2022 Emerging Water Technology Symposium

Emerging Technology for Improving Potable Water Safety in Premise Plumbing

Speaker Bio

- 20 years of experience in plumbing design & project management
- US Technical Sales Manager for GF Piping Systems'
- ASHRAE SPC 514 Committee Member *Risk Management for Building Water Systems: Physical, Chemical, and Microbial Hazards*
- Certifications – CPD, GPD, ASSE 12080

Greg Swafford

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Introduction

Legionnaires' is on the Rise

Facility Age Doesn't Matter

Legionnaires' Outbreaks Like Mount Carmel's Often Tied to New Hospital Construction

By Carrie Ghose – Staff reporter, Columbus Business First
Jun 7, 2019, 7:28am EDT **Updated** Jun 7, 2019, 11:14am EDT

Innovations in healthcare construction to save energy and water could be contributing to the recent nationwide increase in Legionnaires' disease, much like the ongoing outbreak at the brand-new Mount Carmel Grove City hospital.

Health Officials Investigate Legionnaires' Disease at Strongsville Senior Living Facility

By Julie Washington, cleveland.com
Updated Sep 24, 2019; Posted Sep 24, 2019

STRONGSVILLE, Ohio — The Cuyahoga County Board of Health is investigating a case of Legionnaires' disease possibly connected to the Altenheim Senior Living facility in Strongsville. A person who spent time there as a patient has been diagnosed with the disease.

Senior Living Operator Takes Steps After Resident Contracts Legionnaires' Disease

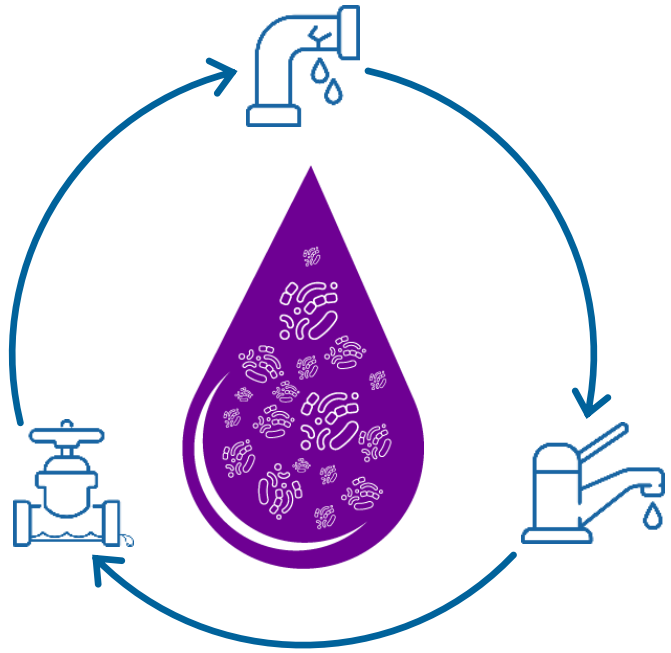
By Lois A. Bowers
November 27, 2016

A New York senior living community is taking precautions after Legionnaires' disease recently was diagnosed in a resident who was hospitalized but has been released.

Trends Impacting Premise Plumbing

The Perfect Storm

Aging infrastructure



Large water service lines

Use of low flow fixtures

Conservation efforts have contributed to ***stagnation*** and ***unfavourable temperatures*** creating an environment conducive for ***biofilm and bacteria proliferation.***

