Water Management Programs and Indicators of *Legionella* Risk in Health Care Facilities

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WISCONSIN DEPARTMENT *of* HEALTH SERVICES

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Legionella Team

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- **Anna Kocharian, MS,** Epidemiologist
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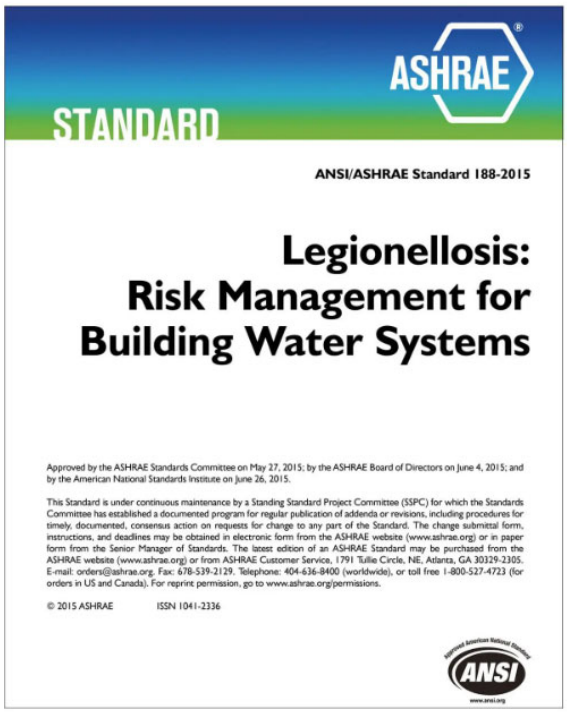

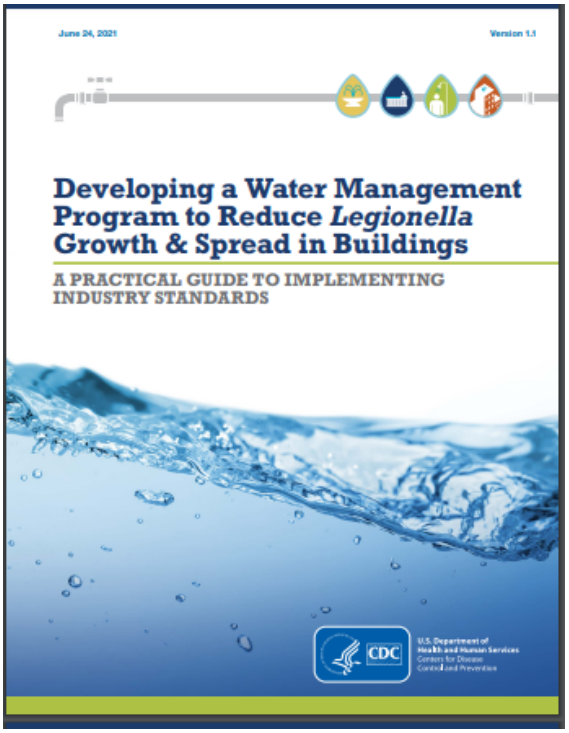

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National standard from ASHRAE and CDC guidelines.

ASHRAE Standard 188 is the parent material (original document) the CDC is based off of ASHRAE 188.

What is a Water Management Program (WMP)?

A risk management plan for the **prevention and control of legionellosis** associated with building water systems.

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Water Management Program (WMP): The risk management plan for the prevention and control of legionellosis associated with building water systems, including documentation of the plan's implementation and operation.

WMP Documents

- Procedures
- Work instructions
- Specifications
- Records for all program activities

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WMP documents should reside in one or more locations and formats.

Risk Management

Domestic cold and hot water systems	Hot tubs	Health care appliances
Decorative fountains	Ice machines	And more!

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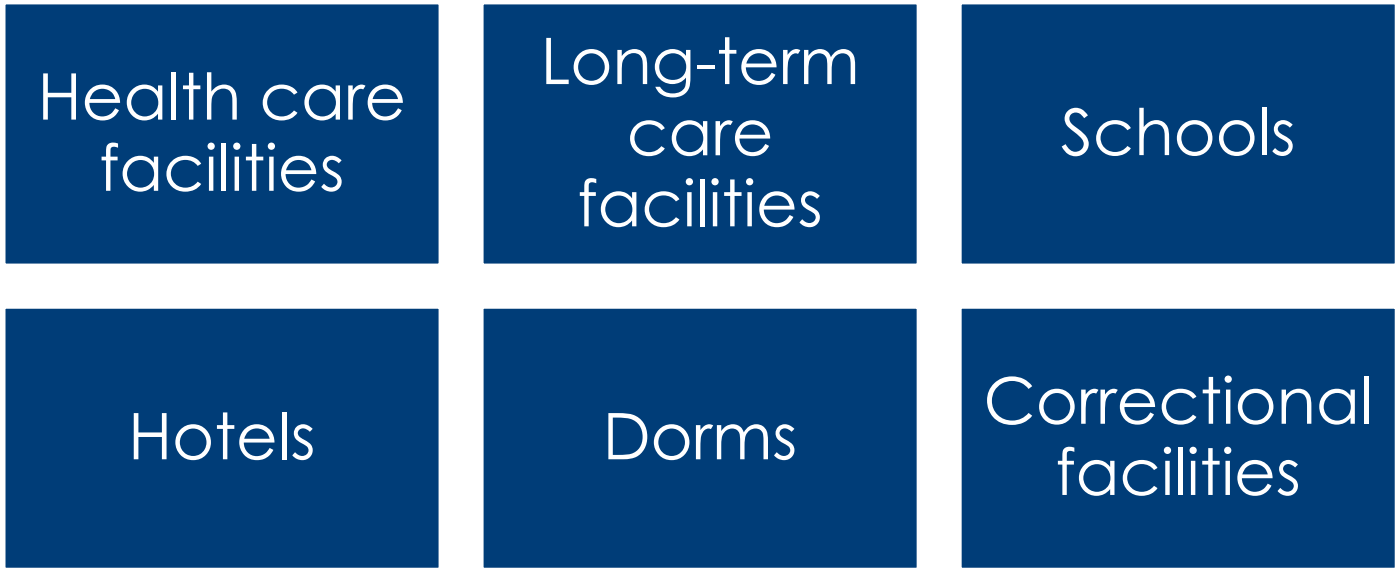
And More: Any other types of sources of water that can be aerosolized. Humidifiers, c-pap?

Purpose and Goal of WMPs

Eliminate water as a contributing factor for illness in your facility

Who Needs WMPs?



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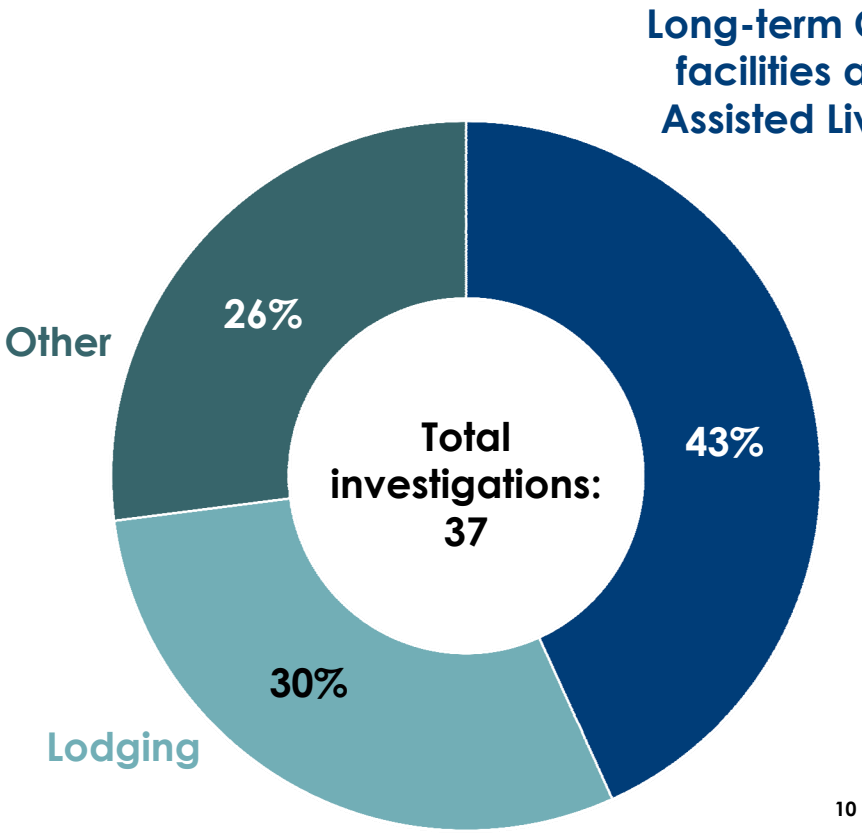
- Health care facilities: Including hospitals, long-term care facilities/skilled nursing facilities, community-based residential facilities, and hospice.
- Schools
- Hotels/Lodging/Time Share
- Dorms
- Correctional Facilities
- Other public buildings with complex/large water distribution systems.

The risk to a bunch of healthy 20-year-olds in a dorm is different then residents in a LTC facility and should be reflected in the water management plan's risk assessment.

