Update on Legionnaires’ Disease in Wisconsin

October 28, 2021  |  Wisconsin Long-Term Care Education Series

Anna Kocharian, MS
Epidemiologist  |  Communicable Diseases Epidemiology Section
Bureau of Communicable Diseases  |  Division of Public Health

Wisconsin Department of Health Services
Presentation Topics: *Legionella*

- Background and ecology
- Growth and transmission
- Burden and surveillance
- Public health investigations
Legionella

Fastidious aerobic Gram-negative bacilli

60+ species and 70+ serotypes are recognized.

*Legionella pneumophila* serogroup 1 is most commonly associated with disease.
Legionnaires’ Disease

American Legion Convention, Philadelphia 1976

Large outbreak of pneumonia among attendees caused by newly identified bacteria

New disease named for the outbreak — Legionnaires’ disease

Bacteria named *Legionella pneumophila*
Legionellosis

Legionnaires’ disease
Severe type of pneumonia

Pontiac fever
Mild febrile illness

Extrapulmonary legionellosis
Infection at sites outside the lungs
## Clinical Features

<table>
<thead>
<tr>
<th></th>
<th>Legionnaires’ disease</th>
<th>Pontiac fever</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs and symptoms</td>
<td>Pneumonia</td>
<td>No pneumonia</td>
</tr>
<tr>
<td></td>
<td>Cough, fever, muscle aches, shortness of breath, chest pain, headache, confusion, diarrhea</td>
<td>Mild, self-limiting illness with fever and muscle aches</td>
</tr>
<tr>
<td>Incubation period</td>
<td>2–10 days (up to 2 weeks)</td>
<td>24–72 hours</td>
</tr>
<tr>
<td>Attack rate</td>
<td>&lt; 5%</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>Treatment</td>
<td>Antibiotics</td>
<td>Supportive care</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>Common</td>
<td>Uncommon</td>
</tr>
<tr>
<td>Case-fatality rate</td>
<td>10% (&gt;25% for healthcare-associated infections)</td>
<td>Extremely low</td>
</tr>
</tbody>
</table>
Indications for Diagnostic Testing

Patients with pneumonia who:

- Are hospitalized with atypical pneumonia
- Are immunocompromised
- Fail to respond to antibiotic treatment
- May have healthcare-associated pneumonia
- Have a travel history (14 days before onset of symptoms)
Diagnostic Tests

Confirmatory Tests

*Legionella* culture

Acceptable specimens: lower respiratory secretions, lung tissue, pleural fluid, or extrapulmonary site

Grown on special media, buffered charcoal yeast extract (BCYE) agar

Validated nucleic acid amplification test (NAAT)

Acceptable specimens: lower respiratory secretions, lung tissue, pleural fluid, or extrapulmonary site

Urinary antigen test

Only detects *Legionella pneumophila* serogroup 1

Non-paired serology/antibody tests and NAAT/PCR of oral, nasal, or nasopharyngeal swabs are not useful for diagnosis and do not meet the case definition.
Found naturally in fresh water but in insufficient quantities to cause disease

Grow in free-living protozoa in water
  Provide nutrients
  Protect from harsh environmental conditions

Can become a public health problem in human-made water systems
Conditions for Transmission

Natural water supply

Exposure to *Legionella* in freshwater environments is not associated with disease.
Conditions for Transmission

Complex plumbing system

*Legionella* grows best in warm water in building water systems that are not adequately maintained.
Conditions for Transmission

Amplification
Warm water
Conditions for Transmission

Rapid decline by 100%
90% decline in 2 minutes
90% decline in 2 hours

Legionella growth zone

Dormant but viable
Conditions for Transmission

Amplification

Warm water (temperatures 77-108°F)
Stagnation (dead legs in pipes)
Sediment, scale, organic matter
Absence of residual disinfectants in water supply
Biofilm
Legionella can live and grow in biofilm.
Conditions for Transmission

Aerosolization

Devices that can aerosolize water droplets include:

- Showers and faucets.
- Jetted hot tubs.
- Decorative fountains.
- Evaporative cooling towers (used in large buildings).
Conditions for Transmission

Inhalation of aerosolized droplets, mists containing *Legionella*
Aspiration (less common)
*Not transmitted* from person to person
Host Risk Factors

People at increased risk for Legionnaires’ disease:

