



Patsy Root

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Reducing Legionnaires' Disease Risk

# Implementing a Water Safety Management Plan

BY PATSY ROOT, ASSOCIATE MEMBER ASHRAE

*Legionella pneumophila* is the primary causative agent of Legionnaires' disease, a severe form of pneumonia with a fatality rate between 10% to 25%.<sup>1,2</sup> Legionnaires' disease is making headlines across the world. Yet, according to the U.S. Centers for Disease Control and Prevention (CDC), simply following a water safety management (WSM) plan could have prevented 90% of Legionnaires' disease cases in the U.S.<sup>3</sup> Luckily, it's easier than you might think for building owners to take this step to reduce the risk of this deadly disease threatening their tenants and staff. WSM plans are much like other safety measures building owners routinely put in place. Building owners and managers can tap readily available resources and knowledge in their staff and/or in their community to set up WSM plans and save lives.<sup>4</sup>

## Why Create a Water Safety Management (WSM) Plan?

An effective WSM plan is good insurance for any building owner to reduce the odds of Legionnaires' disease cases or outbreaks at their property. Although not a requirement in most states, a WSM plan is a relatively inexpensive way to reduce the danger of *Legionella pneumophila* growing in a building's water systems. Building owners already have many safety measures in place to protect employees and occupants, e.g., fire safety and suppression systems, eyewash stations, tornado shelters, and numerous other safety and hazard control plans and devices. A WSM plan is one more opportunity to reduce the risk of both disease and resulting litigation and owner/manager liability.

Referencing its "General Duty Clause," the Occupational Safety and Health Administration (OSHA) directs employers to "know the hazards and risks with having water sources in the workplace and maintain all systems to prevent *Legionella* growth."<sup>5</sup> By reducing the

risk of disease, a WSM plan can also help protect a property's reputation with customers. Just imagine searching online for a vacation spot and seeing the words, "Legionnaires' disease outbreak" associated with a hotel, resort property, or even a destination. Most customers would immediately look elsewhere. Nearly all buildings and cooling towers can benefit from an active WSM plan that reduces the odds of a Legionnaires' disease case and protects the reputation of the brand and of those who manage the building.

## Seven Easy Steps to Develop an Effective WSM Plan

Multiple industry standards and guidelines are available to use as the basis for a WSM plan.<sup>3</sup> However, the only North American ANSI-accredited standard is ASHRAE Standard 188-2018, *Legionellosis: Risk Management for Building Water Systems*. This standard was created

Patsy Root is the regulatory affairs manager for IDEXX Water North America and ASHRAE SSPC 188 committee member.

through consensus by a diverse group of subject matter experts, including water treatment practitioners, plumbing specialists, hospital and health-care officials, CDC staff, filtration providers, and regulatory experts. ASHRAE Standard 188 applies to a broad spectrum of building types and was adapted by CDC into the CDC Toolkit, which summarizes the standard in plain language, with a focus on health-care risk management. Both ASHRAE Standard 188 and the CDC Toolkit provide solid foundations for WSM plans that can reduce Legionnaires' disease risk.

Both ASHRAE Standard 188 and the CDC Toolkit outline seven basic steps of WSM planning:

**1. Create a Water Safety Management team** to bring together the relevant expertise. Team members may include: building/cooling tower owner, facilities/maintenance staff, certified water technologist, industrial hygienist or OSHA/safety officer, microbiologist/testing laboratory, environmental health specialists, and state or local health officials. Some team members may be from the building, others may be external stakeholders or consultants. You'll want to make sure that the team includes someone with financial decision-making authority and that another member is committed to arranging meetings and documenting activities for ongoing review.

The WSM team is key to success. Having the right knowledge at the table from the beginning of the plan will help ensure the next six steps are more easily executed.

**2. Describe the water system/cooling tower.** Using simple text or diagrams, describe the system to be managed, including flows of hot and cold water, return loop systems, where water enters the building or tower, etc.

**3. Identify areas of risk,** such as stagnant water areas, areas where high-risk populations reside, and areas where water use could create aerosolization or where there could be a low disinfectant residual.

**4. Decide where to apply control limits.** Determine what the temperature of hot water at various locations should be, what level of disinfectant should be applied to ensure *L. pneumophila* or other target pathogens are maintained at levels deemed acceptable in the plan, etc.

**5. Corrective actions.** Determine what will be done if verification or validation testing indicates that a part of the system is outside of control limits set forth in the WSM plan. It's essential to have documented action

plans in place before an incident occurs.

**6. Verification and validation.** Verification steps determine if a WSM plan is being implemented as designed. For example, verification monitoring ensures control limits such as water temperature and disinfectant levels are within predetermined ranges. Validation testing confirms the WSM plan is effective at reducing the risk of Legionnaires' disease by determining whether *L. pneumophila* is in the water, for example, and, if so, whether levels of the pathogen exceed the limits documented in the plan.

**7. Documentation.** All good WSM plans are documented at each step, with emphasis given to documenting verification and validation testing activities and maintaining WSM team meeting minutes and notes. This documentation serves as evidence that the WSM team is both following the plan and updating it as needed to address potential risks.

An updated version of ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*, which provides additional detail on how to implement Standard 188, will be available soon.

### How to Validate a WSM Plan

Once a WSM plan is in place, the routine work of executing the plan and collecting ongoing documentation begins, including ongoing verification and validation. Each WSM team will decide how to best ensure the plan is both being implemented as designed (verification) and accomplishing the desired outcomes (validation).

Verifying that planned activities take place, such as flushing outlets or maintaining water temperatures, requires relatively straightforward record keeping. But how does one prove that a WSM plan is *effective*? Remember that the goal of a WSM plan is to reduce Legionnaires' disease risk. The primary causative agent of Legionnaires' disease is the microbe *Legionella pneumophila*. If *L. pneumophila* bacteria are in the building or cooling tower water, and that water can become aerosolized, that creates a risk. To validate that the risk is reduced through the activities of the WSM plan, the widely accepted method is to test the water in several key locations for *L. pneumophila* bacteria. Monitoring the level of *L. pneumophila* bacteria in multiple locations over time provides a clear picture to the WSM team of the effectiveness of the hazard controls that have been implemented to keep

the bacteria at bay and avoid risk of exposure and disease.

**Summary**

Water safety management planning is well described in both Standard 188 and the CDC Toolkit. The forthcoming revised ASHRAE Guideline 12 will further assist WSM teams in implementing the seven-step risk reduction plan. These tools will assist a well-rounded WSM team in understanding how to identify risk in their building or cooling tower, which areas need hazard control, and how to verify and validate the program. This planning, implementation, verification, and validation testing of water samples for *L. pneumophila* will help reduce the risk of Legionnaires’ cases and outbreaks. These measures can protect the brand of the building and its owners and managers, but most importantly, they can help save lives.

**Resources**

ANSI/ASHRAE Standard 188-2018, *Legionellosis: Risk Management for Building Water Systems*.

CDC. 2017. “Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings: A Practical Guide to Implementing Industry Standards.” Centers for Disease Control and Prevention. <https://www.cdc.gov/legionella/downloads/toolkit.pdf>.

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