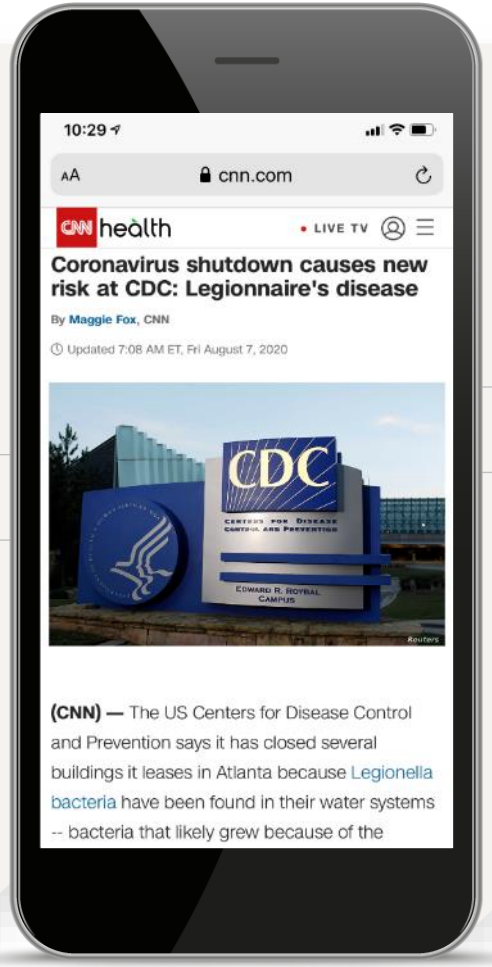
Building Vacancy Feeding the Storm

Legionnaires' Disease Risk Grows as Coronavirus Lockdowns Lift

By Don Rauf – Medically Reviewed by Justin Laube, MD
Last Updated: **August 27, 2020**

Experts warn that Legionella bacteria may pose a danger as workers return to offices and children go back to school.

As COVID-19 stay-at-home orders lift in many parts of the country, people are tiptoeing back into everyday life. But office workers heading back to their cubicles and kids going back to school may face a new danger hidden within air-conditioning cooling towers, toilets, drinking fountains, and other plumbing systems: water contaminated with the *Legionella* bacteria that cause Legionnaires' disease — a serious type of pneumonia.



Legionnaires' Disease May Flourish in Plumbing Due to COVID-19 Closures

By **Adam Townsend** on 08/04/2020 2:00 PM

Source: MedicineNet Health News

As offices, shops, and restaurants sit unused during the COVID-19 pandemic's social distancing measures, some experts worry another deadly microbial attacker may be literally waiting in the pipeline: Legionella pneumophilia, the bacteria that causes Legionnaires' disease.

Researchers at the University of Pittsburgh in July announced they were working on a study to determine how to stop Legionella at the faucet through silver-impregnated antimicrobial showerheads and fixtures. Their work takes on extra importance as managers across industries and disciplines figure out how to reopen their facilities safely.

Lawsuits can be in the millions of dollars.

Lawsuits are more Prevalent

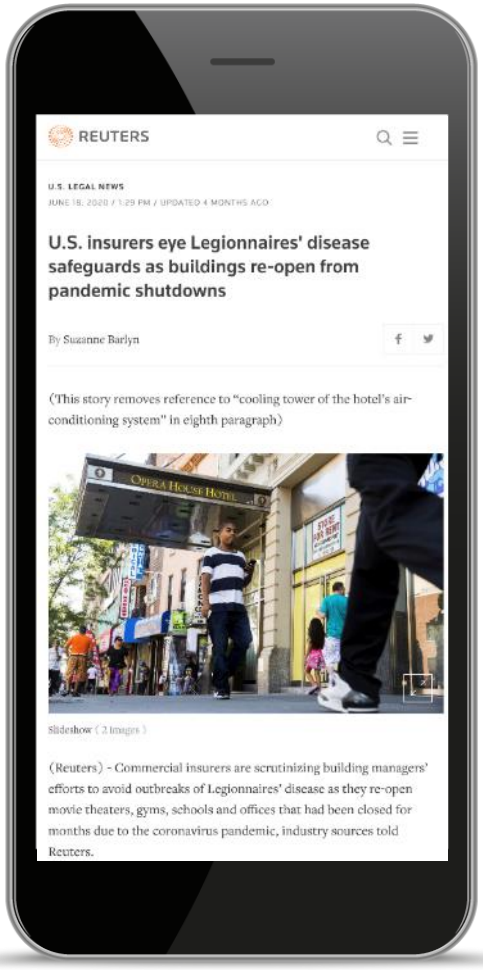
$1.1M verdict in Legionnaires' disease outbreak in Lehigh County

Flint Hospital, State Hit with $100M Lawsuit Over Legionnaires' Outbreak

Lawsuits are more prevalent and in the

millions of dollars.

