Northeast/Mid·Atlantic
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Water Management: Protecting Residents Through Prevention

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Learning Objectives

- **Identify** common water-associated infection risks
- **Recognize** healthcare water-system conditions and practices that can contribute to pathogen growth and transmission
- **Apply** an infection prevention risk-assessment approach to water-related hazards
- **Describe** the Infection Preventionist's role in developing, implementing, and evaluating a Water Management Program
- **Respond** to suspected water-associated infections, contamination events, and water system disruptions using a multidisciplinary approach

Why Water Matters to Infection Prevention

"When you think about healthcare-associated infections, how often does water come to mind?"

Water is Essential AND a Risk

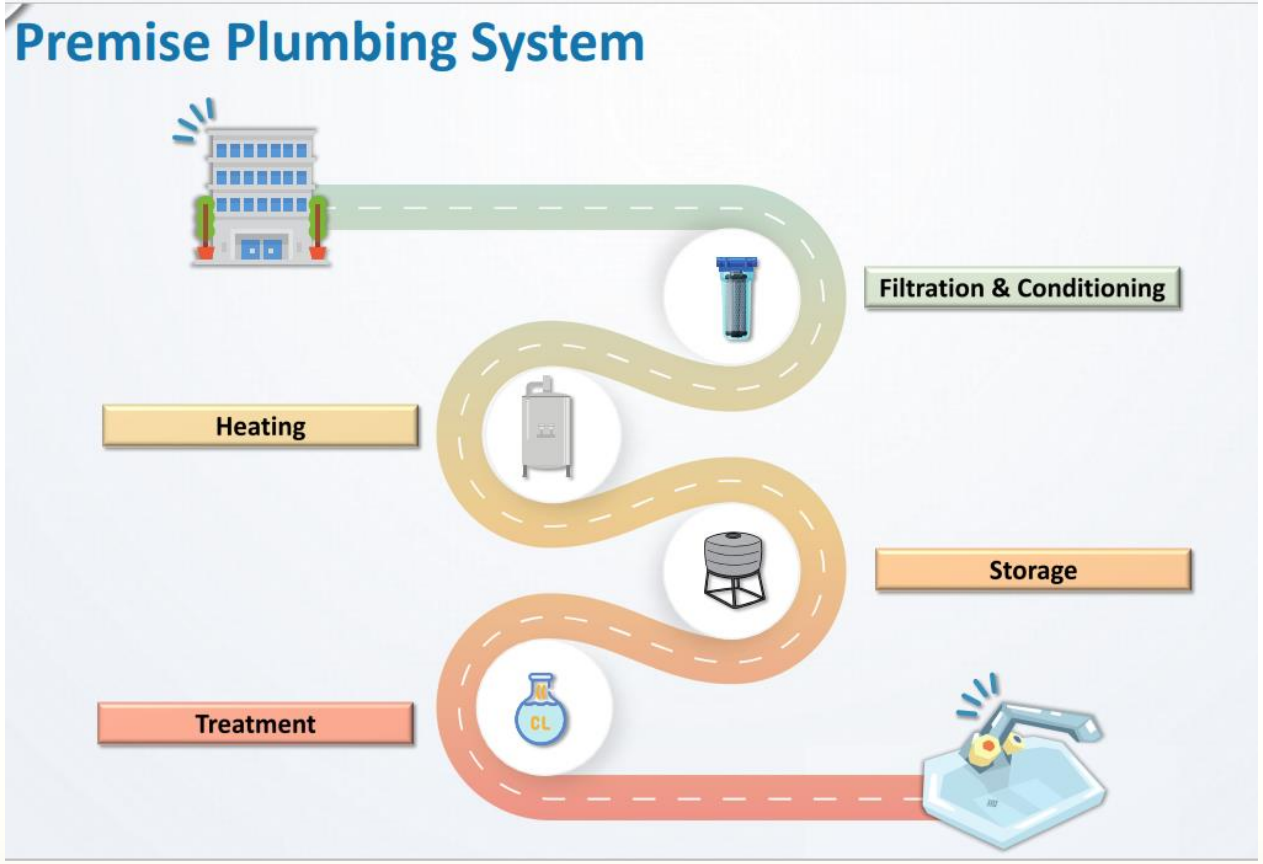
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Drinking and hydration	Hand Hygiene
Bathing and resident care	Environmental Cleaning
Medical equipment processing	Medication Preparation
Respiratory therapy	Food Preparation
Dialysis	Plumbing fixtures
Ice Machines	Construction & Renovation
Hydrotherapy	Emergency Water Use

What Makes Healthcare Water Different?

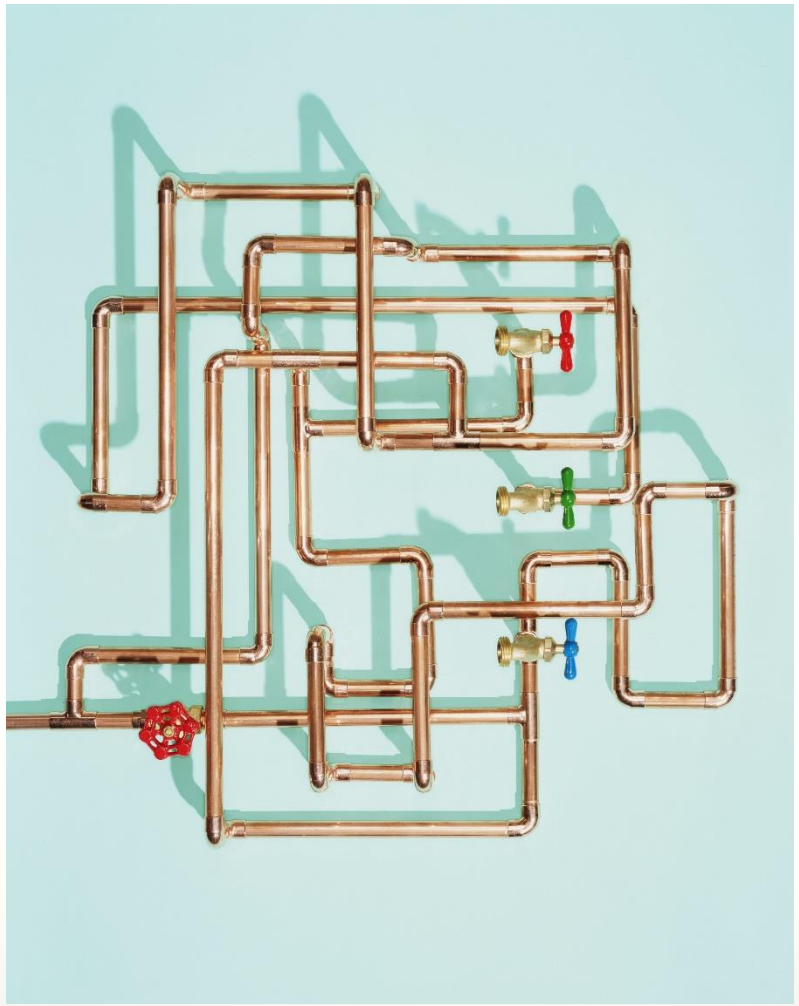
- Complex plumbing systems
- Multiple points of water use
- Dead legs, and low-flow areas
- Vulnerable resident population
- Medical devices that interact with water
- Areas with intermittent occupancy



