



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Testimony of Lisa Daniels
Director, Bureau of Safe Drinking Water
Pennsylvania Department of Environmental Protection
Before the Senate Democratic Policy Committee
Hearing on Legionella Prevention and Senate Bill 1285
Wednesday, May 5, 2021

Good morning Chair Muth, Senator Fontana, Senator Kane, and members. Thank you for this opportunity to talk about the Commonwealth's Safe Drinking Water Program. My name is Lisa Daniels and I am the Director of the Bureau of Safe Drinking Water within the Pennsylvania Department of Environmental Protection (DEP).

Today, I would like to talk with you about the scope and applicability of the Safe Drinking Water Act (SDWA) and regulations, the challenges associated with Legionella bacteria and DEP's actions to address it. I will also briefly discuss some of the potential concerns with Senate Bill 1285. I will begin with a few facts about DEP's Safe Drinking Water Program.

Safe Drinking Water Program

The Safe Drinking Water Program's principal and enduring mission is public health protection. Safe drinking water is vital to maintaining healthy and sustainable communities. Proactively avoiding incidents such as waterborne disease outbreaks can prevent loss of life, reduce the incidents of illness, and reduce health care costs. Proper investment in water infrastructure and operations helps ensure a continuous supply of safe drinking water, enable communities to plan and build future capacity for economic growth, and ensures their long-term sustainability. The Commonwealth has more than 8,300 public water systems (PWS) – which makes us third in the nation, behind Michigan and Wisconsin. These water systems serve drinking water to more than 11.3 million people, or 89 percent of the Commonwealth's population. PWSs and the customers they serve rely on drinking water program staff to ensure that all applicable Federal and State requirements are met and the water is safe to drink.

Note that the Commonwealth does not regulate private wells. We are one of two states (Alaska is the other) that does not have private water well construction standards. Because of this, private wells are often more susceptible to contamination from shallow surface water and other potential sources of contamination.

With this foundation, I would like to talk about the scope and applicability of the SDWA and regulations.

Scope and Applicability of the SDWA and Regulations (Title 25, PA Code Chapter 109)

The Public Water System Supervision Program is a "delegated" program from the U.S. Environmental Protection Agency (EPA). The Commonwealth currently has primary enforcement authority (or primacy) for the program per Section 1413 of the Public Health Service Act, which is more commonly referred to as the Federal Safe Drinking Water Act. This Section provides, in relevant part, that "a state has primary enforcement responsibility for public water systems during any period for which the Administrator [of EPA] determines that such state

(1) has adopted safe drinking water regulations that are no less stringent than the national primary drinking water regulations promulgated by the Administrator . . . [and] (2) has adopted and is implementing adequate procedures for the enforcement of such state regulations, including conducting such monitoring and making such inspections as the Administrator may require by regulation. . . .” 42 U.S.C.A. § 300g-2(a) [Emphasis added].

Per the primacy requirements under 40 CFR, Part 142, the definitions in the PA SDWA and regulations must be at least as stringent as those specified in the federal SDWA and regulations. The PA definition of a PWS is as follows:

Public water system—A system which provides water to the public for human consumption which has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. The term includes collection, treatment, storage and distribution facilities under control of the operator of the system and used in connection with the system. The term includes collection or pretreatment storage facilities not under control of the operator which are used in connection with the system. The term also includes a system which provides water for bottling or bulk hauling for human consumption. Water for human consumption includes water that is used for drinking, bathing and showering, cooking, dishwashing or maintaining oral hygiene.

There are a few exemptions under the SDWA that are specified in the Federal and State Acts and regulations as follows:

Rules and regulations shall apply to each public water system, unless the public water system meets all of the following conditions:

