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CSTE
COUNCIL OF STATE AND
TERRITORIAL EPIDEMIOLOGISTS

Recommendations for Review of Water Management Programs to Reduce Risk of *Legionella* in Healthcare and Community Facilities

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Background on the CSTE Project to Create a *Legionella* Water Management Program Evaluation Tool

The Council of State and Territorial Epidemiologists (CSTE) initiated a project in 2023 to assist state, tribal, local, and territorial (STLT) health jurisdictions in their efforts to reduce the risk of *Legionella* and other bacteria. As a result of this project, CSTE developed an [evaluation framework and tool](#) that provides a standardized approach for assessing facility Water Management Programs (WMPs). The tool is intended to support STLT health jurisdictions' primary prevention activities and Legionnaires' disease outbreak investigations. In addition to serving as a supplement to the resulting WMP Evaluation Tool, this document has been developed to support STLT health jurisdictions that may be initiating or currently conducting reviews of WMPs, with additional information and best practices to consider implementing.

Building water systems, particularly those in larger, complex buildings, can provide a suitable environment for the growth and transmission of *Legionella* bacteria. Adherence to a comprehensive WMP is an important strategy for mitigating the risk for legionellosis and other waterborne diseases. However, prior to this project, there was no standard tool available to evaluate the quality of WMPs.

CSTE established a *Legionella* WMP Evaluation Subgroup as part of our Legionnaires' Disease Surveillance Workgroup and contracted with the public health consulting firm Hutton Health Consulting LLC to develop an evaluation tool that provides a standardized approach for reviewing a facility's WMP to determine if it comports with the [ASHRAE \(a professional organization formally known as the American Society of Heating, Refrigerating and Air-Conditioning Engineers\) Standard 188](#) and the Centers for Disease Control and Prevention (CDC) [WMP Toolkit](#).

The best practices included in this report are based primarily on information obtained through interviews of three state health jurisdictions that are currently involved in WMP reviews (California, New Jersey, and New York), as well as discussions with several jurisdiction representatives who participated in the WMP Evaluation Subgroup.

Differences in Jurisdictions' Current Practices with Review of Water Management Programs

Anecdotally, the practice of reviewing facility WMPs varies considerably by health jurisdictions across the nation. Many jurisdictions do not have capacity to review WMPs at all; a few jurisdictions review specific facility WMPs based on state regulations authorizing the activity. Between these two extremes, there are also jurisdictions that conduct some selected WMP reviews, primarily in response to a single case, cluster, or outbreak of legionellosis at a facility. In addition, there are a number of jurisdictions that would have an interest in beginning WMP reviews but are hampered by limited staff

bandwidth, unclear regulatory burden, previous lack of standard evaluation framework, and other barriers.

Healthcare vs. Community Facilities

Jurisdictions encounter WMPs developed for both healthcare and non-healthcare buildings/facilities. While it is recommended that all buildings meeting any of the criteria established in ASHRAE Standard 188 implement a WMP to reduce the growth and transmission of *Legionella*, a stronger emphasis has typically been placed on healthcare facilities since they house individuals at increased risk for severe disease from potential *Legionella* infection¹.

Nationally, the development of WMPs is completely voluntary; however, at time of publication there are two federal-agency directives focused on WMPs in healthcare facilities under their purview. Healthcare facilities within the U.S. Veterans Health Administration (VHA) are required to evaluate *Legionella* risk annually at all inpatient facilities (VHA Directive 1061 2021). Also, the U.S. Centers for Medicare & Medicaid Services (CMS) requires certain healthcare facilities, as a condition of receiving Medicare or Medicaid funds, to develop, implement, and adhere to a WMP consistent with ASHRAE Standard 188 to reduce the growth and transmission of *Legionella* (CMS 2017). This effectively serves as a requirement for all acute care and long-term care facilities in the United States.

