



# Risk Management for Healthcare Water Systems

November 13th, 2019  
Royal Banquet Conference Center  
Raleigh, NC

Region IV  
Rudy Ferguson Winners  
2015,2016,2017,2018,2019

See homepage for links



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# **Details of a Risk Management Program**

Healthcare Water Systems

# Complete the Distinguished Lecturer Event Summary Critique

*This ASHRAE Distinguished Lecturer is brought to you by the Society Chapter Technology Transfer Committee*

- CTTC needs your feedback to continue to improve the DL Program
  - Distribute the DL Evaluation Form to all attendees
  - Collect at the end of the meeting
  - Compile the attendee rating on the Event Summary Critique
  - Send the completed Event Summary Critique to your CTTC RVC and ASHRAE Headquarters
- Forms are available at:  
[www.ashrae.org/distinguishedlecturers](http://www.ashrae.org/distinguishedlecturers)



# Become A Future Leader in ASHRAE

## *Write the Next Chapter In Your Career*

- ASHRAE Members who are active at their chapter & society become leaders and bring information and technology back to their job.
- You are needed for:
  - Society Technical Committees
  - Society Standard Committees
  - Chapter Membership Promotion
  - Chapter Research Promotion
  - Chapter Student Activities
  - Chapter Technology Transfer



Find your Place in ASHRAE and volunteer

# Presentation Objectives

- Review The Impact Of Legionella And Other Waterborne Pathogens
- Understand The Importance Of A Water Management Program
- Review The Water System Requirements Of §482.42, §483.80, §485.635 Cms Condition Of Participation (Cop) Regarding Infection Control & Utility Management Standards
- Review The Requirements Of ASHRAE Standard 188
- Review The Guidance In ASHE Water Management Monograph
- Reduce Waterborne HAI's



# **It's Water, What Could Go Wrong?**

# Legionella – What is it?

- **Legionella:** the name of the genus of bacteria that was subsequently identified as the causative pathogen associated with the 1976 *outbreak* of disease at the American Legion convention in Philadelphia. *Legionella* are common aquatic bacteria found in natural and *building water systems*, as well as in some soils.
- **legionellosis:** the term used to describe Legionnaires' disease, Pontiac fever and any illness caused by exposure to *Legionella* bacteria.
- **Pontiac fever** is when legionella infections result in a less severe, non-pneumonic, influenza like illness.

# Legionellosis – How it Infects

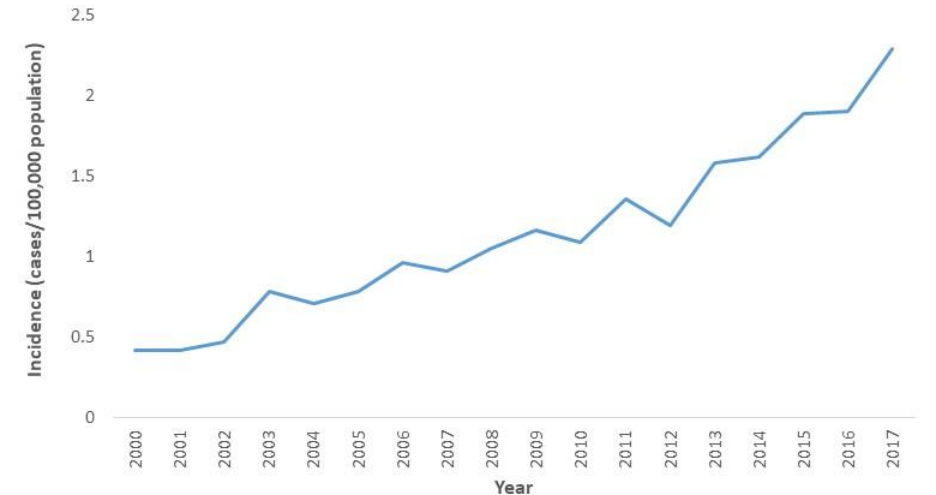
## How does it spread to humans?

- typically when a person breathes in Legionella-infected water that has been aerosolized.

## How serious is it?

- 7,500 cases reported to the Center for Disease Control and Prevention in 2017
- 10% fatality rate