Legionella Public Health Environmental Investigations



Data from 2016 to 2022

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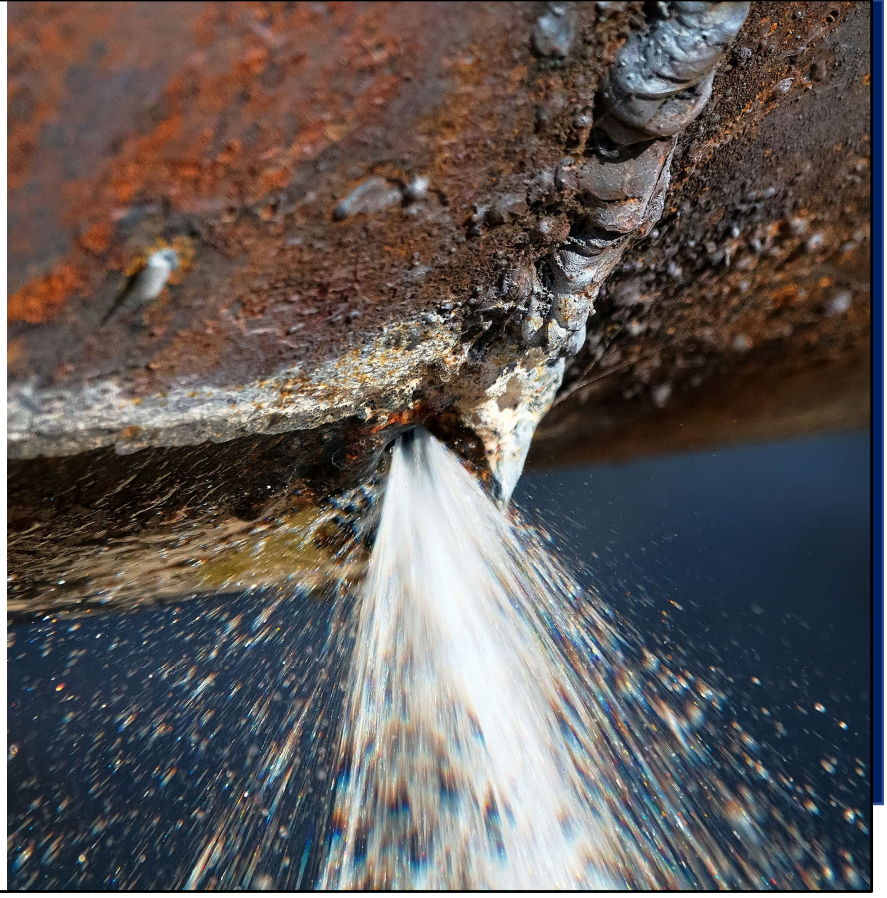
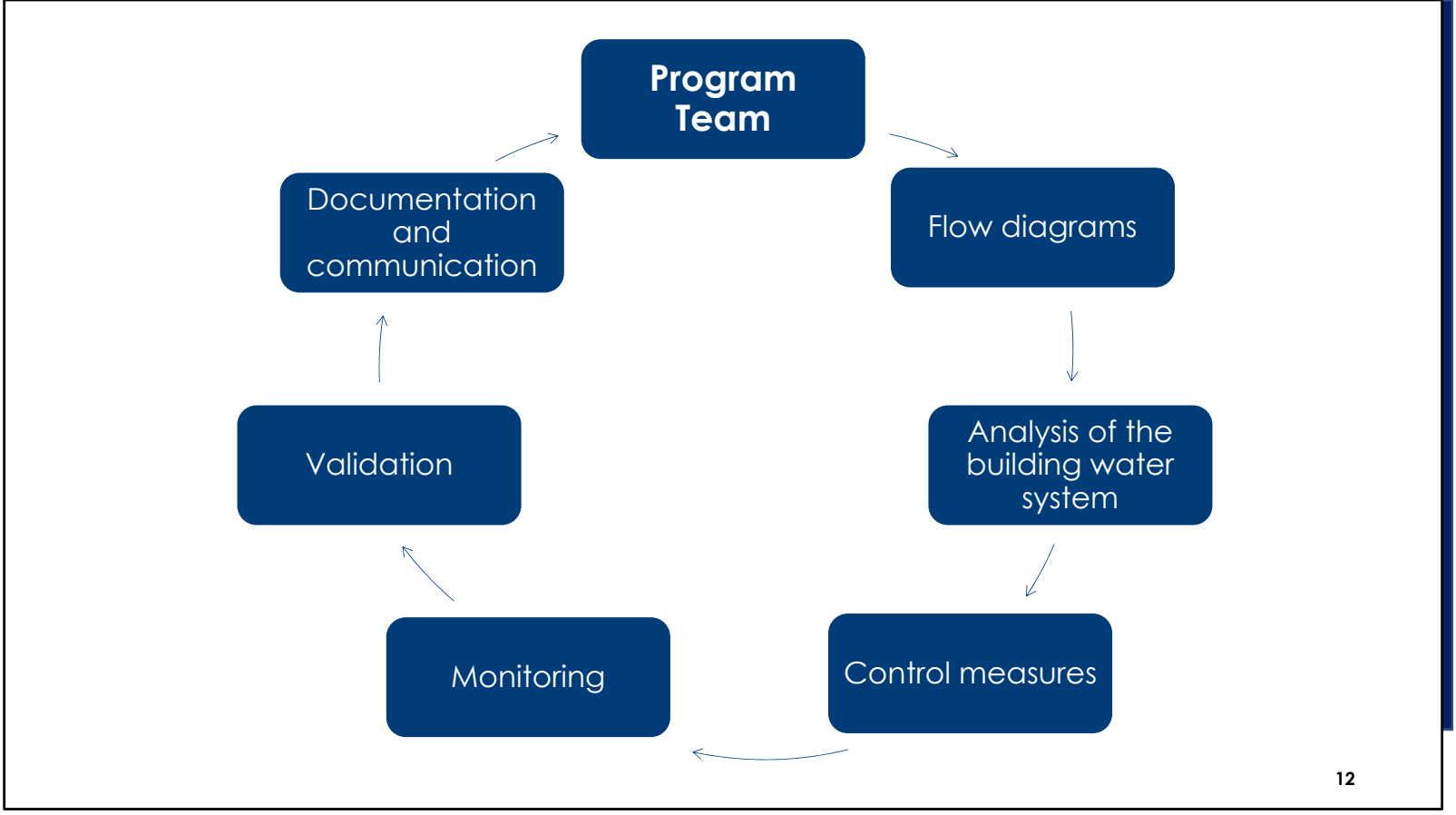
- Hospitals, Correctional Facilities, etc. are included in the other category.
- Lodging includes Hotels, Motels, Time Share.
- If you look at the CDC national numbers published, they show Lodging at around 40%
- These are investigations not total cases reported within the state. Between 2016 and 2022 there were 1,556 reported cases in Wisconsin. [Legionellosis (Legionnaires' Disease and Pontiac Fever) | Wisconsin Department of Health Services]

What are you going to do if something happens?



- Positive *Legionella* case or other water borne disease?
- Construction project planned?
    - Any construction can impact your water distribution system.
- Emergency construction/repair?
- Watermain Break?
- Boil water notice? Low pressure event in the municipality.
- Water is shut off to the building for fire protection maintenance?
    - Depressurize the water distribution system! Repressurize the water distribution system!
- Street construction that vibrates your building?
- Water being used for dust control.
- Water age/low census/ flushing program?
- Health care appliances?



ANSI/ASHRAE Standard 188-2021

There are more details in the CDC's "Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings" and the CDC checklist. For example, in addition to the Flow Diagrams the domestic piping system must be written in text and an additional flow diagram needs to identify risks.

Health Care Considerations

Have a **designated team**, including:

- Senior leadership.
- Member of facilities management.
- Member of the Infection Prevention and Control program.

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Designated Program Team Includes:

- Senior leadership who can make command decisions
- A member of the facilities management staff
    - Needs to have a working knowledge of the water systems.
- A member of the Infection Prevention and Control program.
- Can have others, not limited to the above

ANSI/ASHRAE Standard 188-2021

Health Care Considerations

Develop a **Legionellosis WMP** identifying:

- Team member contact info and roles.
- Hazard analysis of flow diagram.
- Likelihood of legionellosis.
- Areas at higher risk.
- Prevention and control measures.

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Develop a Legionellosis water management plan

- Contact information and roles of team members.
- Flow diagram.
- Hazard analysis of flow diagram.
- Identification of areas with higher probability of infection.
- Using flow diagram, estimate the likelihood of legionellosis.
- Prevention and control measures.
- Document responsibilities for each part of plan.
- Somebody with authority to make decision immediately.
- Documentation of the legionellosis water management plan.
- Disease prevention responses to elevated risks.
- Actions to be taken when the IC Dept identifies *Legionella*.
- Verification that the risk management is being followed.

ANSI/ASHRAE Standard 188-2021

Health Care Considerations

Develop a **water system flow diagram** including:

- Water supply sources, service entrances, and points of use.
- Water treatment systems, control measures, and processing steps.
- Areas that may contribute to *Legionella* growth.

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Water System Flow Diagram

- The designated team is responsible for the water system flow diagram.
- Flow diagram may need to include all:
  - Water supply sources.
  - Water service entrances.
  - Water treatment systems and control measures.
  - Water Processing Steps.
  - Areas where hazardous conditions may contribute to *Legionella*.
  - Water points of use.
  - **Any** other items identified by the team.

ANSI/ASHRAE Standard 188-2021

Health Care Considerations

Document **WMP activities** such as:

- Disease prevention responses to elevated risks.
- Actions to be taken when *Legionella* is identified.
- Verification that risk management is being followed.

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Document WMP activities

- Disease prevention responses to elevated risks.
- Actions to be taken when the IC Dept identifies *Legionella*.
- Verification that the risk management is being followed.

ANSI/ASHRAE Standard 188-2021

Ensure Facility Policies Are In Place

- Potable water system start up and shutdown
- System and equipment maintenance
- Water treatment
- Cooling towers
- Pools, spas, and decorative fountains

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Potable water systems start up and shutdown procedures

- Before commissioning: flushing and disinfection.
- Shutdown: draining, purging.
- Unplanned shutdowns.
- Restarting drained or stagnant conditions.
- Monitoring and treatment following water supply interruptions or watermain breaks.
- Re-establishing required temperatures in the hot water distribution system.

System Maintenance

- Inspection and inspection schedules.
- Flushing of low or no flow areas (water age).

Equipment:

- All domestic water storage tanks.
- Ice machines.
- Water-hammer arrestors.
- Expansion tanks.
- Filters.
- Shower hoses and showerheads.
- Faucets (aerators, flow restrictors).

- Humidifiers.
- Water heaters.
- Eye wash and emergency showers.

Water treatment: Premise plumbing bacterial control/disinfectant

- Monitoring temperature cold and hot water distribution.
- Monitoring chemical residual.
- Procedures for water supply/flow interruptions.
- Schedules and procedures to maintain water treatment system Chemicals.
- Treatment products and equipment (NSF 60 & NSF 61).

Cooling towers

- System maintenance.
- Water treatment (disinfectant & PH).
- Shutdown and start up.
- Water make up.
    - Protected against cross connection/backflow protection.

Pools, spas, and therapy pools

- Maintained per manufacturer.
- Maintained per applicable DATCP codes.
- Installed per applicable DSPS Pool & Plumbing Codes.

Decorative fountains

WMP should include:

- Draining, cleaning, disinfection.
- Draining and refilling schedules.
- Lighting only operates during the circulation of water.
- Confirmation that the circulation pump works.
- Weekly cleaning and disinfection of components.
- Disinfection instructions in accordance with manufacturer recommendations.
- Maintain water temperature within control limits.

ANSI/ASHRAE Standard 188-2021

Test patients with healthcare-associated pneumonia for Legionnaires' disease.

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Important: Tell clinicians so they can test patients with healthcare-associated pneumonia for Legionnaires' disease with both culture of lower respiratory secretions and the *Legionella* urinary antigen test. Please ask them to hold the lower respiratory secretions so DPH can have them sent to the Wisconsin Occupational Health Lab to be identified further.

Reference: ASHRAE 188: Legionellosis: Risk Management for Building Water Systems June 26, 2015, ASHRAE: Atlanta, www.ashrae.org

Legionella consults are available!

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DPH / *Legionella* Team has a list available of known (unrated) consultants. We do not endorse any consultant.

Things to consider:

- **Level of experience:** For example, what kind of *Legionella*-specific experience do the employees of this company have? Do the employees have appropriate training in critical fields (e.g., engineering, environmental health or industrial hygiene, water treatment, plumbing, microbiology)? Does the company have *Legionella*-specific experience with a facility of your size/type? Do they have experience with water system remediation, implementation of water management programs to prevent Legionnaires' disease, or both?
- **Laboratory expertise:** For example, is the laboratory they use accredited for environmental testing? Does it participate in a proficiency testing program for *Legionella*? Does their laboratory perform culture for *Legionella* (which is particularly important following remediation to ensure adequacy of the remediation process)? What level of identification (species/serogroup) can their laboratory perform? Is their laboratory willing to save samples and isolates and share them with public health laboratories if requested during an outbreak investigation?
- **Environmental assessment expertise**: For example, how much experience

does the company have with environmental assessments and/or sampling for *Legionella*? Can they describe situations where they performed an environmental assessment and/or *Legionella* sampling in a facility of your size/type?

- **Remediation expertise:** For example, how frequently does the company provide remediation services and can they describe situations where they remediated *Legionella* from a building water system in a facility of your size/type? Can the company discuss the benefits and challenges associated with multiple approaches to remediation?
- **Water management expertise:** For example, how much experience does the company have creating water management programs compliant with industry standards for a facility of your size/type? What level of support does the company provide with creation and implementation of water management programs? What is the spectrum of services they offer once the water management program is established?
- **Knowledge of codes, standards, and regulations:** For example, does the company have previous experience working in your state and/or jurisdiction? How familiar is the company with state and local building codes in your jurisdiction, water treatment regulations, healthcare accreditation and survey requirements, and public health reporting requirements? Local building code officials or your health department may be good resources for knowledge about existing codes, standards, and regulations.
- **Potential conflicts of interest**: For example, does the company have interest in promoting specific services or products?

Reference: https://www.cdc.gov/legionella/wmp/consultant-considerations.html

*The decision to utilize a *Legionella* consultant service is solely the decision of the user of this content and not the Centers for Disease Control and Prevention. The information provided here is only

intended to be general summary information to the public and should not be cited as legal advice or an endorsement of the use of consultant services. References to the use of consultant services does not constitute endorsement or recommendation by the Centers for Disease Control and Prevention and such references shall not be used for advertising or endorsement purposes.

Centers for Medicare & Medicaid Services (CMS) WMP Regulation

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State Operations Manual aka the SOM that is a federal document, issued by CMS that contains survey and certification rules and guidance.

The SOM includes an Appendix. Each Appendix is a separate file with a corresponding Appendix Letter.

- Appendix PP is the Interpretive Guidelines for LTC facilities known as Guidance to Surveyors for LTC Facilities (nursing homes).
    - Appendix PP includes the federal regulation for Infection Control labeled by CMS as Federal tag F880 (see page 760) with a Code of Federal Regulation (CFR) 42 CFR 483.80 – Infection Control.
        - Each federal tag within the SOM – Appendix PP includes:
            - The regulatory language
            - Intent of the regulation
            - Definitions and
            - Guidance
                - The guidance for Water Management is located in the F880 Infection Control guidance beginning on page 771

In summary, CMS Water Management guidance is located in SOM – Appendix PP at Federal tag F880 – Infection Control.

CMS QSO 20-17

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

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

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

Ref: *QSO*-17-30- Hospitals/CAHs/NHs
REVISED 07.06.2018

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****

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Federal requirement to reduce legionella risk has been in effect since 2017: CMS QSO 20-17: cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/QSO17-30-HospitalCAH-NH-REVISED-.pdf

This memo was replaced by F-880. The memo came out in 2017 and was used until they opened F-880 for revisions.