Proactive Review vs. Reactive Review in Response to Clusters or Outbreaks

In the absence of a specific requirement, STLT health jurisdictions often only review WMPs in response to a legionellosis outbreak or single presumptive case at a given facility as a way of prioritizing their attention and staff resources. Facilities are often more receptive to creating a WMP, or implementing improvements or enhancements to an existing WMP, during an investigation of legionellosis cases that are potentially associated with the water systems or devices of their building(s). Many jurisdictions find that a current investigation creates an opportunity to provide recommendations that might otherwise not be implemented by facility ownership.

Specific Legislative/Regulatory Authority vs. Broad Authority to Protect the Public

Most STLT health jurisdictions do not have specific authorizing legislation or regulations providing a requirement for facilities to proactively review WMPs. On the heels of the high-profile outbreak of legionellosis associated with a cooling tower in the South Bronx, both the New York State Department of Health and New York City Department of Health

¹ CDC has a worksheet to determine if buildings and devices are at increased risk for *Legionella* growth and spread and should have a WMP according to industry standards: [Identify Buildings with Increased Legionella Risk | Controlling Legionella | CDC](#).

and Mental Hygiene adopted regulations to develop a cooling tower registry and require cooling tower owners to implement a Maintenance Program and Plan to clean, disinfect, and test their towers for *Legionella*. New York State also required all general hospitals and residential healthcare facilities, including nursing homes, to perform an environmental assessment, prepare and implement a sampling and management plan to sample their water systems or devices for *Legionella*, and enact control measures if there is a *Legionella* exceedance or legionellosis case, defined in the regulation (NYSDOH 2016). These two jurisdictions are rare examples in the United States. Most jurisdictions cite broader legislative or regulatory authority for the control of communicable diseases or to prevent morbidity and mortality as authorizing their actions related to the control of *Legionella* in the water systems or devices of facilities. These authorities are rarely exercised in absence of legionellosis cases

Differing Roles for State Health Departments (e.g., Centralized vs. Decentralized)

States and localities across the country organize their government public health systems in different ways. This has important implications for the roles and responsibilities regarding the review of WMPs and the coordination necessary for legionellosis outbreak investigations.

State public health governance generally falls into one of two categories, “centralized” or “decentralized,” also known as home rule^{2 3}. These categories refer to the governing relationship between state and local health departments and whether they operate under the authority of the state or local government. Furthermore, some state health departments may also include smaller regional and/or district offices. These differing governance structures can impact roles, responsibilities, and how *Legionella* prevention and control efforts are implemented.

Based on input from the *Legionella* WMP Evaluation Subgroup, jurisdictions with home rule tend to have state health departments serving in an advisory role, providing technical assistance to local health departments for any type of *Legionella* response. State and local health departments may not have the technical expertise or necessary staffing levels to perform proactive reviews of WMPs, which is ultimately the responsibility of the building owner/operator. Furthermore, based on the level of delegation, state health departments may lack the authority to perform independent WMP reviews without working collaboratively with the local jurisdiction. CSTE Subgroup members reported there can be confusion over whose responsibility it is to perform WMP reviews and who has the direct authority to require building owners/managers to mitigate the *Legionella* risk within a facility’s water systems or devices.

² [Association of State and Territorial Health Officials, State Public Health Agency: Understanding the Relationship between State and Local Public Health \(2012\)](#)

³ Meit *et al.* 2012. Governance Typology: A Consensus Classification of State-Local Health Department Relationships. *Journal of Public Health Management and Practice* 18(6): 520-528

Lessons Learned from Experienced Jurisdictions

Based on the experiences of the jurisdictions that were interviewed, there are several observations and lessons learned that jurisdictions undertaking WMP reviews should consider.

