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Policy

Brief

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Problem Statement

The key to preventing Legionnaires' disease (LD) is to reduce the risk of *Legionellae* growth and spread within building water systems and devices (1). Currently, prevention efforts are proposed and implemented primarily at the local and state levels given the absence of federal regulations or authoritative federal guidance governing this area. Strategies for preventing *Legionellae* growth, spread, and exposure are most effective when they are evidence-based; however, some proposals at the local and state levels have lacked such empirical evidence. Furthermore, proposals lacking empirical evidence may place additional strain on state, Tribal, local, and territorial (STLT) health departments, many of which already face challenges in carrying out basic LD prevention, surveillance, and response activities due to the increasing incidence of LD and limited public health resources.

Policy Proposal

The Council of State and Territorial Epidemiologists (CSTE) recommends that any proposed legislation, regulations, or policies targeting LD support the primary prevention of LD and be based on existing evidence and established best practices. The optimal regulatory and legislative policy initiatives aimed at preventing *Legionellae* exposure should be informed by consensus scientific positions and sound public health practices. Effectively addressing LD requires staying informed on the latest research, interpreting epidemiologic data, considering environmental and industrial hygiene factors, and evaluating laboratory capacity. STLT health department staff, with their specialized expertise and scientific training, are well-positioned to provide valuable input on LD-related policies and legislation, ensuring the policies are based on evidence and best practices.

Background

Legionellae bacteria were first identified following an outbreak of severe pneumonia at the American Legion Convention in Philadelphia, Pennsylvania in 1976, and have remained a focus of considerable national and global concern (2,3). Legionnaires' disease (LD), the pneumonia caused by inhaling aerosolized water containing *Legionellae*, primarily affects individuals 50 years of age or older, and those with weakened immune systems (4). LD has a 10% fatality rate, but that figure increases to 25% among patients who contract LD in a healthcare setting (5). Reported cases of LD have surged, with a ninefold increase in the United States (U.S.) from 2000 to 2018 that has disproportionately affected communities of color (6).

Legionellae naturally exist in freshwater environments, including surface and ground water, but generally the low amounts in natural freshwater bodies do not lead to disease (7,8). *Legionellae* can pose a health risk when they enter and proliferate in human-made water systems (8). Most buildings in the U.S. receive water from a public water system (9), and systems that serve 25 or more people are regulated by the U.S. Environmental Protection Agency (EPA) (10). In 1989, the EPA implemented the Surface Water Treatment Rule (SWTR), mandating that public water systems filter and disinfect their supply to control microbial contaminants when using surface water, or groundwater influenced by surface water (11). Despite these regulations, drinking water is not sterile, and *Legionellae* can sometimes be detected at low levels (12).

Once introduced into a building's water system (i.e., premise plumbing), *Legionellae* can grow and spread, particularly if conditions are conducive for biofilm formation (13). Factors that contribute to *Legionellae* and biofilm growth include inadequate hot water temperatures, reduced disinfectant levels, increased water age, stagnation, and presence of nutrients; several of these factors can be affected by water use patterns or conservation measures (13, 14, 15). Aging pipes and plumbing systems can further exacerbate these issues (15,16). *Legionellae* can then become aerosolized in water droplets by devices

such as showerheads, sink faucets, decorative fountains, hot tubs, and cooling towers, leading to potential exposure to people. Once a building water system is colonized with *Legionellae*, it can be difficult to mitigate (17).

The number of LD outbreaks reported to the National Outbreak Reporting System increased from 14 in 2009 to 98 in 2018 (18). A Centers for Disease Control and Prevention (CDC) analysis of LD outbreak data from 2015-2019 identified that the premise plumbing was the most frequently cited contributing factor for reported LD outbreaks (19). Approximately two-thirds of reported LD outbreaks were linked to building water systems of hotels, assisted living, long-term care, and healthcare facilities (19). Analysis of data from these outbreaks found that inadequate water management practices contributed to *Legionellae* growth and transmission, and that some outbreaks were likely preventable had better practices been in place (20). Furthermore, improved facility water management practices are likely to have an impact on the overall incidence of LD, as approximately one-third of patients report exposure to a healthcare facility (18%), travel accommodation (17%), or assisted/senior living facility (3%) prior to becoming sick (21). *Legionellae* are now the leading cause of reported waterborne disease-related outbreaks, hospitalizations, and deaths in the U.S. (19, 22). Contaminated cooling towers can result in a large number of LD cases, and they have been implicated or suspected in the majority of LD outbreak-related deaths examined between 2006 and 2017 (23).