- Are aged 50 years and older.
- Are current or former smokers.
- Have chronic lung disease.
- Have a weakened immune system.
Environmental Risk Factors

Common sources of infection during outbreaks involve complex water systems found in buildings such as:

- Hospitals.
- Long-term care facilities.
- Hotels.
- Cruise ships.
Sources of Infection

- Potable water
- Cooling towers
- Hot tubs
- Decorative fountains
Legionnaires' disease is on the rise in the United States
2000-2018

Source: Nationally Notifiable Diseases Surveillance System

https://www.cdc.gov/legionella/about/history.html
Wisconsin Trend

Laboratory-confirmed cases, Wisconsin Electronic Disease Surveillance System

- **Wisconsin Department of Health Services**
- **Wisconsin Trend**
- **Laboratory-confirmed cases, Wisconsin Electronic Disease Surveillance System**

- **Laboratory-confirmed cases**
- **Incidence rate (per 100,000)**

- **Cases**: 350
- **Rate**: 7.0

- **Years**: 2010-2020
  - 2010: 63
  - 2011: 68
  - 2012: 92
  - 2013: 161
  - 2014: 96
  - 2015: 120
  - 2016: 122
  - 2017: 181
  - 2018: 333
  - 2019: 246
  - 2020: 246
Possible Reasons for Rising Trends

- Increased susceptibility
- Legionella in environment
- Improved diagnostics
- Improved surveillance
Wisconsin Department of Health Services

Case Demographics, Wisconsin

Laboratory-confirmed cases by age group (years) and gender, 2009-2018 average

82% of cases are aged ≥50 years

75% of cases are aged ≥50 years

Females

Males

- 85
- 80-84
- 75-79
- 70-74
- 65-69
- 60-64
- 55-59
- 50-54
- 45-49
- 40-44
- 35-39
- 30-34
- 25-29
- 20-24
- 15-19
- 10-14
- 5-9
- 1-4
- <1

- 2
- 4
- 6
- 8
- 10
- 12
- 14

14 12 10 8 6 4 2
Seasonality, Wisconsin

Laboratory-confirmed cases by month of illness onset, 2009-2018 average
Increased Reports During Summer Months

STATE OF WISCONSIN
Department of Health Services
Division of Public Health

Date: July 23, 2021

To: Wisconsin Clinicians, Infection Preventionists, Laboratorians, Local Health Departments, and Tribal Health Agencies

From: Ryan Westergaard, MD, PhD, MPH
Chief Medical Officer and State Epidemiologist for Communicable Diseases, Wisconsin Department of Health Services

Increased reports of laboratory-confirmed cases of legionellosis (Legionnaires’ disease)

PLEASE DISTRIBUTE WIDELY

www.dhs.wisconsin.gov
Enhanced Statewide Surveillance

Improve diagnosis and reporting

Approval of fee-exempt testing at the Wisconsin State Laboratory of Hygiene

Culture and PCR of lower-respiratory secretions

Use expanded hypothesis-generating questionnaire during public health follow-up
Importance of Clinical Isolates

Characterization of clinical isolates at WSLH and the CDC

Pulsed-field gel electrophoresis (PFGE)

Whole genome multilocus sequence typing (wgMLST)

Essential to linking clinical cases and environmental sources
Importance of Clinical Isolates

[Link to Resource]

Provider Information

- Reporting and Surveillance Guidance
- Provider Resources
- Water Management Program Resources

Diagnosing Legionnaires' Disease: Best Practices, P-02433:
[Link to Resource]

Division of Public Health Memo BCD-2021-05: Increased Reports of Laboratory-Confirmed Cases of Legionellosis (Legionnaires' Disease):
[Link to Resource]
Legionella Environmental Investigations

If cases appear to be epidemiologically linked to a common source:

**Conduct environmental assessment.**

Completion of [CDC assessment form](#) helps identify potential problem spots in water system with conditions that contribute to *Legionella* growth, and where samples should be collected.