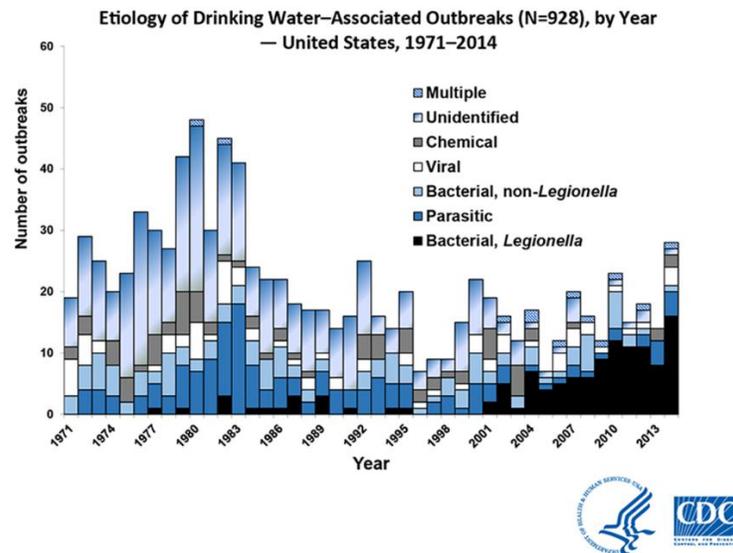
- (1) Consists only of distribution and storage facilities and does not have collection (e.g. sources of supply) and treatment facilities.*
- (2) Obtains all of its water from, but is not owned or operated by, a public water system to which these rules and regulations apply.*
- (3) Does not sell water to any person.*
- (4) Does not provide water for potable purposes to carriers which convey passengers in interstate commerce.*

As per these exemptions, the Federal and State Acts do not apply to buildings that are served by a public water system if the building consists only of distribution and storage facilities and does not have collection (e.g. sources of supply) or treatment facilities.

Legionella Bacteria

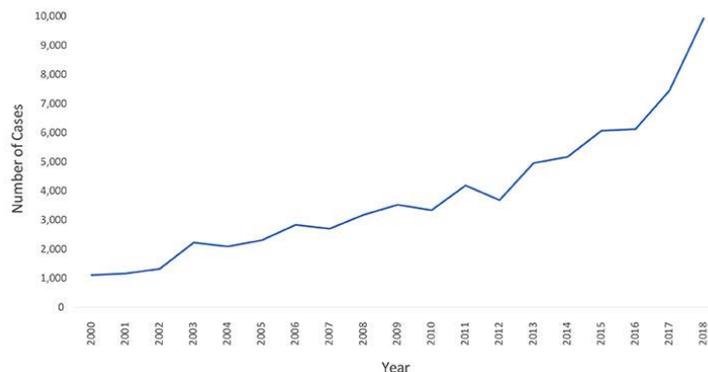
Prevalence of WBDOs:

The CDC tracks Waterborne Disease Outbreaks (WBDO) based on state reporting of cases of illness. The below graph represents the number of WBDOs associated with drinking water by year and etiology in the U.S. from 1971-2014. Despite advances in water treatment, WBDOs continue to occur. Note that since 2001, WBDOs associated with Legionella bacteria have been on the rise.



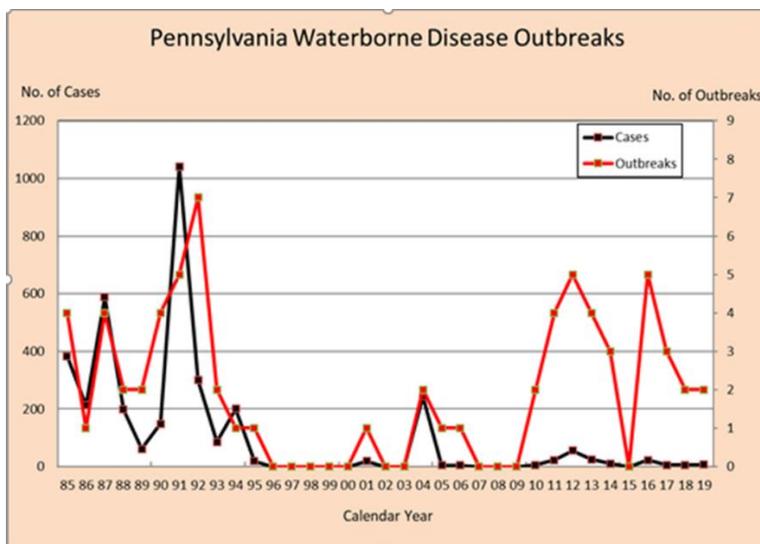
According to the CDC, and as per the below graph, state health departments reported nearly 10,000 cases of Legionnaires' disease in the United States in 2018. However, because Legionnaires' disease is likely underdiagnosed, this number may underestimate the true incidence. A recent study estimated that the true number of Legionnaires' disease cases may be 1.8–2.7 times higher than what is reported.