**Legionnaires' disease is on the rise in the United States**



**Rate of reported cases increased 5.5 times (2000–2017)**

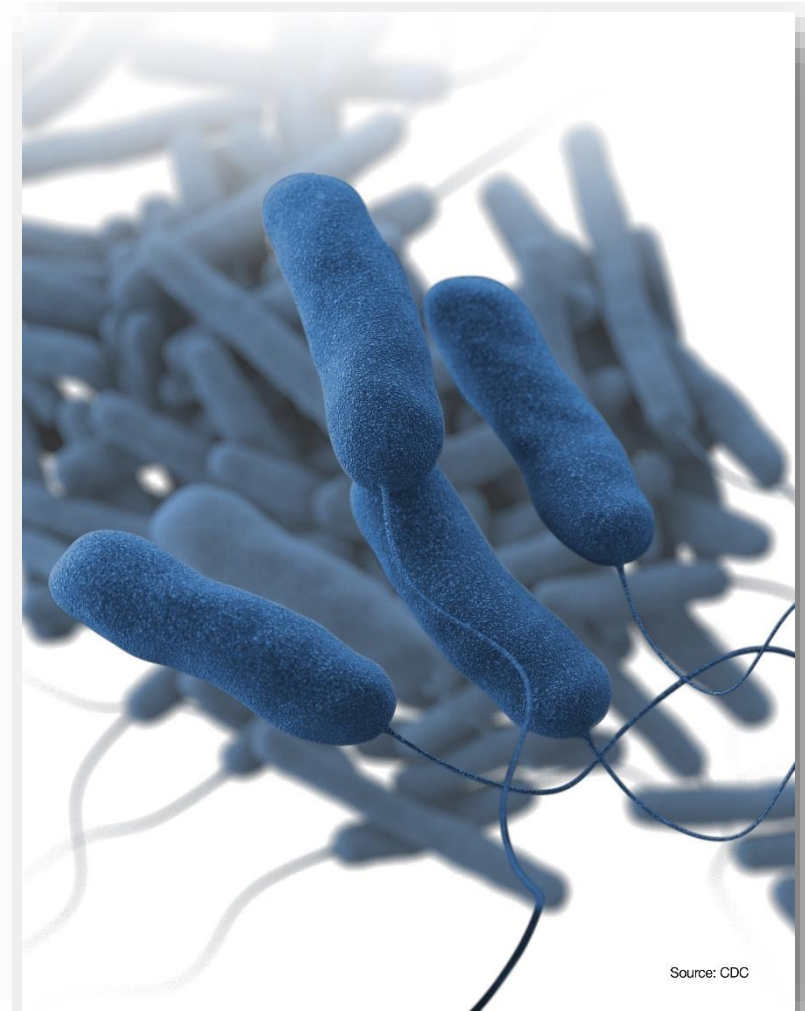
Source: National Notifiable Diseases Surveillance System

Centers for Disease Control and Prevention (CDC)



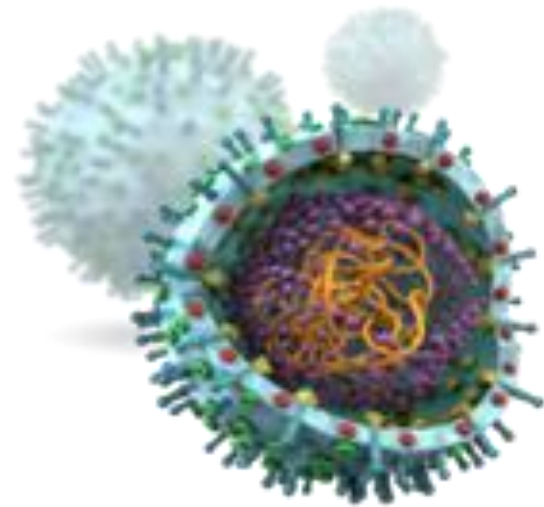
# Where Legionella Grows

- Water Storage Tanks
- Water Heaters
- Water-hammer Arrestors
- Water Filters
- Aerators/Faucet Flow Restrictors
- Showerheads/Hoses
- Pipes/Valves/Fittings
- Infrequently Used Equipment
- Ice Machines
- Cooling Towers
- Medical Devices