**Collect and test water samples.**

In collaboration with DPH and other state or local agencies

**Determine course of action based on results.**
Legionella Environmental Investigations

Legionella detected in system

- Remediation
  - Removal of *Legionella* from plumbing system
  - Involvement of a team of specialists
  - Development or amendment of a water management plan

Legionella NOT detected in system

- Water management plan
  - Development of a water management plan (in health care setting)
    - Provides long-term solutions for the control of *Legionella*
Agencies Involved in *Legionella* Public Health Investigations

- Local or tribal health department (LHD)
- Wisconsin DHS, DPH/BCD – may involve DPH/Bureau of Environmental and Occupational Health (BEOH) or Division of Quality Assurance (DQA)
- Centers for Disease Control and Prevention (CDC)
- Wisconsin State Laboratory of Hygiene (WSLH)
- Wisconsin Department of Safety and Professional Services (DSPS)
- Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP)
- Wisconsin Department of Natural Resources (DNR)
Legionella Public Health Environmental Investigations

2020

2019

2018

2017

2016
Legionella Public Health Investigation in a Long-Term Care Facility: Case Study

Centers for Disease Control and Prevention
Legionella Environmental Assessment Form

HOW TO USE THIS FORM

This form enables public health officials to gain a thorough understanding of a facility’s water systems and assist facility management with minimizing the risk of legionellosis. It can be used along with epidemiologic information to determine whether to conduct Legionella environmental sampling and to develop a sampling plan. The assessment should be performed on-site by an epidemiologist and an environmental health specialist with knowledge of the ecology of Legionella. Keep in mind that conditions promoting Legionella amplification include water stagnation, warm temperatures (77-104°F or 25-40°C), availability of organic matter, and lack of residual disinfectant such as chlorine. For training and information, please visit CDC’s Legionella resource webpage at http://www.cdc.gov/legionella/outbreaks/index.html.

Complete the form in as much detail as possible. Do not leave sections blank; if a question does not apply, write “NA.” If a question applies but cannot be answered, explain why. Where applicable, specify the units of measurement being used (e.g., ppm). Completion of the form may take several hours.

BEFORE ARRIVING ON SITE

☑ Request the attendance of the lead facility manager as well as others who have a detailed knowledge of the facility’s water systems, such as a facility engineer or industrial hygienist.
☑ Request that they have maintenance logs and blueprints available for the meeting.
☑ Bring a plastic bottle, thermometer, pH test kit, and a chlorine test kit that can detect a wide range of residual disinfectants (c<1 ppm for potable water and up to 10 ppm for whirlpool spas).
☑ If the epidemiologic information available suggests a particular source (e.g., whirlpool spa, cooling tower), request that they shut it down (but do not drain or disinfect) in order to stop transmission.

INSTRUCTIONS FOR MEASURING WATER PARAMETERS IN THE PREMISE PLUMBING
(TABLE R 8)

It is very important to measure and document the current physical and chemical characteristics of the potable water, as this can help determine whether conditions are likely to support Legionella amplification.

STEP 1: Plan a sampling strategy that incorporates all central hot water heaters/boilers and various points along each loop of the potable water system. For example, if the facility has one loop serving all occupant rooms, an occupant near the (proximal) central hot water heater and another at the farthest point (distal) of the loop should be sampled.

STEP 2: For each sampling point (e.g., tap in an occupant room):

a. Turn on the hot water tap. Collect the first 50 mL from the tap. Measure the free chlorine residual and pH. Document the findings in the table on p. 8. Note: If there is no residual chlorine in the hot water, measure it in the cold water. Note: Total chlorine should be measured instead of free chlorine if the method of disinfection is not chlorine (e.g., monochloramine).

b. Allow the hot water tap to run until it is as hot as it will get. Collect 50 mL and measure the temperature. Document the temperature and the time it took to reach the maximum temperature.
Case Study: Facility A, 2018

Case-patient A reported to public health on 1/15

91-year-old male

Onset of illness: 1/9

Weakness

Confusion

Shortness of breath

No appetite

Hospitalized 1/13 and diagnosed with pneumonia

*Legionella* urinary antigen positive on 1/13

Patient died 1/18, primary cause of death: cancer
Case Study: Facility A, 2018

Case-patient A exposures:

Admitted to facility A (assisted living) on 11/27/2017

Other exposures during incubation period:
  Grocery shopping
  Outpatient hospital and clinic visits

January, 2018

<table>
<thead>
<tr>
<th>Su</th>
<th>M</th>
<th>Tu</th>
<th>W</th>
<th>Th</th>
<th>F</th>
<th>Sa</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>28</td>
<td>29</td>
<td>30</td>
<td>31</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
Case Study: Facility A, 2018

