Water Management Programs

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Presenters

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Michigan Department of Licensing and Regulatory Affairs
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Oakland County Health Department

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Objectives

- Explain the state and federal regulatory authority requiring a Water Management Program
- Identify and implement the requirements of Water Management Programs
- Describe the Public Health Investigation process

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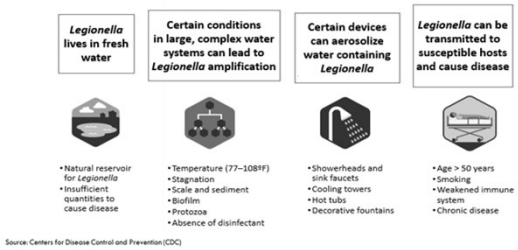
From Fresh Water to Clinical Disease



Source: Centers for Disease Control and Prevention (CDC)

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CMS Memorandum, QSO-17-30

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

CMS

Center for Clinical Standards and Quality/Survey & Certification Group

Ref: S&C 17-30-*Hospitals/CAHs/ASCs*
REVISED 06.09.2017

DATE: June 02, 2017

TO: State Survey Agency Directors

FROM: Director
Survey and 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 Provider Types Affected****

Memorandum Summary

- ***Legionella* Infection:** 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.
- **Facility Requirements to Prevent *Legionella* Infection:** Facilities must develop and adhere to policies and procedures that inhibit microbial growth in building water systems that reduce the risk of growth and spread of *legionella* and other opportunistic pathogens in water.
- *This policy memorandum applies to Hospitals, Critical Access Hospitals (CAHs) and Long-Term Care (LTC). However, this policy memorandum is also intended to provide general awareness for all healthcare organizations.*

- **Released June 2017**
- **Requires healthcare facilities to develop and adhere to policies to inhibit microbial growth in building water systems (water management programs)**
- **Effective Immediately**

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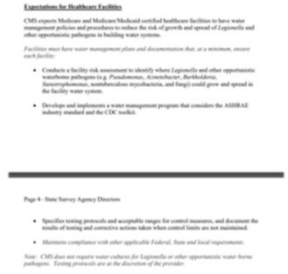
CMS Memorandum Update



Expectations for Healthcare Facilities

CMS expects Medicare and Medicare/Medicaid certified healthcare facilities to have water management policies and procedures to reduce the risk of growth and spread of Legionella and other opportunistic pathogens in building water systems.

Facilities must have water management plans and documentation that, at a minimum, ensure each facility:

- Conducts a facility risk assessment to identify where *Legionella* and other opportunistic waterborne pathogens (e.g. *Pseudomonas, Acinetobacter, Burkholderia, Stenotrophomonas*, nontuberculous mycobacteria, and fungi) could grow and spread in the facility water system.
- Develops and implements a water management program that considers the ASHRAE industry standard and the CDC toolkit.

Page 4- State Survey Agency Directors

- Specifies testing protocols and acceptable ranges for control measures, and document the results of testing and corrective actions taken when control limits are not maintained.
- *Maintains compliance with other applicable Federal, State and local requirements.*

Note: CMS does not require water cultures for Legionella or other opportunistic water borne pathogens. Testing protocols are at the discretion of the provider.

- **Updated July 2018**
- **Clarified expectations for providers**
- **Conduct facility risk assessment, develop and implement WMP, specifies testing protocols and acceptable ranges for control measures, etc.**

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QSO-17-30 CMS Regulatory Authority

- 42 CFR §483.80 for skilled nursing facilities and nursing facilities: "The facility must establish and maintain an infection prevention and control program designed to provide a safe, sanitary, and comfortable environment and to help prevent the development and transmission of communicable diseases and infections."

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QSO-17-30, Expectations for Healthcare Facilities

- Facilities must have water management plans and documentation that, at a minimum, ensure each facility:
  - Conducts a facility risk assessment to identify where *Legionella* and other opportunistic waterborne pathogens could grow and spread
  - Develop and implement a WMP that considers the ASHRAE industry standard and the CDC toolkit
  - Specifies testing protocols and acceptable ranges for control measures, and document the results of testing and corrective actions taken when control limits are not maintained
  - *Note: CMS does not require water cultures for Legionella or other opportunistic water borne pathogens. Testing protocols are at the discretion of the provider.*

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State Licensing Rules

New combined rule set went into effect February 21, 2020

R 325.45303 Water supply system.

(7) A health facility must implement a water management program that follows the "American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 188-2018 – Legionellosis: Risk Management for Building Water Systems." This standard is available for inspection at the Lansing office of the Department of Licensing and Regulatory Affairs, Bureau of Community and Health Systems. It can be purchased for $88.00 from the ASHRAE Store, https://www.ashrae.org/technical-resources/bookstore/ansi-ashrae-standard-188-2018-legionellosis-risk-management-for-building-water-systems.