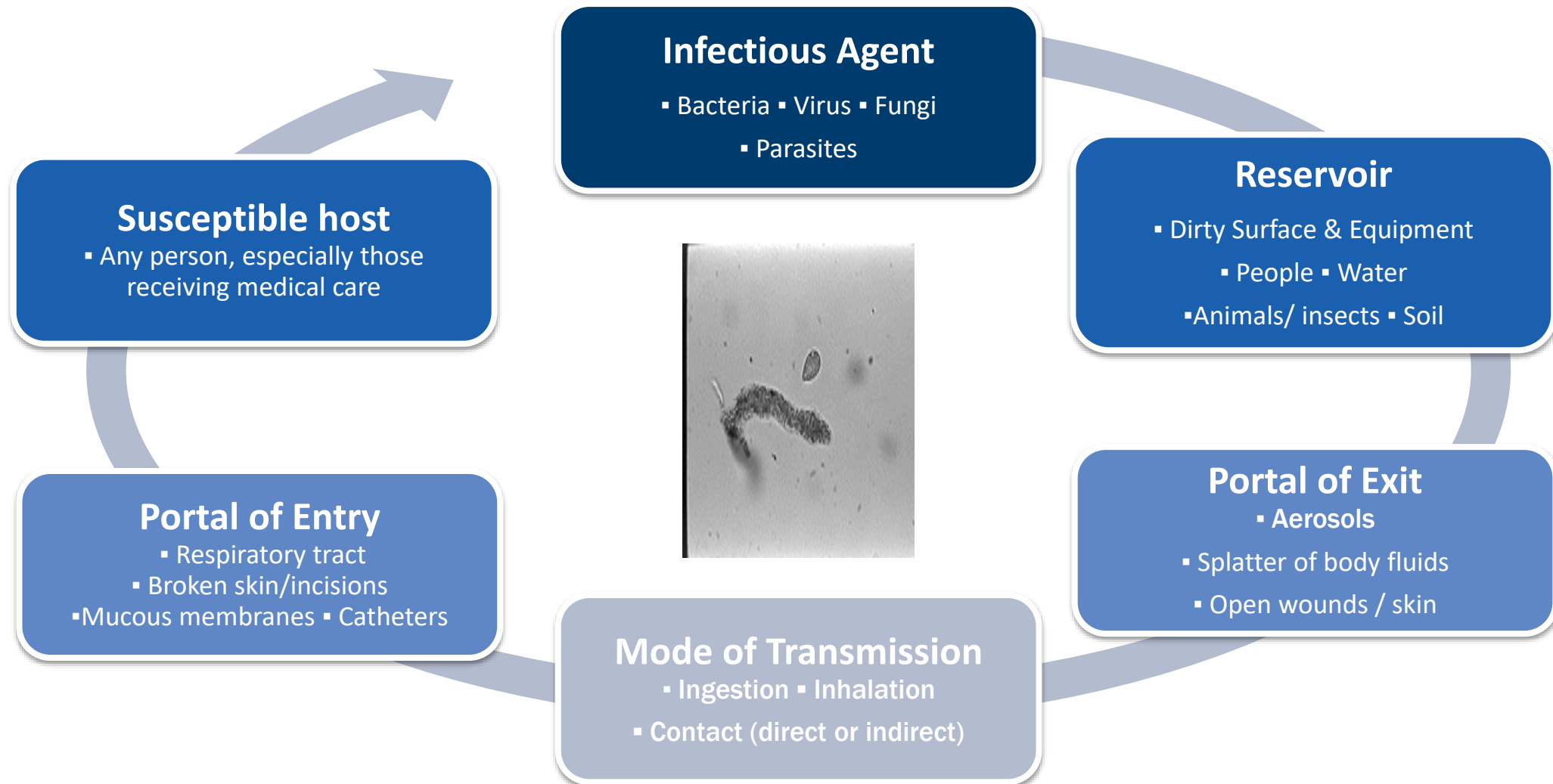


# Other Waterborne Pathogens

- Escherichia coli (E. coli)
- Pseudomonas aeruginosa
- Klebsiella pneumoniae
- Cronobacter
- Acinetobacter baumannii
- Klebsiella oxytoca
- Elizabethkingia anopheles



# Chain of Infection

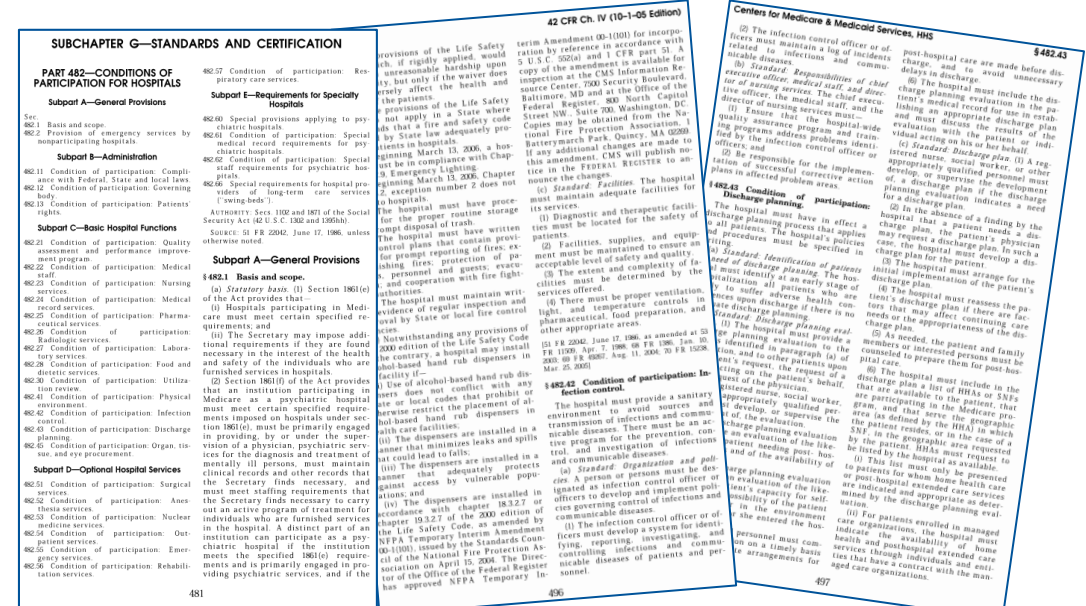




# CMS Condition of Participation

## CoP §480.80 Infection Control:

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 of communicable diseases and infections.