Case-patient B reported to public health on 3/14

82-year-old female

Onset of illness: 3/8

- Weakness
- Runny nose
- No appetite
- No fever or chills

Hospitalized 3/12 and diagnosed with pneumonia

*Legionella* urinary antigen positive on 3/12

Patient died 3/19, cause of death: bronchopneumonia
Case Study: Facility A, 2018

Case-patient B exposures:

Admitted to facility A (nursing home) on 9/1/2017

Other exposures during incubation period:

  Used a portable humidifier in her room
Case Study: Facility A, 2018

Environmental Investigation

- Municipal water supply (disinfected with chlorine)
- Connected water system (nursing home, assisted living)
- No recent construction or plumbing projects
- No cooling tower/evaporative condenser
- Outdoor fountains (during summer months only)
- No pool or whirlpool spa (single-use tubs only)
Case Study: Facility A, 2018

Environmental Investigation

Enhanced surveillance for Legionnaires’ disease

- Environmental assessment
- Environmental sampling

- 3/17
- 3/19
- 3/21
- 3/23
- 3/25
- 3/27
- 3/29
- 3/31
- 4/2
- 4/4
- 4/6
Case Study: Facility A, 2018

Environmental Sampling

Measurement of water quality parameters
- Free or total chlorine levels
- Temperature
- pH

Collection of environmental samples
- Bulk water
- Biofilm swab
Case Study: Facility A, 2018

Environmental Sampling

- Assisted living
  - Patient A room
    - Bathroom faucet
    - Shower

- Boiler room
  - Hot water storage tanks

- Nursing home
  - Patient B shared bath
    - Tub faucet
    - Tub sprayer
    - Shower

- Nursing home
  - Patient B room
    - Personal humidifier
    - Room sink faucet
Case Study: Facility A, 2018

Environmental Investigation

Enhanced surveillance for Legionnaires’ disease
# Case Study: Facility A, 2018

## Environmental Testing Results

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Date Collected</th>
<th>Specimen Type</th>
<th>Sample description</th>
<th>Temp (°F)</th>
<th>Free Cl₂ (ppm)</th>
<th>pH</th>
<th>WSLH Result</th>
<th>Count</th>
<th>Concentration, bulk water (CFU/ml)</th>
<th>Concentration, swab (CFU/sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Water heater tank 1, left*</td>
<td>100.0</td>
<td>0.01</td>
<td>5.0</td>
<td>No Legionella isolated</td>
<td>&lt;0.053</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>002</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Water heater tank 2, right*</td>
<td>115.0</td>
<td>0.18</td>
<td>4.5</td>
<td>No Legionella isolated</td>
<td>&lt;0.05</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>003</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Water heater tank 3, middle*</td>
<td>147.0</td>
<td>0.04</td>
<td>4.5</td>
<td>No Legionella isolated</td>
<td>&lt;0.056</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>004</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Room B (patient B), sink</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>68</td>
<td>-</td>
<td>850</td>
</tr>
<tr>
<td>005</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Room B, sink</td>
<td>107.0</td>
<td>0.18</td>
<td>5.0</td>
<td>Legionella pneumophila</td>
<td>635</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>006</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Section B (patient B), tub, sprayer</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>7</td>
<td>-</td>
<td>120</td>
</tr>
<tr>
<td>007</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Section B, tub, sprayer</td>
<td>100.0</td>
<td>-</td>
<td>-</td>
<td>Legionella pneumophila</td>
<td>297</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>008</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Section B, tub, faucet</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>17</td>
<td>-</td>
<td>210</td>
</tr>
<tr>
<td>009</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Section B, tub, faucet</td>
<td>106.0</td>
<td>0.06</td>
<td>5.0</td>
<td>Legionella pneumophila</td>
<td>445</td>
<td>24</td>
<td>-</td>
</tr>
<tr>
<td>010</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Section B, shower</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>14</td>
<td>-</td>
<td>180</td>
</tr>
<tr>
<td>011</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Section B, shower</td>
<td>93.0</td>
<td>0.12</td>
<td>5.0</td>
<td>Legionella pneumophila</td>
<td>144</td>
<td>7.8</td>
<td>-</td>
</tr>
<tr>
<td>012</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Room A (patient A), sink</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>152</td>
<td>-</td>
<td>1,900</td>
</tr>
<tr>
<td>013</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Room A, sink</td>
<td>102.0</td>
<td>0.02</td>
<td>5.0</td>
<td>Legionella pneumophila</td>
<td>546</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>014</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Room A, shower</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>152</td>
<td>-</td>
<td>2,500</td>
</tr>
<tr>
<td>015</td>
<td>3/27/2018</td>
<td>Bulk water</td>
<td>Room A, shower</td>
<td>104.0</td>
<td>0.03</td>
<td>5.0</td>
<td>Legionella pneumophila</td>
<td>571</td>
<td>34</td>
<td>-</td>
</tr>
<tr>
<td>016</td>
<td>3/27/2018</td>
<td>Swab</td>
<td>Personal humidifier (patient B)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>- Legionella pneumophila</td>
<td>533</td>
<td>-</td>
<td>13,000</td>
</tr>
</tbody>
</table>