Effective water management practices are essential to mitigate *Legionellae* growth and exposure from human-made water systems. Both the World Health Organization (WHO) and the CDC recognize the significant public health impact of *Legionellae* and LD. However, little guidance has been issued by federal laws and administrative agencies on this matter, leaving prevention efforts to be largely driven by state and local initiatives. While healthcare settings like hospitals and nursing homes remain an important focus, most existing regulations overlook other potential sources of exposure. STLT health departments may encounter challenges when legislation or regulatory policies aimed at reducing LD risk do not align with evidence-based prevention strategies or conflict with recommendations from organizations like the CDC and the National Academies of Sciences, Engineering, and Medicine (NASEM). For example, some pieces of proposed legislation have advocated for prevention efforts that focus on eradicating *Legionellae* at its source, despite a lack of available guidance and research for this approach and possible unintended health consequences. Proposals have included:

- **Unnecessary Environmental Testing**: Requiring testing of water from locations visited by case-patients even when visits occurred outside the incubation period, as well as testing of locations not recognized as posing a significant risk of *Legionellae* exposure, such as toilets.
- **Potentially Harmful Disinfectant Levels**: Increasing the required disinfectant residual across all areas of public water system distribution networks beyond the minimum levels recommended by the EPA, without evaluating feasibility or potential unintended consequences such as increased levels of disinfection byproducts that may pose health risks, damage to water mains, and disruptions to other biological, chemical, or quality standards for water.
- **Focus on Low-Risk Settings**: Mandating Water Management Programs (WMPs) for facilities that are not frequent settings for LD outbreaks, such as office buildings, instead of prioritizing high-risk settings such as healthcare, travel accommodations, and assisted/senior living facilities.

Proposals that are not evidence-based or that block public health agencies from implementing well-researched, effective policies can undermine the ability of STLT health departments to prevent and respond to LD. This increases the operational burden on public health agencies without meaningfully reducing disease incidence.

Examples of Evidence-Based Policy

Effective prevention requires comprehensive, multi-faceted strategies supported by scientific evidence. This section provides two examples of policies that have a strong evidence basis.

Water Management Programs (WMPs)

Building owners and management can play a pivotal role in the prevention of LD by creating and implementing WMPs for their facilities. A WMP is a comprehensive strategy that includes: 1. conducting a risk assessment of the building water systems to identify environmental conditions that could foster microbial growth; 2. implementing control strategies to mitigate these risks; 3. monitoring implementation of control strategies; and 4. validating efficacy of control strategies. WMPs are now widely recognized as a best practice and an industry standard for managing large building water systems and devices, such as cooling towers. Unfortunately, many building owners and managers do not proactively implement WMPs. For example, an analysis of data resulting from CDC-led LD outbreak investigations between 2015-2019 found that 83% of implicated buildings either lacked (43%) or were not following (40%) an adequate WMP (24).

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) developed the ASHRAE Standard 188 in 2015, which provides a comprehensive framework for developing and implementing WMPs (25). It sets forth minimum requirements for managing legionellosis risks in both potable and non-potable water systems within buildings. The standard includes provisions for building surveys, principles of WMP development, preventive measures, and requirements for designing water systems, including documentation, balancing, and commissioning. While ASHRAE Standard 188 represents a consensus among stakeholders in the field, compliance with these standards remains voluntary unless adopted into local laws, rules, or regulations.

Federal requirements in the U.S. directly addressing *Legionellae* management are primarily limited to healthcare facilities with funding from the Centers for Medicare and Medicaid Services (CMS) or Joint Commission accreditation. In 2017, the CMS issued a memo requiring hospitals, critical care hospitals, and long-term care facilities to implement policies and procedures to prevent microbial growth in building water systems (26). The Joint Commission also updated its requirements, mandating accredited facilities to maintain WMPs compliant with ASHRAE Standard 188 (27). Additionally, the Veterans Health Administration (VHA) issued a directive to prevent healthcare-associated *Legionella* infections in Veterans Affairs medical facilities (28). The U.S. General Services Administration now requires all federally-owned and leased buildings to perform risk assessments and develop WMPs based on their findings (29).

Other facilities at increased risk for *Legionellae* growth and exposure, such as assisted/senior living, travel accommodations, and other congregate living facilities, are not federally mandated to adopt WMPs. Furthermore, some STLT health departments report that non-healthcare facilities that are not licensed or regulated are outside of the health department's jurisdiction and that they have no authority to respond to potential *Legionellae* risks until after an outbreak has occurred.

Proposed legislation and regulatory policies could target this gap by requiring ASHRAE-compliant WMPs. In the absence of federal guidance that presently address this issue, STLT health departments, with their expertise, are in the best position to identify which buildings or devices are at higher risk, as described in epidemiologic literature, and should be prioritized for prevention efforts based on their jurisdictional needs.