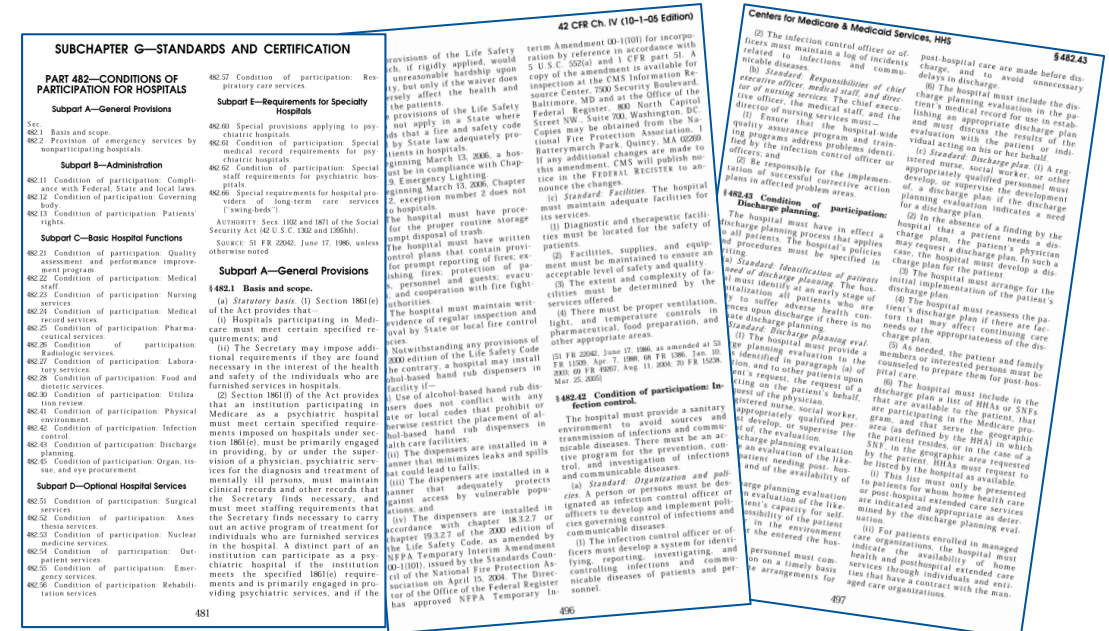




# CMS Condition of Participation

## CoP §485.635 Provision of services:

The Critical Access Hospital's health care policies include a system for identifying, reporting, investigating, and controlling infections and communicable diseases of patients and personnel.



# TJC: Environment of Care

## EC.01.01.01: The hospital plans activities to minimize risks in the environment of care.

- EP 8: The hospital has a written plan for managing the following: Utility systems

### EP Attributes

New	FSA	CMS	DOC	ESP
		§482.41(a) §482.41(d)(2)	D	ESP-1

# TJC: Environment of Care

## EC.04.01.01: The hospital collects information to monitor conditions in the environment.

- EP 15: Every 12 months, the hospital evaluates each environment of care management plan, including a review of the plan's objectives, scope, performance, and effectiveness.

### EP Attributes

New	FSA	CMS	DOC	ESP
	- Environment of Care	§482.41(a) §482.41(d)(2)	D	



# Utility Management Requirements:

- Purpose
- Scope
- Authority
- Risk Assessment
- Design
- Inventory
- Inspection/Maintenance
- Verification
- Maps of System
- Labeling
- Disruptions
- Shutdowns
- Clinical Interventions
- Responses
- Data
- Reports



STANDARD

ANSI/ASHRAE Standard 188-2015

# Legionellosis: Risk Management for Building Water Systems

Approved by the ASHRAE Standards Committee on May 27, 2015; by the ASHRAE Board of Directors on June 4, 2015; and by the American National Standards Institute on June 26, 2015.

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or in paper form from the Senior Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website ([www.ashrae.org](http://www.ashrae.org)) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to [www.ashrae.org/permissions](http://www.ashrae.org/permissions).

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# ASHRAE Standard 188-2015

Finalized and Published June 2015

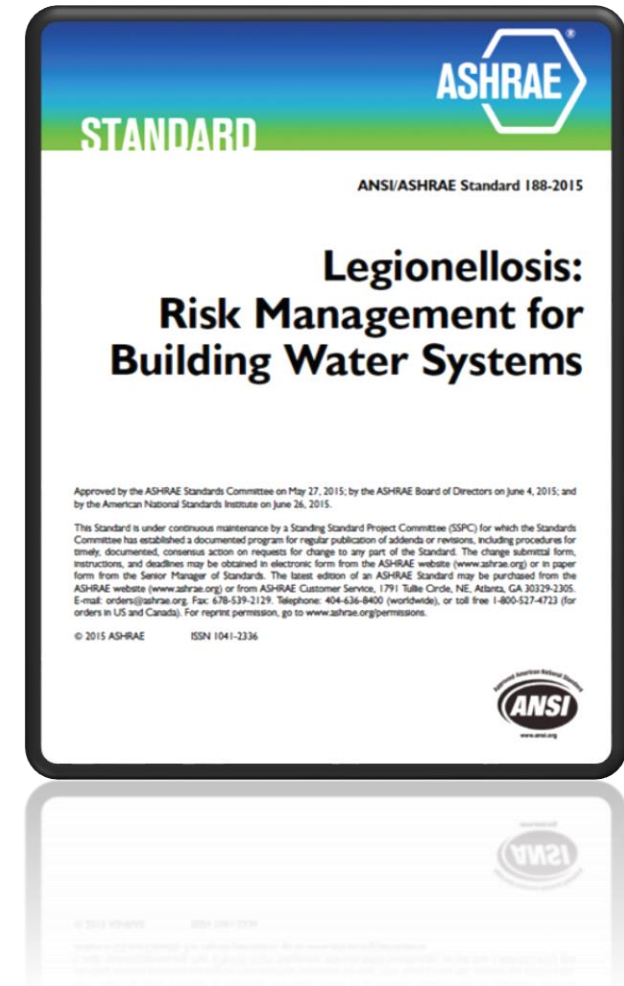
## Section 1 - Purpose

Establish **minimum** legionellosis risk management **requirements** for building water systems

## Section 2 - Scope

**Human-occupied** Commercial, Institutional, Multiunit Residential, and Industrial Buildings.

- To Date - Limited **Adoption**



# ASHRAE Standard 188-2015

## ASHE worked with ASHRAE

- Align 188 with Utility Management Requirements
- Align 188 with Healthcare Operations
  - Risk Assessment Based
  - Risk Mitigation Process
  - Operational Management of Risk
  - Planned Remediation
- Not 100% Successful
  - Normative Annex A
  - Continuous Maintenance



# ASHRAE Standard 188-2015

**PROGRAM TEAM** – Identify persons responsible for Program development and implementation.

**DESCRIBE WATER SYSTEMS/FLOW DIAGRAMS** – Describe the potable and non-potable water systems within the building and on the building site and develop water system schematics.

