What's Up with Water Management & Legionella

Kenneth Daily, LNHA

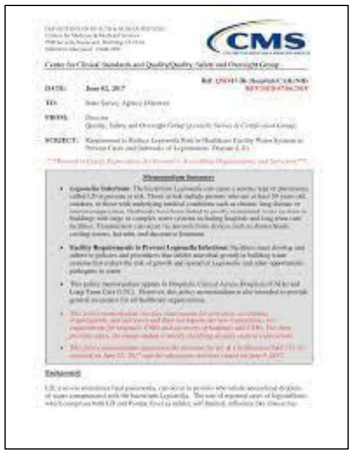
AHCA AMERICAN HEALTH CARE ASSOCIATION NCAL NATIONAL CENTER FOR ASSISTED LIVING

1

Originally

CMS S & C Memo 17-30 updated June 2018

- Applies to hospitals, critical access hospitals and long-term care (SNFs)
- At a minimum, a facility must:
  1. Conduct a facility risk assessment
  2. Develop water management plan
  3. Verify the program is working
  4. Document results



AHCA AMERICAN HEALTH CARE ASSOCIATION NCAL NATIONAL CENTER FOR ASSISTED LIVING

2

F 880 *Water Management*
(revised 6/29/22 and effective 10/24/22)

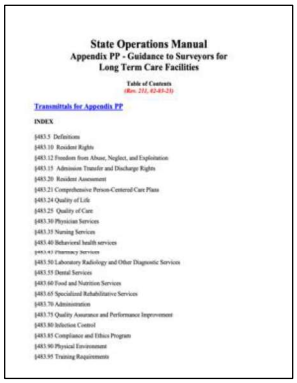

State Operations Manual
Appendix PP - Guidance to Surveyors for Long Term Care Facilities

Table of Contents

Transmittals for Appendix PP

INDEX

§483.5 Definitions
§483.10 Resident Rights
§483.12 Freedom from Abuse, Neglect, and Exploitation
§483.15 Admission Transfer and Discharge Rights
§483.20 Resident Assessment
§483.21 Comprehensive Person-Centered Care Plans
§483.24 Quality of Life
§483.25 Quality of Care
§483.30 Physician Services
§483.35 Nursing Services
§483.40 Behavioral health services
§483.45 Pharmacy Services
§483.50 Laboratory Radiology and Other Diagnostic Services
§483.55 Dental Services
§483.60 Food and Nutrition Services
§483.65 Specialized Rehabilitative Services
§483.70 Administration
§483.75 Quality Assurance and Performance Improvement
§483.80 Infection Control
§483.85 Compliance and Ethics Program
§483.90 Physical Environment
§483.95 Training Requirements

- Legionella can cause a serious type of pneumonia called in persons at risk, such as those who are at least 50 years old, smokers, or with underlying medical conditions such as chronic lung disease or immunosuppression. Legionella can grow in parts of building water systems (e.g., pipes, faucets, water storage tanks, decorative fountains), and certain devices can spread contaminated water droplets via aerosolization.
- Legionellosis outbreaks are generally linked to locations where water is held or accumulates, and pathogens can reproduce. Transmission from these water systems to humans occurs when the water is aerosolized (i.e., converted into a spray/mist in the air).

AHCA AMERICAN HEALTH CARE ASSOCIATION
NCAL NATIONAL CENTER FOR ASSISTED LIVING

3

F880 continued


State Operations Manual
Appendix PP - Guidance to Surveyors for Long Term Care Facilities

Table of Contents

Transmittals for Appendix PP

INDEX

§483.5 Definitions
§483.10 Resident Rights
§483.12 Freedom from Abuse, Neglect, and Exploitation
§483.15 Admission Transfer and Discharge Rights
§483.20 Resident Assessment
§483.21 Comprehensive Person-Centered Care Plans
§483.24 Quality of Life
§483.25 Quality of Care
§483.30 Physician Services
§483.35 Nursing Services
§483.40 Behavioral health services
§483.45 Pharmacy Services
§483.50 Laboratory Radiology and Other Diagnostic Services
§483.55 Dental Services
§483.60 Food and Nutrition Services
§483.65 Specialized Rehabilitative Services
§483.70 Administration
§483.75 Quality Assurance and Performance Improvement
§483.80 Infection Control
§483.85 Compliance and Ethics Program
§483.90 Physical Environment
§483.95 Training Requirements

- Facilities must be able to demonstrate its measures to minimize the risk of Legionella and other opportunistic pathogens in building water systems by having a documented water management program and include:
  - An assessment to identify where Legionella and other opportunistic waterborne pathogens could grow and spread; and
  - Measures to prevent the growth of opportunistic waterborne pathogens (known as control measures), and how to monitor them.
- ……a description of the building water systems using text and flow diagrams for identification. Additionally, control measures may include visible inspections, use of disinfectant, and temperature monitoring. Monitoring such controls include testing protocols for control measures, acceptable ranges, and documenting the results of testing. Water management should include established ways to intervene when control limits are not met.