Insurance Companies are Fighting Liability



Some insurers are intensifying Legionnaires' precautions before adding new clients or renewing coverage, insurers and brokers said. For instance, they may ask customers to document how they maintain plumbing and cooling systems.

Insurers might limit Legionnaires' coverage amounts or impose higher deductibles if building systems are outdated, brokers said.

Insurers were already worried about possible outbreaks, because of elevated lawsuits and claims. They are stepping up their scrutiny even more due to the coronavirus pandemic.

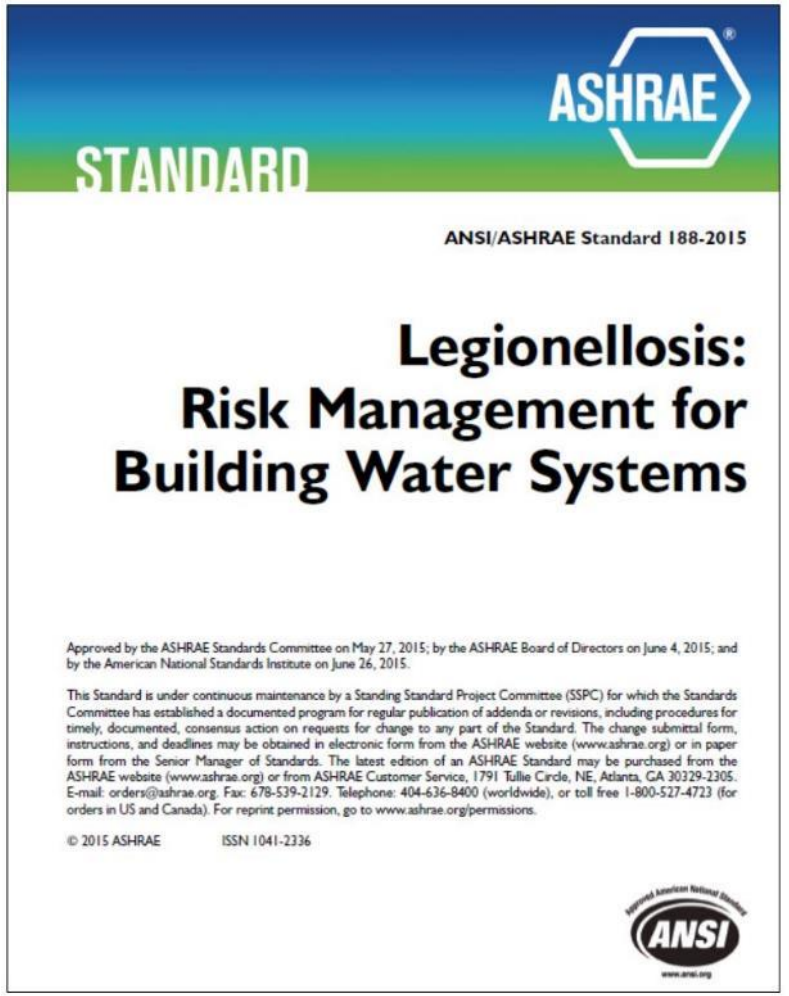
Source: U.S. insurers eye Legionnaires' disease safeguards as buildings re-open from pandemic shutdowns, Reuters JUNE 18, 2020.

