

AHCA/NCAL Infection Preventionist Hot Topic Brief

Legionella Prevention with Water Management Programs

Focal Problem or Issue

Waterborne pathogens, such as Legionella bacteria, can thrive in water systems and cause outbreaks. Legionella outbreaks can occur in Long Term Care facilities; about every other month there is a news report of an outbreak in LTCF somewhere in the country¹. Nursing homes need to ensure that water used for resident care, drinking, and other purposes—also known as potable water—is free from contaminants to prevent infections and protect the health of vulnerable patients. Legionnaires' disease, a type of severe pneumonia, is caused by the waterborne bacteria Legionella. There are risk factors that can increase a person's chance of getting sick from Legionella. These risk factors include being over 50 years old, 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 like cancer, diabetes, or kidney failure, and/or taking medication that weakens your immune system². An effective water management program helps identify and mitigate potential sources of infection, reducing the risk of healthcare-associated infections in high-risk patients.

Background and Scope

Water containing the bacteria Legionella and other opportunist pathogens of premise plumbing (OPPP) could be aerosolized through devices such as cooling towers, shower heads and hoses, hot tubs and saunas, sink faucets, decorative fountains, eyewash stations, ice machines, and poorly maintained large plumbing systems. Legionella is then transmitted via inhalation of contaminated aerosolized water. People who get sick after being exposed to Legionella can develop two different illnesses, collectively known as legionellosis: Legionnaires' disease and Pontiac fever.

Legionnaires' disease is very similar to other types of pneumonia and hard to distinguish from pneumonia caused by other pathogens. Those with legionnaires' disease commonly have the common symptoms of pneumonia that include cough, shortness of breath, fever, muscle aches, headaches, and in some cases diarrhea, nausea, and confusion. Symptoms usually begin 2 to 14 days after being exposed. Pontiac fever is a milder infection and does not cause pneumonia. Symptoms are primarily fever and muscle aches, that begin as early as a few hours to 3 days after being exposed and usually last less than a week.

CDC encourages healthcare facilities, including assisted living facilities and senior living facilities to have effective water management programs. A water management program (WMP) is a multistep process to reduce Legionella and OPPP growth and spread; includes identifying devices where Legionella might grow or spread to people, determining control measures, monitoring control measures, and establishing remediation activities and interventions when control measures are not met³.

In general, the principles of effective water management include⁴:

- Maintaining water temperatures outside the ideal range for Legionella growth
- Preventing water stagnation
- Ensuring adequate disinfection
- Maintaining devices to prevent sediment, scale, corrosion, and biofilm, all of which provide a habitat and nutrients for Legionella

Suggestions for Practice and Resources

Listed below are seven steps recommended by the CDC to create an effective WMP that prevents and controls Legionella growth along with suggestions for practice. Any water management program should align with industry standards ([ANSI/ASHRAE Standard 188-2018, Legionellosis: Risk Management for Building Water Systems](#)). The details for all the steps vary depending on your building and water systems. The examples for each step are not comprehensive and we encourage you to review the resources listed at the end as you work through your water management program.

1. **Establish a WMP team** including, that at a minimum should include the administrator, Infection Prevention designee, building and grounds manager and/or EVS supervisor, and risk and quality manager.
2. **Describe the building's water systems by creating a flow diagram** of how the water enters the facility and flows through to different outlets. It should include a simple written description of the water system and the devices attached to the system such as,
 - a cooling tower,
 - hot tub,
 - decorative fountain, andthat also identifies if there is a system that is centrally located within the building that is designed to control or modify the humidity levels in the air.
3. **Identify where Legionella could grow and spread.** Use the flow diagram to help identify potential sources. Examples of factors that can lead to Legionella growth are in areas where water temperature changes, inadequate disinfectant or water stagnation.

Some areas where these factors can occur include:

- cooling towers
- hot water storage
- Bathing areas
- Laundry
- Firefighting and fire suppression including sprinklers
- Food preparation areas including ice machines
- Ground irrigation
- Decorative fountains

4. **Decide where control measures should be applied and how to monitor them.** Common control measures include:
 - monitor water temperature and chlorine levels. Note: routine culturing water for legionella is not recommended.
 - flushing low-flow pipe runs and dead legs (piping subject to low or no flow because of design or decreased water use) at least weekly, and
 - flush infrequently used fixtures regularly³.
5. **Establish ways to intervene when control limits are not met.** For example, after a water main break has occurred in the neighborhood near the facility it may be recommended to flush water at multiple sinks and fixtures—at pre-determined flushing locations per the WMP—and increase frequency of measuring chlorine levels to ensure that the water is effectively treated and free from pathogens that could pose a risk to patients, staff, and visitors.
6. **Verify the program is running as designed.** Update and review your water management system on a regular schedule (e.g. annually) or when there are changes to your water system (e.g. additional of new water areas such as new water fountain). During the review of your WMP by the team, some questions to consider:
 - “Are we doing what we said we would do?” and (Achieving the desired results?)
 - “Is our program actually working?” (Is the program effective?)
7. **Document and communicate all activities⁴.**
 - Keep record of who is on the WMP team
 - the water system description
 - control measures in place
 - corrective actions taken
 - verification steps to show the WMP is being followed as written
 - validation that the WPM is achieving the desired results and is effective, and
 - communications with staff about the program regularly.

For additional information on implementing a WMP, utilizing other sources for testing, various control measures as well as corrective actions and remediation steps, refer to:

[Legionella Toolkit – Version 1.1 – June 24, 2021.](#)

Additional Resources

CMS | [State Operating Manual Appendix PP](#) (Water Management starts on Page 771)

CDC | [Legionnaires' Disease](#)

CDC | [Legionella Water Management Programs Overview](#)

CDC | [Toolkit for Controlling Legionella in Common Sources of Exposure \(Legionella Control Toolkit\)](#)

CDC | [Legionella Toolkit – Version 1.1 – June 24, 2021](#)

CDC | Legionella control measures established should align with [ASHRAE Guideline 12-2020 Standards](#)

CDC | [Controlling Legionella in Potable Water Systems](#)

CDC | [Healthcare Water Management Program Frequently Asked Questions](#)

References

1. Lin YE, Yu VI. Legionnaires' disease in nursing homes and long-term care facilities: an emerging catastrophe. [The Journal of Nursing Home Research \(2012\) ISSN 2496-0799 Accessed 3/1/23](#)
2. [Centers for Disease Control and Prevention. Legionnaires' Disease \(2018\) Accessed 3/1/23](#)
3. [Centers for Disease Control and Prevention. Toolkit for Controlling Legionella in Common Sources of Exposure \(2021\) Accessed 3/1/24](#)
4. [Centers for Disease Control and Prevention. Legionella Water Management Programs Overview. \(2021\) Accessed 3.1.24](#)

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