CMS Requirement for Nursing Homes

483.80*- 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.

*F-tag 880

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This is the portion of the regulation that applies to Legionella. https://www.ecfr.gov/current/title-42/chapter-IV/subchapter-G/part-483/subpart-B/section-483.80

Expectations for Health Care Providers

Have water management policies and procedures to **reduce the risk of growth and spread of *Legionella*** and other opportunistic pathogens (OOP) in building water systems.

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CMS expects Medicare certified health care facilities to have water management policies and procedures to **reduce the risk of growth and spread of *Legionella*** and other opportunistic pathogens (OOP) in building water systems.

Expectations for Health Care Facilities

- Conduct a waterborne pathogen facility risk assessment.
- Implement a water management program.
- Specify testing protocols.
- Document results and corrective actions.

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Surveyors will review the facility water management documentation to verify **the facility:**

- Conducted a facility risk assessment to identify where *Legionella* and other opportunistic waterborne pathogens could grow and spread.
- Implemented a water management program that considers the ASHRAE industry standard and the CDC toolkit.
- Specified testing protocols and acceptable ranges for control measures.
- Document the results of testing and corrective actions taken.

F-880 Guidance

Facilities must be able to demonstrate measures taken to minimize the risk of *Legionella* and other opportunistic pathogens in the building water systems such as by having a documented WMP.

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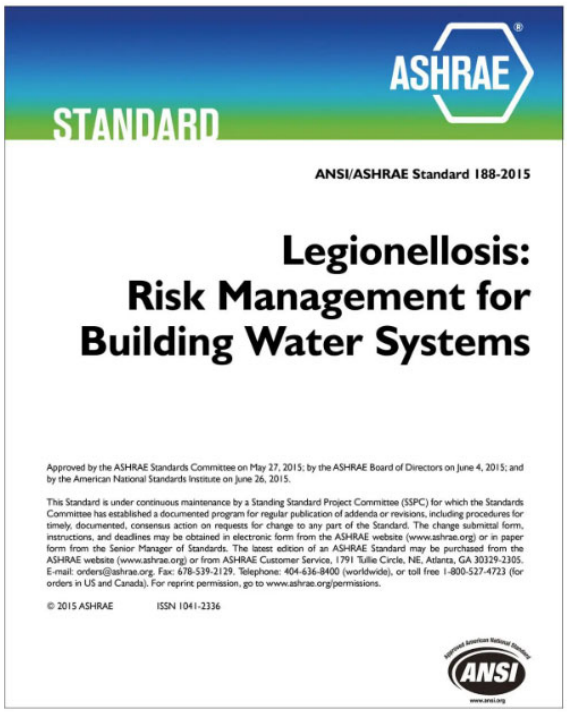
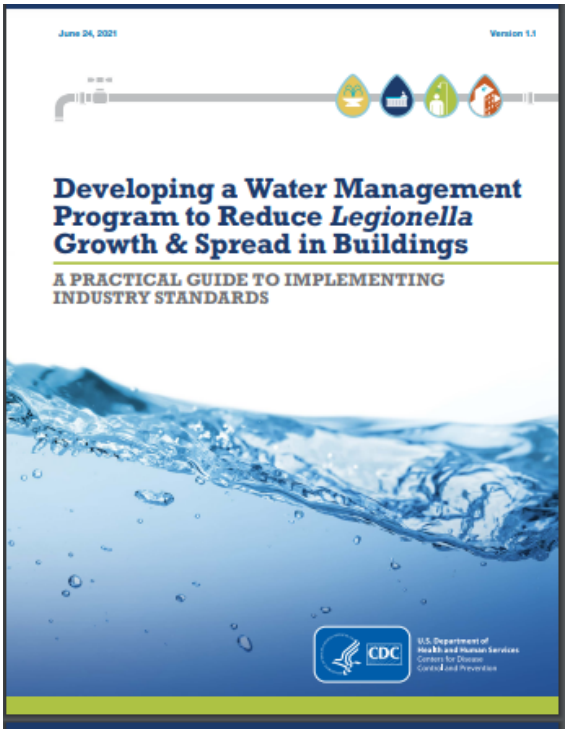
- Must be based on **nationally accepted standards** (e.g., ASHRAE, CDC, EPA) and include:
  - An assessment to identify where *Legionella* & waterborne pathogens could grow and spread; and
  - Measures (control measures) to prevent the growth of waterborne pathogens and
  - How to monitor them.





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National standard from ASHRAE and CDC guidelines.

ASHRAE Standard 188 is the parent material (original document) the CDC is based off of ASHRAE 188

WMP Resources

- WI Department of Health Services (DHS), Legionellosis webpage
- Council and State and Territorial Epidemiologists (CSTE), Legionnaires' Disease Surveillance Workgroup
- CSTE, Legionnaires' Disease Risk Communication Toolkit
- Centers for Disease Control and Prevention (CDC), Developing a WMP to Reduce Legionella Growth & Spread in Buildings Toolkit

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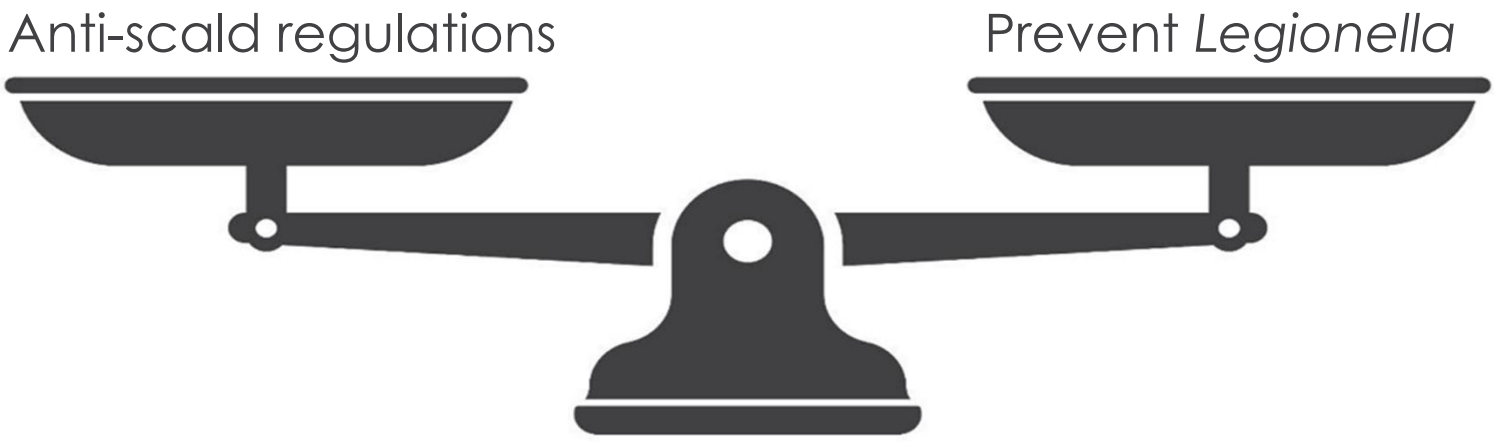
Water Management in Health Care Facilities

Hot Water Dilemma



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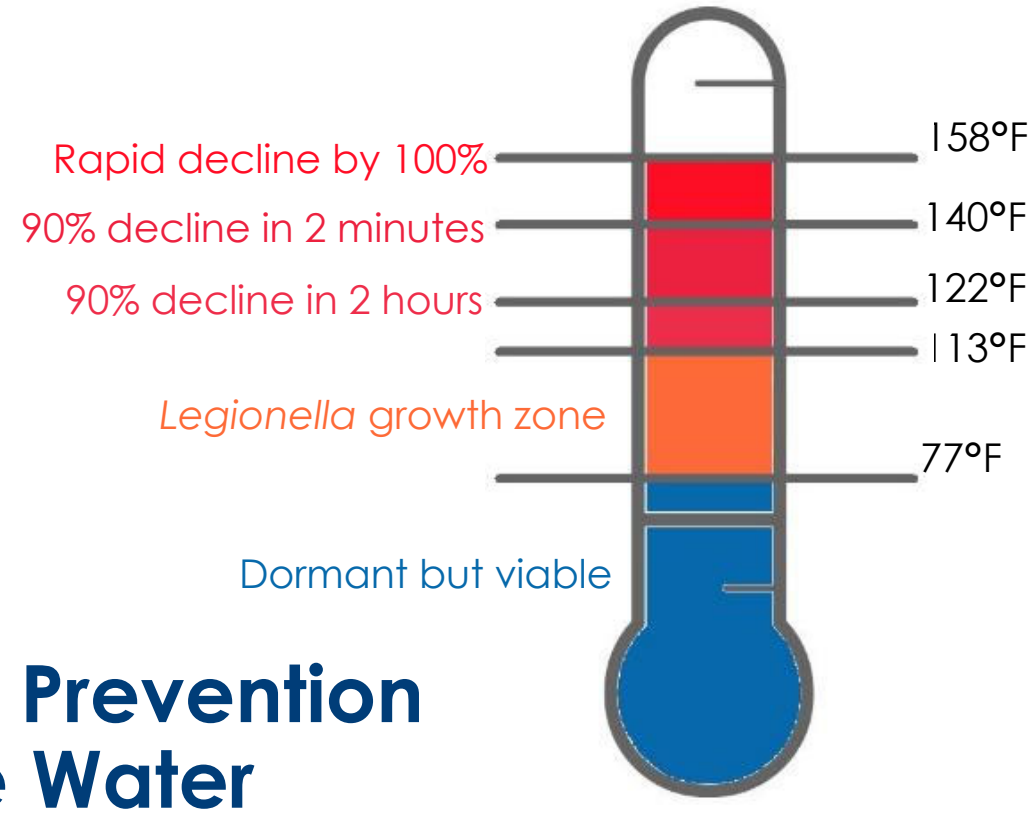
Anti Scald regulations: F689 – Accidents and SPS 382.50(3)(b)5 which sets a prescriptive temperature range of 110° to 115°

Prevent *Legionella*: CDC Environmental Infection Control Guidelines



Legionella Prevention in Portable Water

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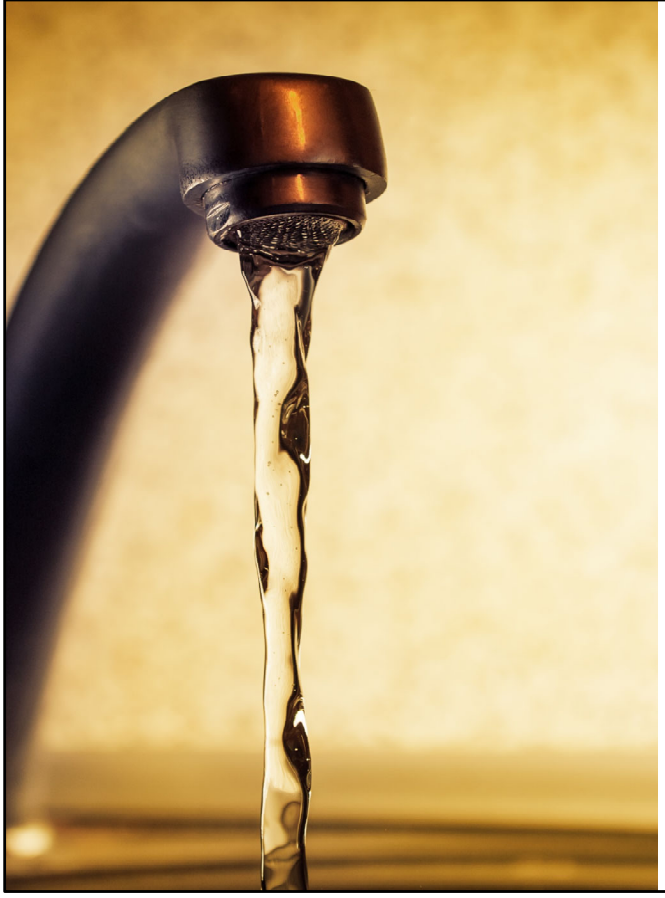
Depending on your source these temperature milestones may very by a degree or two. Don't worry about it.



Keep the hot water hot

Keep the cold water cold

Keep the water moving

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Keep the hot water hot, keep the cold water cold is important if you remember the temperatures on the previous slide.