Vendor-Prepared WMPs

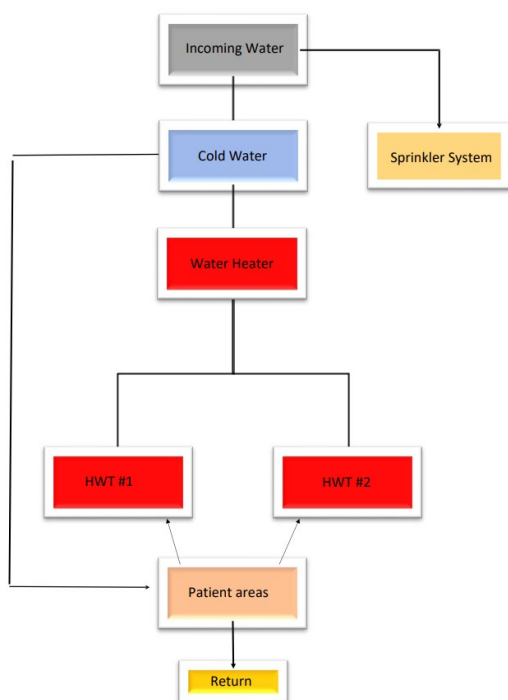
Developing a WMP for a facility often presents unique challenges to building/facility managers. Some larger facilities, often with greater resources, hire an external consultant/vendor to help develop a WMP. One jurisdiction indicated that almost half of the WMPs they reviewed were developed with the input of an external consultant/vendor. Often those facilities were more likely to have a WMP that did not comply with ASHRAE Standard 188. The section of the WMP reported to be most frequently deficient in those developed by a consultant was the Control Measures and Monitoring Plan section.

A consultant can, however, provide a level of expertise and experience that facility staff may not have. Vendors specializing in WMP development can bring important resources, such as engineering and water quality expertise, to facilities' WMP teams, allowing for the development of a WMP that is consistent with ASHRAE Standard 188. A good consultant works with the facility's WMP team to develop a WMP that is individualized for that facility. It should be noted that the WMP Evaluation Tool guides reviewers in STLT jurisdictions to look for documentation of whether an external consultant/vendor was used. The CDC also provides several questions building owners/managers can utilize when hiring a vendor to help develop a WMP. These questions can also be useful for the reviewers of a WMP developed by a consultant. Consultants preparing WMPs should be aware of and knowledgeable about any local or state specific codes or regulations that could impact the WMP.

While an external consultant/vendor can bring added expertise, it is important for both the facility and WMP reviewer to understand the background and experience of any consultant engaged in developing a WMP. STLT jurisdictions with experience in WMP evaluation report that many WMPs developed by vendors are generic and not individualized to the specific facility for which they were developed. Consultants should visit the facility and tailor the WMP to address the specific water devices and conditions there, and reviewers of WMPs should scrutinize vendor-prepared WMPs to ensure they do not lack facility-specific details. Consultant-recommended control measures should also be consistent with ASHRAE Guideline 12. One indicator of a generic WMP is the presence of an overly simplistic water system diagram that does not have any facility-specific detail, as shown below in Figure 1.

Many facilities, especially smaller ones, struggle to even develop a WMP. These facilities and their staff may lack training and education on legionellosis, as well as prevention and control methods of *Legionella* amplification in water systems.

Figure 1: Hypothetical facility water system diagram that is overly simplistic.



Healthcare Facility Compliance with CMS' WMP Requirement

Since 2017, healthcare facilities meeting certain CMS criteria has been required to develop and implement a WMP consistent with ASHRAE Standard 188 and the CDC WMP Toolkit⁴. However, jurisdictions report that not all of these healthcare facilities appear to have implemented a WMP consistent with CMS requirements. Jurisdictions' WMP reviews have noted many instances where the healthcare facility's WMP is very generic or there is a lack of documentation of corrective actions taken when control limits are exceeded. These WMPs appeared to contain just enough general information to allow the facility to "check the box" to indicate compliance with the CMS requirement. While healthcare facilities are at risk of citation for non-compliance with the CMS directive, it is not clear what review criteria are used by CMS Surveyors and State Accrediting Organizations besides determining the presence of a WMP. Furthermore, the CMS directive does not require healthcare facilities to test for *Legionella* or other opportunistic waterborne pathogens as part of their WMP.