Several state and local jurisdictions have enacted legislation mandating the adoption of WMPs. New York State requires healthcare facilities to implement WMPs that meet or exceed its comprehensive guidelines (30). Additionally, both New York City and New York State have set specific WMP requirements for cooling

towers (31, 32). New Jersey has also enacted WMP mandates for healthcare facilities, correctional institutions, certain residential buildings, hot tubs, and cooling towers (33).

Cooling Tower Registration

Cooling towers are devices that use water to remove heat from a building or facility, such as for air-conditioning, refrigeration, and other industrial manufacturing purposes. They operate by evaporating water, which releases small, aerosolized droplets, known as "drift," into the atmosphere. Cooling towers can be found in various settings, including schools, hospitals, hotels, dry cleaners, supermarkets, and commercial offices, as well as in industry settings like metal manufacturing, energy production, water treatment, chemical processing, food processing, and data centers.

Inadequately maintained cooling towers can foster *Legionellae* growth. A 2016 study of 196 cooling towers in the U.S. found that 47% tested positive for *Legionellae*, with 24% positive for *Legionella pneumophila* (34). Once colonized, cooling towers can release *Legionellae* into the air through drift, which can travel miles and affect many people.

Despite these risks, regulations on cooling towers vary significantly across jurisdictions. In most jurisdictions, cooling tower owners are not required to obtain permits, register their towers, or notify public health authorities of their operations. This lack of oversight hinders timely identification and response to potential LD outbreaks associated with cooling towers.

In areas without cooling tower registration, public health staff must manually locate these towers after an outbreak has begun. This process involves searching aerial imagery, conducting on-the-ground scouting, contacting industry sources, and reviewing water utility records. Identifying cooling towers during an outbreak can be challenging due to building density, poor visibility, and accessibility issues, wasting critical time that could be used to test known cooling towers and prevent additional illness.

Regulations mandating the registration or permitting of cooling towers offer significant public health benefits with minimal impact on owners and operators. Establishing these registries is essential for improving public health preparedness, as they enable quick identification and remediation of contaminated cooling towers during community-associated clusters. In addition, there are other *Legionellae* prevention activities that can be incorporated as part of or in addition to established cooling tower registries to enhance prevention of LD outbreaks:

- **Mandatory Water Management Programs (WMPs)**: Requiring facilities with cooling towers to implement WMPs to prevent *Legionellae* growth and transmission.
- **Routine Inspections**: Routine inspections by public health officials or third-party consultants to ensure that cooling towers are well-maintained and/or conduct periodic *Legionellae* testing to identify and address conditions supporting *Legionellae* growth before LD outbreaks occur.

Cooling tower registries were a recommended action by the National Academy of Sciences and have been widely adopted globally, including in Spain, France, the United Kingdom, Portugal, Germany, Belgium, Australia, New Zealand, Hong Kong, Singapore, the State of New York, and the Canadian provinces of Quebec and New Brunswick, among others (17).

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Recommended Actions and Considerations

The following recommended actions provide options for STLT health departments to consider when legislation or regulations aimed at preventing LD are proposed or reviewed.

- **Promote Evidence-Based Strategies for LD Prevention**: This policy brief can be a powerful tool to inform leadership and policymakers who are considering strategies to prevent LD. The brief highlights evidence-based strategies and examples of implementations from various jurisdictions, providing a solid foundation for informed decision-making.

- **Review and Advise on Proposed Policies**: CSTE acknowledges that available resources and other constraints may vary across jurisdictions. When feasible and in accordance with individual agency policies and procedures, reviewing legislation, regulations, and policies proposed by legislators and other policymakers aimed at LD prevention can help to ensure they are scientifically sound and supported by the literature. When proposals lack a strong evidence base and when resources allow, staff may offer expert input to revise these policies to align with best practices and local needs or actively participate in the legislative process to influence policy development and decision-making.
    - Because predominant sources of exposure for LD can vary by jurisdiction, proposed legislation or policies should account for local needs and factors influencing exposure.
    - The field of LD prevention and response continues to evolve, highlighting the need for further research to identify additional factors contributing to the rising incidence, such as aging infrastructure and climate change, as well as effective prevention measures.
    - Optimal legislative proposals incorporate appropriations or other funding mechanisms when there is an expected impact to STLT health departments.

Engagement and consultation of STLT health department staff in these processes is crucial, but the authors understand that several barriers can hinder this engagement:

- **Lack of Time**: STLT health department staff often juggle multiple responsibilities and may find it challenging to allocate time for legislative engagement and to proactively engage in prevention activities that could inform future policy decisions.
- **Limited Resources**: STLT health departments may have constrained budgets and limited resources, making it difficult to participate in engagement efforts.
- **Competing Priorities**: STLT health department staff may prioritize immediate public health crises or operational tasks over long-term engagement efforts.
- **Constraints**: Institutional or organizational policies might restrict STLT health department staff from engaging directly with legislators or other elected officials, even for educational purposes.

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