(8) A health facility must utilize the Centers for Disease Control and Prevention (CDC) best practice guidance on water management, including the "CDC Toolkit: Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings." This toolkit is adopted by reference. It is available for inspection at the Lansing office of the Department of Licensing and Regulatory Affairs, Bureau of Community and Health Systems. It is available without charge at https://www.cdc.gov/legionella/wmp/toolkit/.

(9) The water management program must include a facility risk assessment, control measures, and ongoing verification of the program.

(10) If secondary treatment of the public water system is incorporated as part of the water management program, the health facility must comply with the Michigan safe drinking water act, 1976 PA 399, MCL 325.1001 to 325.1023, and the administrative rules, R 325.10101 to 325.12820.

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WATER MANAGEMENT PROGRAMS

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WATER MANAGEMENT PROGRAMS

In the general population, Legionnaire's disease kills 10% of those diagnosed; in the CDC's analysis, 25% of cases acquired in the hospital or long-term care facility were fatal

"75% of cases acquired in healthcare settings could be prevented with better water management"
-Vital Signs report from the (CDC)

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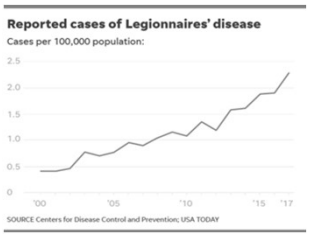
Legionnaires' Disease cases up more than fivefold since 2000

9 in 10
CDC investigations show almost all outbreaks were caused by problems preventable with more effective water management.

www.cdc.gov/vitalsigns/pdf/2016-06-vitalsigns.pdf



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WORLD HEALTH ORGANIZATION

"The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a **comprehensive risk assessment** and **risk management** approach that encompasses all steps in water supply from catchment to consumer."

Chapter 4 of the Fourth Edition of the WHO Guidelines for Drinking-water Quality (2017)

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SELECTED LITERATURE

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Developing a Water Management Program

- Establish Water Management Team
- Create Process Flow Diagram
- Perform Hazard Analysis
- Identify Control Points
- Identify Control Measures
- Determine Critical Limits
- Monitoring
- Corrective Actions
- Verification and Validation

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DEVELOPING THE PROGRAM

- Establish Water Management Team
- Create Process Flow Diagram
- Perform Hazard Analysis
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ESTABLISH WATER MANAGEMENT TEAM

- Facilities Manager
- Building Administrator
- Building Engineer/Maintenance
- Water Treatment Professional
- Infection Prevention
- Nursing
- Clinical Engineering

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DEVELOPING THE PROGRAM

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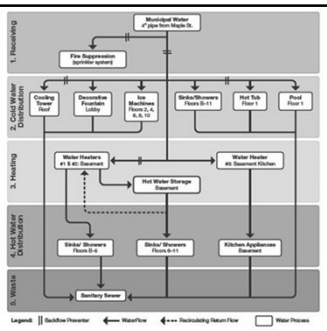

PROCESS FLOW DIAGRAM

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DEVELOPING THE PROGRAM

- Establish Water Management Team
- Create Process Flow Diagram
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RISK ASSESSMENT

- Review existing systems
- Identify vulnerable populations
- Determine system vulnerabilities

A Comprehensive Risk Assessment helps meet and exceed policy and procedural requirements established by CMS for reducing the risk of growth and transmission of Legionella and other waterborne pathogens in building water systems.

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RISK ASSESSMENT PREMISE PLUMBING

- Hazards
  - Chemical
    - Lead
    - Disinfection by-products (e.g., trihalomethanes)
  - Physical
    - Water that can cause scalding
  - Microbial
    - *Legionella*
    - *Pseudomonas*
- Hazardous Conditions
  - Sediment/solid buildup in low-flow areas
  - Low water temperatures in the distribution system (bacterial growth)
  - High temperatures from the outlets (scalding)
  - Water age due to low-flow fixtures, inconsistent turnover
  - Disinfectant residual too high or too low
  - Materials may be incompatible with the disinfectant chemical
  - Quality of water entering the building contaminated
  - Cross-connections can cause ingress of contaminants
  - Over-softening water causing corrosion
  - Filters/filter media not maintained or changed regularly

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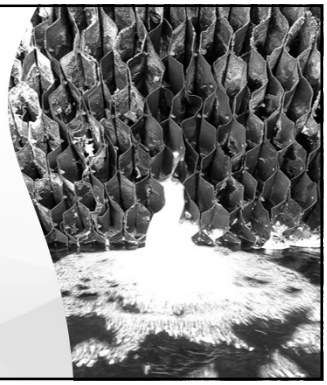
RISK ASSESSMENT COOLING TOWER SYSTEMS