Many CSTE Subgroup members asserted that the quality of WMPs at healthcare facilities could be improved if CMS established standards for what constitutes an acceptable WMP. This could be followed by an increase in enforcement against facilities that either do not have a WMP or have a substandard WMP. Finally, Subgroup members generally agree with the National Academies' recommendation for CMS to

⁴ See QSO-17-30- Hospitals/CAHs/NHs

expand its Memorandum to require monitoring for *Legionella* in facility water samples⁵. Routine *Legionella* monitoring would enable these facilities to assess the effectiveness of their WMPs.

Entities Owning Numerous Facilities May Have Inadequately Individualized WMPs

CSTE Subgroup members also identified issues with WMPs from certain types of long-term care facilities, specifically those owned by larger corporate entities. Nationally, many long-term care facilities are owned and managed by for-profit operators⁶. It has been noted that the WMPs of facilities owned by the same entity can be very similar and fail to incorporate any of the unique features of each facility. There is a tendency for corporate entities to create a “boilerplate” WMP that is used for all facilities under their control. While it may be intended as good business management to standardize across facilities, it runs counter to the need for each WMP to be individualized to be effective for preventing *Legionella*.

Concerns with Testing by Facilities

STLT jurisdictions report that proactive *Legionella* sampling as part of a WMP is either not taking place unless specifically required or is lacking in representative sample locations and frequency. Jurisdictions report that facilities often do not test for *Legionella* because of a lack of understanding about how to respond to findings or fear of liability if detected. This is further compounded by the fact that neither ASHRAE Standard 188 nor CMS explicitly require routine *Legionella* testing as the method for WMP validation. While CDC does not require testing, it does provide guidance on *Legionella* for both routine and non-routine purposes, including specifying that *Legionella* testing is the best method for WMP validation⁷.

Many Subgroup members were concerned that WMP teams and building managers may not appreciate that *Legionella* testing is the only direct way to validate WMP effectiveness. Without clear guidelines and understanding of *Legionella* results, building owners may be fearful of testing. STLT jurisdictions report that in those rare facilities that do test for *Legionella*, samples are often not analyzed at a laboratory certified to analyze environmental samples. CDC recommends that laboratories performing this analysis be accredited to a recognized standard for routine *Legionella* test methods,

⁵ [National Academies of Sciences, Engineering, and Medicine. 2020. Management of Legionella in Water Systems. Washington, DC: The National Academies Press](#)

⁶ [See ASPE: Trends in Ownership Structures of U.S. Nursing Homes and the Relationship with Facility Traits and Quality of Care \(2013-2022\)](#)

⁷ [Controlling Legionella | Water Management Program Validation | CDC](#)

such as ISO/IEC 17025, through a state, national, or international accrediting body (see footnote 6).

Tension Between Facility Conservation Measures and *Legionella* Risk Reduction

Currently, there is increasing effort to advance “green” building features, with a goal of conserving critical energy and water resources. Many buildings and facilities are striving to achieve Leadership in Environmental Engineering Design (LEED) certification and can earn points toward this through potable water and energy savings. However, some jurisdictions report that implementing these widely promoted water and energy conservation measures can result in unintended consequences for *Legionella* control. A recommended energy conservation measure to lower temperatures on hot water heaters can create an ideal environment for *Legionella* amplification within a building water system. Similarly, water conservation measures intended to save potable water, such as motion sensor-activated faucets and low-flow toilets and shower heads, can inadvertently increase the water residence time in premise plumbing, leading to the loss of disinfectant residual and creating conditions conducive to *Legionella* growth. It is important to balance conservation efforts with *Legionella* risk mitigation. As changes are made in favor of conservation, it is important to monitor water quality parameters for conditions favorable for *Legionella* growth and implement controls accordingly.