**ANALYSIS OF BUILDING WATER SYSTEMS** – Evaluate where hazardous conditions may occur in the water systems and determine where control measures can be applied.

**CONTROL MEASURES** – Determine locations where control measures must be applied and maintained in order to stay within established control limits.

# ASHRAE Standard 188-2015

**MONITORING/CORRECTIVE ACTIONS** – Establish procedures for monitoring whether control measures are operating within established limits and if not, take corrective actions.

**CORRECTIVE ACTIONS/CONFIRMATION** – Establish procedures to confirm that:

- The Program is being implemented as designed. (verification)
- The Program effectively controls the hazardous conditions throughout the building water systems (validation)

**DOCUMENTATION** – Establish documentation and communication procedures for all activities of the Program.

# Water Management in Health Care Facilities: Complying with ASHRAE Standard 188

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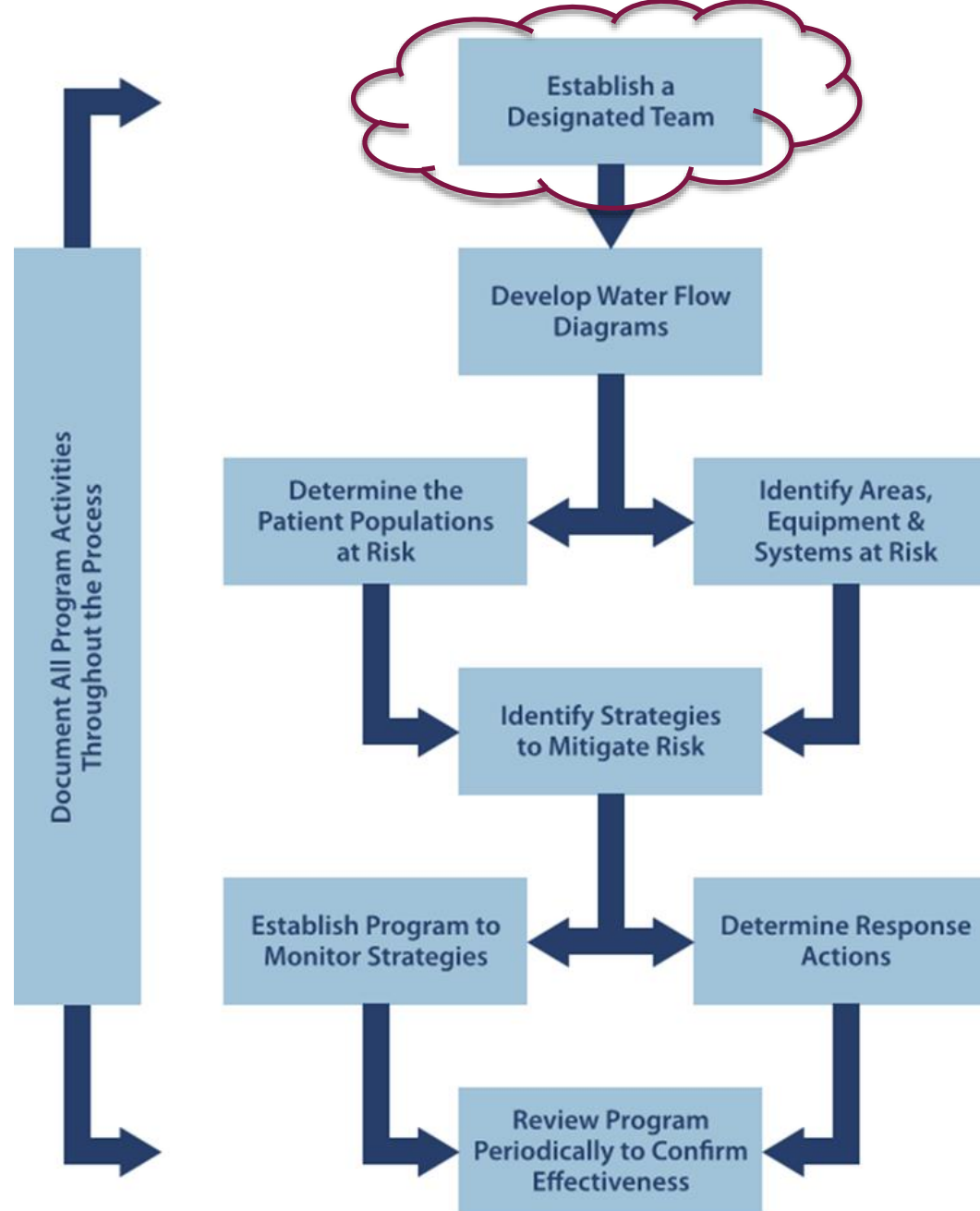


# Purpose

Monograph provides guidance and best practices for hospitals in developing and implementing water management plans

- Hospitals have unique resources and unique requirements
- Hospitals may be pressured to take steps that are not required, unnecessarily costly or not helpful