Three Categories of Water Risk

Waterborne Pathogens	Water-associated Devices/Equipment	Water System Conditions
Legionella *Pseudomonas aeruginosa* Nontuberculous mycobacteria *Acinetobacter* Enteric organisms Other opportunistic water-associated organisms	Ice machines Sink fixtures Shower systems Respiratory equipment Endoscopes Dialysis equipment Hydrotherapy equipment Dental equipment	Stagnation Temperature problems Biofilm Low flow Plumbing disruptions Cross-connections Construction Loss of water pressure Water main breaks

How Water Can Become An Exposure



- Aerosolization
  - Showers, faucets
- Aspiration
  - Contaminated water
- Ingestion
  - Ice, Food preparation
- Direct Contact
  - Wounds, Mucous membranes
- Care Process
  - Cleaning, therapy

The Landscape

- The New Jersey Department of Health (NJDOH) is currently inv
disease cases associated with a hotel/casino in Atlantic City, N
- Local health departments are being asked t
Atlantic City when interviewing case-patien
inform NJDOH by email or phone if a case-
Include the name of the travel accommod

4 in the Bangor area hospitalized with Legionnaires' disease, Maine CDC investigating

The Maine CDC is "actively investigating" whether the cases are coincidental or if there is a common exposure among them, Maine DHHS said





Call for Enhanced Surveillance and Testing
Associated Cases of Legionnaires' Disease -- Atlantic City

The New York Times

Atlanta Hotel, Source of Legionnaires' Disease Outbreak, Reopens

Bacteria was found on a cooling tower and a fountain in the hotel's atrium, Georgia public health officials said.

Give this article



Outbreak Examples

Pathogen	Outbreak	Site of Product/Device Contamination
Serratia marcescens	Bloodstream infection	Dialysis equipment
Serratia marcescens	Joint Infections	Multi-dose vials
Acinetobacter/Pseudomonas	Pneumonia	Ventilator and Nebulizer
Nontuberculous mycobacteria (NTM)	Skin and soft tissue infections	Injectable medications

CDC Water Management in Healthcare Facilities

Water Risks In Long-term Care

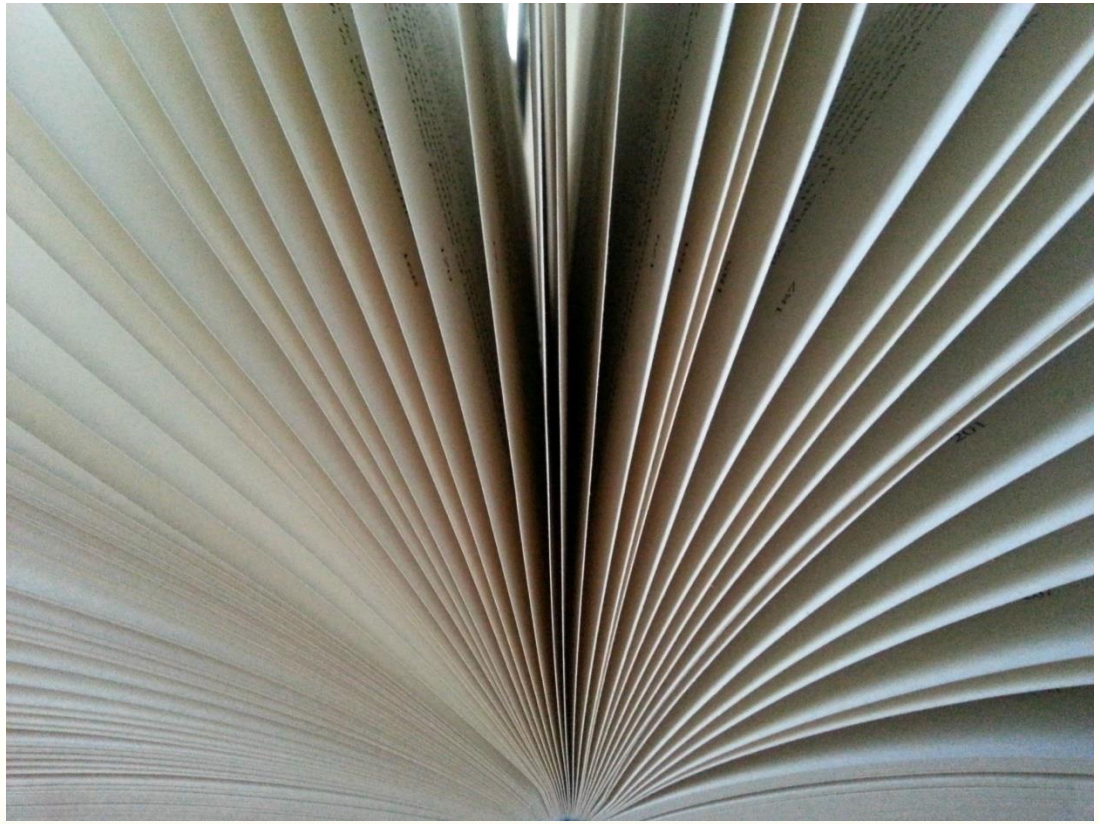
- Aging plumbing infrastructure
- Long-term resident exposure
- Showers and bathing
- Hydrotherapy
- Ice/water dispensers
- Respiratory care
- Residents with chronic disease or immunocompromised



State Operations Manual

- Defines Legionellosis:
  - Two clinically and epidemiologically distinct illnesses
    - Legionnaires Disease and Pontiac Fever
  - Legionellosis is caused by Legionella bacteria

- Water Management Section
  - Detailed language starts on page ***822*** of the SOM



State Operations Manual – Appendix PP

What Do Facilities Need to Do?