Legionnaires' disease is on the rise in the United States
2000-2018



Source: Nationally Notifiable Diseases Surveillance System

The below figure shows WBDOs in Pennsylvania since 1985 (the year PA obtained primacy for the program). In the 1980s through the early 2000s, WBDOs were attributed to “traditional” pathogens (*E. coli*, *Salmonella*, *Cryptosporidium*, *Giardia*) and were mainly associated with source water contamination or inadequate treatment. However, since 2010 nearly all of the WBDOs have been associated with “emerging” pathogens such as *Legionella* bacteria.



Source: PA DEP, BSDW tracking based on information provided by PA DOH

In 2019, two WBDOs were reported in Pennsylvania. Both were associated with *Legionella* in health care facilities. In Outbreak #1, there were two cases of illness, with two hospitalizations, and no deaths. In Outbreak #2, there were five cases of illness, with four hospitalizations, and one death. In both of these cases, an underlying deficiency was not determined.

Legionella bacteria:

Legionella bacteria are found naturally in the environment worldwide, usually in aquatic environments (e.g. lakes, rivers, ground water). The bacteria also occur in distribution systems and premise plumbing.

Legionella can cause Legionnaires' disease and Pontiac fever, collectively known as legionellosis. Sometimes the bacteria infect the lungs and can cause a severe pneumonia called Legionnaires' disease. The bacteria can also cause a less serious infection that seems like a mild case of the flu called Pontiac fever. People can get Legionnaires' disease or Pontiac fever when they breathe in small droplets of water in the air that contain Legionella. Most healthy people do not become infected with Legionella after exposure. People at higher risk of getting sick include people 50 years or older, current or former smokers, people with a chronic lung disease and people with a weakened immune system from diseases like cancer, diabetes or kidney failure. About one in 10 people who gets sick from Legionnaires' disease will die.

Legionella bacteria can become a health concern when it grows and spreads in potable water systems such as the premise plumbing of large buildings (consisting of hot water heaters, storage tanks and pipes), cooling towers, decorative fountains and hot tubs. The term "premise plumbing" traditionally refers to the portion of the water distribution system from the water meter to the tap in homes and buildings.

Challenges associated with Legionella bacteria:

Potable water entering a building from a public water system is not sterile. Legionella bacteria can be present even when water meets drinking water standards, but typically not at levels that can cause illness. Legionella bacteria can also be introduced directly into building water systems (premise plumbing).

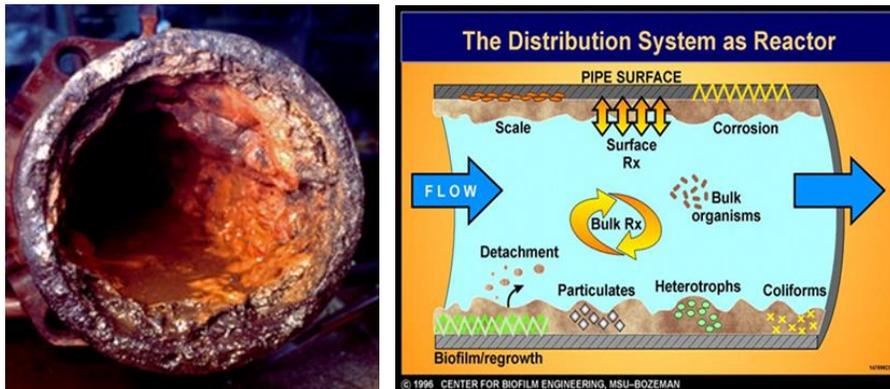
Potential pathways of contamination into plumbing systems include:

- Treatment breakthrough
- Cross connections and backflow
- Leaking pipes, valves, joints and seals
- Water line breaks, repairs, and new construction (includes building renovation projects, new additions)
- Storage tanks (vents allow entry of airborne contaminants, sediment accumulation)

Legionella bacteria become a problem when amplification occurs within building plumbing systems. Conditions that favor amplification include:

- Low flow (stagnation) and high-water age (due to excessive storage, dead ends/legs, low flow fixtures, other water conservation measures)
- Material and condition of water pipes (pipe scale/rust – impacts from corrosion and aging infrastructure), fittings, fixtures (shower heads, faucets), water heaters and treatment devices
- Presence of nutrients (organic and inorganic – iron, manganese, zinc, nitrogen) and sediment
- Warm water temperatures (25 - 42°C or 77 - 108°F)
- Low or no disinfectant residual

Stagnation degrades water quality because it decreases disinfectant residual, increases disinfection byproducts, increases biofilm and microbial growth, decreases pH, increases corrosion and increases chlorine demand. These conditions support the growth of biofilms within hot and cold plumbing systems and the amplification of Legionella.



