those identified, depending on the individual's condition and length of exposure.

State regulations for Intermediate Care Facilities (NAC 449.7332) note hot water must be not more than 110 degrees Fahrenheit (43 degrees Celsius) for toilet, bath and shower areas and lavatories equipped for washing hands which are used by patients.

It is your facility's responsibility to ensure water temperatures are set in accordance with state and federal water temperature ranges governing your facility to prevent resident injury, such as burns.

- The above is in contrast to the recommendation to set a property's water heater at or above 120°F to minimize the growth of Legionella. As noted previously, temperatures of 120 degrees Fahrenheit or above (and sometimes lower depending on the condition of a resident) can result in burns; therefore, all federal and state laws and regulations related to resident safety and the prevention of injury must be followed.

- It is important to have a water management program in place and to work closely with public health officials and a legionella remediation specialist for guidance if legionella is detected in your facility. It is also recommended that you follow your water heater's manufacturer's recommendations, including but not limited to, routinely flushing the water heater according to manufacturer recommendations. For rental properties that are part of a condominium or apartment building, check if the water heater is maintained by the building owner or the homeowner's association.

- **"Dead legs"** in plumbing systems. Dead legs may sound like something you get after sitting for too long, but when they are found in water systems they can present a significant risk to people as they encourage the stagnation of water and the growth of potentially dangerous bacteria such as legionella. The link provides an image with additional information - https://legionellacontrol.com/legionella/removing-dead-legs-water-pipes/

- **Water Management Program:** Multi-unit buildings with centralized hot water systems should have a water management program to reduce Legionella growth and spread.

Be aware: authorities having jurisdiction (AHJ) are reluctant to provide a dead-end definition to what constitutes a dead-end's length, due to possible liability concerns

3. **FOR GUIDELINES ON PREVENTION LEGIONELLA AT HOME REFER TO THE FOLLOWING LINK:** Preventing Waterborne Germs at Home | Drinking Water | Healthy Water | CDC

ADDITIONAL RESOURCES ON HOW TO PROTECT YOUR RESIDENTS AND COMMUNITY FROM LEGIONNAIRES' DISEASE

- Center for Disease Control and Prevention Legionella web page
- Preventing Waterborne Germs at Home
- Considerations for Owners and Managers: How to Prevent Legionnaires' Disease
- Legionella Control Toolkit
- Private Ground Water Wells
- Well Maintenance

- Well Testing
- Choosing Home Water Filters & Other Water Treatment Systems
- A Guide to Drinking Water Treatment Technologies for Household Use
- Cisterns and Other Rain Catchment System

ADDITIONAL RESOURCES IN SPANISH

Legionella: Lo que debe saber Sobre la enfermedad del legionario y la fiebre de Pontiac | Legionella | CDC