Best Practices for Performing Water Management Program Reviews

On-site Reviews vs. Remote Reviews

Often, the most comprehensive and effective method of reviewing a facility WMP to determine if it accurately reflects the building’s water systems and devices is by performing an on-site review of the facility with representatives of the facility. However, on-site reviews are time-intensive, may require travel depending on the jurisdiction area, and jurisdictions often do not have time to conduct such reviews. In addition, many STLT jurisdictions do not have staff with expertise in engineering or environmental health to conduct such reviews. Some jurisdictions with expertise in reviewing WMPs have developed methods of conducting remote reviews. There are some best practices for validating the information in WMPs to confirm it matches the fixtures present in a facility that increase the risk of growth of *Legionella*. For example, a few jurisdictions use web mapping software platforms (e.g., Google Maps) to view satellite images of facilities to determine facility characteristics such as the number of floors and the presence of cooling towers. While the satellite images available on such platforms can sometimes be out-of-date, they are still helpful. Figure 2 shows a satellite image of a facility with arrows indicating some items associated with cooling systems. To help with

identification, CDC has a web page of photos to serve as examples for identifying cooling towers in buildings⁸.

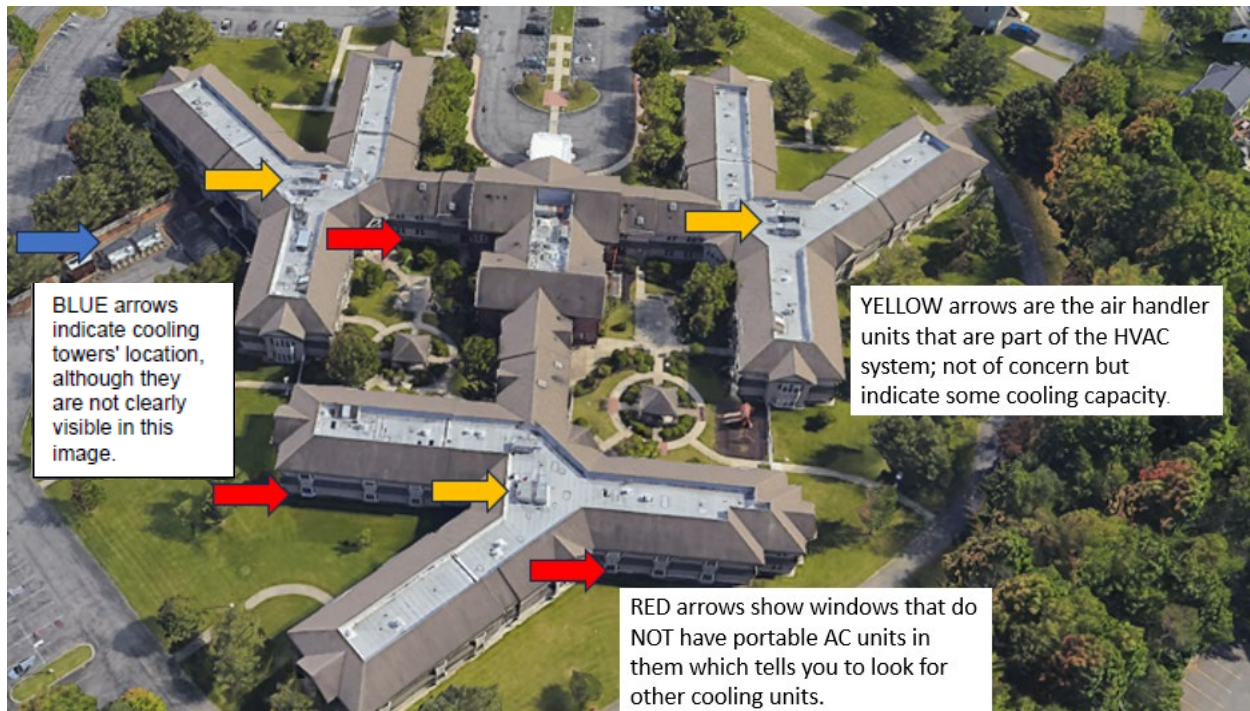


Figure 2: Satellite image of facility highlighting features relevant for *Legionella* WMPs.