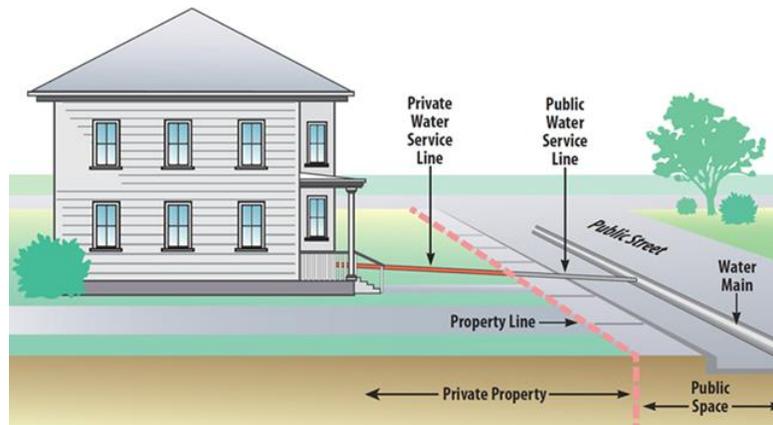
Biofilms:

- Are a complex mixture of microbes (bacteria, amoebae), organic and inorganic material accumulated within a secreted slime
- Attach to inner surfaces of pipes, fittings and fixtures
- Provide a food source (nutrients) and protection from disinfectants
- Provide a “host” for Legionella growth
- Provide the ideal environment for Legionella colonization and growth
- Serve as a slow-release mechanism, seeding contamination further downstream
- Can break off in larger chunks, containing higher concentrations of Legionella (due to excessive/abrupt change in flow/pressure, change in water chemistry, disturbance from pipe repair/replacement)

In order to control Legionella, the underlying conditions that promote amplification must be addressed. And water age and water stagnation may be the most important factors.

Shared responsibility:

Water quality (and Legionella control) is a shared responsibility between the water system and building owner and may involve multiple approaches.



Public water systems are responsible for delivering water that meets drinking water standards. Building owners are responsible for maintaining water quality through the proper design, construction, operation and maintenance of premise plumbing.

Because Legionella control is a shared responsibility, there are steps that public water systems and building owners can take to reduce the risks.

Legionella control approaches for public water systems include the following:

- Maintain a disinfectant residual throughout the distribution system that meets current regulatory requirements of at least 0.2 mg/L
- Use best practices and industry standards for distribution system and storage tank operation and maintenance (includes proper main replacement/repair, flushing and cleaning protocols, preventative maintenance)
- Improve hydraulics and reduce water age, increase storage tank turnover (goal ≤ 5 days retention time), and eliminate dead ends which will improve overall water quality and control biofilms/microbial regrowth
- Develop proactive messaging for customers regarding pathogens in plumbing systems

The proper design, operation and maintenance of premise plumbing systems is critical to maintaining water quality and controlling Legionella. Building control measures include the following:

- Develop and implement a water management or water safety plan
- Monitor water quality

- Maintain incoming water quality
- Prevent water stagnation within buildings
- Prevent scaling and corrosion
- Control biofilms within building
- Prevent sanitary defects or pathways of contamination
- Maintain adequate water temperatures
- If needed, maintain or install adequate disinfection

DEP's approach to addressing Legionella bacteria:

Since 2012, DEP has had an existing protocol in place to address Legionella in public water systems. The protocol includes communication and coordination with the Department of Health and the use of existing authorities under Chapter 109 (Safe Drinking Water) regulations to require follow up and corrective actions. These authorities include the following:

§ 109.202. State MCLs, MRDLs and treatment technique requirements.

** * **

(c) Treatment technique requirements for pathogenic bacteria, viruses and protozoan cysts. A public water system shall provide adequate treatment to reliably protect users from the adverse health effects of microbiological contaminants, including pathogenic bacteria, viruses and protozoan cysts. The number and type of treatment barriers and the efficacy of treatment provided shall be commensurate with the type, degree and likelihood of contamination in the source water.