AHCA AMERICAN HEALTH CARE ASSOCIATION
NCAL NATIONAL CENTER FOR ASSISTED LIVING

4

Reporting

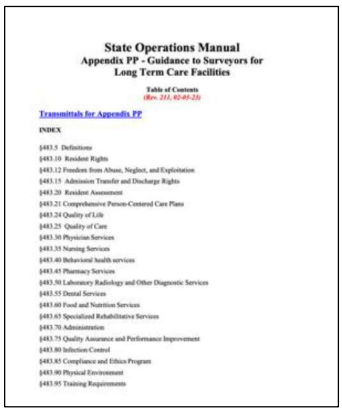

State Operations Manual
Appendix PP - Guidance to Surveyors for Long Term Care Facilities

Table of Contents

Transmittals for Appendix PP

INDEX

- The facility should contact the local public health authority if there is a case of legionella
- The facility must follow public health authority recommendations which may include, but is not limited to, remediating, and adjusting control measures.
- The SA should work with local/state public health authorities, if possible, to determine if the water management program was adequate to prevent the growth of Legionella and whether the facility implemented adequate prevention and control measures once the issue was identified.

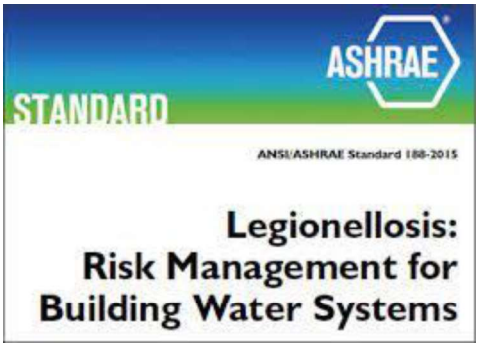
AHCA NCAL

5

Water Management Considerations

- ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)

- CDC (Centers of Disease Control)



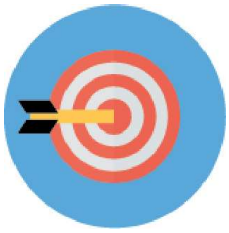
AHCA NCAL

6

Water Management Programs

- WMPs at long-term care facilities are often missing key components needed to adequately reduce risk.
- CDC provides following principles for effective water management:
  - Maintaining water temperatures outside the ideal range for *Legionella* growth.
  - Preventing water stagnation.
  - Maintaining devices to prevent scale, corrosion, and biofilm growth

7



Water Management Program

Key elements of a WMP:

1. Establishment of a water management program team.
2. Description of building water systems with text and flow diagrams.
3. Identification of areas where *Legionella* can grow and spread.
4. Set control measures and how to monitor them.
5. Establish ways to intervene when control limits are not met.
6. Ensure the program is running as designed and is effective.
7. Documentation and communication of all WMP activities.

AHCA
AMERICAN HEALTH CARE ASSOCIATION
NCAL
NATIONAL CENTER FOR ASSISTED LIVING

8

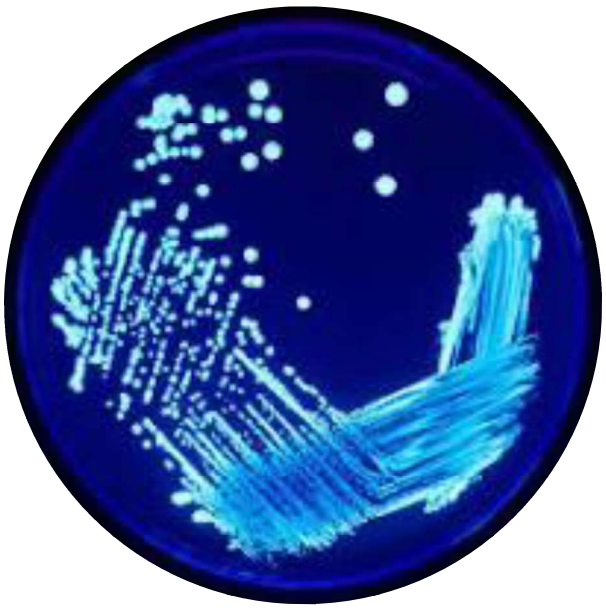
Compliance?

The facility has established measures in place to prevent the growth of opportunistic waterborne pathogens (also known as control measures.