Buildings Lack Water Management Programs

9 OUT OF 10

OUTBREAKS COULD BE PREVENTED WITH MORE EFFECTIVE WATER MANAGEMENT

CENTERS FOR DISEASE CONTROL AND PREVENTION



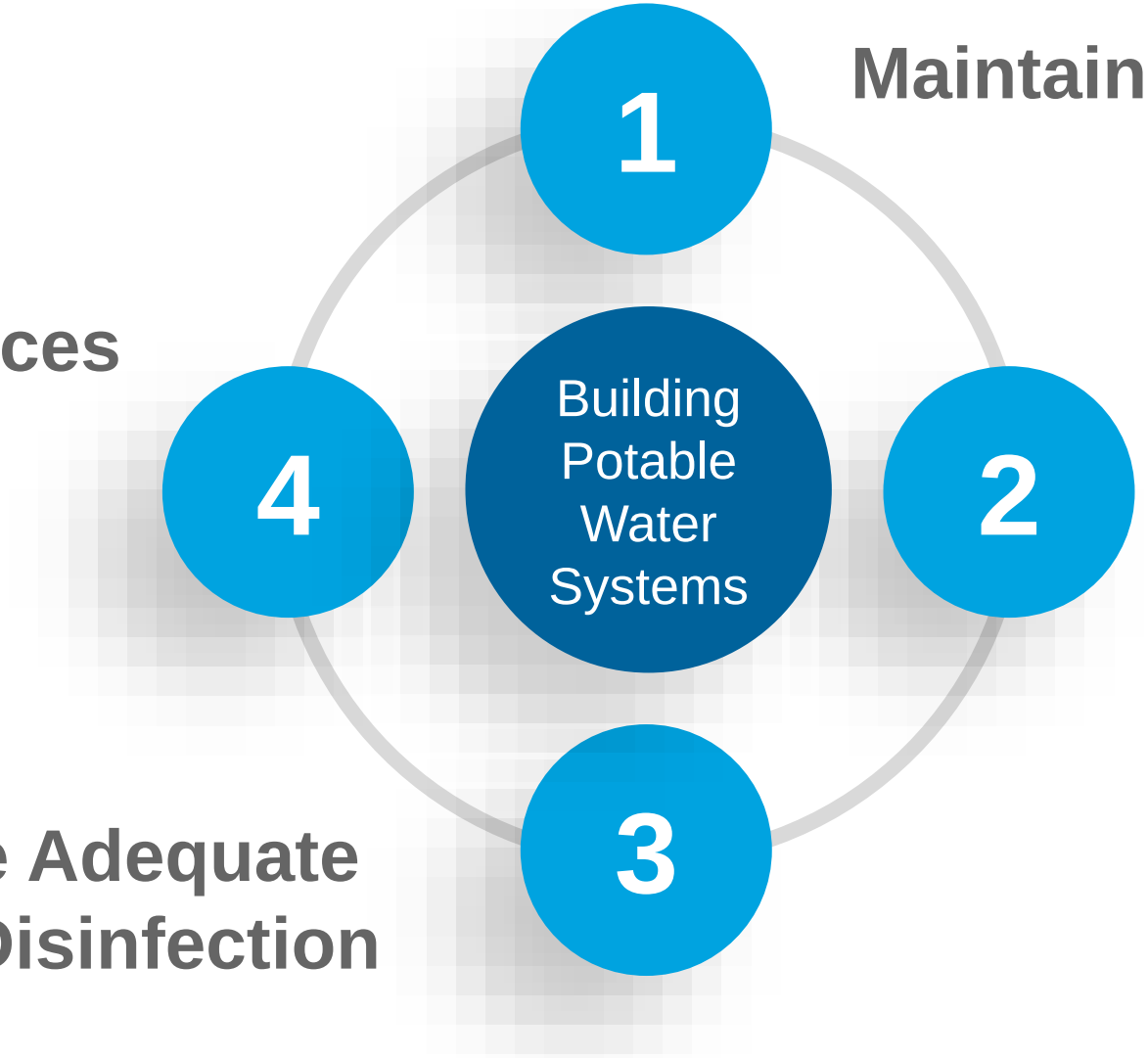
Rising Construction Costs

- Increasing more than 5% each year since 2017.
- A/E/C teams must consistently evaluate options for cost savings.
- Effective design concepts and innovations developed to manage risks are vulnerable.