Keep the water moving means circulating the hot water 24/7 when required by code, but also means that keeping it moving is using it **or running it down the drain unused**. Remember water age is the villain here. With low use of water in these buildings compared to the oversized water distribution piping, running the water down the drain (if possible higher velocities) will displace old water and bring in fresh with (importantly) disinfection whether chlorine or monochloramines. Water conservation is not advised as this promotes biofilm and other issues within the water distribution system. So think twice before using fixtures that use less water then the EPA (law) required maximums.

What could go wrong?

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The following pictures are potential life-safety issues (non regulator)

No one is necessarily at fault

- Time
- Staffing changes
- Staff shortages
- Budget constraints
- Energy Conservation

Dead Legs and Ends

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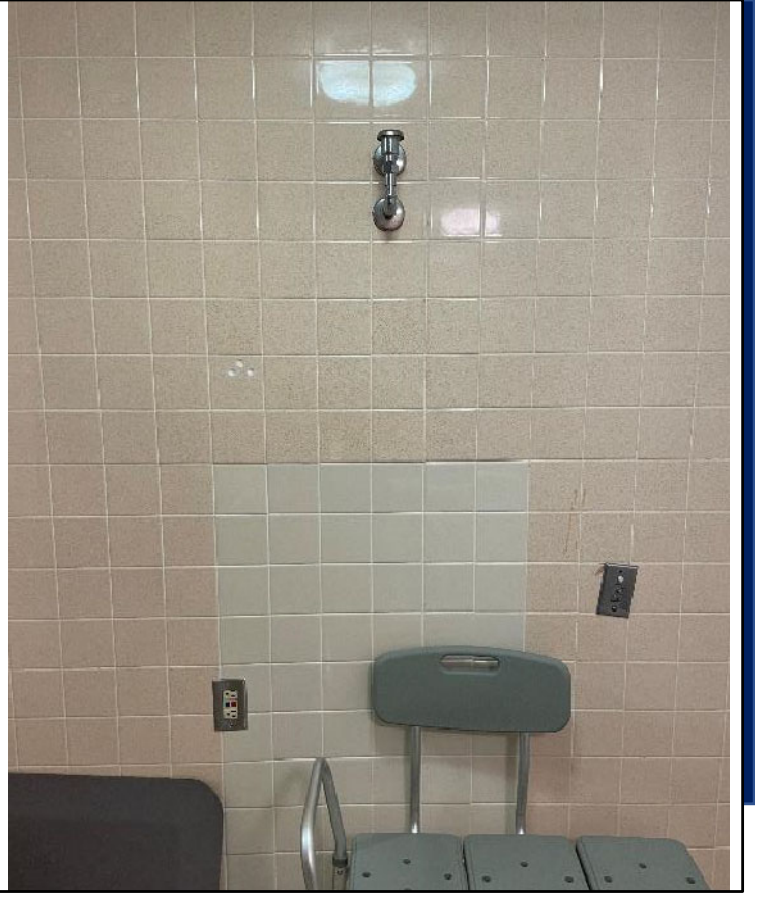
Dead leg/ends

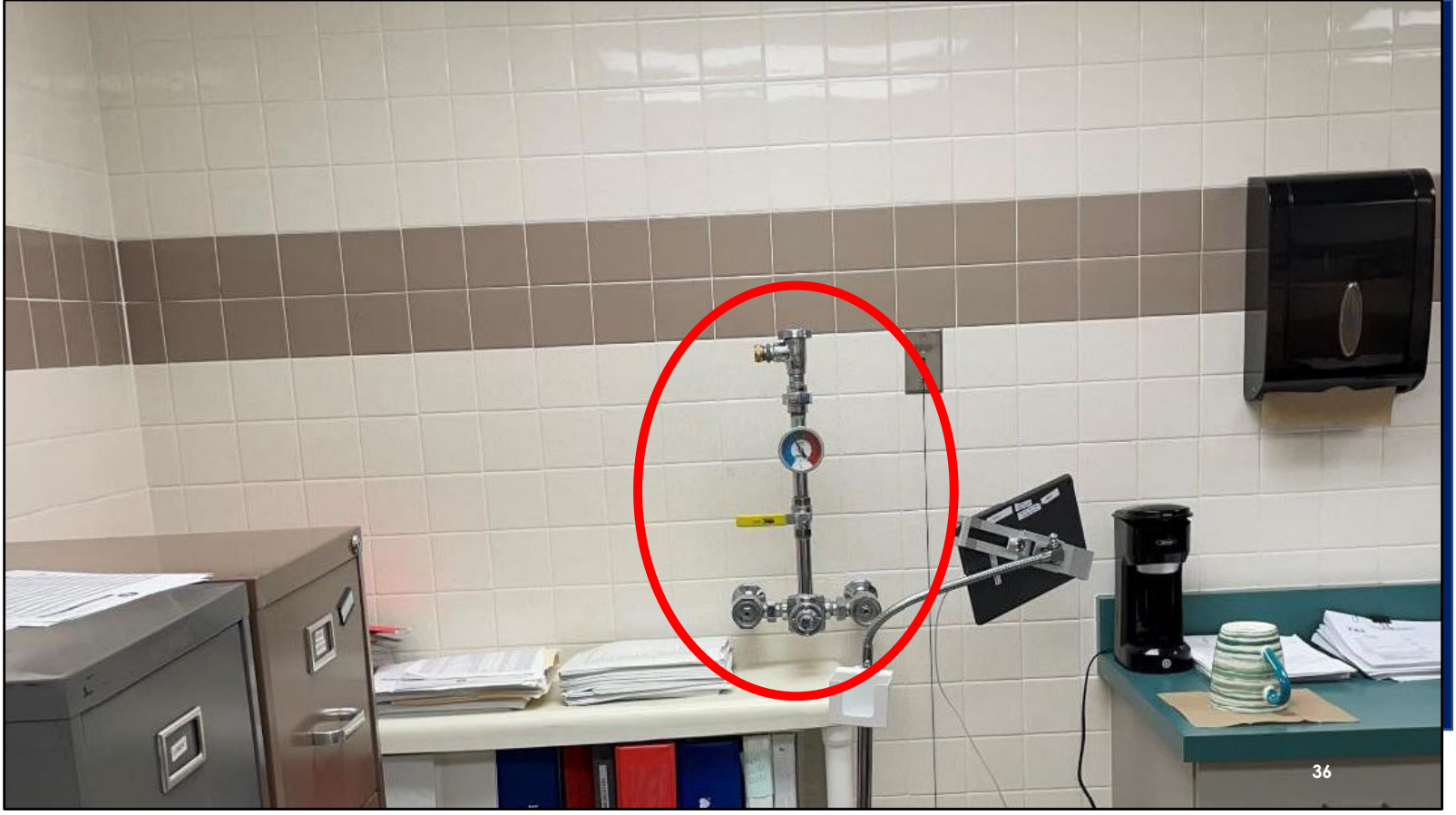
My recommendations: Fix the faucet so it can be flushed per their WMP.
Do <u>not</u> remove the fixture unless the attending fixture piping can be removed back to the distribution system. **DANGER!** If you remove the fixture and piping, you risk disturbing all the biofilm within all the piping in the building. **Consult you WMP!**

Bed pan water



Dead leg/end

- Assumed abandoned piping in wall
- Bed pan washer was in this spot
- Abandoned piping cannot be remediated
- Future issues?
- Different colored tiles = abandoned piping behind



Dead leg/end
Old therapy tub.

Difficult flush? Doesn't matter. Find a way!

Do not cap the piping as it will create a worse issue by creating dead legs/ends and create "dead water".

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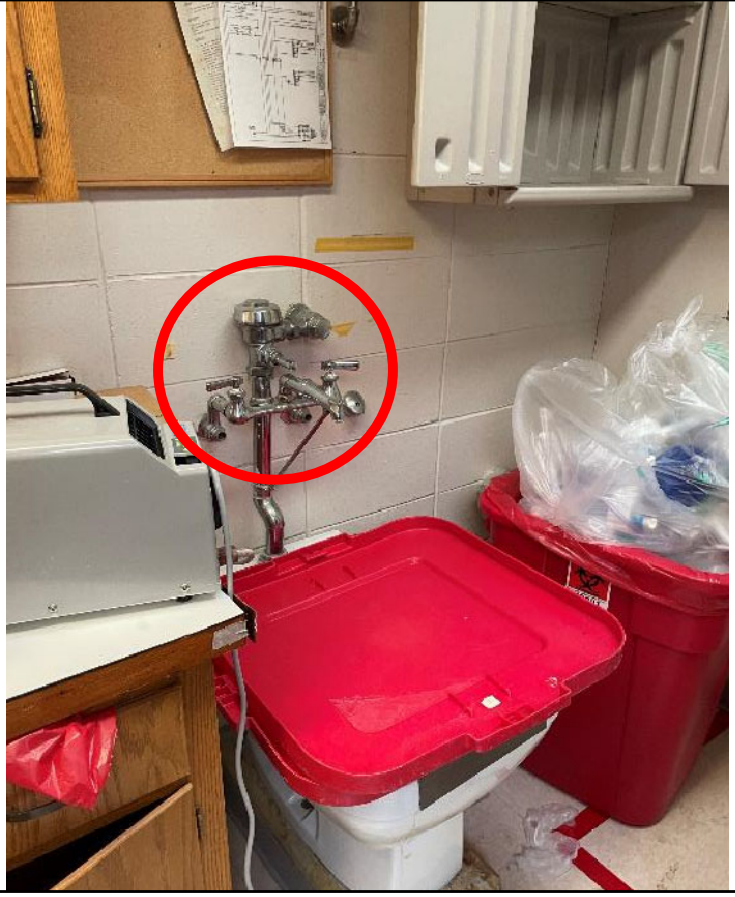
Wheelchair washer room/former locker room

- Does not have compliant backflow protection.
- Recommended caps removed to be able to flush out this "dead water." Eventually these pipes need to be taken back to the main and capped.
- Any ways to flush these pipes has to keep in mind not create another issue of cross connection and contaminate the water distribution system. Provide approved backflow protection per the plumbing code. In Wisconsin: sps382.41



Utility/biohazard room

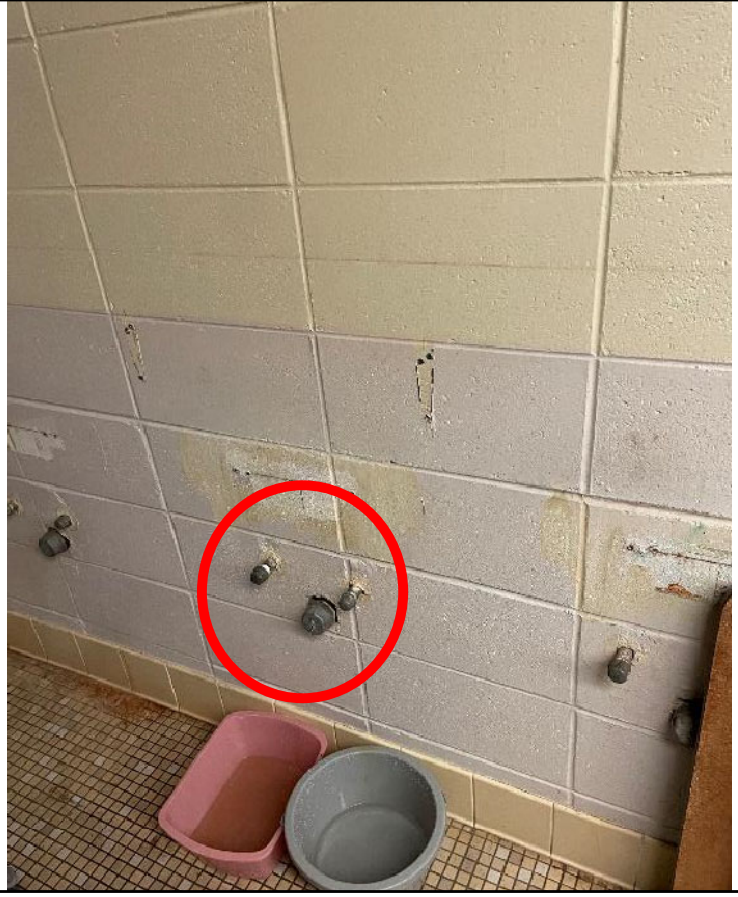
Photo 1:

- Dead leg/end
- Clinic sink

Photo 2:

- Bed pan washer. Under the stuff stacked on top of it the four inch trap is dried out creating an issue with sewer gas. It also signals to me that this fixer has not been used in well over a year.

- Creating water age! Potentially allowing pathogens to grow because there is no disinfectant (in this case chlorine to help keep it in check and not flushing them down the drain. These pathogens will make their way back into the main water distribution system "seeding the system".