# Create a Team

## Designated team consists of:

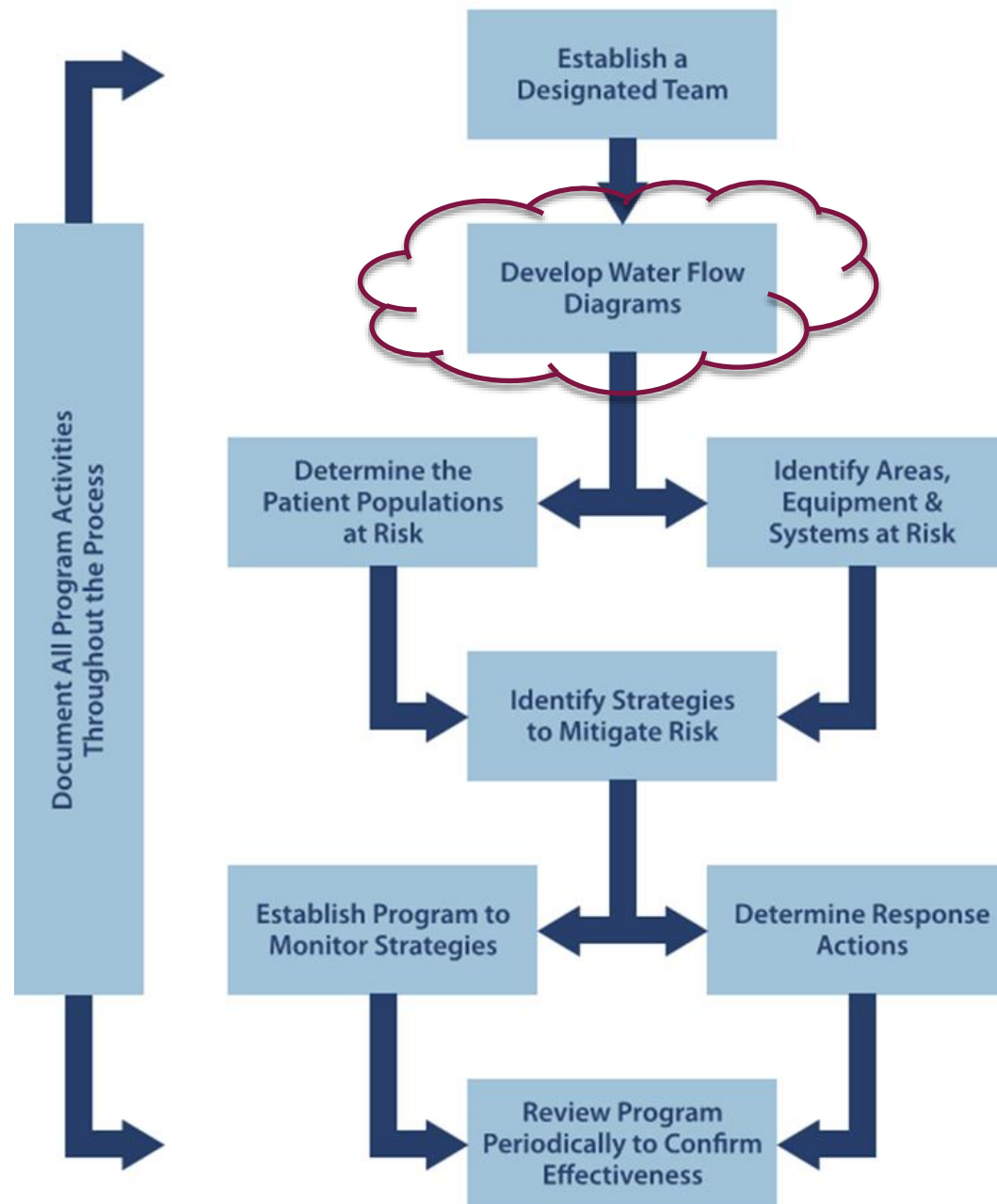
- Hospital executive
- Facility manager
- Infection Preventionist
- Nursing management
- Occupational and environmental safety management
- Representatives from high risk areas
- Others?



# Team Purpose

- Establish standard building water system procedures.
- Potentially seek support from:
  - Engineer with waterborne pathogen experience
  - Water treatment specialist
  - Industrial hygienist