Testing protocols would be items such as recording of water temperatures, flushing water, cleaning hot water tanks, etc. and/or could be legionella water testing (which is not pH or chlorine testing). Specifies 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.

9



Legionellosis Overview

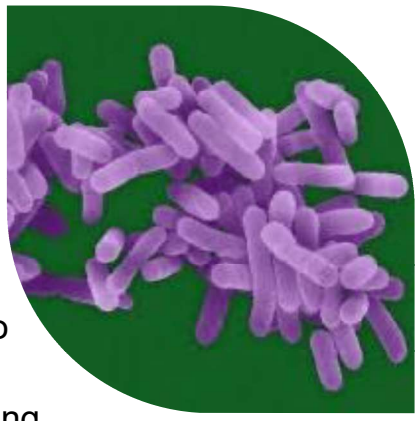
10

The "New" Pneumonia Disease was named **"Legionnaires' Disease"**

The Bellevue-Stratford Hotel closed 4 months after the outbreak

11

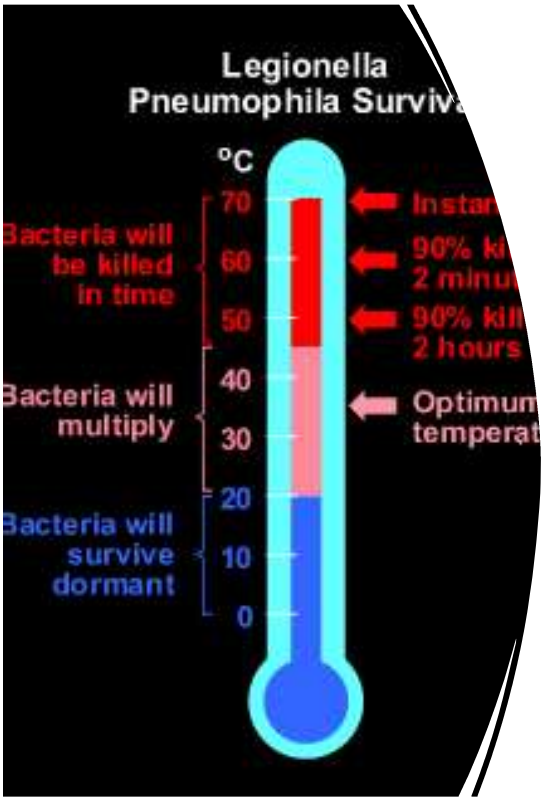
What is Legionella



- A waterborne bacteria
- Lives in fresh water is very common and referred to as ubiquitous in water
- Most likely present in small numbers in many building water systems
- Bacteria can grow in large numbers where there are favorable conditions
- Dangerous when infected water droplets are formed and are **INHALED** into the lungs

AHCA NCAL

12



Legionella Ecology

- *Legionella* bacteria live in water (primarily) and soil, can live inside protozoa
- Favorable conditions:
  - Standing or stagnant water (dead legs in plumbing)
  - Warmer water preferred- 77°F-108°F
  - Presence of organic matter
  - Biofilm

13

Legionella in Facilities

14

Legionella Risk Groups

- Immune system disorders
- Smoking (current or former)
- Age ≥50 years
- Recent travel with an overnight stay outside of the home, including stay in a healthcare facility
- Exposure to hot tubs
- Recent repairs or maintenance work on plumbing
- Renal - hepatic failure, diabetes, chronic lung disease
- Systemic malignancy

15

Legionella …. The Concern

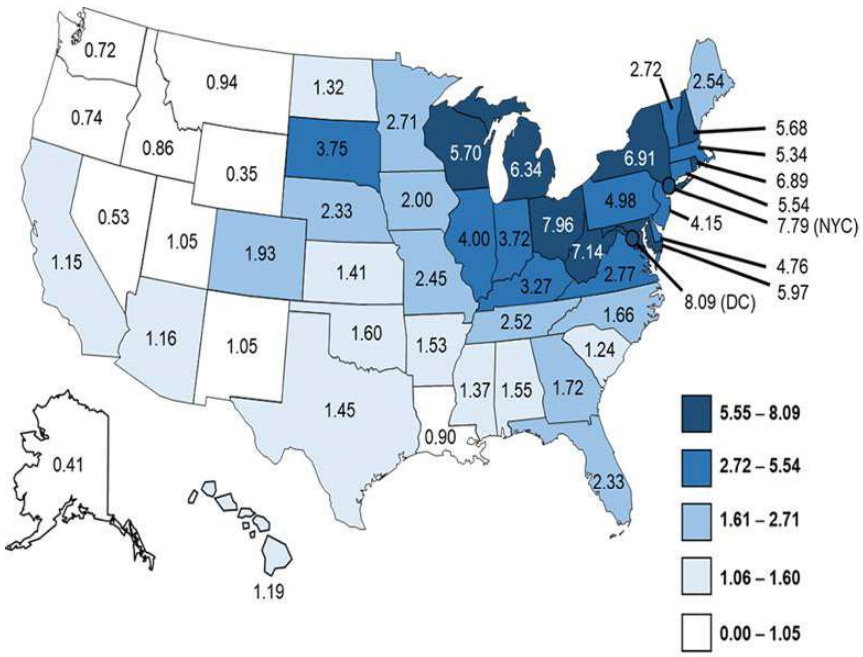
An estimated **8000-18,000** cases of Legionnaires disease are reported in the United States each year. Most cases are not reported. More than 80% of cases are sporadic throughout the year, and the rest occur in outbreaks during the summer and early fall.