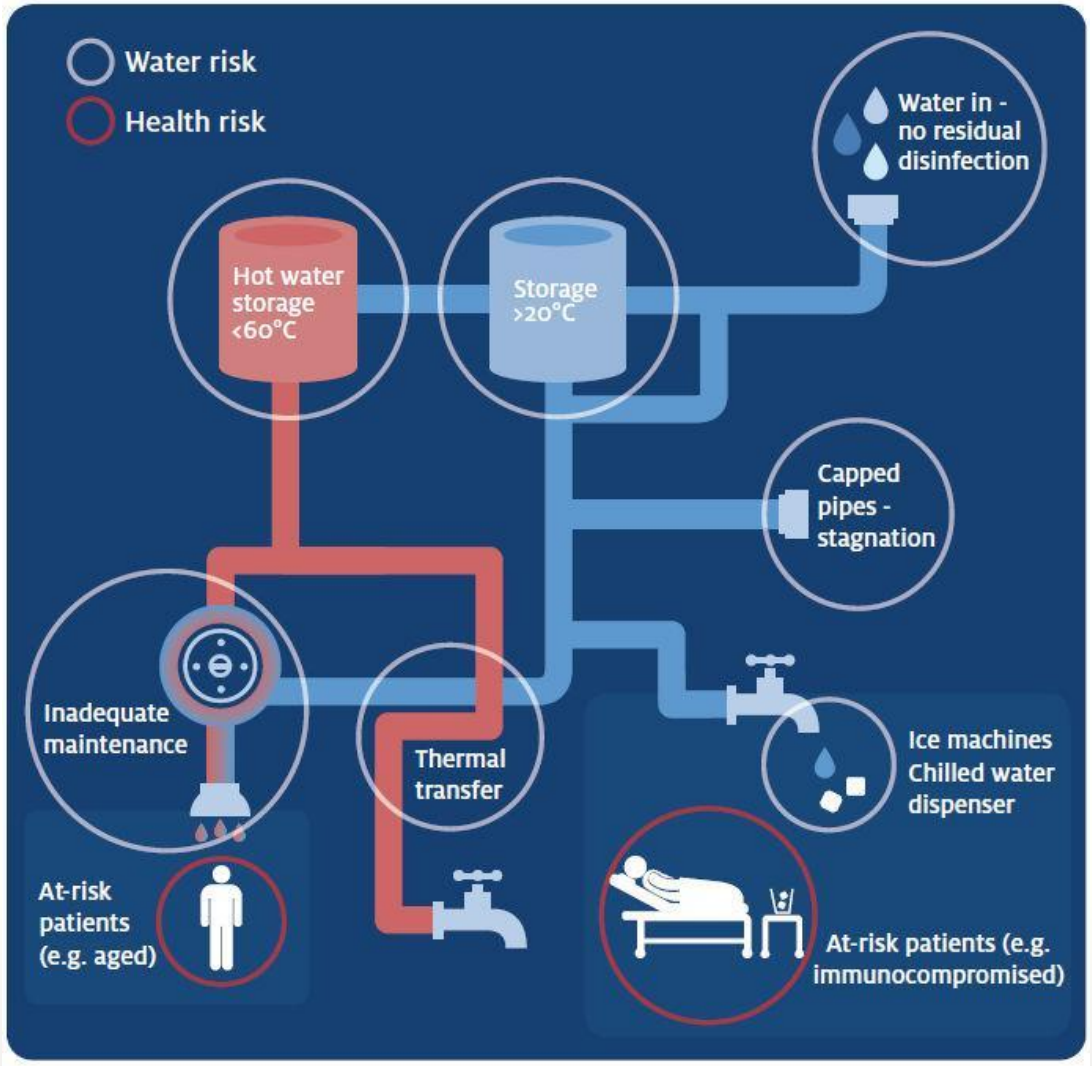
- Documented water management program
- Water management must be based on nationally accepted standards:
  - Assessment
  - Control Measures
- Access the resources available
  - The SOM provides the links in this section of the manual
- Contact local/state public health department if there is a case or outbreak
- Review plan annually

CDC Recommendations for Water Management Programs

- Establish a designated water management team.
- Describe building water systems using text and flow diagrams.
- Identify areas where hazards can contribute to microbial growth and spread.
- Decide where control measures should be applied and how they will be monitored.
- Establish interventions when control limits are not met.
- Verify that the program is operating as designed and is effective.
- Document and communicate activities, findings, and actions.
- Review the program continuously and update it when conditions change.

Know your Facility Water System

- Where does water enter the building?
- Who maintains the system?
- What are the hot- and cold-water distribution pathways
- Where are storage tanks, recirculation loops, low-use areas, dead legs, and point-of-use devices
- Which clinical and support areas have specialized water uses?
- What happens to the water system during construction, renovation, shutdowns, or prolonged vacancies?



Understanding the Building: Water Systems and the Infection Preventionist

Know the systems → Identify the risks → Support a water management program → Protect residents

1 Water Sources & Entry

Municipal water enters the building and is often stored in a cistern or water storage tank.

- Municipal water supply
- Backflow prevention
- Water storage tank/cistern (if applicable)

2 Distribution System

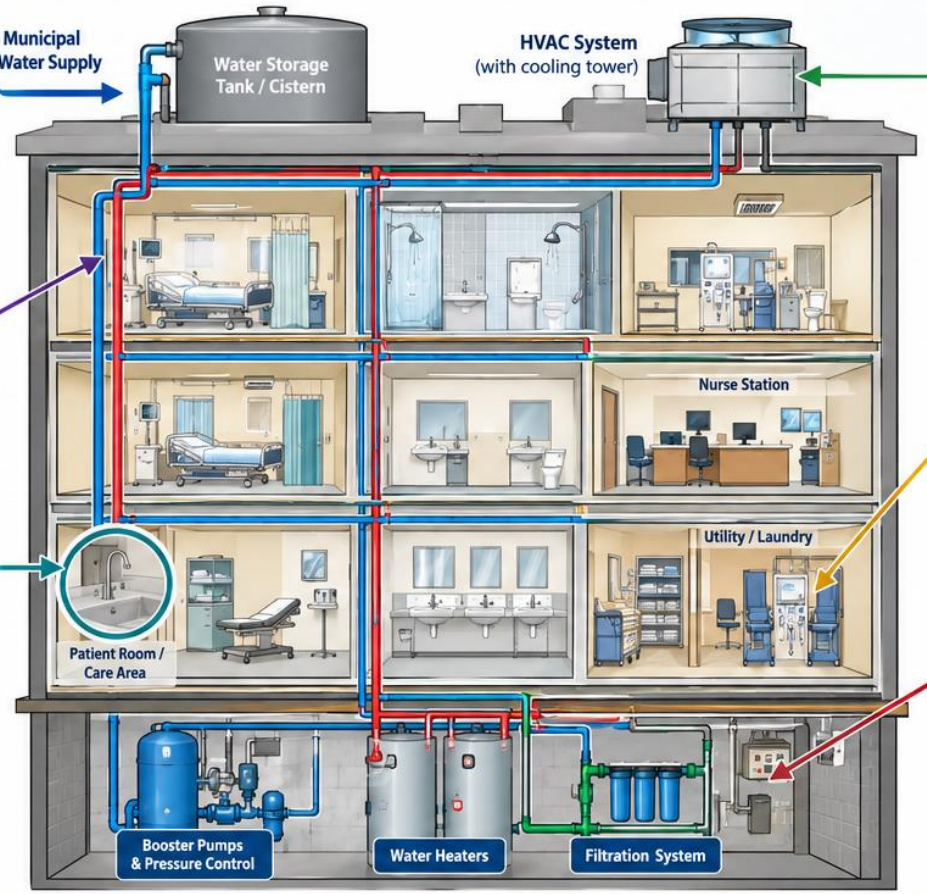
Pipes carry potable water throughout the building to all areas.

- Hot and cold water lines
- Recirculation loops
- Water pressure and temperature
- Preventing stagnation

3 Point-of-Use (POU) Devices

Water is used at faucets, showers, ICEMs, and other outlets.