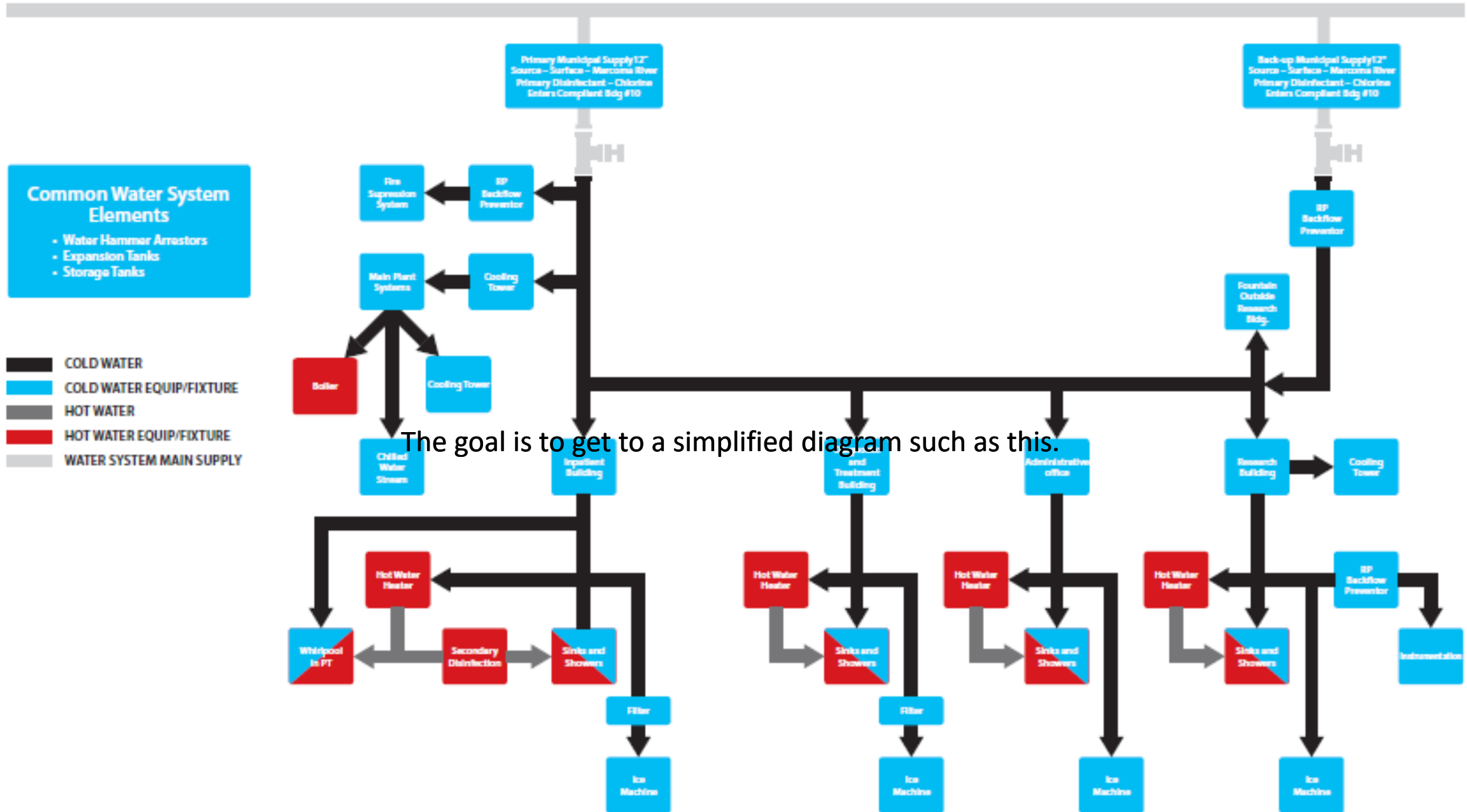




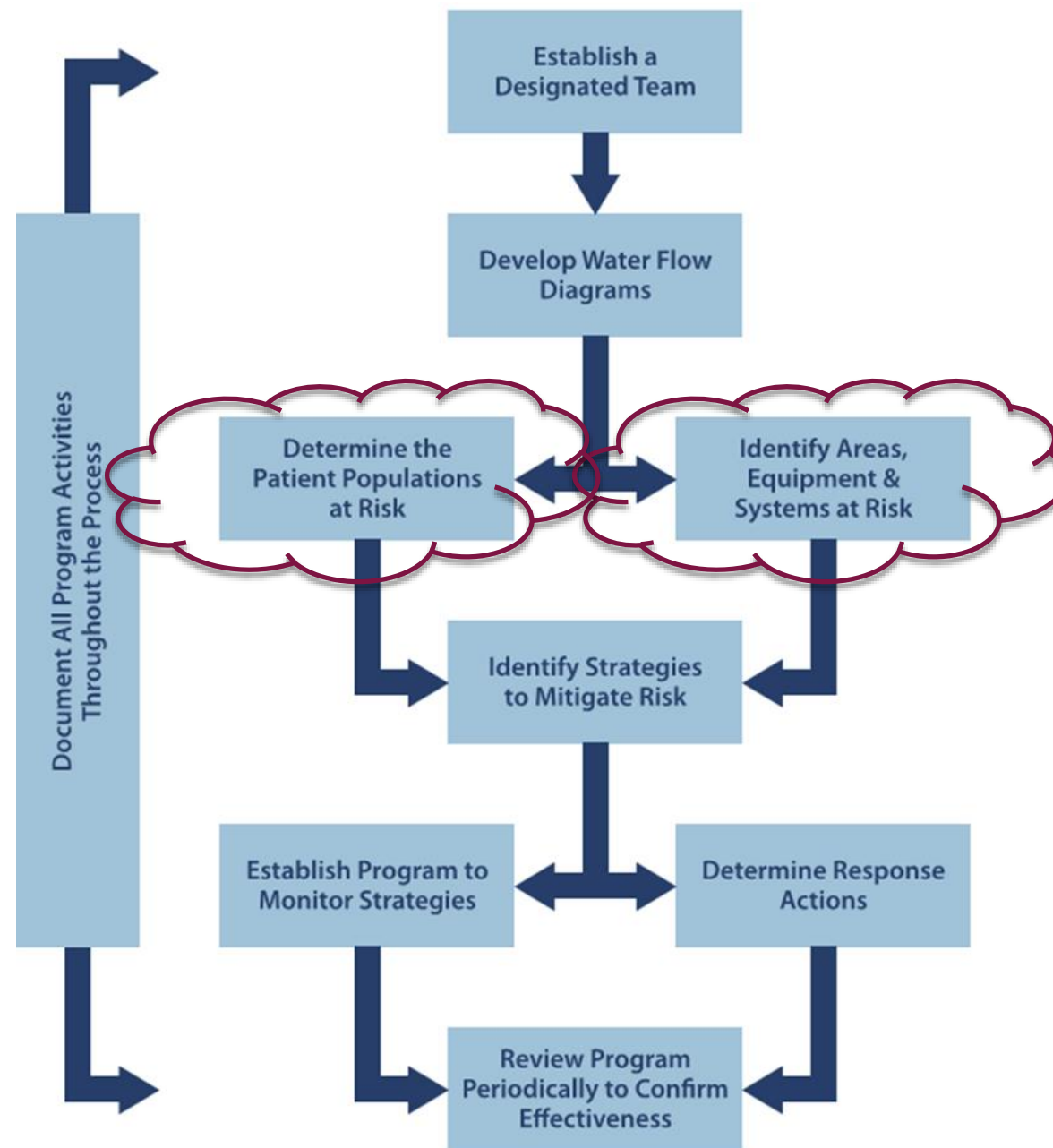
# Map the Water System

- Everyone on team must understand how water flows through building
- Everyone on team must understand how water flows to the building
- Keep updated map of water system





The goal is to get to a simplified diagram such as this.