AHCA
NCAL

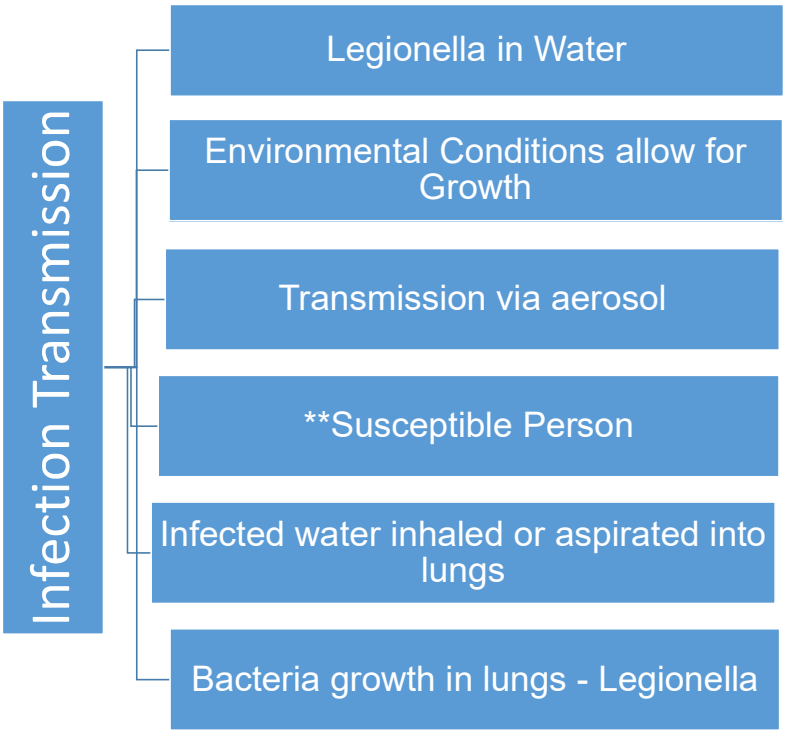
16

The Numbers

- For the U.S., the Centers for Disease Control and Prevention (CDC) have also reported a 4.5-fold increase in the number of Legionellosis cases from the period from 2000 to 2015 (0.42 per 100,000 persons in 2000 to 1.89 per 100,000 in 2015)



17



**** Susceptible persons** include, but not limited to, over age 50, very young, dialysis patients, smokers, persons with weakened immuno-system

18

The Water Management Plan for *<FACILITY>*

Legionella policies, risk assessment and control measures for the management of the facility's water system

- FACILITY NAME AND ADDRESS
- Responsible – Administrator
- Date created/ updated XX-2024

AHCA AMERICAN HEALTH CARE ASSOCIATION NCAL NATIONAL CENTER FOR ASSISTED LIVING

19

Policy - Goal

The facility promotes and encourages proactive endeavours to establish healthy, infection-free environment for the residents, staff and visitors. The facility is committed to preventing the occurrence or spread of Legionnaires' disease.

AHCA AMERICAN HEALTH CARE ASSOCIATION NCAL NATIONAL CENTER FOR ASSISTED LIVING

20

Background… Policy

- Legionnaires' disease is caused by a type of bacterium called Legionella.
- The bacterium is named after a 1976 outbreak, when many people who went to a Philadelphia convention of the American Legion suffered from this disease.
- A type of pneumonia (lung infection/ progressive pneumonia) that may be accompanied by cardiac, renal and gastrointestinal involvement).
- The incubation period for Legionnaires' disease is most commonly 5 to 6 days from the time of exposure to symptom onset, with a range of 2 to 14 days, but public health officials have reported incubation periods up to 26 days under rare circumstances
- Legionella species are naturally occurring, ubiquitous aquatic organisms.
- Ideal temperature for growth ranging from 77° to 120° F (25 to 48°C).
- Cases may be community or healthcare facility-associated and result from exposure to contaminated water. Numerous citations have appeared in the medical literature describing the link between

