

Alliance to Prevent Legionnaires' Disease

Testimony for the
Senate and Assembly
Joint Public Hearing on
Water Quality & Contamination

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STATISTICAL MECHANICS

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Introduction

Honorable Chairs Senator Hannon, Assemblyman Gottfried, Senator O'Mara, Assemblyman Englebright and other distinguished members of the Health and Environmental Conservation Committees of the Senate and Assembly, my name is Daryn Cline. I am the Director of Environmental Technologies at Evapco and here today representing an *Alliance to Prevent Legionnaires' Disease*. We thank you for the opportunity to testify about water quality and contamination in New York State, and in particular today, I will discuss the pathogen *Legionella* bacteria, the most common cause of waterborne disease in the United States.

As background for the committees, Legionnaires' disease is a severe form of pneumonia that can occur through aspiration or inhalation of water droplets contaminated with *Legionella* bacteria. Exposure to *Legionella* in freshwater environments such as lakes and streams typically does not lead to disease. However in manmade water systems, *Legionella* can grow and cause disease in humans. The bacteria is most likely to impact susceptible individuals: those aged 50 years or older, and persons with underlying medical conditions such as respiratory disease, diabetes or immunosuppression.

According to the Centers for Disease Control and Prevention (CDC), there are approximately 5,000 cases of Legionnaires' disease reported each year in the United States and nearly 10% of cases are fatal. Thousands of cases go unreported. This summer marks the one year Anniversary of the worst outbreak of Legionnaires' disease in New York City's history, in the Bronx. Coincidentally, it has also been forty years since the first outbreak of the disease (in July of 1976). Unfortunately, forty years later much remains unknown about the cause and proliferation of this waterborne disease and efforts to date to prevent Legionnaires' disease *are failing*.

A recently released CDC report (June 2016) cited a four-fold increase in reported Legionnaires' disease cases in the last decade. In response, an alliance to prevent Legionnaires' disease has recently been formed. We are working with public health and medical professionals, disease prevention experts, water treatment professionals, building engineers, impacted individuals and family members. The mission of the alliance is to promote best practices around preventing Legionnaires' disease (a highly preventable illness). We are working to dispel the myths about what causes this disease and more importantly, provide the tools to help protect the public against future outbreaks.

While State regulations and local ordinances were recently enacted in New York related to preventing Legionnaires' disease, such requirements do not follow best practice guidelines for prevention and therefore leave the public at significant risk, as evidenced by the subsequent outbreaks and cases that have taken place since their enactment including the recent clusters in Harlem in two separate buildings.

In order to effectively protect the public and prevent cases of Legionnaires' disease, our testimony today is focused on the following Recommendations:

1. Testing, Control & Monitoring for *Legionella* in Public Water Supplies
2. Assist Building Owners with the Management of Entire Building Water Systems
3. Use Investigational Protocols when Cases are Reported

Recommendation 1: Test, Control & Monitor for *Legionella* in Public Water Supplies

If government and health officials are serious about preventing the spread of *Legionella* bacteria and the disease it causes, they must take a much closer look at the water that flows into buildings to ensure that it is properly treated and disinfected against the bacteria. This is the first and primary line of defense to address *Legionella* growth and prevent disease.

Source water is the water we use, collected from lakes, rivers and reservoirs, which naturally contains bacteria and nutrients. To protect public health, source water is treated and filtered to limit the level of contaminants per the Safe Water Drinking Act. Notably, New York City does not filter approximately 90% of its water since it was granted an exemption from the federal Environmental Protection Agency (EPA) if the water meets certain criteria including residual disinfection concentration, and incidentally not being identified as a source of a waterborne disease outbreak, which as we understand it occurred last Summer in NYC, but that is a topic for another day.

Since *Legionella* has been shown to survive certain chemical disinfectants used by water treatment plants, water must be closely monitored to ensure that *Legionella* is being effectively eliminated and to prevent its growth as water travels from treatment plants through water distribution systems and into buildings. *Legionella* growth can occur or be proliferated when there is a lack of residual disinfectants further down the system, or through corrosion in piping, water tank storage, and/or disruptions such as water main breaks, infrastructure upgrades, construction or other factors external to buildings which can dislodge biofilm and free *Legionella* into water entering buildings.