*Water recirculates between all three water heater tanks
Case Study: Facility A, 2018

Environmental Testing Results

- Assisted living
  - Patient A room
    - Bathroom faucet
    - Shower

- Patient B room
  - Personal humidifier
  - Room sink faucet

- Nursing home
  - Patient B shared bath
    - Tub faucet
    - Tub sprayer
    - Shower

- Boiler room
  - Hot water storage tanks

**Legend:**
+ Positive test result
- Negative test result
Interpretation of Environmental Testing Results

Locations of positive samples
  Systemwide versus localized to distal points
  In conjunction with environmental assessment

Presence versus absence of *Legionella* within water system
  *Legionella pneumophila*

Other *Legionella* species

Molecular subtyping and comparison with clinical samples
Example: Facility B, 2017

Linking Clinical and Environmental Isolates

PFGE at WSLH
Example: Facility B, 2017

Linking Clinical and Environmental Isolates

wgMLST at CDC

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample_ID</th>
<th>Serogroup</th>
<th>Source</th>
<th>ST</th>
<th>State</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>3</td>
<td>Environmental</td>
<td>93*</td>
<td>WI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>3</td>
<td>Environmental</td>
<td>93*</td>
<td>WI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>Environmental</td>
<td>40*</td>
<td>WI</td>
<td>Rm</td>
<td>water heater tank</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>Environmental</td>
<td>40*</td>
<td>WI</td>
<td>Rm</td>
<td>water heater tank</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>Environmental</td>
<td>40*</td>
<td>WI</td>
<td>Rm</td>
<td>shower</td>
</tr>
</tbody>
</table>
Case Study: Facility A, 2018

Response

- Remediation with assistance from specialized consultants
- Revision of existing water management plan

Immediate action steps during remediation process:

- Notification of residents, staff, and families
- Water restriction measures (for example, showering)
- Installation of point-of-use filters on faucets, showers, sprayers
- Continued enhanced surveillance for legionellosis
- Restriction of new admissions
CDC Guidance on Remediation

“Remediation may be required immediately to minimize the risk of *Legionella* growth and transmission. Tailor the remediation to structural characteristics of the facility and circumstances of the outbreak.

Remediation options can include:

- Hyperchlorinating the potable water system
- Flushing unused plumbing outlets
- Draining and scrubbing devices
- Superheating and flushing a simple device. Note: [ASHRAE Guideline 12-2020](https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html#remediation) recommends against superheating as a remediation method for potable water systems.

You should base decisions on findings from the environmental assessment, sampling results, and epidemiologic findings of the investigation. See [General Guidelines](https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html#remediation) for additional remediation resources. It may sometimes be necessary to hire a consultant with *Legionella*-specific environmental expertise to help make decisions about or perform remediation.”

[https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html#remediation](https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html#remediation)
CDC: Immediate Control Measures for Potable Water Outbreaks

Implementing water restrictions and/or installing point-of-use filters, either globally or in areas of greatest risk

Options tailored to the structural characteristics of the building and circumstances of the outbreak

Examples of immediate control measures include:

- Restricting showers (using sponge baths instead)
- Avoiding exposure to hot tubs
- Installing 0.2 micron biological point-of-use filters on any showerheads or sink/tub faucets intended for use
- Understand manufacturer’s recommendations regarding the temperature, pressure, and chemical levels that filters can withstand and suggested frequency for replacement
- Confirm if filters need to be removed during acute remediation procedures
- Halting new admissions or temporarily closing the building, affected area, or device
- Ensuring that contingency responses and corrective actions are implemented if the building already has a water management program
- Distributing notification letters to the appropriate audience(s); see Communications Resources for more information

https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html#potable-water
Review: Conditions for Transmission