21

Establish Risk Management Team

Legionella risk management team members

- _____, LNHA
- _____, RN, DON
- _____, RN, Infection Preventionist
- _____, Maintenance Supervisor
- _____, Housekeeping Supervisor
- _____, Medical Director
- _____, OTHER

The facility does have contracts for emergency water supply in the event of an interruption or supply failure. The facility contracts with (recommend two sources): [emergency water providers]

22

Facility Basics

Describe the facility's water system and the facility

- How large is the facility i.e., square footage?
- The age, number of floors, additions, etc.
- The building is certified for _____beds?
- The average census is _____ the past year?
- What type of sprinkler system with what type of piping such as The piping in the facility is a combination of iron, copper and PVC
- Who supplies the water and where/ how does it enter the facility
- Confirm that the facility has back flow devices to ensure domestic and fire suppression water do not mix as well as return water.

AHCA NCAL

23

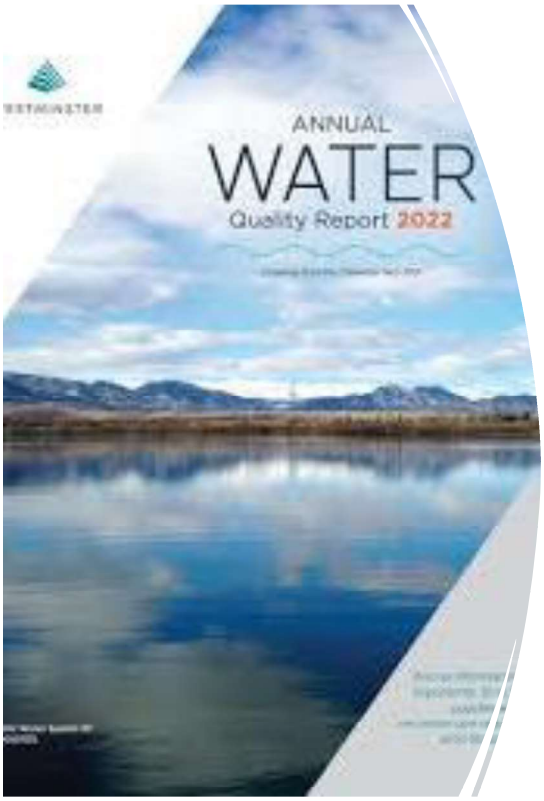
Facility Basics

- Uses of water
  - Drinking
  - Bathing
  - Toilet flushing
  - Laundry
  - Firefighting (fully sprinklered facility)
  - Food preparation including an ice machine

Facility inventory (such as…)

- Kitchen has _____
- Laundry has _____
- The facility has _____ hot water tank(s)
- Facility has _____ hot water holding tanks
- Facility has _____ shower heads
- Facility has _____ faucets
- Facility has _____toilets
- Facility has _____whirlpool tubs
- Facility has _____eye wash stations
- Facility has _____ ice machines
- Facility has _____ water fountains
- Facility has _____ ornamental water features

24



Local Water Quality Report

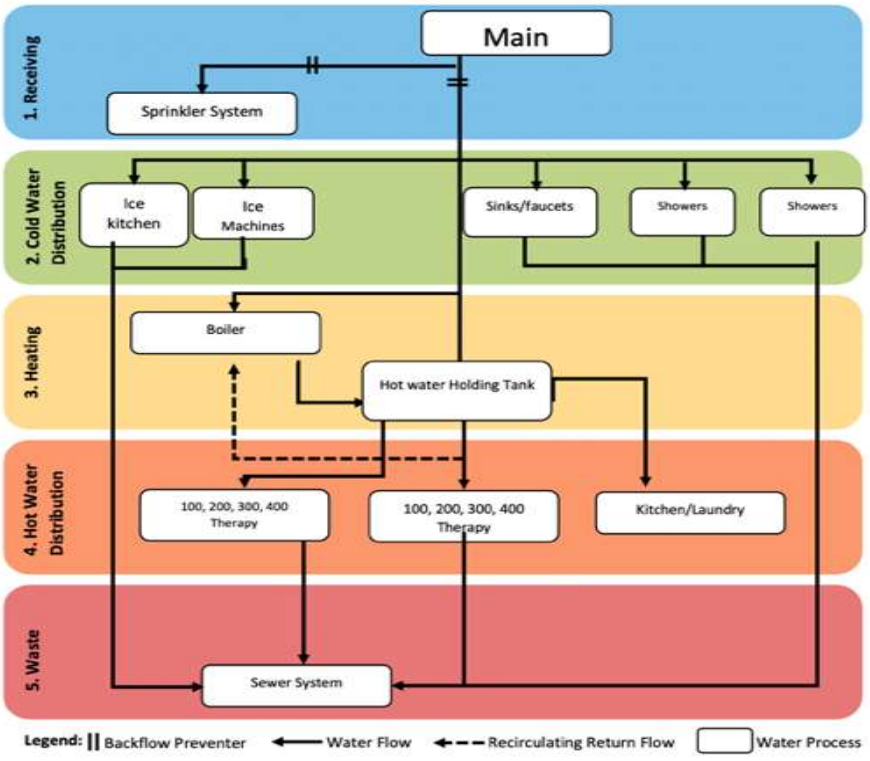
- Who is the facility's water provider?
  - Where does the water enter facility?
  - How large is the pipe
- According to the **[WATER PROVIDER]** they provide comprehensive water treatment to ensure quality. The most recent water quality report is included in you water management plan. Most water water systems are 100% reliable.