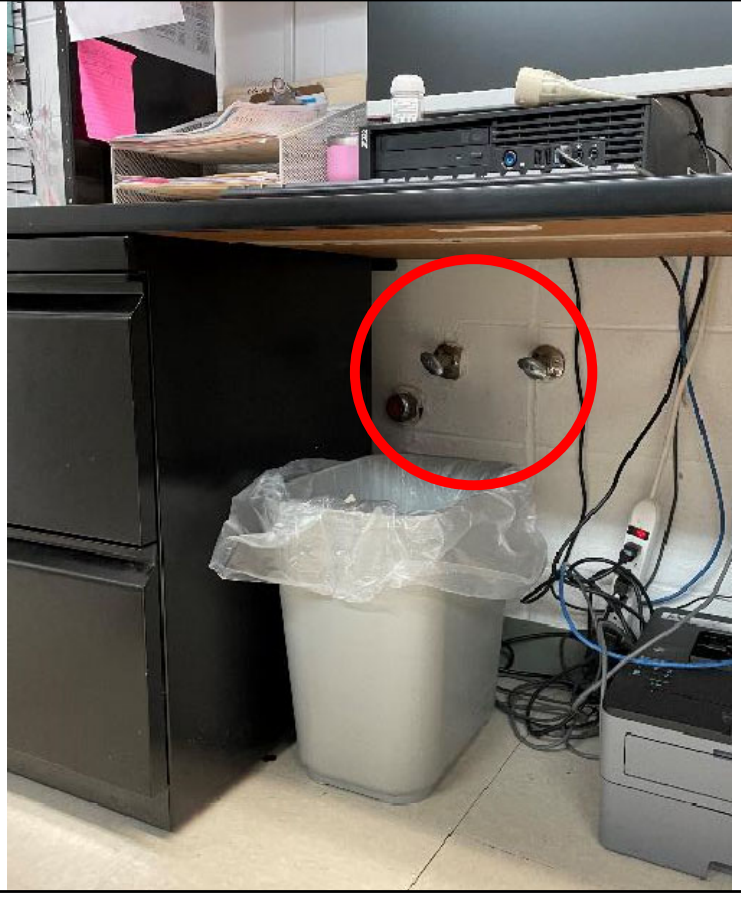


Photo 1: Employee locker room

- Pipes are capped
- Cannot be flushed
- Dead leg/end
- Dead water will seed the system.

Photo 2: Office

- Dead leg/end

Dead legs/ends

Hot water distribution systems depending how they are designed sometimes require a hot water expansion tank (you cannot compress water). As water heats up and expands if the systems has check valves, in your homes, for example, when water expands it pushes back into the municipal water main.

Photo 1: Expansion tank

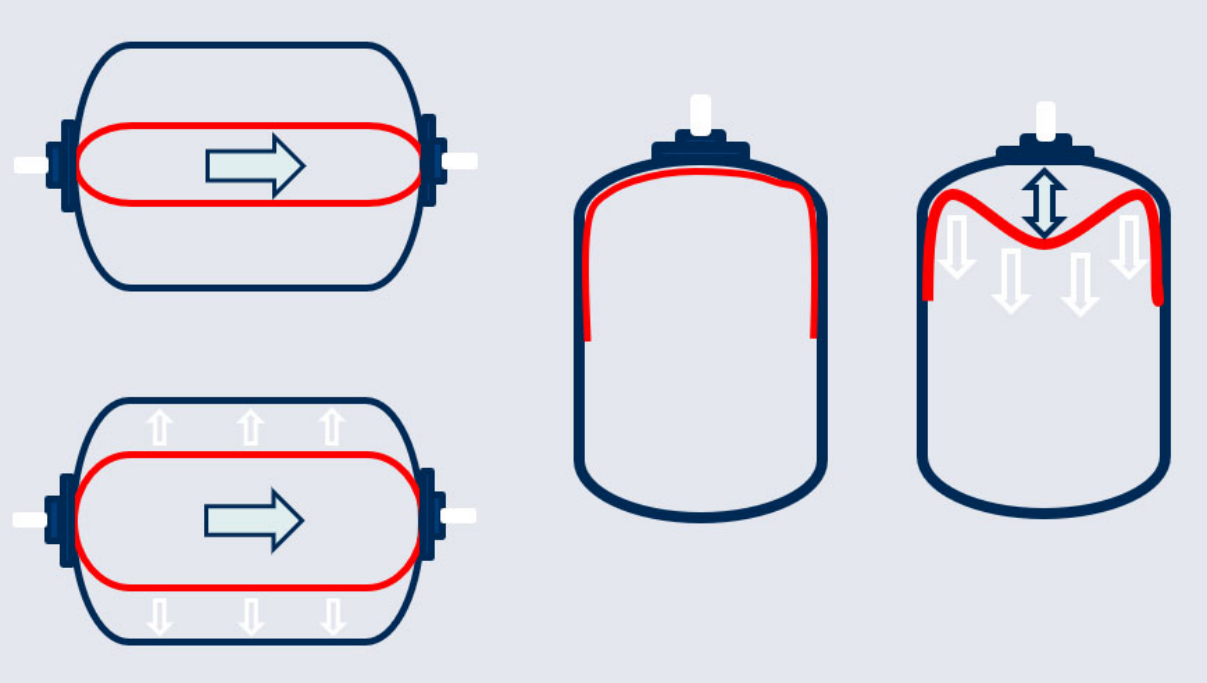
- Expansion tank
- Installed in April 2010
- Water in tank about 13 years old
- Life-safety issue
- Amplifier for *Legionella*

Photo 2: Expansion tank

- Installed April 2000
- Water in tank about 20 years old
- Life-safety issue

- Amplifier for *Legionella*

Expansion Tanks

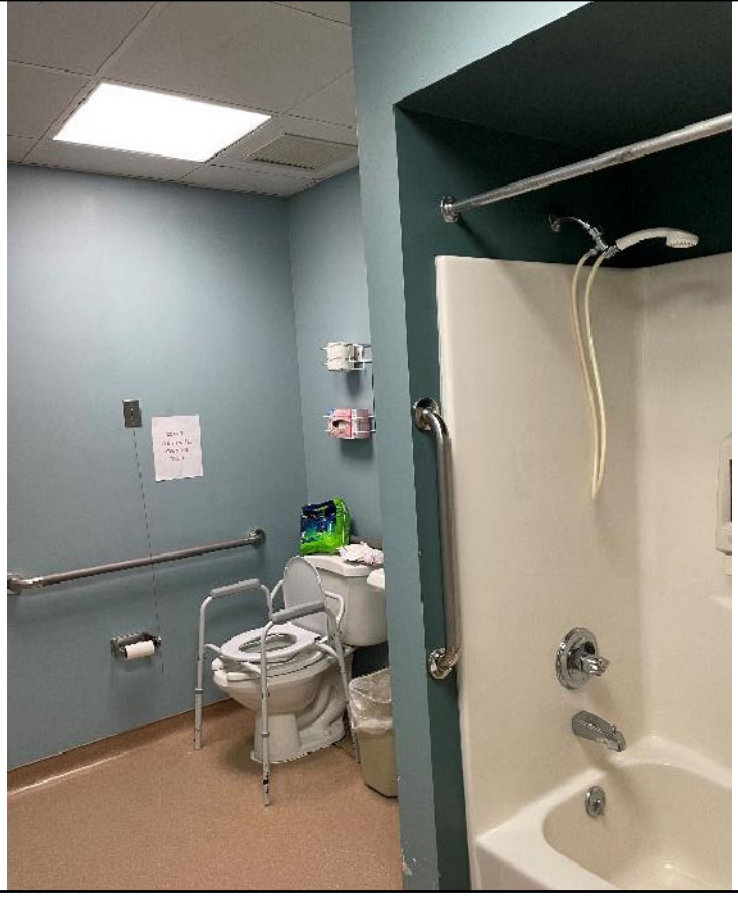


Industry standard to use flow through type expansion tanks. Proposed Wisconsin Plumbing code change for health care, became codified 10/01/2023. Wisconsin became the first state to require this. Talk now that other states will follow now.

- The two diagrams on the right are standard hot water expansion tanks. Note the white arrows represent an air charge (kind of like your car tire).

- Two diagrams are representing one type of flow through expansion tank. Note the white arrows represent an air charge (kind of like your car tire). Required by code on 10/01/2023. Existing installations are grandfathered in.

- Remember potable hot water distribution systems depending how they are designed sometimes require a hot water expansion tank (you cannot compress water).



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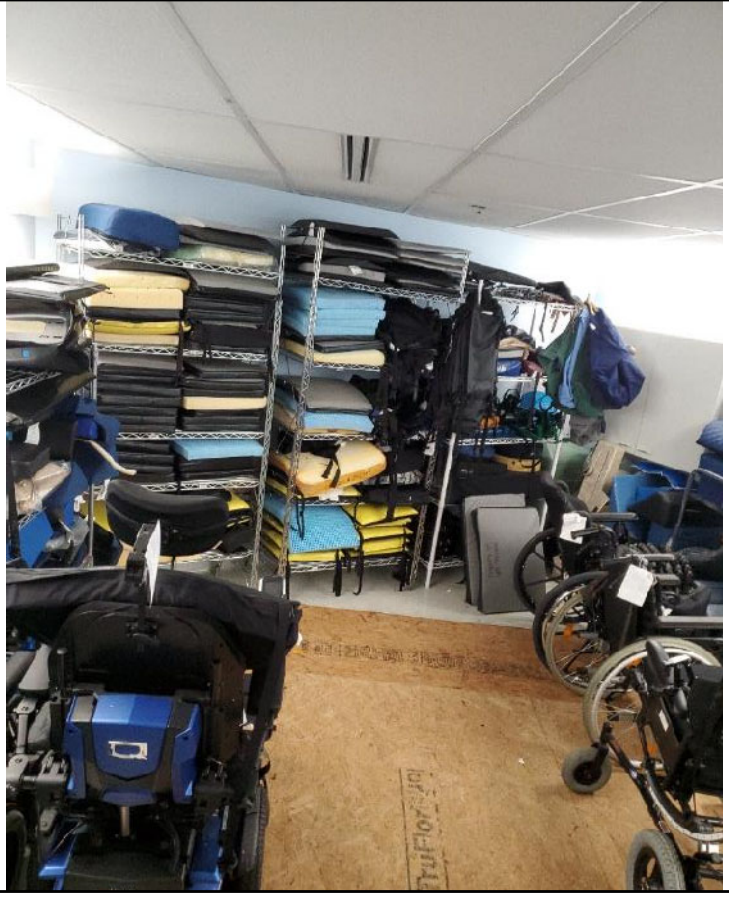
Shower room

- Low use shower, needs flushing plan.

- This is a therapy shower. It is only used to show how to use the grab bars. Water is there to the shower, but never used. Don’t forget about this and other therapy fixtures.