- Sinks and hand hygiene stations
- Showers and tubs
- Ice machines
- Medical equipment (e.g., dialysis, respiratory therapy)



5 Cooling Towers & Evaporative Systems

Can be a source of Legionella if not properly managed.

- Maintenance
- Disinfection
- Monitoring (e.g., Legionella testing)

6 Water-Using Equipment

Specialty equipment can be a source of waterborne pathogens if not maintained.

- Dialysis machines
- Endoscopes / medical devices
- Humidifiers
- Water heaters

7 Building Systems & Safety

All systems should be monitored, maintained, and documented.

- Temperature control
- Routine flushing
- Water quality testing
- Corrective actions
- Documentation & reporting

What You as an IP Need to Learn

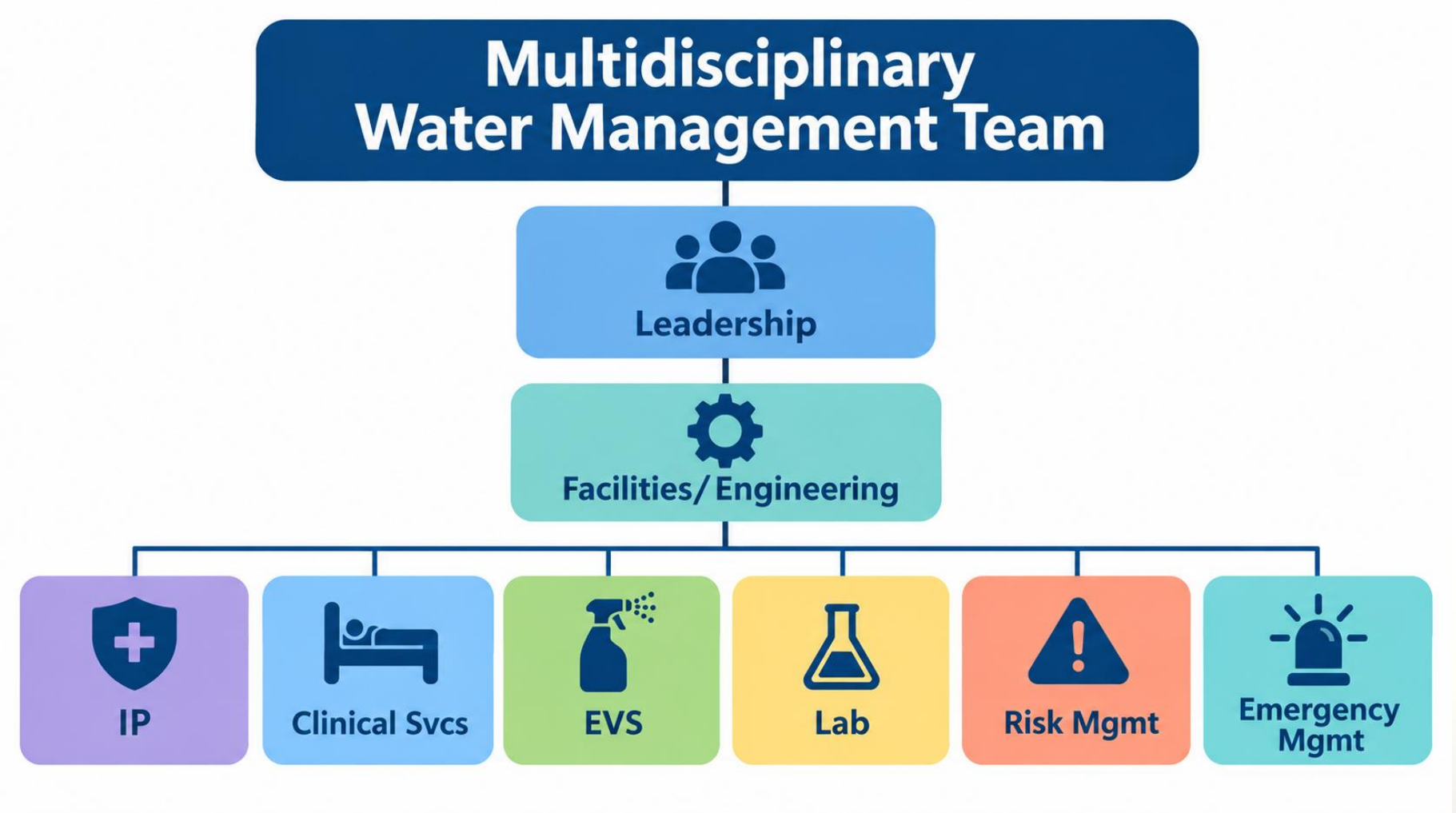
1. **Learn the Basics** — Waterborne pathogens, water systems, and regulations
2. **Explore the Building** — Identify water systems, POU devices and risks
3. **Apply the Knowledge** — Support your facility's water management plan
4. **Improve & Sustain** — Monitor, collaborate, and drive quality improvement

The Result

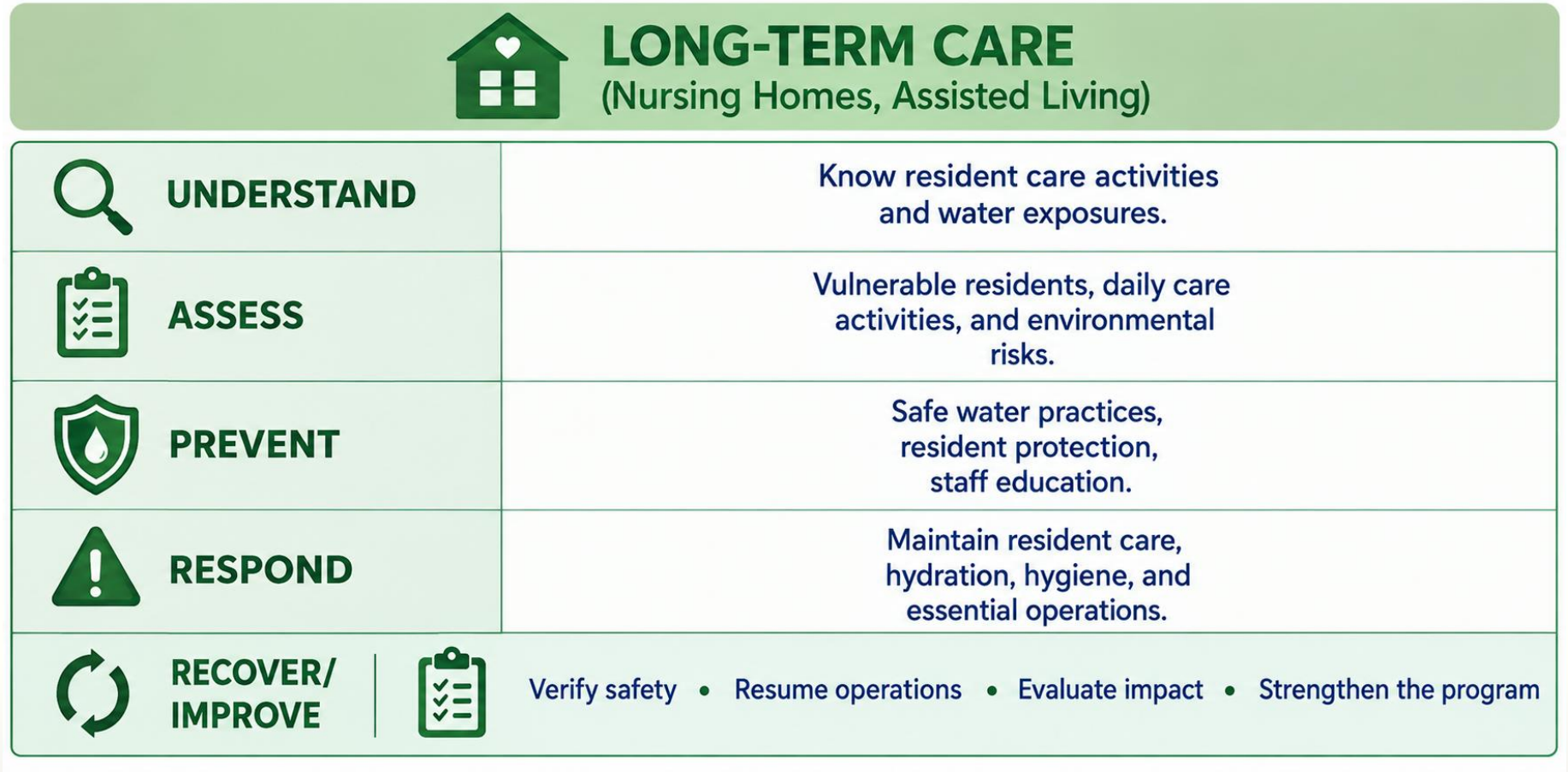
- ✓ Reduced risk of waterborne infections
- ✓ Compliance with standards
- ✓ Safer residents and staff