Source: Construction Analytics edzarenski.com

Managing Risks in System Design

CDC Principles for Effective Water Management



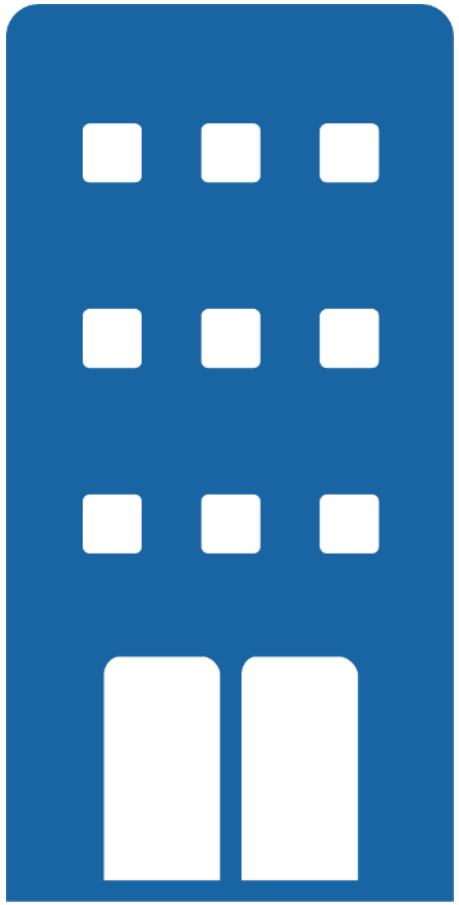
Focus on the Fundamentals

Maintain Water Temperatures

- Temperature creep
- Heat transfer and heat loss
- Hydraulic deficiencies

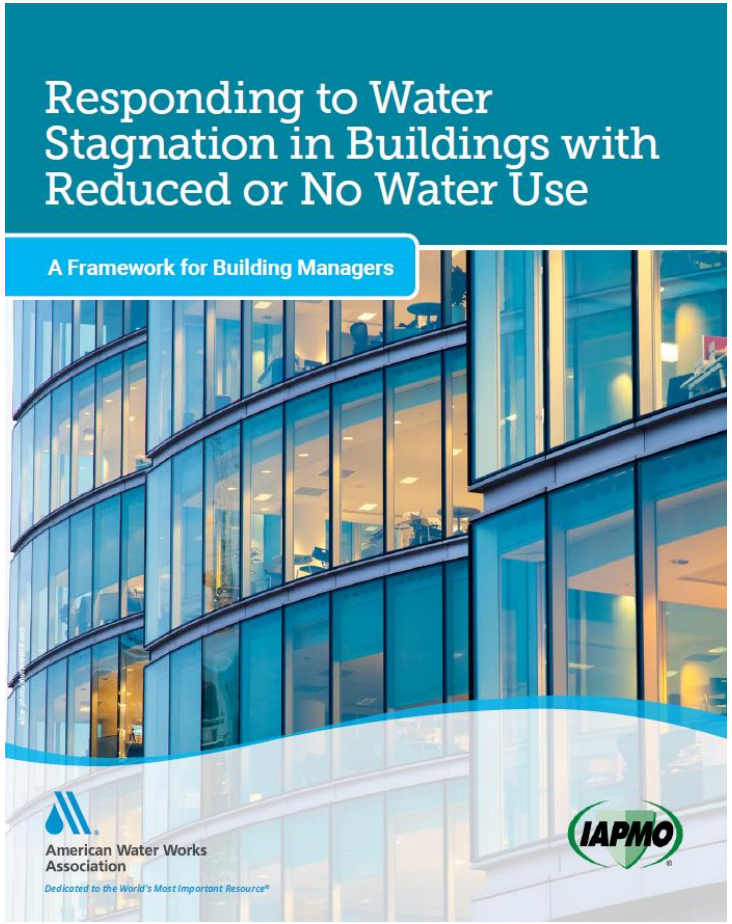
Avoid Water Stagnation

- Dead legs and dead ends
- Reduced occupancy
- Unoccupied building or floors
- Low volume flow