Identify Questions to Ask a Facility

In many instances, STLT jurisdictions may be reviewing a WMP for a facility they have never visited, which presents a challenge when conducting a desk review. Experienced jurisdictions have found it beneficial to ask certain questions of the facility representative prior to a review to help validate the information found in the written WMP. Depending on the size of the facility, these questions can include:

- How many floors are in the facility?
- Does the facility contain connected buildings or wings?
- Is there a single entry point of public water into the facility or are there multiple entry points?
- Is there any supplemental water treatment such as water softening?
- Does the facility use a cooling tower?

While not exhaustive, asking these questions can help provide a broad overview to confirm consistency and accuracy of information in the WMP. Questions such as these also help determine if the WMP being reviewed is generic or individualized to the facility.

⁸ [Health Departments: Pictures of Cooling Towers](#) | [LD Investigations](#) | [CDC](#)

The Facility/Building Water System and Devices Checklist within the WMP Evaluation Tool can be used to develop additional questions, as appropriate.

Coordination of Expertise within a Jurisdiction

Jurisdictions engaged in WMP reviews note that there is a critical need for coordination between epidemiology and environmental health/industrial hygiene disciplines for this activity, especially if the review is being conducted in response to legionellosis cases or an outbreak at a facility. Staff in these two disciplines are in separate organizational units in most STLT jurisdictions and may not routinely interact. However, with WMP reviews there is a need to foster close collaboration, communication, and coordination. Consideration could also be given to having staff cross-trained in these respective disciplines.

Focus on Facility Control Measures and Sampling Plans Described in WMPs

Given that many jurisdictions may have limited time to complete a comprehensive review of a facility's WMP, jurisdictions with more expertise have identified certain aspects of a WMP that warrant more focused attention. These include the control measures, the sampling program, and sufficient evidence through documentation that the WMP is being implemented. At its core, a WMP's effectiveness is dependent on the control measures and the limits set for each (e.g., temperature, disinfectant residual). To ensure these measures are being met, attention should be focused on the WMP verification activities to see where and how the control measures are being monitored and at what frequency. Finally, there should be available documentation recording the sampling events, the results, and any actions taken if a control measure was found to be out of range. A quick check for this information will indicate whether the WMP is being implemented.

Conclusions and Key Recommendations for Jurisdictions Newly Conducting Reviews of Water Management Programs

The CSTE WMP Evaluation Tool provides jurisdictions a standardized approach to evaluate the quality of a WMP and determine if it comports with ASHRAE Standard 188 and CDC WMP Toolkit. The CSTE WMP Evaluation Tool also helps support STLT jurisdictions' primary prevention activities and Legionnaires' disease outbreak investigations.

Key Recommendations:

- While the CSTE WMP Evaluation Tool was developed to be used by an array of reviewers, including those who are not water system experts, epidemiology and environmental health staff within a jurisdiction should be encouraged to

collaborate on *Legionella* prevention and control activities and develop routine coordination and communication.

- WMPs are intended to be facility specific. Jurisdictions should be cognizant of “generic” or “boilerplate” WMPs that may be developed by consultants or corporate entities owning multiple facilities and are likely insufficient without inclusion of robust and detail facility-specific information.
- While it is not specifically required by ASHRAE Standard 188 at time of publication, STLT jurisdictions should encourage facilities to conduct routine *Legionella* sampling as part of their WMPs and consistent with CDC recommendation as a best practice. They should educate facilities on the importance of this routine monitoring to both validate and assess the effectiveness of their WMPs.
- Jurisdictions should have staff members who will be conducting WMP evaluations take advantage of existing training and other resources. Examples include a free online course, “[Preventing Legionnaires’ Disease: A Training on Legionella Water Management Programs](#),” developed by the CDC and partners. In addition, jurisdictions should also encourage building managers/engineering staff and water treatment consultants within their purview to access available resources.

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