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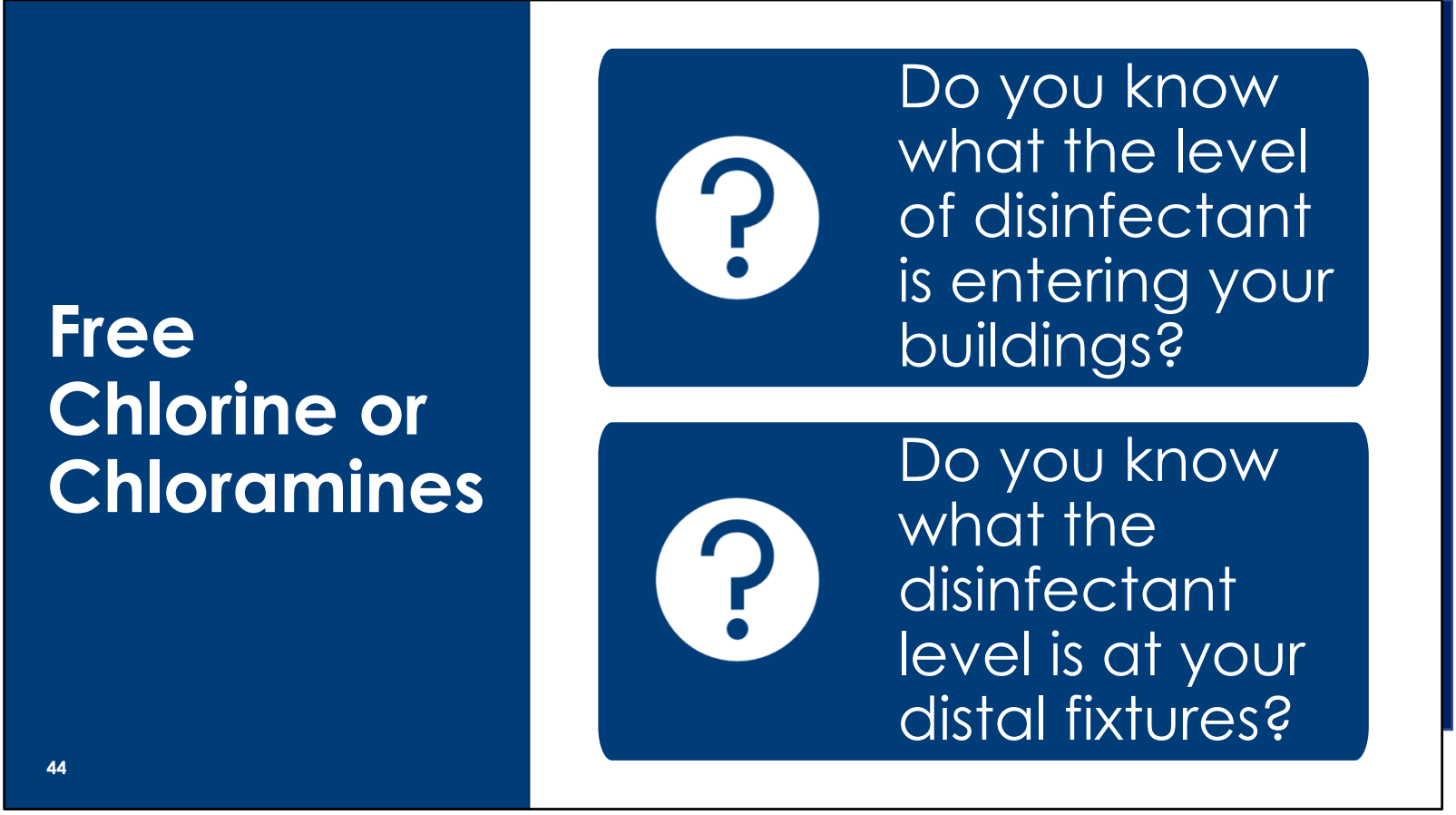
Repurposed room-hidden piping or fixtures?



Monochloramines

Ever facility should have a test kit. You need to know what you are working with and if the disinfectant is making it to all the fixtures in the building.

FYI, In Wisconsin municipal water systems are not required to put disinfectant in their water, only deliver safe water. Here is a link to check. [Municipal water system disinfection | | Wisconsin DNR]

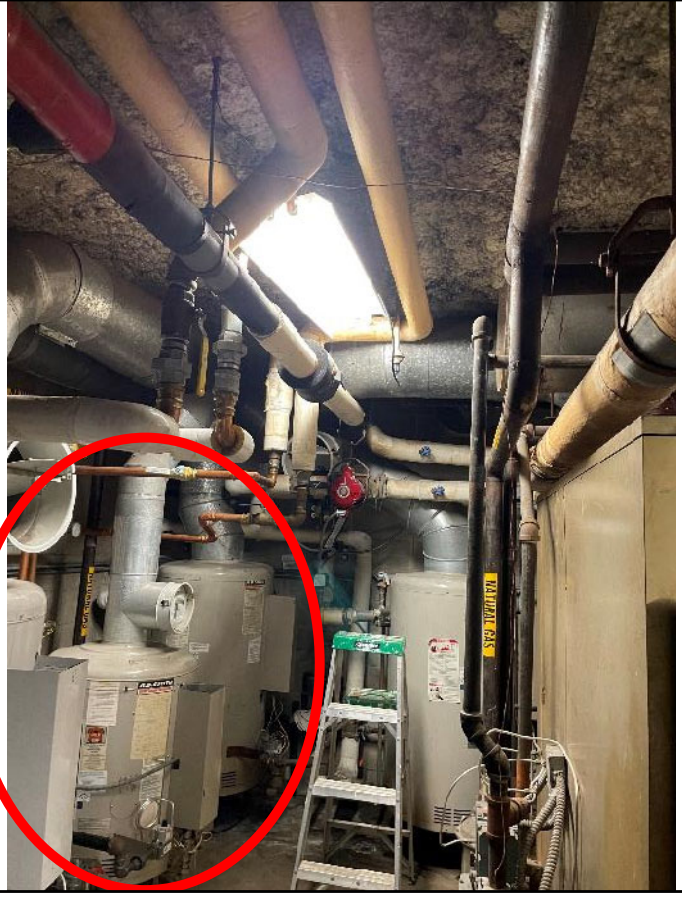
Photo 1: 2nd floor south shower

- 113°F
- 0.0 ppm free chlorine

Photo 2: Distal fixture samples

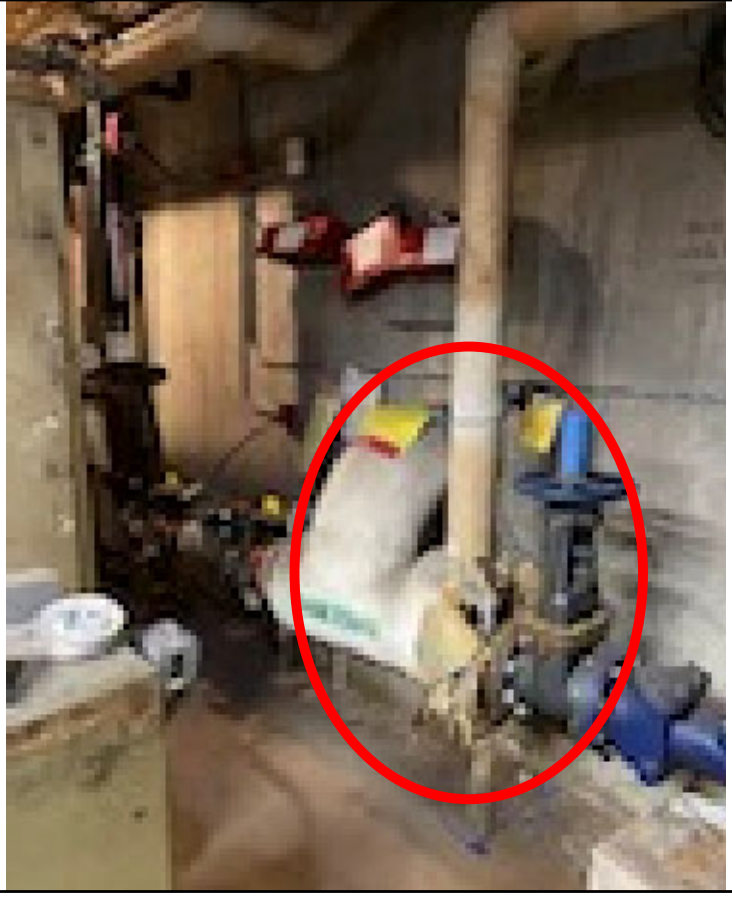
- Testing for *Legionella* and chlorine residual

Water Heaters, Service, and Meter



Master water heater

- Master water heater circulates at about 150°F water
- Three non-energized storage tanks (not shown)
- Storage tanks had thermometers at the bottom at 103°F
- There is a possible issue with the controls. Know and document what all the temperatures should be for all the components of your water distribution system.



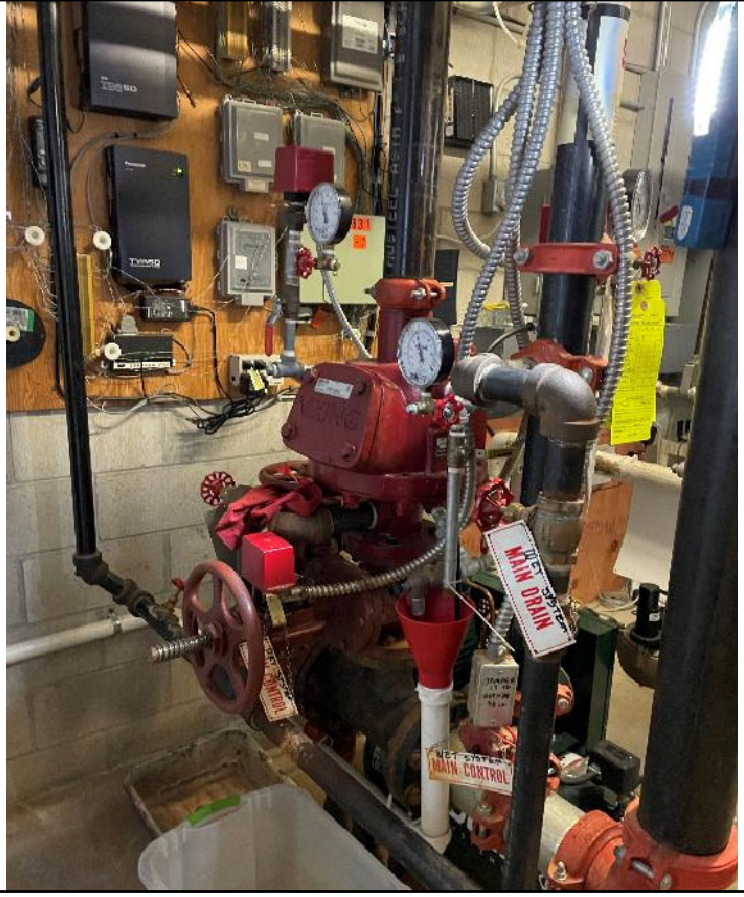
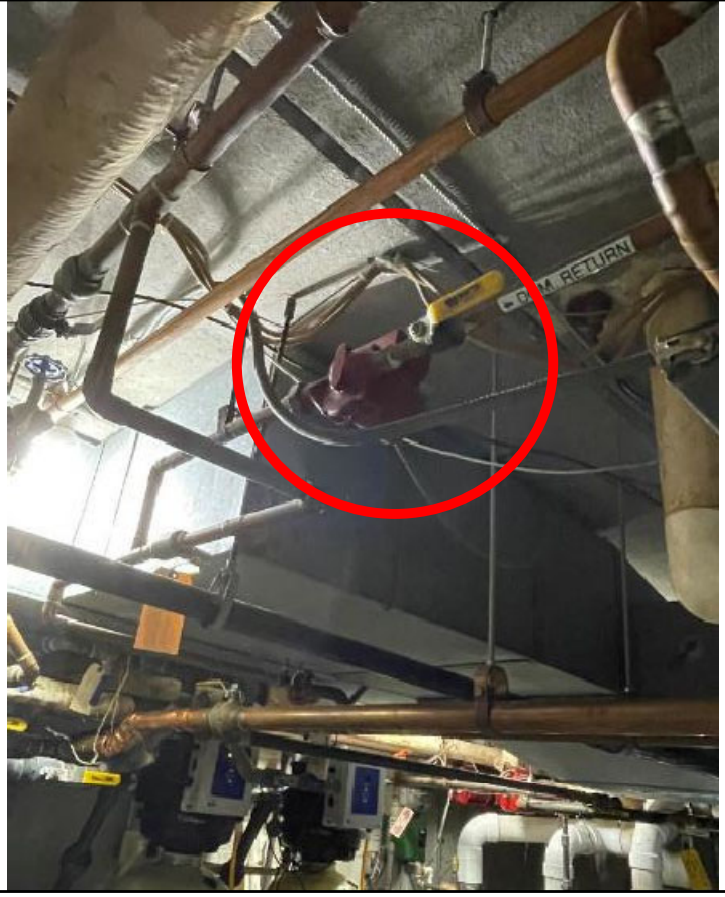


Photo 1:

- Water age
- Combined fire and domestic water service
- 6" ductile iron pipe at 8 fps = about 775 GPM
- 2" L copper at 8 fps = about 77 GPM
- The point is that every combined water service is sized correctly for fire protection, but grossly oversized for domestic water use. A creator of water age and low disinfectant residuals delivered.