Healthy water. Healthy people. It's an infection prevention priority.

The IP Role


Multidisciplinary
Water Management Team
Leadership
Facilities/ Engineering
IP
Clinical Svcs
EVS
Lab
Risk Mgmt
Emergency Mgmt

The IP's Core Functions



Case Study

Facility Profile:

- 160-bed skilled nursing facility
- Residents include older adults with chronic illnesses, swallowing difficulties, and compromised immune systems.
- The building has a central hot-water system, multiple resident shower rooms, and a therapy area.
- A water management program exists, but documentation of routine monitoring and corrective actions is inconsistent.



Recognizing the Outbreak

- Over a 10-day period, the infection preventionist identifies three residents with new-onset fever, cough, shortness of breath, and pneumonia. Two residents are transferred to the hospital, and one requires intensive care.
- Laboratory testing confirms Legionella pneumophila infection in two residents. The third resident is being evaluated.

The Investigation

- The facility activates its outbreak response team, including the infection preventionist, medical director, nursing leadership, facilities management, environmental services, and local or state public health authorities.
- The team reviews resident symptoms, hospital records, laboratory results, room locations, shower use, and water-system maintenance logs.

The Findings



Hot-water system concerns

Hot-water temperatures in several locations are outside the facility's established control limits. Some sections of the plumbing system have prolonged periods of low water use.



Potential exposure points

Showerheads and sink faucets are identified as potential sources of aerosolized water. Recent plumbing work may have disturbed biofilm or changed water flow.



Water management gaps

Required monitoring records are incomplete, corrective actions are not consistently documented, and the water management team has not routinely reviewed whether its control measures are effective.



Laboratory findings

Public health-directed environmental sampling detects Legionella in selected water-system locations. Further comparison of clinical and environmental isolates is needed to assess whether the facility's water system is the outbreak source.

Immediate Response

- ❑ Notify public health authorities
- ❑ Identify and monitor additional cases
- ❑ Reduce potential exposure
- ❑ Conduct an environmental assessment
- ❑ Implement corrective measures
- ❑ Verify effectiveness

Water Management Program (WMP)

What a WMP Does

Identifies hazards in building water systems and water-using devices

Defines control measures and measurable control limits

Establishes routine monitoring and documentation

Specifies corrective actions when limits are not met

Verifies program effectiveness and updates it when systems or risks change

CDC Steps to Develop a Water Management Program

Where to Start

- **Risk Assessment of Facility**
  - Mapping
  - Identify
  - Consider
  - Include
  - Document



- **Monitoring, Corrective Action, and Verification**
  - Monitor parameters
  - Use defined control limits
  - Assess exposure
  - Verify corrective actions
  - Review trends

Think WHO + WHERE + HOW

WHO	• Who could become infected or harmed by this water exposure?
WHERE	• Where in the facility could the exposure occur?
HOW	• How does water reach the resident?

Where to Start

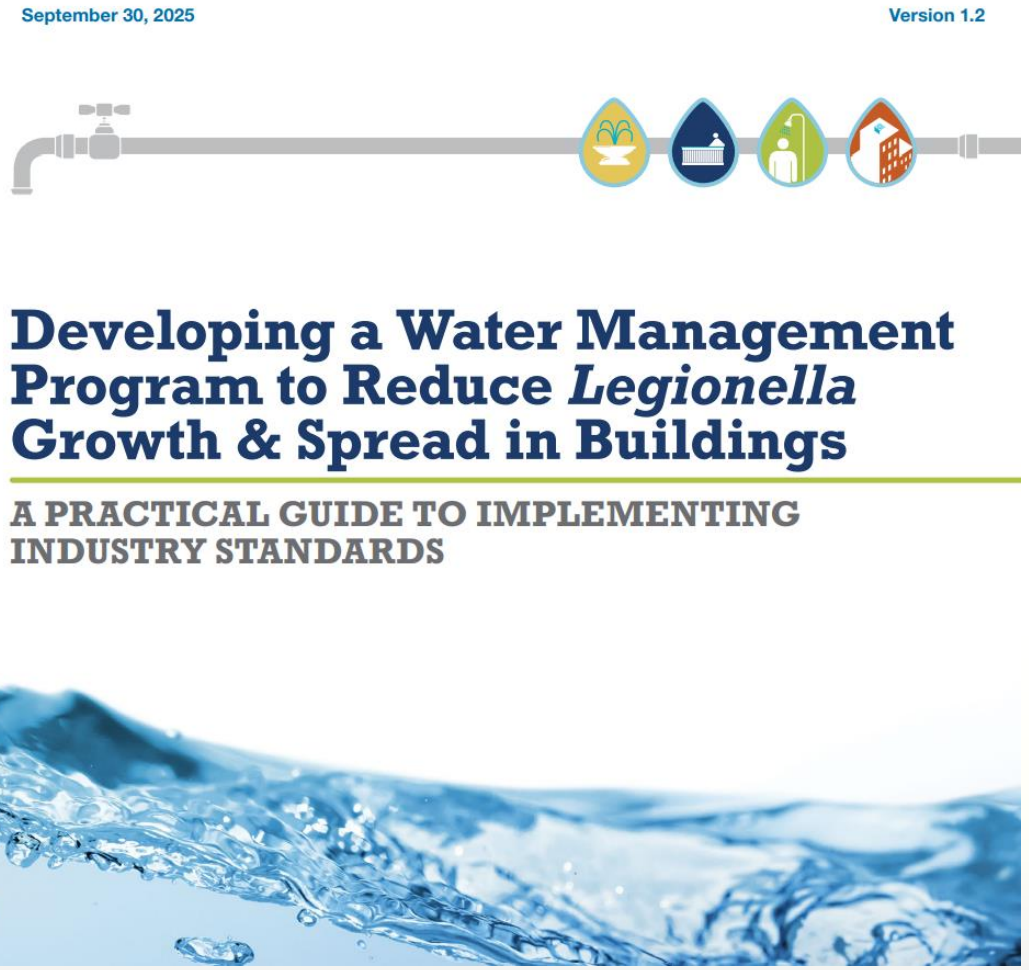
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Water Management Tools