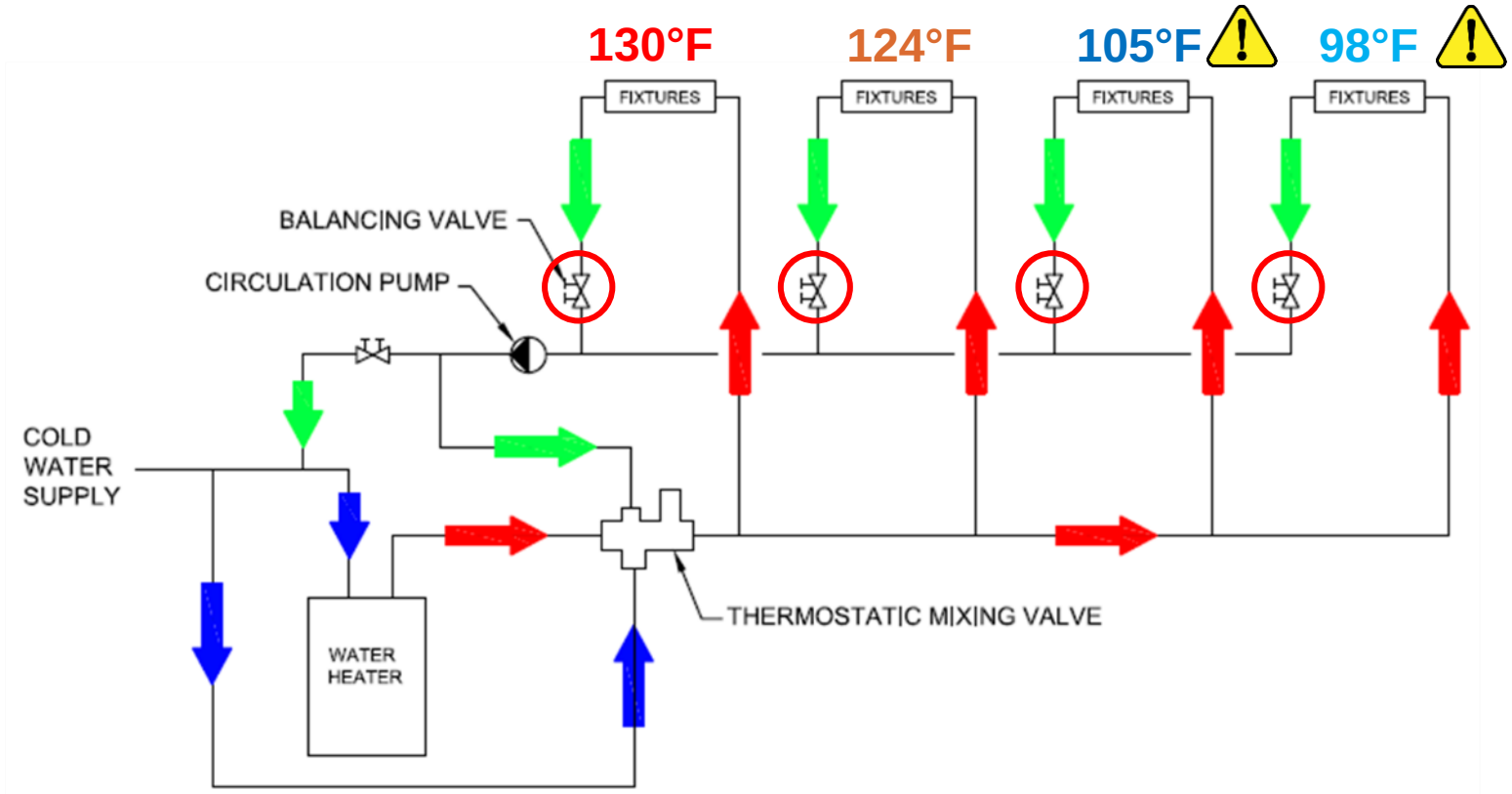
Address Stagnation throughout System Design

- Minimize dead legs and eliminate dead ends.
- Provide means of flushing seldom used bypasses, mains, and branches.
- Consider piping layouts, fixtures, fittings, and valves that facilitate remedial / routine flushing.
- Address stagnation between the time of substantial completion and building occupancy.