Photo 2: Combined portable water and fire system



49

Hot water circulation

- Runs 24/7
- Correct installation for WI health care

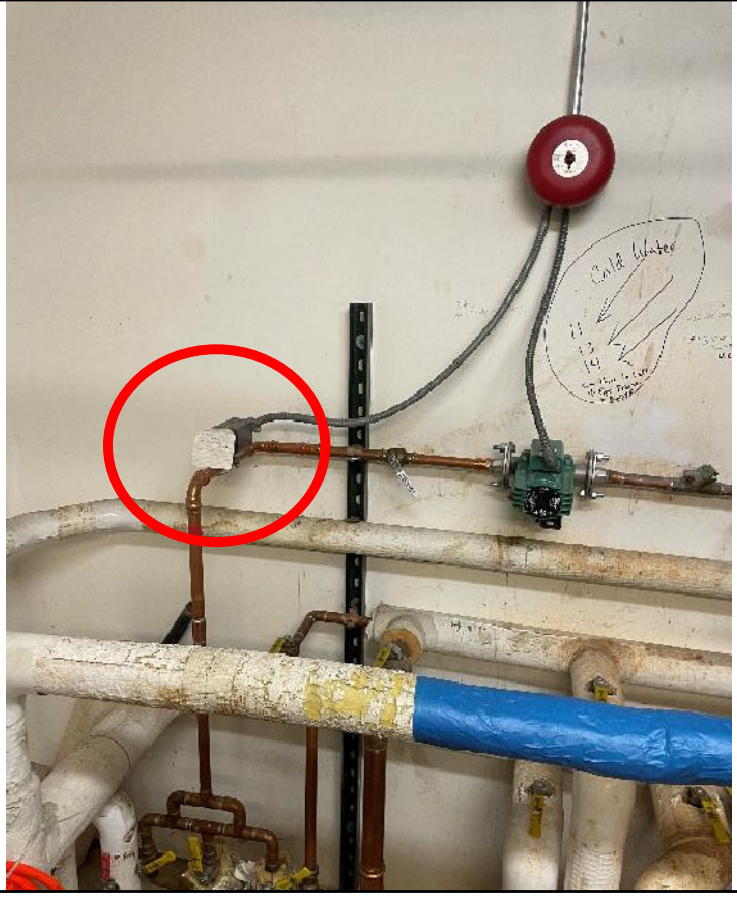


Photo 1: Domestic hot water circulator pump timer

Photo 2: Domestic hot water circulator pump aquastat, shuts pump down on temperature.

Both installations are noncompliant with the Wisconsin Plumbing Code for healthcare.

51

- Mixing valve stopped working
- Water heater temperature reduced
- *Legionella* growth

This is in a LTC facility. Personnel were untrained as to the necessity of all the components. So when the mixing valve (chrome cross fitting) which blended the 140° degree water down (which took the water heater out of the equation as a *Legionella* amplifier) failed, they did not fix it, but turned down the water heater temperature (which put the water heater into the equation and made it a confirmed amplifier of *Legionella*). This well intentioned action by untrained staff created the legionella incident.

Photo 1:

- Dead water heater
- Still connected to the hot water distribution system
- Amplifier for *Legionella*

Photo 2:

- Non-energized low temperature storage tanks
- Not needed, replaced only because the old ones leaked. No one asked if they were needed. Maybe bring in professionals to determine?

53

Very old hot water expansion tank, not needed for this system.

Water Age!

54

Senior apartment

- 50 gallon water heater.
- Small water system can still be fatal to the user.
- Low temperature water heater because of scalding concerns. Grandfathered CBRF so bacterial control/disinfection was not required in the hot water distribution system.
- The person using this water heater and the sink in the following slide passed away from Legionellosis.

Hot Water

55

Hot Water Dilemma

Anti-scald regulations

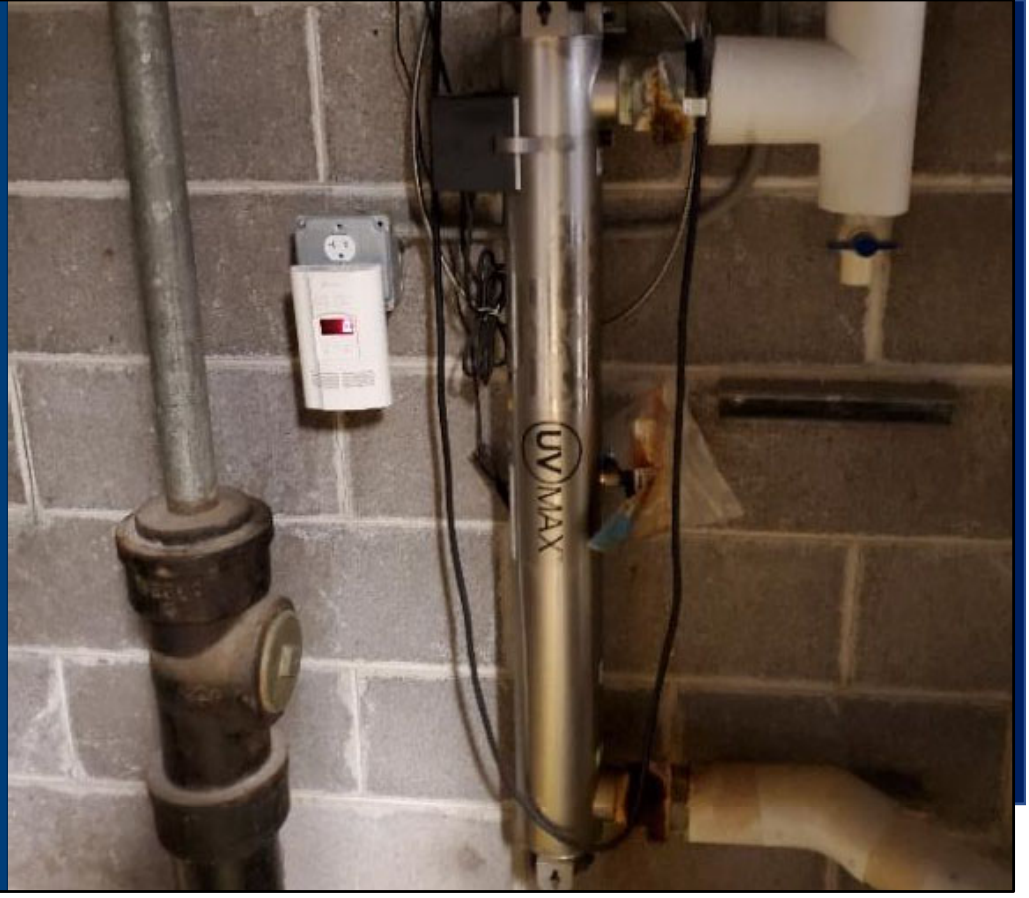
Prevent *Legionella*

56

57

- Temperature set correctly?
- Do you know what the correct temperatures are supposed to be for your facility? DO not assume, you may have to bring in a plumber or engineer to see how your water system was originally designed.

UV System



58

- UV system not installed correctly
- UV system not working/turned off.

This LTC facility was required by Wisconsin code (sps382.50(3)(b)6.) to have a hot water disinfectant system installed. All Nursing homes, CBRFs, Inpatient Hospice, and Hospitals built after May 1, 2003 are required to meet this code language.

Thermal (heat), Chlorine, Monochloramines, Chlorine Dioxide, UV and others as approved by the department are acceptable methods of hot water disinfection/ bacterial control. They all have there positive and negative points. UV even though it works well to disable pathogens from growing/amplify it is hard to implement in large water distribution systems.

Disinfectant System

59

Disinfectant system removed.
Required in WI. in all LTC, CBRF, In Patient Hospice, & Hospitals built after May 1, 2003

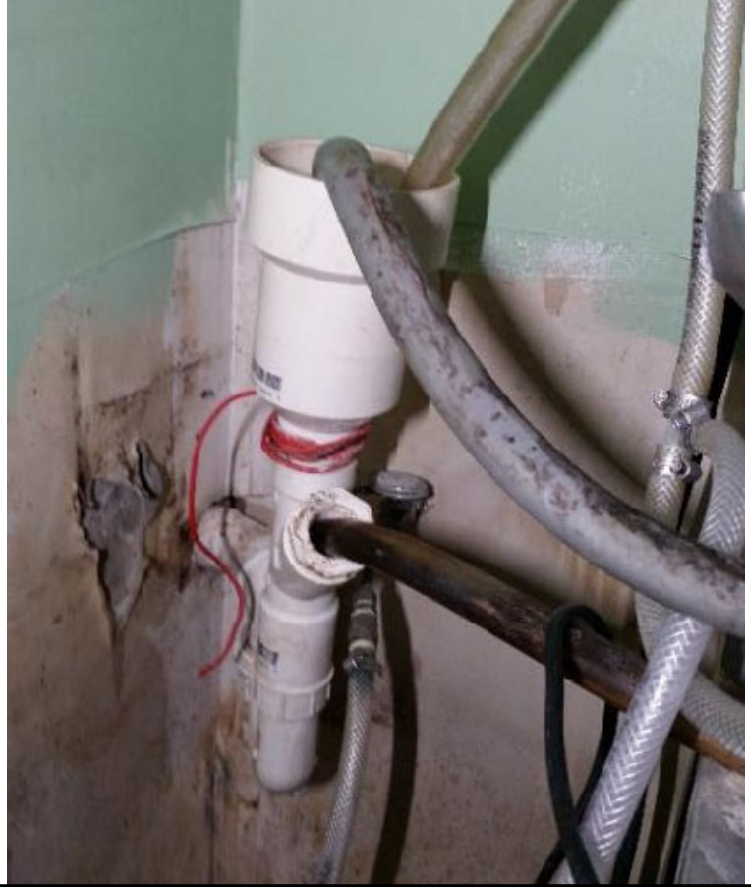
Ice Machines

60

Ice machines: Maintenance and cleaning per manufacturer instructions?

We test ice on every environmental assessment. *Legionella* can be trapped in ice and then aspirated into the lungs.

Water is brought to the ice machine, then usually runs through a filter that removes any disinfectant. The water is then temporarily sitting in a warm area created by the compressor and fan. *Legionella* can then amplify before it is frozen and made dormant.



Ice machines

- Noncompliant ice machine drains
- Ice is a food

Those clear tubes that are not so clear, maintenance is a part of having these machines..

Those drain tubes stuffed directly into the sewer drain, not compliant per Wisconsin plumbing code, an air-gap is required.

Hot Tubs, Whirlpools, Jacuzzi, and Pools

62

This hotel Jacuzzi test positive for *Legionella.*

Jacuzzi's piping may not totally drain leaving it to sit and for pathogens to amplify and then be mixed into the water of the next bather.

63

Pool and whirlpool basin

Pools and more likely Whirlpools/Hot tubs are great places for pathogens when the disinfectant levels are not maintained to code.

64

Pool filter

Filters are a great place for pathogens to hide. We found *Legionella* in this Whirlpool/hot tub filter.

Cooling Towers

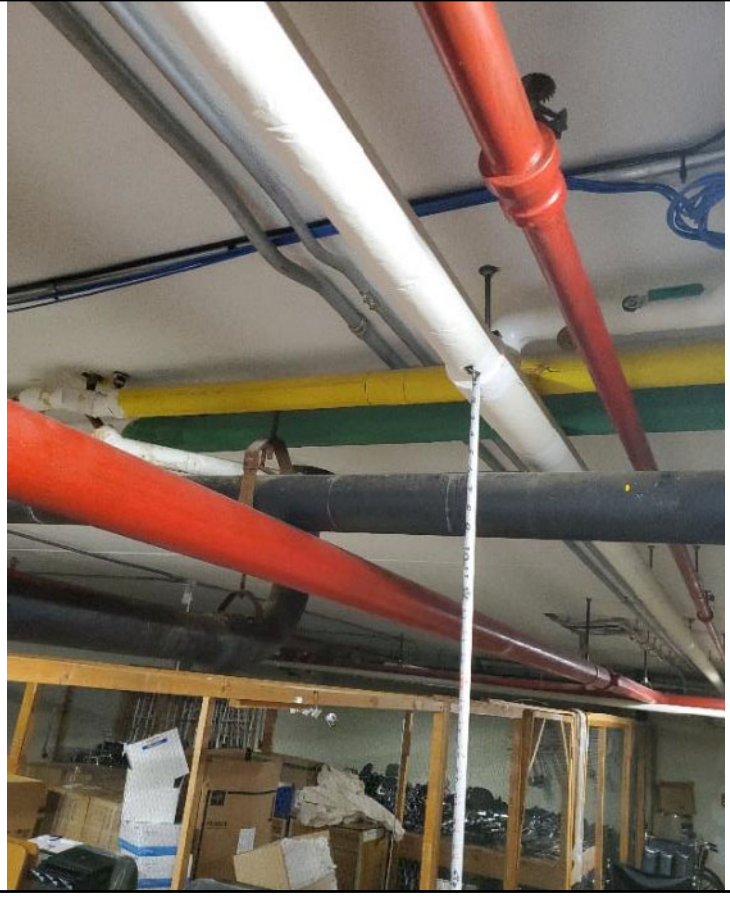
65

Don’t forget Cooling towers, if the disinfectant levels and pH are not maintained they could be a source of *Legionella* for you facility. Be aware of any cooling towers in your area. *Legionella* can drift up to a mile from the cooling tower. You should know where the cooling towers are in your area in case you have a resident test positive for *Legionella*. This will help figure out where the source was, investigations need to move fast when you have a positive case of *Legionella*.