- Hazardous conditions
  - Sediment buildup in the basin
  - Algae growth in the tower
  - Corrosion in the tower or heat exchanger
  - Uneven flow distribution
  - Scale on the fill material
  - Temperatures conducive to bacterial growth
  - Stagnant water in piping
  - Inadequately maintained equipment
  - Lack of regular cleaning



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RISK ASSESSMENT DECORATIVE FOUNTAINS AND INDOOR WATER FEATURES

- Hazards
  - Even clear water untreated can cause *Legionella* growth
- Hazardous conditions
  - Materials scrubbed from the air and reunited with falling water droplets
  - Water age due to intermittent use
  - Higher outdoor temperatures facilitated by pumps/filters
  - Equipment and submerged lighting may raise temperature
  - Scale deposits
  - Fountains in patient care areas
  - Non-distilled makeup water

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RISK ASSESSMENT ICE MACHINES

- Hazards
  - *Legionella* and biofilm associated pathogens
- Hazardous conditions
  - Location in small, warm rooms (temperature fluctuation)
  - Excessive water piping (water age)
  - Warm condenser coil
  - Filter saturation
  - Lack of regular cleaning/sanitization

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DEVELOPING THE PROGRAM

- Establish Water Management Team
- Create Process Flow Diagram
- Perform Hazard Analysis
- **Identify Control Points**
- Identify Control Measures
- Determine Critical Limits
- Monitoring
- Corrective Actions
- Verification and Validation

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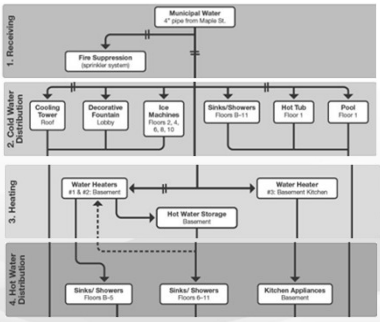
IDENTIFY CONTROL POINTS

- **Receiving – Incoming Main**
- **Cold Water Distribution**
- **Hot Water Storage**
- **Hot Water Distribution**



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DEVELOPING THE PROGRAM

- Establish Water Management Team
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- Perform Hazard Analysis
- Identify Control Points
- **Identify Control Measures**
- Determine Critical Limits
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CONTROL MEASURES PREMISE PLUMBING

- Temperature
- Disinfectant Residual
- pH
- Flushing
- Backflow devices to prevent cross-connections

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CONTROL MEASURES COOLING TOWER SYSTEMS

- Routine water treatment
- Routine maintenance of pH levels
- Routine corrosion control
- Routine scale and deposits control

CONTROL MEASURES DECORATIVE WATER FEATURES

- Chemical disinfection
- Filtration
- Removal of algae

CONTROL MEASURES ICE MACHINES

- Adequate ventilation and space
- Filter Changes
- Routine Cleaning – surface and mechanical

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DEVELOPING THE PROGRAM

- Establish Water Management Team
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- Perform Hazard Analysis
- Identify Control Points
- Identify Control Measures
- Determine Critical Limits
- **Monitoring**
- Corrective Actions
- Verification and Validation

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MONITORING

- For each control measure, the Team determines the means, method, and frequency by which critical limits are monitored
- Monitoring results are always quantitative and immediate
- **Example:**
  - Control measure
    - Water is heated
  - Monitoring
    - Means
      - (e.g. thermometer)
    - Method
      - (e.g. place under shower for 1 minute)
    - Frequency
      - (e.g. daily)

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DEVELOPING THE PROGRAM

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- **Corrective Actions**
- Verification and Validation

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CORRECTIVE ACTIONS

- For each control measure, the Team determines *in advance* the actions to be taken when monitoring indicates a control measure is outside of the critical limits
- **Example**
  - Control measure
    - Water is heated
  - Critical limit
    - Temperature range
  - Monitoring
    - Temperature is lower than acceptable range
  - Corrective Action
    - Turn heater temp setting to desired range, measure every 30 minutes until in range
    - Person responsible: John Doe
    - Minimum response time: 8 hours

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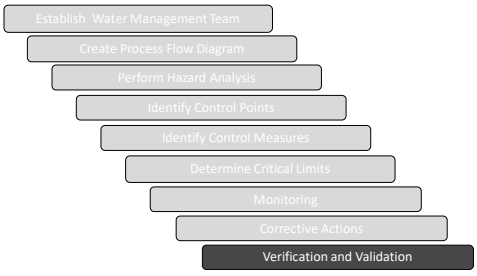
DEVELOPING THE PROGRAM



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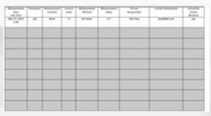
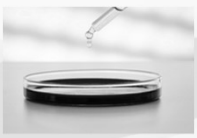
VERIFICATION AND VALIDATION

- Verification
  - Monitoring records
  - Disinfection reports
  - Chemical dosing records
  - Vendor service records
  - Inspection reports
- Validation
  - Microbial testing
  - Parametric testing
  - Re-evaluation
  - Water quality