Download a copy of your water providers annual water report to determine what control they may have in place

AHCA
NCAL

25

Facility Water System



26

Hazard Risk Severity

Level		Example description
1	Insignificant	Insignificant impact, little disruption to normal operation, low increase in normal operating costs
2	Minor	Minor impact for part of facility, some manageable disruption to normal operation, some increase in operating costs (e.g., several rooms or one wing with total bacterial count >500 CFU/mL, requiring more frequent flushing)
3	Moderate	Minor impact for most of facility, significant but manageable modification to normal operation, increase in operating costs, increased monitoring (e.g., extensive bacterial growth with some Legionella, requiring extensive flushing and additional controls)
4	Major	Major impact for part of facility, systems significantly compromised, abnormal operation, high level of monitoring required (e.g., temporary closure of part of facility requiring extensive disinfection)
5	Catastrophic	Major impact for whole of facility, complete failure of systems (e.g., extensive Legionella colonisation, normally with cases of Legionnaires' disease)

27

Risk Assessment

Probability	Severity				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A (almost certain)	Moderate	High	Very high	Very high	Very high
B (likely)	Moderate	High	High	Very high	Very high
C (possible)	Low	Moderate	High	Very high	Very high
D (unlikely)	Low	Low	Moderate	High	Very high
E (rare)	Low	Low	Moderate	High	High

28

Risk Assessment

- Has the facility conducted a risk assessment to identify where Legionella and other opportunistic waterborne pathogens could grow and spread in the facility?

- Boilers
- Hot water storage tanks
- Cold water storage tanks
- Water heaters
- Expansion Tanks
- Faucets - Aerators
- Shower heads
- Eyewash stations
- Ice machines

- Drinking fountains
- Misters & atomizer
- Humidifiers
- Hot tubs
- Whirlpool tubs
- Decorative water features
- Cooling towers

29

Control Measures

- Does the WMP list specific preventive measures (control measures) for the operation and maintenance of the types of water systems listed in #1 (e.g., physical controls, temperature management, disinfectant level control, visual inspections)?
- Identify the performance criteria (control limits) for each control measure, a monitoring procedure for determining control measure performance, and corrective actions to take if the control measure is not performed within the control limit

30

Risk

System component	Hazard and hazardous event	Risk score	Common Control Measure(s)	Remediation/ Investigation
Pipework	Low flow in several areas (allows adherence and proliferation of Legionella	Low	Weekly flushing of water in areas of low use (resident rooms)	If not being done investigate to determine where the failure is occurring following QAPI
Incoming water	Supply of water from County with chlorine other chemicals added for disinfection	Low	Facility flushing, see above	If not being done investigate to determine where the failure is occurring following QAPI
Hot water System	Supply water through these devices which may provide for the proliferation of Legionella	Low	Hot water tank inspected and cleaned annually to reduce sediment, scaling and corrosion.	If not being done investigate to determine where the failure is occurring following QAPI

31

[Example of the control measures that are recommended]
Facility On-Going Measures

System component	Control measure	Procedure
Pipework	Regular (weekly) flushing of low use areas	Resident rooms and other locations in the facility that have not had water use in the past week will have the appropriate output devices flushed for a minimum of 3 minutes.
Outlets	Regular maintenance	Shower heads and wash basin aerators will be cleaned or replaced quarterly to eliminate scale and lime.
Ice Machines	Regular maintenance	Ice machines will be cleaned quarterly
Eye Wash Stations	Regular maintenance	Eyewash will be flushed at least weekly for at least 3 minutes.
Drinking Fountain	Regular maintenance	Drinking fountains will be flushed at least weekly for 3 minutes.