A new study was recently released that found that the corrosive tap water in Flint, Michigan was not only linked to dangerous lead levels but it also contributed to two outbreaks of Legionnaires' disease there.¹ This study is a wake-up call to the many cities failing to address corrosion in their aging water pipes.² According to study author, Amy Pruden, an environmental microbiologist at Virginia Tech, "*lab-scale type studies have illustrated that corrosion in drinking water pipes can stimulate the growth of Legionella.*" This is due to the fact that corrosive water dissolves the protective mineral lining in pipes and then leaches iron out of old pipes. Iron is a micronutrient that boosts *Legionella* reproduction since the metal reacts with and inactivates chlorine disinfectant that otherwise would kill the bacteria. Further, in more than half of the water samples in Flint, the researchers could not detect any chlorine, which they expected, due to corrosion.³

To ensure that *Legionella* is properly monitored in drinking water systems, particularly when there are infrastructure or source water changes or other system disruptions, many experts are calling on the EPA to require testing for *Legionella* in drinking water systems. "*Water operators need to understand that when water service is disrupted, the risk of Legionnaires' disease can go up and the community should be notified,*" said Janet Stout, Director of the Special Pathogens Lab in Pittsburgh.⁴

New Bronx Water Source, May 2015

¹ (Environ. Sci. Technol. Lett. 2016, DOI: <http://pubs.acs.org/doi/abs/10.1021/acs.estlett.6b00192>)

² <http://cen.acs.org/articles/94/web/2016/07/Legionnairesoutbreaks-Flint-linked-corrosive-tap.html>.

³ Ibid.

⁴ <http://cen.acs.org/articles/94/web/2016/07/Legionnairesoutbreaks-Flint-linked-corrosive-tap.html>

On May 5, 2015, the source of water serving areas of the Bronx was changed. Specifically, after years of work water from the Croton watershed began flowing to the South Bronx and Western Manhattan. Since *Legionella* is currently not a pathogen that is tested for in the water, there would not have been any monitoring of the water supply for the bacteria during this major infrastructure and source water change. Beginning in late 2014 and throughout the summer and into the fall of 2015, several outbreaks of Legionnaires' disease occurred in the Bronx including the largest in the City's history which infected 133 people and led to 16 deaths.

We strongly urge New York State to ensure an adequate level of chemical disinfection against *Legionella* throughout water distribution systems and to require testing for the bacteria at distal points in the distribution system to confirm the bacteria is controlled.

Recommendation 2: Assist Building Owners with the Management of Entire Building Water Systems

Over the last few months, the State (July 2016) and New York City (May 2016) Health Departments adopted regulations related to the prevention of *Legionella*. Such regulations followed a State Emergency Rule Making and NYC local law enacted in August 2015, during the Bronx summer outbreak. Despite comments by many organizations and experts, these regulations ignore the best practice recommendations of national and international health agencies as well as the peer-reviewed literature around Legionnaires' disease prevention. Instead, they focus on the testing, reporting and inspection of cooling towers, equipment which utilizes the same water which enters and circulates through buildings and is used for many purposes including drinking, showering, cooking, and heating. The State regulations also codify requirements on healthcare facilities to have water management programs but ignore many other high risk buildings where individuals live and work.

Numerous studies and peer-reviewed literature have identified drinking water as the primary source of exposure to *Legionella*. The World Health Organization (WHO), Environmental Protection Agency, Occupational Safety and Health Administration, Veterans Health Administration, and CDC have all focused on the entire building water system including potable (drinking) water in their *Legionella* prevention guidelines and recommendations.

Experts agree that if there is *Legionella* in the cooling equipment, the entire building water system is likely contaminated. Consequently, there are many possible pathways of exposure to humans in buildings including faucets, showers, hot tubs/spas, ice machines, pools, decorative fountains and others.

June 7th CDC Toolkit

In response to the recent events in Flint, Michigan, New York City and elsewhere, the CDC released a comprehensive toolkit nationwide in June with guidelines for how building owners can work to prevent Legionnaires' disease through proper management of building water systems.⁵ This toolkit underscores the need for a comprehensive water management plan in all "high risk" buildings which manages potable and non-potable water as it circulates throughout a building and all related building equipment. Buildings are deemed high risk due to susceptible populations, size, complex plumbing system or the presence of certain building equipment that can increase risks. New York's exclusive focus on cooling towers and healthcare facilities ignore these recommendations and leave the public at risk.