System Balancing is Essential

- Hot water recirculation is the biggest challenge to maintaining water temperatures



Correlation Between Temp., Legionella, and Scald Potential

Table N 104.1, Uniform Plumbing Code

Water Description	Temperature (°F)	Scald Potential	Legionella Growth Potential
Cold	<77	None	Minimal
Tepid Cold	≥77 and <85	None	Low
Tepid	≥85 and <110	None	High
Warm	≥110 and <120	Minimal	Moderate
Tempered Hot	≥120 and <130	Low	Low
Hot	≥130 and <140	Moderate to High	None
Very Hot	≥140 and <160	High	None
Disinfecting Hot	≥160	Immediate	None

Balancing Valves on the Market

TECHNOLOGY IS EVOLVING

Provide Control, Monitoring, and Data Logging Capabilities

- Provide means of verification.
- Manual verification requires time, diligence, and knowledge.
- Data logging and documentation are critical for risk assessments and risk management.
- Consider emerging technologies that automate operations and support WMP compliance.

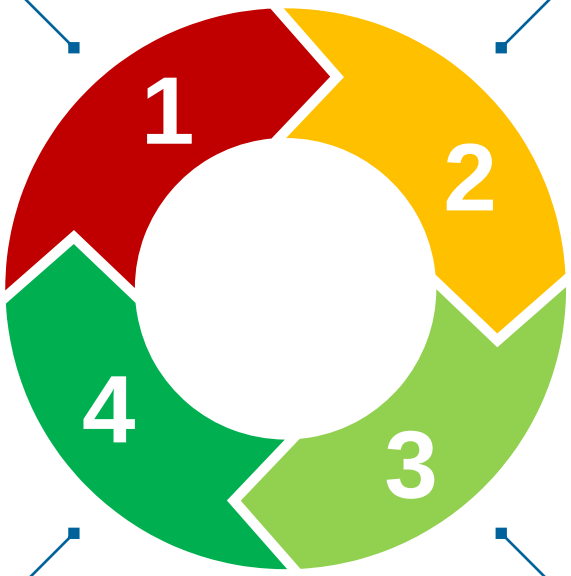
Controls, monitoring, and data logging are essential tools for verification.

The Rise of Smarter Systems

Plumbing Systems Are Getting Smarter

Digitization
Converting data, documents, and processes from analog to digital

Digitalization
Transforming a process by leveraging digitization



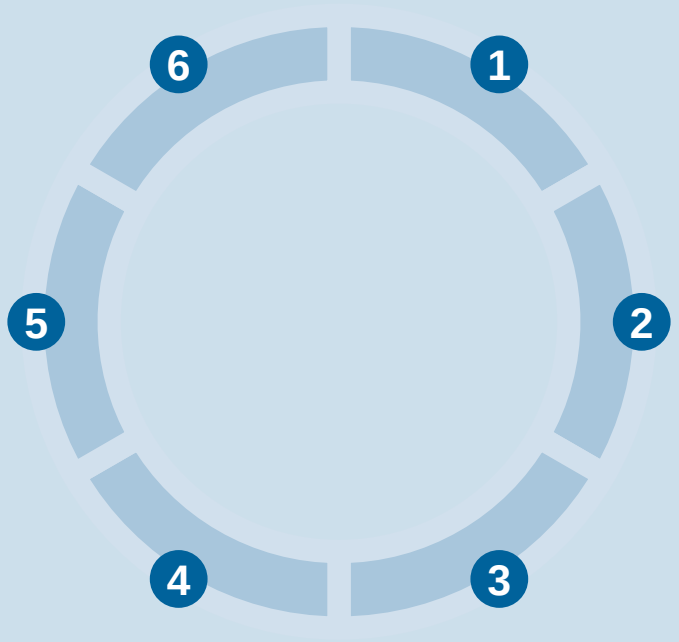
Machine Learning
Analyzes information, identifies relevant patterns, and acts accordingly

Automation
Performs repetitive tasks based on commands and rules.

Why are Smarter Systems the Logical Next Step?