32

Control Measures - continued (examples)

System component	Control measure	Procedure
Fire Suppression System	Regular maintenance	Annual flushing of the sprinkler system will be completed when system is tested.
Back flow	Regular maintenance	Annual inspection, testing and maintenance will be completed to ensure no mixing of fire suppression water and/or return water with domestic water supply
Water Heaters	Collecting temperatures	Water temperatures will be gathered weekly at each of the facility's water heaters to ensure water being maintained at a minimum of 140 degrees F.
Staff training and in-servicing	Provide staff education	Staff will be provided information regarding legionella during initial orientation and annually including: I. Introduction II. Disease Recognition III. Source Identification IV. Investigation Protocol V. Controls

33

Legionella Case

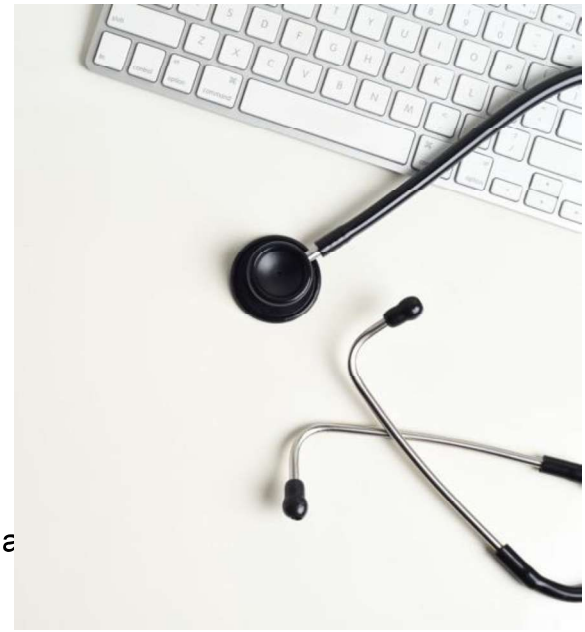
Normally we discover we have a positive Legionella case from a phone call from a hospital

34

Healthcare-Associated

Confirmed cases linked to healthcare are defined as either:

- **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 spend a portion of the 14 days prior to symptom onset in one or more healthcare facilities.



35

Legionella Response

Department of Health
Bureau of Environmental Health and Radiation Protection

1. Contact a *Legionella* consultant with installing filters, assisting with sample collection, conducting a facility assessment, and water systems.
2. Contact consultant either one you know or one recommended by Health Department
3. Pause the use of water in the facility
4. Install immediately Point of Use Filters on all distal points - faucets, shower heads, ice machine filters, etc.
   - Implement water-use restrictions throughout the facility using point-of-use filters (0.2 microns). Filters are typically graded as 30, 60, and 90-days. The 90-day filters typically give the facility ample time to complete all investigation activities but speak with their consultant for their advice. **Filters should be installed within couple days after receiving notice of positive case.** Working with a consultant, you will install these filters on all fixtures in the building and restrict water access until completed.
5. Communicate to staff and residents about water restrictions and post signage near each fixture with a filter for people to contact maintenance staff if a filter is damaged or removed.

36

Water-use Restrictions
Start bed baths instead of showers

Cease use of drinking fountains, ice machine, drinking fountains, etc. Provide bottled water to residents and staff

Begin screening residents for signs and symptoms of legionella

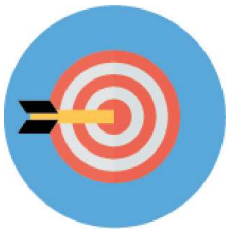
37

Legionella Response

Department of Health
Bureau of Environmental Health and Radiation Protection

6. Conduct a new risk assessment of the facility, it is recommended to complete a CDC *Legionella* Environmental Assessment Form (LEAF). This document can be found on the CDC website.
7. Create a *Legionella* sampling plan for their facility. These will be considered **pre-remediation samples** and will follow CDC guidance for samples collected during an investigation. Samples should be a combination of flush (bulk water) and first draws/swabs (see CDC sampling guidance https://www.cdc.gov/legionella/downloads/cdc-sampling-procedure.pdf). Water samples should be collected in 1L bottles and sent to a CDC ELITE Certified Laboratory (https://wwwn.cdc.gov/elite/public/memberlist.aspx). Make sure samples are evenly distributed and include all water sources in each of the case rooms. Samples should include a combination of swab/first draw samples and flush samples.