Cooling towers

Blueprints


PORCH CORNICE
SCALE-1½"
STANDARD CABINET
Sheathing
2"x6" Plate
Hose Bibb



Blueprints

- Potable water systems are complicated.
- Refer to approved plans.
- Bring in consultant or plumber.
- You must trace the water system in the building.
- Can be long and complicated.
- If you don’t understand the plumbing system, bring in someone who does and then document it.

Unused and Low Use Fixtures

69

Don’t forget low use fixtures. Flushing and in this picture this installation is noncompliant because it is missing it’s required approved backflow assembly.

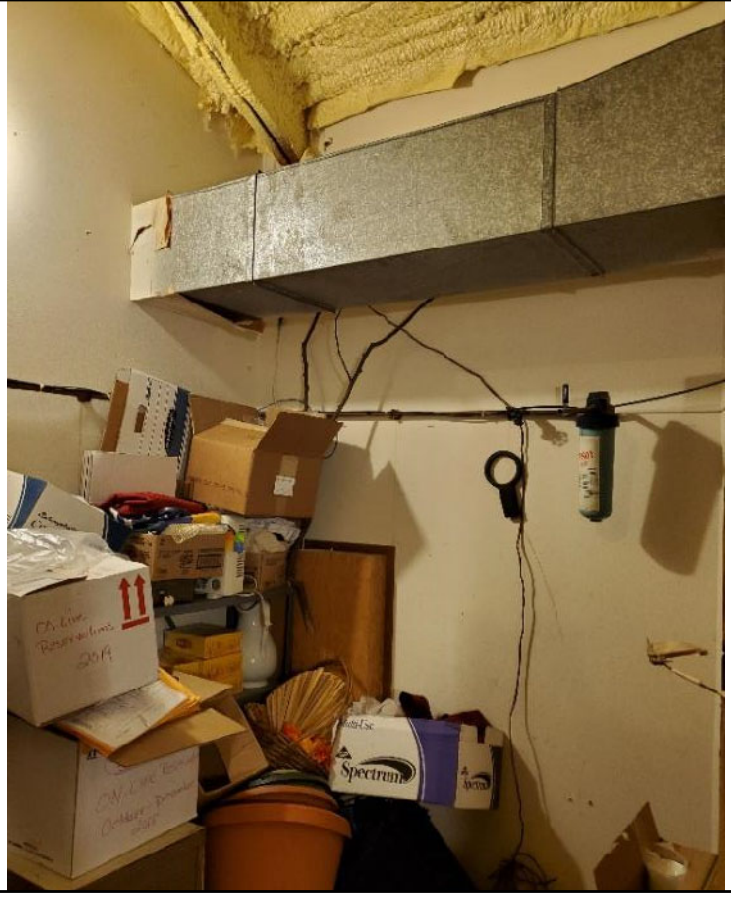


Photo 1:

- Unused or low use fixtures and appliances
- Dead legs/end

Photo 2:

- Observe dried out trap
- Health hazard from sewer gas
- Issue with all unused/underused fixtures

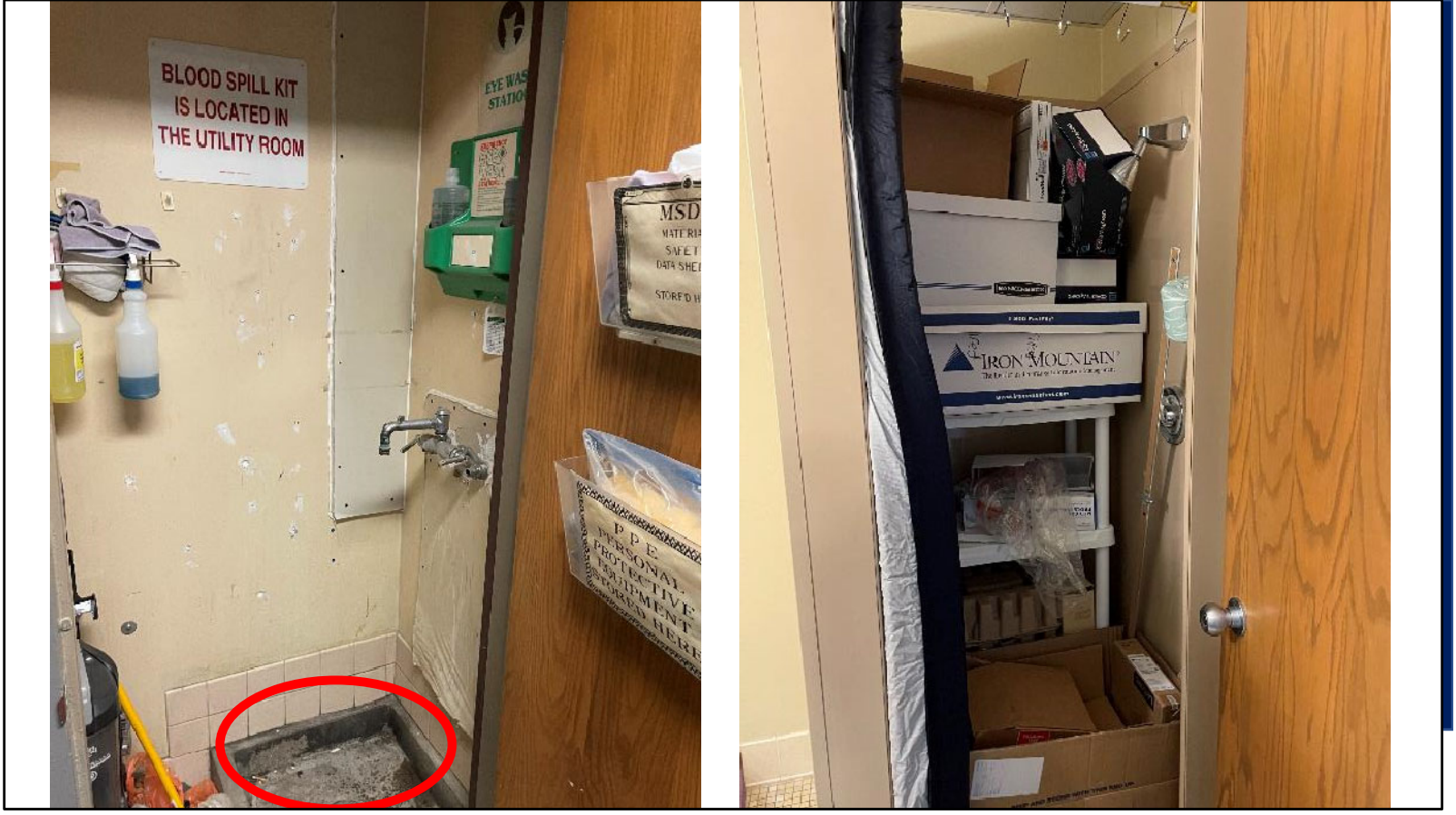


Photo 1: Unused mop sink

Photo 2: Unused shower, used as storage, Dead leg/end

These both need to be put on a flushing plan. If fixtures do not work, FIX them!

72

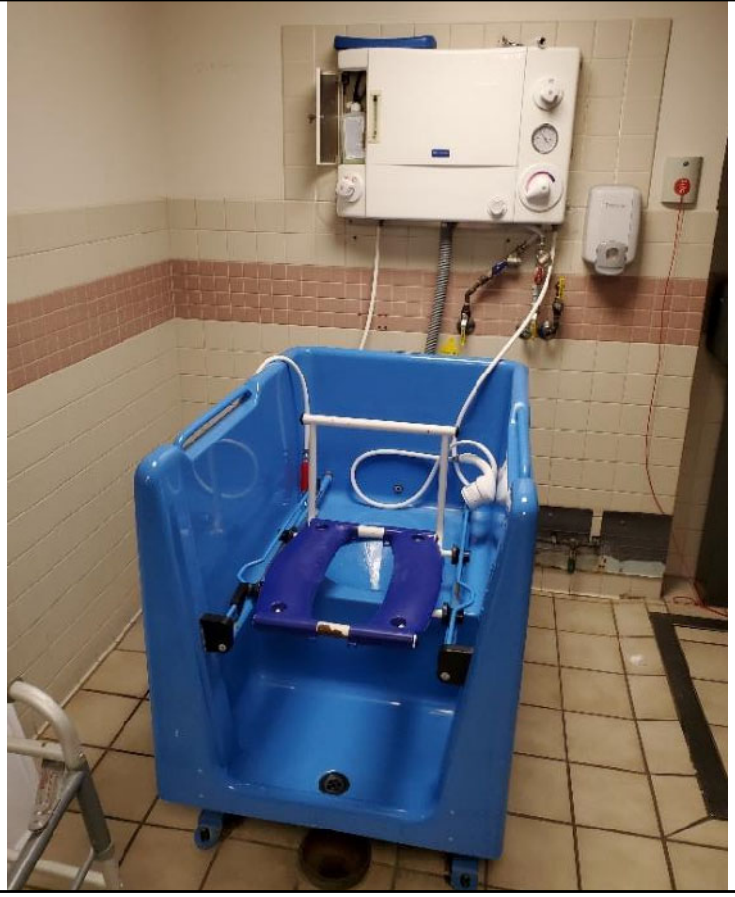
Shower room, therapy tub

- Low use
- Dead end/leg

Photo 1: Room with unused sink.

Photo 2: Laundry room, sink low us.

These both need to be put on a flushing plan. If fixtures do not work, FIX them!



- Unused or low use fixtures and appliances
- Dead leg/end

These both need to be put on a flushing plan. If fixtures do not work, FIX them!

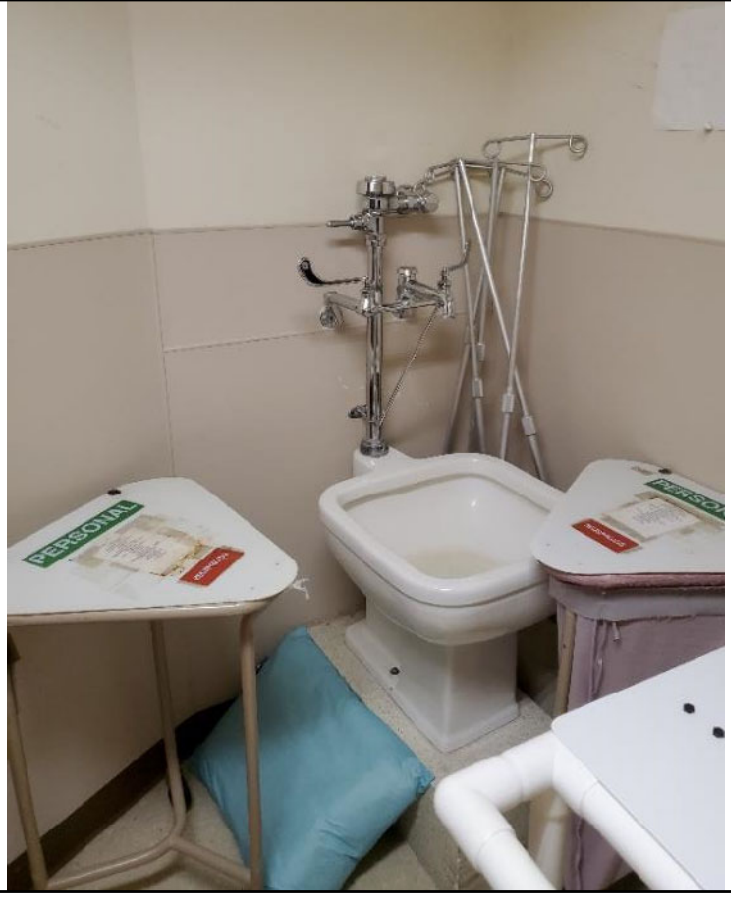


Photo 1:

- Unused or low use fixtures and appliances
- Dead leg/end

Photo 2:

- Shower in the rehab center
- Not used
- Dead leg/end

These both need to be put on a flushing plan. If fixtures do not work, FIX them!

Photo 1:

- Dead leg/end
- Bad pan washer, not used for years maybe decades

Photo 2:

- Dead leg/end
- Should be on WMP for flushing
- Removal? Remove only if the branch piping is removed back to the main water distribution piping.

These both need to be put on a flushing plan. If fixtures do not work, FIX them!

Questions?

Thank you!

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