⁵ (<http://www.cdc.gov/Legionella/WMPtoolkit>)

In June, the CDC also released its *Vital Signs* investigation data demonstrating that the cause of the majority of building-associated outbreaks (nearly 60%) is drinking water such as that used for showering.⁶ When releasing the Toolkit and MMWR report, CDC Director Tom Frieden, M.D. M.P.H. stated, “*Many of the Legionnaire’s disease outbreaks in the United States over the past 15 years could have been prevented... Better water system management is the best way to reduce illness and save lives, and today’s report promotes tools to make that happen.*”

The CDC’s investigations found that 9 in 10 outbreaks were caused by problems preventable with more effective water management with 65% due to process failures, like not having a *Legionella* water management program in buildings and 35% due to changes in water quality for reasons external to the building itself, like nearby construction.

Despite the recommendations of many disease experts, last summer New York City officials targeted cooling towers in their investigations and did not test the drinking water in the homes or workplaces of those who contracted the disease. It seems that it was politically advantageous and easier to blame cooling towers and tell residents that their drinking water was safe (a common theme with government officials recently). New regulations and ordinances were developed in August 2015 which targeted cooling towers and the outbreak was declared over.

Outbreaks/Cases Following New York Regulations

Immediately following enactment of the emergency ordinances, there were subsequent outbreaks in the Bronx including one at the Melrose Houses in the South Bronx in September 2015 where *Legionella* was found in the water distribution system serving the public housing complex. Further, in September 2015 it was made public that an infectious disease doctor employed by Lincoln Hospital in the Bronx tested the drinking water in homes of his patients during one of the outbreaks and found six of the patient’s homes tested positive for the bacteria in their kitchen faucets or bathroom showers or faucets. Four days after conducting the tests, Dr. Michael Skelly was fired for doing so. He has since filed a wrongful termination lawsuit under the whistleblower statute. According to this lawsuit, he was fired at the request of NYC Health Department officials who had told his boss, “*we know what he is doing and we expect it to stop.*” When he refused to stop testing the drinking water, he was fired.⁷

On August 31, 2016, the NY Times reported on the recent lead testing of schools by New York City officials. In doing the tests, the City ignored recommendations by the EPA and their own voluntary guidelines against pre-stagnation flushing. Instead, every water outlet in the schools was turned on fully for two hours the night before the samples were taken. When the test results were announced in July, officials declared the water safe to drink. In contrast, experts believe the pre-stagnation flushing masked the scope of risk and the results are unreliable and lead concentrations may be much higher than reported. We see parallels between this story and how City officials handled investigations during the Legionnaires’ outbreak, assuring residents that their water was safe to drink, having never testing the potable water in patient homes.

Finally, according to the CDC there have been approximately 317 reported cases of Legionnaires’ disease in New York State so far in 2016. In one week alone in late January 2016,

⁶ (<http://www.cdc.gov/media/releases/2016/p0607-legionnaires.html>)

⁷ <http://www.nydailynews.com/new-york/bronx-legionnaires-doc-fired-testing-water-article-1.2391609>

twenty seven (27) cases were reported in New York City to the CDC. And on July 31, 2016, it was announced that the City Health Department is conducting an investigation at a Harlem apartment complex after two cases were reported from the same address. According to press reports, the water system is believed to be the source. And just last week it was announced that two more cases are being investigated in another building in Harlem, based on CDC guidelines each of these cases would be considered an outbreak.

Clearly, the State and City requirements are not working to prevent cases and accordingly, they should be repealed. Instead, State and City officials should work with building owners to incentivize the use of the CDC toolkit to help prevent Legionnaires' disease.

Recommendation 3: Use of Investigational Protocols when Cases are Reported

In order to identify the true source of Legionnaires' disease cases, government and public health officials must use nationally recognized investigation protocols in their entirety when cases are reported. This is essential to ensure that the source (s) of exposure are quickly identified to prevent further cases.

The CDC has made available easy-to-use investigation protocols both for single (sporadic) cases and for outbreaks (clusters of cases).⁸ Our concern is that these protocols are not consistently used in New York and certainly not used in their entirety as recommended.

Further, we are very concerned that public health officials in all levels of government are content to only take action and investigate cases that occur as part of a declared outbreak. This, according to the CDC, only accounts for 4% of all Legionnaires' disease cases. This means that in 96% of cases deemed "sporadic" or "singular cases" there is no investigation to identify the source to provide answers to those who contract this disease or their family members about the cause. And without identifying the source, there is no way to prevent additional cases that could result from the same source of exposure.