Amplification

Warm water (temperatures 77-108°F)
Stagnation (dead legs in pipes)
Sediment, scale, organic matter
Absence of residual disinfectants in water supply
Biofilm
Commonly Observed Risk Factors for Legionella Amplification and Colonization

Temperatures in optimal range for Legionella growth (77-108°F) throughout the facility or localized

Stagnation: unoccupied rooms, unused water fixtures (e.g., faucets, therapy/spa tubs, bed pan washers), dead ends in pipes

Improperly maintained ice machines

Recent construction/plumbing work

Improper use of personal humidifiers (e.g., warm water from the sink)

Absence of residual disinfectant in the water supply throughout the facility or localized to distal sites within the facility
Preventing *Legionella* Growth and Colonization

Centers for Medicare and Medicaid Services **Requirement**

**DEPARTMENT OF HEALTH & HUMAN SERVICES**
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland  21244-1850

**Center for Clinical Standards and Quality/Quality, Safety and Oversight Group**

**DATE:**  June 02, 2017

**TO:**  State Survey Agency Directors

**FROM:**  Director
Quality, Safety and Oversight Group *(formerly Survey & Certification Group)*

**SUBJECT:**  Requirement to Reduce *Legionella* Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires’ Disease (LD)

***Revised to Clarify Expectations for Providers, Accrediting Organizations, and Surveyors***

---

**Memorandum Summary**

- **Legionella Infections:** The bacterium *Legionella* can cause a serious type of pneumonia called LD in persons at risk. Those at risk include persons who are at least 50 years old, smokers, or those with underlying medical conditions such as chronic lung disease or immunosuppression. Outbreaks have been linked to poorly maintained water systems in buildings with large or complex water systems including hospitals and long-term care facilities. Transmission can occur via aerosols from devices such as showerheads, cooling towers, hot tubs, and decorative fountains.
Preventing *Legionella* Growth and Colonization

Developing a Water Management Program: **CDC Toolkit**

Basic elements of a water management program

Common scenarios, responses, and special considerations
Preventing Legionnaires’ Disease Webinar

Enroll: PreventLD Training

Preventing Legionnaires’ Disease (PreventLD Training)

Course Introduction

Preventing Legionnaires’ Disease: A Training on Legionella Water Management Programs (PreventLD Training)

What Are the Benefits of This Training?

The training

- **Outlines how to reduce risk for *Legionella* in facilities** through water management programs.
- **Helps water management programs align with ASHRAE 188** on reducing risk for *Legionella* in building water systems (e.g., potable water, cooling towers, hot tubs, decorative water features).
- **Is free and available online**, and continuing education units are available from the National Environmental Health Association (NEHA).
- **Helps build common language** across the range of professionals involved in water management programs.
- **Includes case studies, templates, and other practical resources** to reduce the risk for *Legionella* and protect those at increased risk of Legionnaires’ disease: adults aged 50 years or older, current or former smokers, and those with a weakened immune system or chronic disease.

Continuing Education

Individuals completing courses within the curriculum are eligible to receive continuing education units (CEUs) through the National Environmental Health Association (NEHA). For questions regarding NEHA continuing education, please visit NEHA’s CE information page or contact credentialing@neha.org.

Attention Healthcare Facilities!

The Centers for Medicare & Medicaid Services (CMS) now requires healthcare facilities to have water management policies and procedures to reduce the risk of *Legionella* and other pathogens in building water systems. Learn more from CMS.

Want More?

Home » Western Region Public Health Training Center » PreventLD Training
Water Management Program Resources

https://www.dhs.wisconsin.gov/disease/legionellosis.htm

Provider Information

In June 2017, the Centers for Medicare & Medicaid Services (CMS) released a survey and certification memo stating that healthcare facilities (hospitals and skilled nursing facilities) should develop and adhere to ASHRAE-compliant water management programs to reduce the risk for Legionella and other pathogens in their water systems.

The following resources may be useful when trying to understand what the requirement covers and for developing a comprehensive water management program.

Toolkits, Trainings, and Templates:


Fact Sheets and FAQ's:
Highlights: Water Management Program Resources


Water Management Program Template (CSTE): https://www.cste.org/page/Legionnaires
Thank you!

Questions?

anna.kocharian@dhs.wisconsin.gov

608.267.9004