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CONCLUSIONS

- Evaluate all systems that use water
- Identify control measures that can be implemented to prevent amplification of hazards
- Avoid control measures/control limits that cause unintended consequences
- Water management programs are ever-evolving strategies to prevent disease and injury
  - **Document, Document, Document** all activities
  - Implement corrective actions
  - Review Water Management Program at least once a year with team

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Healthcare-Associated Legionellosis

Among patients who meet clinical and lab criteria for confirmed Legionnaires Disease:

- **Presumptive healthcare-associated Legionnaires' disease:** A case with ≥10 days of continuous stay at a healthcare facility during the 14 days before onset of symptoms.
- **Possible healthcare-associated Legionnaires' disease:** A case that spent a portion of the 14 days before date of symptom onset in one or more healthcare facilities but does not meet the criteria for presumptive healthcare-associated Legionnaires' disease.

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What to Expect

Initial meeting with the Health Department to discuss the case(s). We ask that administration, infection control, and building engineers be present.

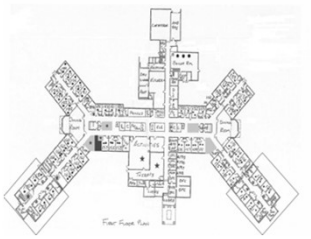
We are interested in the "path of the patient(s)" – is the exposure isolated to one area or water system?

Requested follow-up information

- Plumbing schematic
- Water management plan
- Cooling tower maintenance records
- Hot water distribution system
- Chart review of all cases of pneumonia over the past 6 months

Implement immediate control measures (bottled water, shower filters, monitoring of resident symptoms)

Ask a letter be sent to patients discharged over the previous few weeks notifying of the current case(s)



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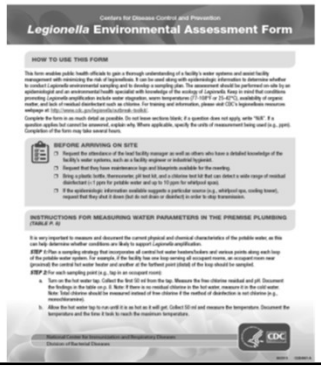
Environmental Investigation

Necessary to identify possible environmental sources of *Legionella*

Multi-step process that provides a thorough understanding of a facility's water system(s)

Involves visual inspection and specialized testing of water parameters

Similar to risk assessment needed for a WMP


Centers for Disease Control and Prevention

Legionella Environmental Assessment Form

HOW TO USE THIS FORM

BEFORE ARRIVING ON SITE

INSTRUCTIONS FOR MEASURING WATER PARAMETERS IN THE PREMISE PLUMBING

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Environmental Investigation

- Follow the "path of the patient(s)"
- Collect water quality parameters
  - Temperature – Legionella grows best between 77°-113° F
  - Disinfectant – A detectable level is need to limit growth
  - PH – Disinfectants are more effective at a neutral pH
- Establish sampling locations
  - Highest interest are the hot water systems
  - Patient sinks and shower area
  - Features and equipment capable of producing aerosols

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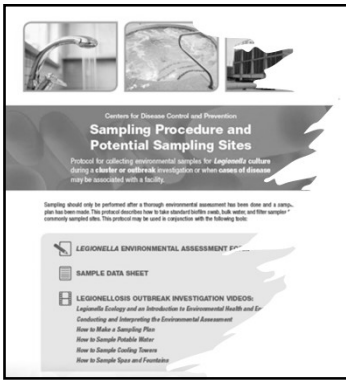

Now it's your turn…

- The Health Division strongly recommends contracting with a professional water systems consultant
  - Conduct the Environmental Sampling
  - Perform the Water Quality Parameters
  - Relationship with an ELITE Certified Lab
  - Assist with Remediation if Needed
  - Assist in Updating WMP
  - Communicate with Health Division and MDHHS

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Testing and Sampling

- Parameter Testing
  - Temperature
  - Disinfectant
  - pH

- Environmental Sampling
  - Every other week for 3 months
  - Once a month for additional 3 months
  - Locations and frequency may change based on results

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What do we see while on survey?

- Lack of a MWP team
- A printed CDC Toolkit or a consultant template, but nothing is specific to the facility
- No control measures specified
- No corrective actions to be taken when control limits are not met
- WMP has not been revisited or updated with current staff

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QUESTIONS?

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References

- ASHRAE 188: *Legionellosis: Risk Management for Building Water Systems.* June 26, 2015. ASHRAE: Atlanta
- CDC – *Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings.* June, 5, 2017. Available from https://www.cdc.gov/legionella/maintenance/wmp-toolkit.html
- CDC – Legionella - Homepage. https://www.cdc.gov/legionella/index.html March 16, 2018.

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