As previously mentioned, last summer's outbreak was preceded by an earlier outbreak in Co-Op City in the Bronx only six months prior (December 2014/January 2015) which affected eight individuals. Also in March 2015 cases of Legionnaires' disease were reported at the Melrose Houses (also part of the July/August 2015 outbreak).

Finally in April 2015, James Rouse an otherwise healthy, athletic 50-year old teacher at the Urban Science Academy in the Bronx (less than a mile from the Melrose Houses and center of Summer 2015 outbreak), died from Legionnaires' disease.⁹ Despite strong requests from James Rouse's family, New York City refused to provide his family with any information on the number and general vicinity of other cases in the city. After having the family complete a questionnaire, the city declared the case closed. The city refused to test the drinking water in the Urban Science Academy until the teachers union got involved. Months later the water in the school was tested (only after the city disinfected the schools' water system). Despite disinfection, all five tests that were conducted were positive for the bacteria. If the public had

⁸ Single Case Investigation Protocols: <http://www.cdc.gov/legionella/health-depts/inv-tools-single/index.html> and Outbreak Investigation Protocols: <http://www.cdc.gov/legionella/health-depts/inv-tools-cluster/index.html>

⁹ <http://www.metro.us/new-york/are-bronx-schools-safe-after-legionnaires-outbreak/zsJohk---x1KO4N5HuZOOg/>

been notified and if these cases were properly and fully investigated it is possible that some or all of the outbreaks that followed could have been mitigated.

In sum, more can and should be done to protect the public to truly prevent Legionnaires' disease in our communities. The good news is that it is preventable. By understanding the primary source of the disease, programs can be put in place to effectively disinfect against or help prevent the growth of *Legionella* bacteria and the associated illness it can cause.

We believe this is a watershed moment for New York to take the right steps to change the course of this preventable disease by establishing policies that ensure proper monitoring and disinfection against *Legionella* in water distribution systems and to ensure that cases are properly investigated so the true source can be identified and addressed. We would welcome the opportunity to work with you to implement these policy changes. The alliance suggests a task force be formed with all stake holders involved to develop a rational approach to solving this preventable disease.

We thank you for your consideration of our comments and recommendations.

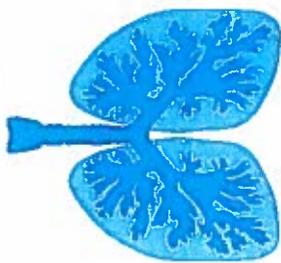
Attachments:

Legionnaires' Disease Helpful Information Infographic

Legionnaires' Disease Lines of Prevention Infographic

LEGIONNAIRES' DISEASE

HELPFUL INFORMATION



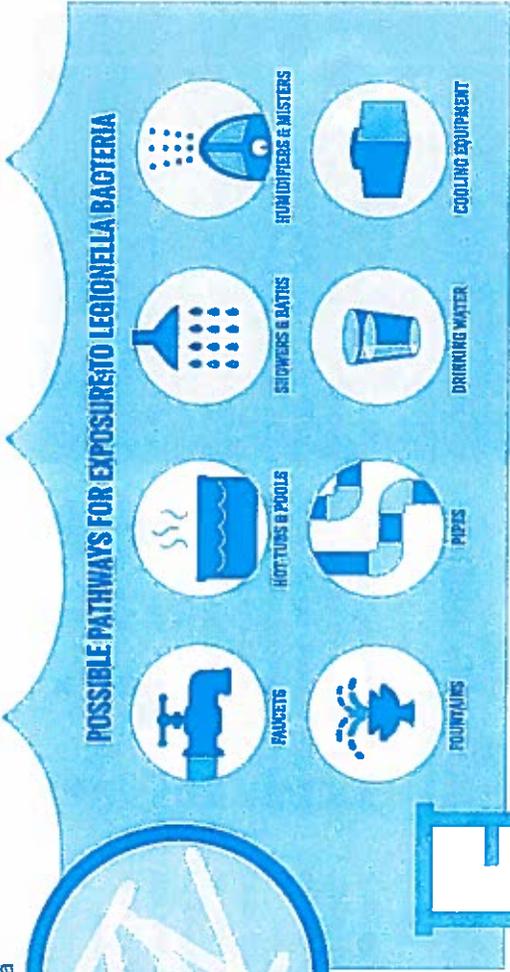
THE DISEASE A severe form of pneumonia caused by *Legionella* bacteria. Symptoms of this type of respiratory infection include high fever, chills, cough, muscle aches, headaches, and diarrhea.