38



Local and State Health Requested Materials

- The facility's water management program.
- Any previous water sampling logs (for *Legionella*).
- Water system monitoring logs.
- A floor plan of the facility.
- Ice machine servicing logs.
- Cooling tower servicing and disinfectant residual logs (as appropriate)
- Additional water feature maintenance and disinfection records.
- Cleaning and disinfection records for any respiratory equipment used by the facility.

AHCA
NCAL

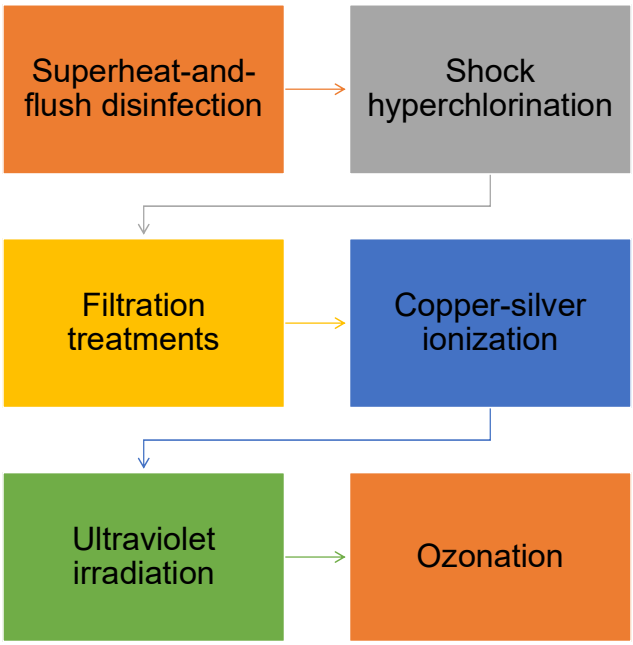
39

Remediation

Legionella control in plumbing systems	
Chemical treatment technologies: • Chlorine-based disinfection • Copper-silver ionization (CSI) • Ozonation	Physical treatment technologies: • Thermal inactivation • Filtration • Ozonation
Emerging treatment technologies: • Ultraviolet (UV) irradiation • UV light emitting diodes (LEDs) • Innovative point-of-use (POU) filters	Other strategies: • Superheat-and-flush disinfection • Shock hyperchlorination

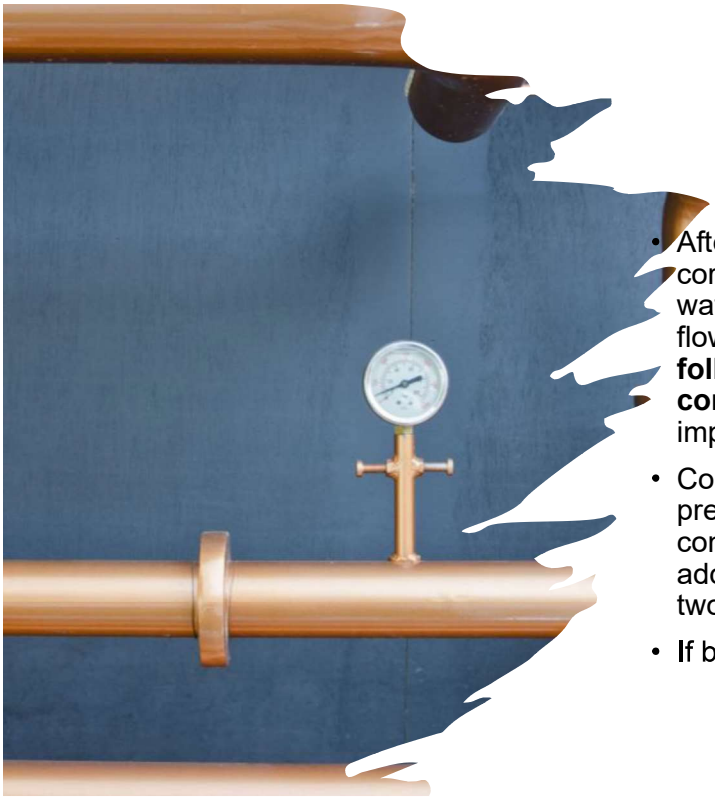
40

Remediations



41

41



Legionella Response

- After samples are collected, implement any identified corrections to the potable water system to prevent water stagnation and/or improve water flow. **Remediate/ treat your facility's water system following the guidance of their consultant.** Hyperchlorination is the most implemented method.
- Collect a set of samples at the same locations as the previous set 72-hours after remediation. These will be considered post-remediation samples. Collect additional sets every two weeks until the facility has two consecutive negative sample sets.
- If both are negative the facility's case is closed

42

Thank you!

AHCA AMERICAN HEALTH CARE ASSOCIATION

NCAL NATIONAL CENTER FOR ASSISTED LIVING

43