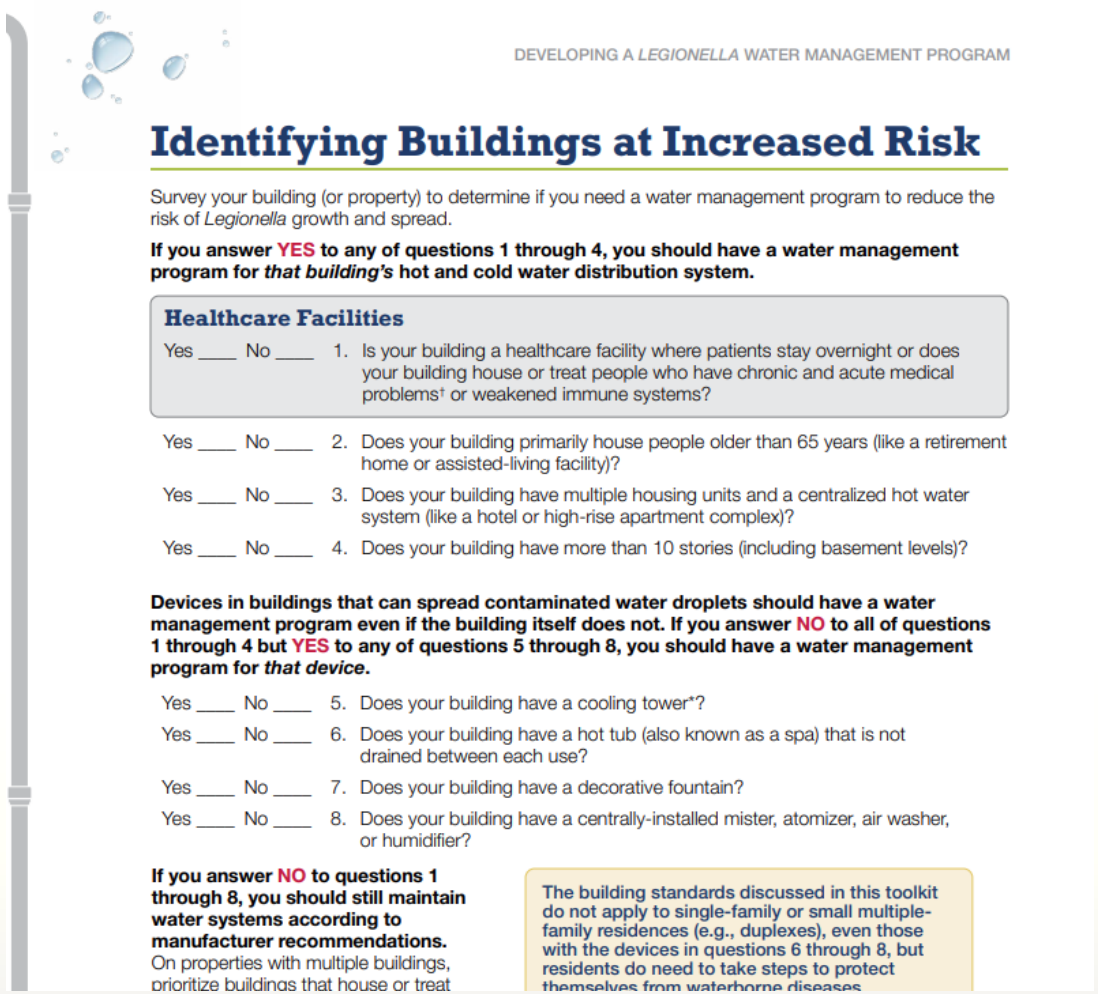
CDC Toolkit

- The Toolkit includes:
- Simple risk assessment worksheet
- A basic review of the elements of a water management program
- Case scenarios and how to respond to them
- Sections and considerations specific to Health Care Facilities



Worksheet

- Quick yes/no worksheet
- Determine if your facility or certain devices in your facility need a water management program
- If YES to any of questions 1-4, a facility should have a water management program



DEVELOPING A *LEGIONELLA* WATER MANAGEMENT PROGRAM

Identifying Buildings at Increased Risk

Survey your building (or property) to determine if you need a water management program to reduce the risk of *Legionella* growth and spread.

If you answer YES to any of questions 1 through 4, you should have a water management program for *that building's* hot and cold water distribution system.

Healthcare Facilities

Yes ___ No ___ 1. Is your building a healthcare facility where patients stay overnight or does your building house or treat people who have chronic and acute medical problems† or weakened immune systems?

Yes ___ No ___ 2. Does your building primarily house people older than 65 years (like a retirement home or assisted-living facility)?

Yes ___ No ___ 3. Does your building have multiple housing units and a centralized hot water system (like a hotel or high-rise apartment complex)?

Yes ___ No ___ 4. Does your building have more than 10 stories (including basement levels)?

Devices in buildings that can spread contaminated water droplets should have a water management program even if the building itself does not. If you answer NO to all of questions 1 through 4 but YES to any of questions 5 through 8, you should have a water management program for *that device*.

Yes ___ No ___ 5. Does your building have a cooling tower*?

Yes ___ No ___ 6. Does your building have a hot tub (also known as a spa) that is not drained between each use?

Yes ___ No ___ 7. Does your building have a decorative fountain?

Yes ___ No ___ 8. Does your building have a centrally-installed mister, atomizer, air washer, or humidifier?