- Optimize water & energy use
- Monitor critical data
- Preventative maintenance
- Predictive maintenance
- Simplify water management
- Stay connected anywhere

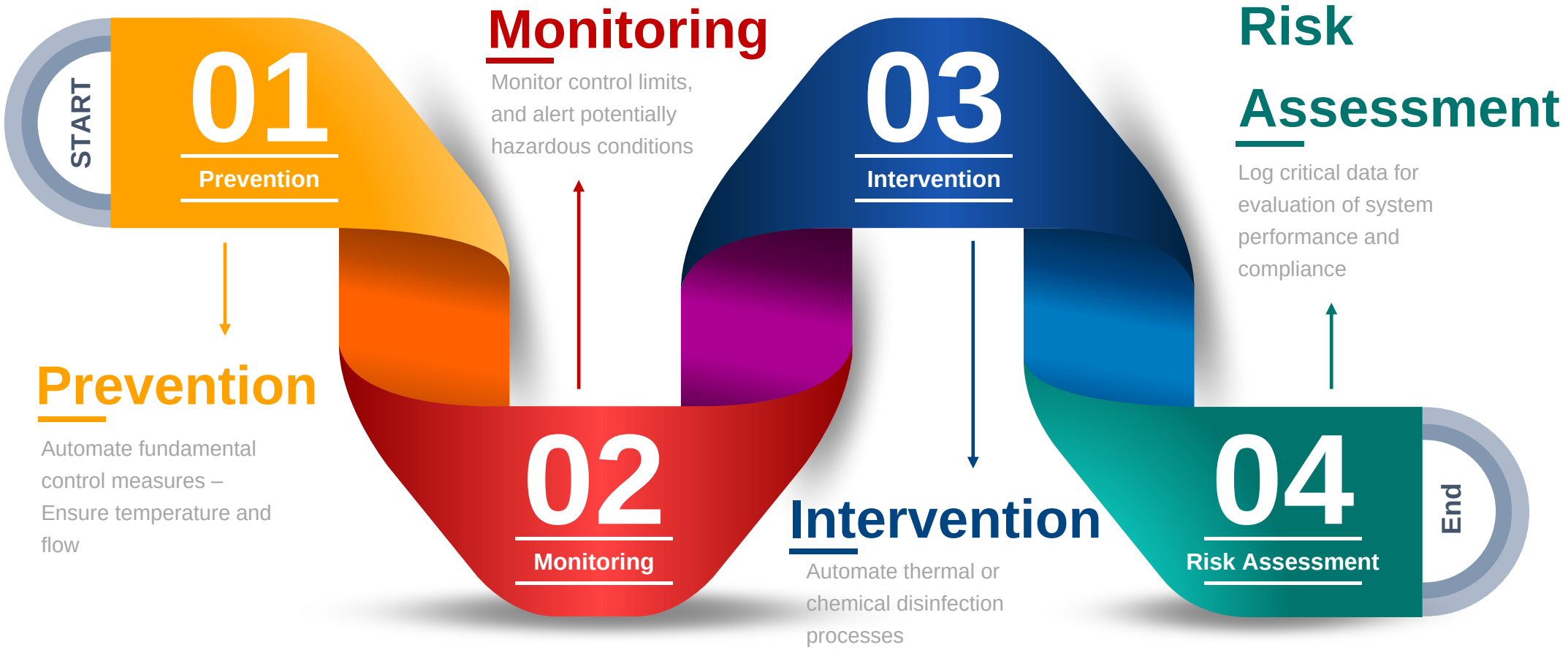
What to Consider



1. Is it needed?
2. Where does it add value?
3. Is it easy?
4. What is the project impact?
5. What are the risks?
6. What does it cost?

Emerging Technology for Improved Safety and Performance

Automation Technology's 4-step Concept



Primary Functions of Automated Technology

Hydraulic balancing

- Perfectly balance domestic hot water systems
- Customizable settings
- Real-time temp. monitoring
- Controlled thermal disinfection

Automated flushing

- Minimize stagnation
- Inhibit bacteria/biofilm growth
- Increase residual disinfectant levels

Controls, Monitors, Logs, & Reports

- System control of all components
- Automated valve maintenance
- Continuous data logging
- Quickly generate reports

Key Benefits of Automated Systems

Deliver Hot Water Quickly

Manage Legionella risks

Enhance water management

Optimize system performance

QUESTIONS?