MOST PEOPLE EXPOSED TO THE BACTERIA DO NOT BECOME ILL.

TRANSMISSION *Legionella* bacteria reach people when a water supply is contaminated. Hospitals, hotels, and large buildings are common locations for outbreaks. The drinking water supply is the primary source. Once the bacteria enters a water supply, it can multiply and be distributed throughout the building, coming into contact with people through fountains, mist machines, humidifiers, cooling towers, showers and sinks.

WHO'S SUSCEPTIBLE? The bacteria may enter the lungs through aspirated water droplets. While smokers, the elderly, and those with asthma, chronic lung disease or suppressed immune systems are more likely to become infected, healthy people may also be at risk.

Legionella bacteria



PREVENTION, MAINTENANCE & MONITORING To prevent Legionnaires', the drinking water supply must be kept free of *Legionella* bacteria. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Centers for Disease Control and Prevention (CDC) have developed a standard for risk management to support proper maintenance and monitoring of building drinking water systems.

FALSE

Legionnaires' disease most often occurs in large outbreaks.



The primary cause of Legionnaires' is cooling towers.



You can't get Legionnaires' from a shower head.



THE FACTS

Only 4% of Legionnaires' disease cases are part of known outbreaks. There are approximately 5,000 cases per year in the United States.

Peer-reviewed studies published in the New England Journal of Medicine, The Lancet: Infectious Diseases, and many other publications have found the drinking water supply to be the primary source of the bacteria.

Bacteria can grow in the plumbing and in the shower head, which breaks up the water into a fine mist which can easily be inhaled allowing bacteria to travel directly to the lungs.



optimal temperature for bacteria growth



LEGIONNAIRES' DISEASE

WAYS OF PREVENTION

#1 EDUCATION

The general public, building owners and health care professionals need more information on *Legionella* bacteria and how it may cause Legionnaires' disease. There are many myths surrounding the disease, so up-to-date and accurate information is crucial to reduce its incidence and increase prevention. Knowledge of the origins and exposure points of *Legionella* throughout the water system help us to understand how best to prevent its spread.



preventlegionnaires.org



#2 SOURCE WATER TREATMENT

The water we use, collected from lakes, rivers and reservoirs, is known as source water. Source water naturally contains bacteria and nutrients. To protect public health it is treated and filtered* to limit the levels of contaminants, per the Safe Water Drinking Act.

* New York City does not filter 99% of its water, having been given an exemption from the EPA if the water meets certain criteria, including residual disinfectant concentrations, and not being identified as a source of a waterborne disease outbreak.

#3 PUBLIC WATER TREATMENT

After collection and treatment, source water enters the public water system. Opportunities exist for *Legionella* and other bacteria to colonize and reproduce in the public water system. Pipe biofilm and corrosion, potential low chlorine levels and stagnant water all contribute to growth. It is critical to design, manage and maintain new distribution systems, as well as upgrade and repair older ones, to limit the growth of bacteria.

#4 BUILDING WATER SYSTEMS

Multi-story buildings are at greater risk of water-borne bacteria than smaller buildings, as the complexity of their piping provides more opportunity for bacterial growth. The exposure points in a building water system are numerous, from showers, baths and drinking water to ice machines, faucets, and cooling equipment. A multi-disciplinary team has developed ASHRAE Standard 188 for risk management of building water systems.

#5 WATER EQUIPMENT MANAGEMENT

Proper selection, placement, maintenance, treatment, monitoring, and management of water-based equipment, such as medical equipment, humidifiers, misters, hot tubs and pools, can further reduce the risk of exposure to water-borne *Legionella* bacteria.



#6 TESTING PROCEDURES

When Legionnaires' disease clusters or outbreaks are reported, it is crucial to determine the point of exposure by testing all water sources within the water system.* When the exposure point is found, it can be treated to stop the spread. Prematurely ending an investigation with the first positive sample may lead to further outbreaks which could occur unexpectedly, even months later. Multiple exposure points to bacteria are possible within one water system. Failure to test throughout the system may result in the inclusion or incorrect findings, or mis-identification of the source of the bacteria that caused the illness.

* Growth is generally verified by viable, recovery culture practices.

#7 RESEARCH

As Legionnaires' disease is a relatively newly discovered disease, ongoing research is imperative to better understand its causes, prevention and treatment. New studies and their findings are published periodically and it is important that this new information is communicated to dispel myths with proven measures for combatting the disease.