If you answer NO to questions 1 through 8, you should still maintain water systems according to manufacturer recommendations. On properties with multiple buildings, prioritize buildings that house or treat

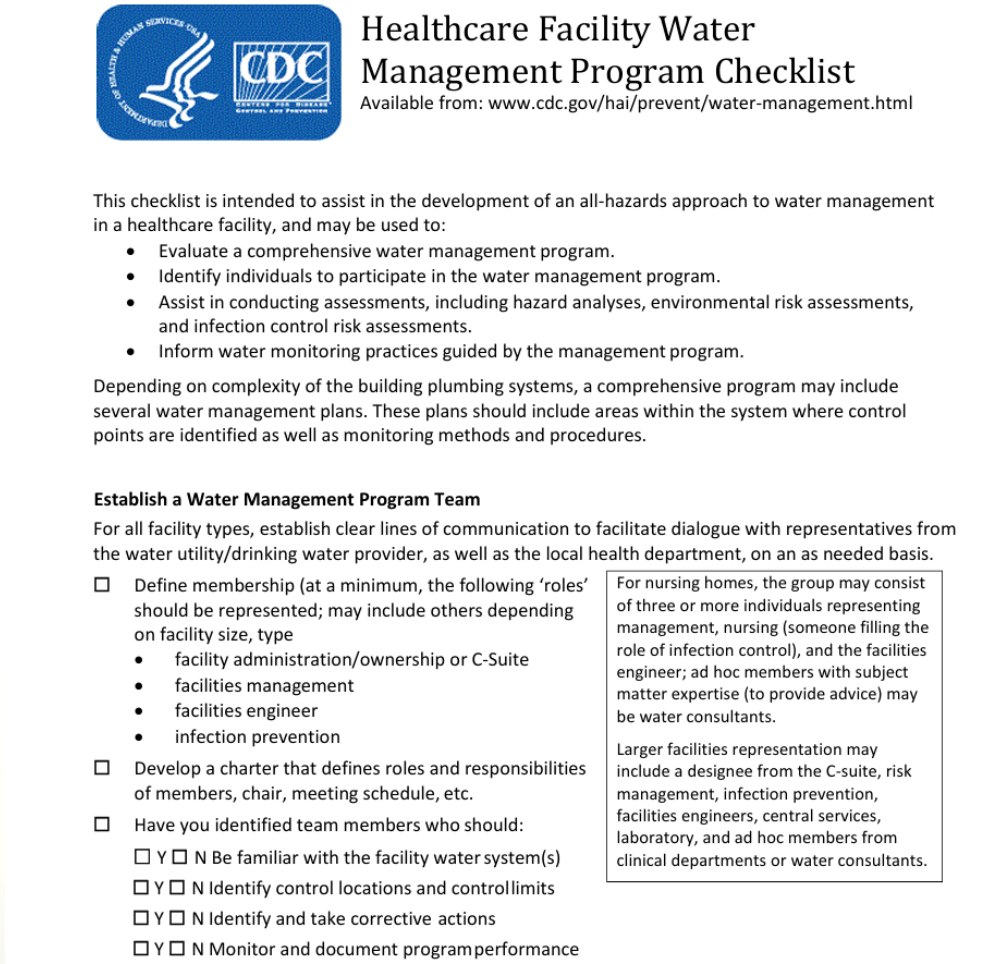
The building standards discussed in this toolkit do not apply to single-family or small multiple-family residences (e.g., duplexes), even those with the devices in questions 6 through 8, but residents do need to take steps to protect themselves from waterborne diseases

Legionella Testing: Prevention Is More Than Testing

- Control conditions that allow growth and spread within water systems.
- Consider showers, faucets, cooling towers, decorative water features, and other aerosol sources where present.
- Use environmental testing strategically under the facility plan or expert/public health direction.
- Investigate suspected cases promptly with clinical, IP, facilities, and public health partners.

All Hazards Approach

- Water management may reduce risks from multiple opportunistic pathogens
- Consider potable water, sinks and drains, ice, medical devices, water used in care, and water intrusion
- Match interventions to the hazard, system, exposure pathway, and resident population



Healthcare Facility Water Management Program Checklist
Available from: www.cdc.gov/hai/prevent/water-management.html

This checklist is intended to assist in the development of an all-hazards approach to water management in a healthcare facility, and may be used to:

- Evaluate a comprehensive water management program.
- Identify individuals to participate in the water management program.
- Assist in conducting assessments, including hazard analyses, environmental risk assessments, and infection control risk assessments.
- Inform water monitoring practices guided by the management program.

Depending on complexity of the building plumbing systems, a comprehensive program may include several water management plans. These plans should include areas within the system where control points are identified as well as monitoring methods and procedures.

Establish a Water Management Program Team

For all facility types, establish clear lines of communication to facilitate dialogue with representatives from the water utility/drinking water provider, as well as the local health department, on an as needed basis.

☐ Define membership (at a minimum, the following 'roles' should be represented; may include others depending on facility size, type
- facility administration/ownership or C-Suite
- facilities management
- facilities engineer
- infection prevention

☐ Develop a charter that defines roles and responsibilities of members, chair, meeting schedule, etc.

☐ Have you identified team members who should:

☐ Y ☐ N Be familiar with the facility water system(s)

☐ Y ☐ N Identify control locations and control limits

☐ Y ☐ N Identify and take corrective actions

☐ Y ☐ N Monitor and document program performance

For nursing homes, the group may consist of three or more individuals representing management, nursing (someone filling the role of infection control), and the facilities engineer; ad hoc members with subject matter expertise (to provide advice) may be water consultants.

Larger facilities representation may include a designee from the C-suite, risk management, infection prevention, facilities engineers, central services, laboratory, and ad hoc members from clinical departments or water consultants.

Healthcare Facility Water Management Program Checklist

WICRA

Water Infection Control Risk Assessment (WICRA) for Healthcare Settings

INTRODUCTION

- A water infection control risk assessment (WICRA) is a critical component of water management programs (WMP) in healthcare settings. WMP team members can use a WICRA to evaluate water sources, modes of transmission, patient susceptibility, patient exposure, and program preparedness.
- A WICRA may be conducted during the initial development of a WMP and updated over time. The frequency of subsequent assessments should be informed by and defined in the WMP.
- Performing a WICRA using this tool will generate numerical scores of perceived risk, which can assist in prioritizing WMP activities such as monitoring and mitigation efforts. Total risk scores are intended for internal prioritization and do not hold significance outside the context of each site-specific WMP. Typically, the risks with highest scores will be used for priority focus, though some with lower scores may be given special consideration (e.g., mitigation can be quickly and easily implemented). Specific risk management actions should be determined in accordance with WMP activities.
- This WICRA tool provides a completed example for a Burn Intensive Care Unit (BICU). This may be used as a reference when completing the fillable document, which is intended to be flexible for different WMP needs.

For more information about water-associated pathogens, see CDC's Reduce Risk from Water page.