** * **

§ 109.4. General requirements.

Public water suppliers shall:

- (1) Protect the water sources under the supplier's control.*
- (2) Provide treatment adequate to assure that the public health is protected.*
- (3) Provide and effectively operate and maintain public water system facilities.*
- (4) Take whatever investigative or corrective action is necessary to assure that safe and potable water is continuously supplied to the users.*

Under these authorities, DEP can require the following corrective actions if Legionnaires' disease cases are reported or Legionella is detected:

- One-hour reporting to DEP under 109.701(a)(3)
- Tier 1 public notification under 109.408(10) & (11)
- Confirmation and additional sampling under 109.302

- Additional corrective actions as necessary including remediation, sampling and installation of treatment (109.4)

DEP requires a permit for the treatment of Legionella. The treatment must meet industry standards and be approved by EPA or the state (using 3rd party validation and certification for efficacy). DEP also incorporates a system-specific water management plan into the permit to ensure ongoing implementation of a water safety program.

In 2018, DEP finalized the Disinfection Requirements Rule which, among other things, increased the minimum residual in the distribution system to 0.2 mg/L. The Rule improved monitoring by requiring more frequent sampling at representative and worst-case sites as per a sample siting plan. The Rule was intended to strike a balance between improved microbial inactivation while limiting adverse impacts on disinfection byproducts. Water systems can achieve both by employing effective best management practices, including proper flushing, storage tank maintenance, leak detection and effective pipe replacement and repair practices.

While DEP has taken steps to address Legionella, many unanswered questions and research needs still remain.

- What role do building codes, or the lack thereof, play in adversely impacting building water quality? Do some building codes contribute to water stagnation and other conditions that allow the amplification of Legionella?
- How do we balance the risk-risk tradeoff associated with improved disinfection treatment for Legionella while limiting the adverse impacts on disinfection byproducts and corrosion control treatment (simultaneous compliance)?
- Research needs include better analytical methods (faster, more accurate, better QA/QC) and a more robust national accreditation program; validated treatment technologies that are effective at controlling Legionella within the water column and within biofilms; and a better understanding of how control measures for Legionella may adversely impact other opportunistic premise plumbing pathogens.

DEP has been active in several federal workgroups and task forces with EPA, CDC, industry organizations and other states to better understand and address the risks associated with Legionella. EPA has also initiated action at the federal level to review and amend the suite of Microbial and Disinfection/Disinfection Byproducts (M/DBP) Rules. Among other things, the amendments are expected to address Legionella.

For all of these reasons, DEP would urge caution when considering broad legislative or regulatory requirements to address Legionella. A more targeted and incremental approach may be warranted.

Potential Concerns with Senate Bill 1285

The bill would amend one of the most fundamental definitions under the SDWA – the definition of a public water system (PWS) – which is used to determine the types of facilities that are regulated under the SDWA. The bill would delete the exemption for buildings that are merely a customer of a public water system. This could add tens of thousands of buildings to the list of facilities regulated under the SDWA and significantly increase DEP’s jurisdiction into what has traditionally been considered private property. It is also not clear what requirements would apply to buildings.

The bill seems to be more focused on Legionella testing rather than addressing the underlying causes of Legionella growth. DEP believes that water age and stagnation may be the most important factors leading to the amplification of Legionella. And these can be addressed through the development and implementation of a water management plan, and better design, operation and maintenance of premise plumbing. Note that Legionella testing is just one small part of a comprehensive water management plan.

The bill may contain duplicative requirements as it does not fully recognize the current authorities under the SDWA to address Legionella, or the current requirements for health care facilities to develop and implement a water safety program under the 2017/2018 directive from the Center for Medicare and Medicaid Services.

The bill does not consider the potential adverse impacts that an increased disinfectant residual may have on disinfection byproducts and corrosion control treatment.

Without addressing these and other outstanding questions, it is possible that this legislation could unintentionally do more harm than good. DEP is interested in further exploration of this issue with our sister agencies, public water systems, and other stakeholders to review the best available science and make recommendations on how to comprehensively and effectively address and prevent Legionella in Pennsylvania.

Thank you and I look forward to answering any questions you may have.