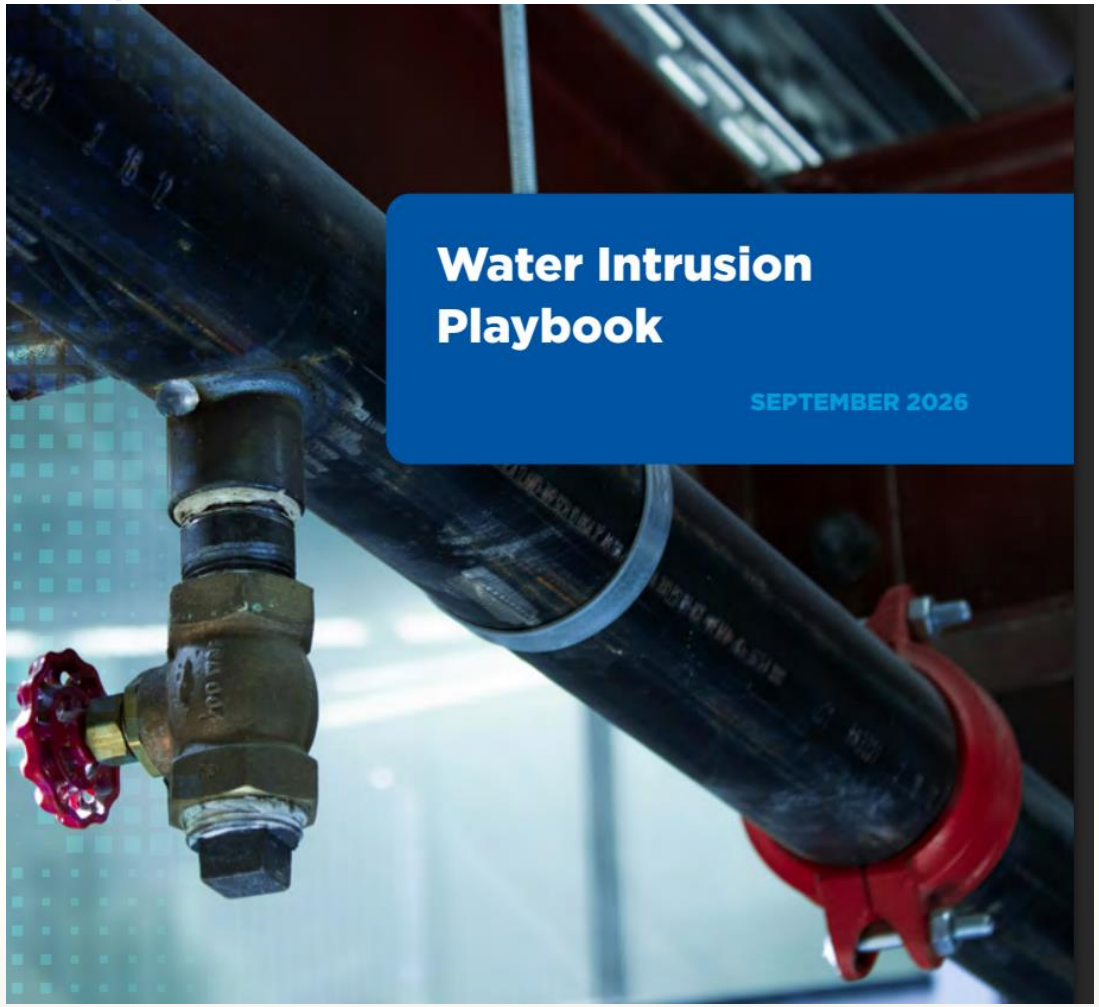
INSTRUCTIONS

- **Step 1:** Identify the areas within your facility to assess using the WICRA tool. Consider grouping each page by location (e.g., unit/ward/ wing/building). Use the Location column for additional information (e.g., space/room/area).
- **Step 2:** Identify potential water sources, considering the examples on the next page. Each row of the WICRA table may be used for a unique exposure, or set of like exposures, in a location (e.g., sink, hopper, shower, fountain, ice machine).
- **Step 3:** Categorize potential modes of transmission for water-associated pathogens, considering the categories on the next page. Record this in the Modes of Transmission column.
- **Step 4:** Classify the patient susceptibility for each water source, considering the categories on the next page (highest, high, moderate, low). Record a score in the Patient Susceptibility column (e.g., from 4 to 1).
- **Step 5:** Characterize patient exposure, considering the categories on the next page (high, moderate, low, none). Record a score in the Patient Exposure column (e.g., from 3 to 0).
- **Step 6:** Determine the current level of preparedness in your WMP, considering the categories on the next page (poor, fair, good). Record a score in the Current Preparedness column (e.g., from 3 to 1).
- **Step 7:** Multiply the numerical scores in each column to calculate a total risk score for each water source. Record notes on specific pathogens or other considerations in the Comments column.

https://www.cdc.gov/healthcare-associated-infections/media/pdfs/water-assessment-tool-508.pdf

APIC Water Intrusion Playbook

1. Assess and Classify
2. Mitigate immediate risks
3. Coordinate remediation
4. Verify safe reopening



Water Intrusion

First Response Priorities:	Remediation and Safe Reopening:
• Activate the facility incident process and notify facilities, IP, leadership, and affected clinical teams. • Identify the source and stop the intrusion when safe • Restrict access or relocate residents and activities when indicated by risk • Protect clean supplies and equipment; assess wet materials and possible concealed moisture • Document decisions, timelines, affected spaces, and approvals	• Complete an infection control risk assessment before and during remediation • Coordinate containment, removal of damaged materials, cleaning, drying, and repair • Assess hidden moisture and possible mold or contamination • Verify remediation criteria and document authorization to reopen. • Communicate restrictions, residual risks, and follow-up monitoring

Case Study

- At 7:00 a.m., staff discovered water leaking from a ceiling near two resident rooms
- The source is not confirmed; maintenance repaired plumbing on the floor above overnight
- Ceiling material is wet, a supply cart is nearby, and morning care is scheduled

Case Study Debrief

- **Protect** residents and prevent exposure while the source and extent are assessed
- **Engage** facilities, IP, nursing leadership, environmental services, and administration
- **Determine** water source, affected materials, adjacent spaces, and concealed damage
- **Use** the facility risk assessment and APIC playbook to guide mitigation and remediation
- **Reopen** only after documented criteria are satisfied and responsible leaders approve

Practical Prevention in Long-term Care



Policies and Practices



Staff Education



Clinical Collaboration



Environmental Controls



Risk Communication

Surveillance and Monitoring

- Are cases clustering?
- Are they occurring in the same patient population?
- Is there a common water exposure?
- Has there been construction?
- Has there been a water interruption?
- Has plumbing work occurred?
- Has the water system experienced pressure or disinfection changes?

Key Takeaways

- Water management is an ongoing infection-risk management process
- The IP brings resident-risk assessment, surveillance, infection prevention, and clinical context to the team
- Risk is driven by the intersection of the water system, the exposure, and the resident
- A good program defines what happens before, during, and after a water-related event
- The best water management programs are multidisciplinary, documented, tested, and continuously improved



Three Actions to Take Back



Confirm the water management team, responsibilities, and escalation pathway are current



Review one high-risk water exposure pathway or water intrusion response procedure



Confirm how monitoring failures, corrective actions, and reopening decisions are documented

Resources

- APIC Water Intrusion Playbook
- CDC Considerations for Reducing Risk: Water in Healthcare Facilities
- CDC Controlling Legionella in Potable Water Systems
- CDC Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities
- CDC Steps to Develop a Water Management Program
- CDC Toolkit: Developing a *Legionella* Water Management Program
- CDC Water Management in Healthcare Facilities
- State Operations Manual – Appendix PP

IP3

- Infection Prevention education for Infection Preventionists by Infection Preventionists
- Weekly peer-to-peer call for long-term care IPs
- What do **YOU** want to talk about?
- Meets every Thursday from 11:30 a.m. – 12:00 p.m.



https://qi.ipro.org/upcoming-events/ip3-office-hours-27/

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