# Control Locations and Limits

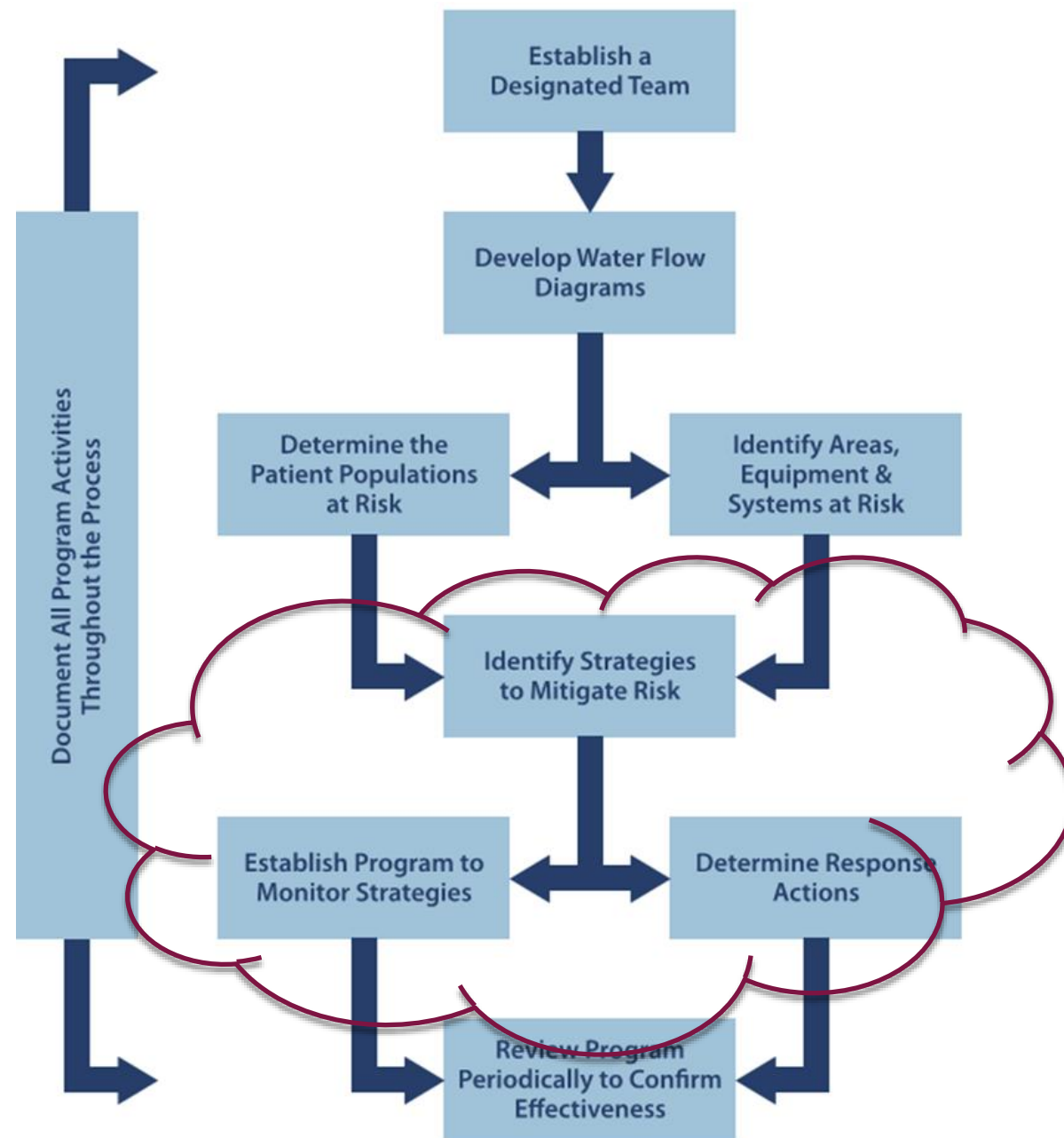
- Identify sensitive locations to control.
- Ensure the location stays within control limits

		Potential Severity Rating			
		Minor	Moderate	Significant	Catastrophic
Likelihood severity occurs	Very Likely	Moderate	High	Extreme	Extreme
	Likely	Low	Moderate	High	Extreme
	Unlikely	Very Low	Low	Moderate	High
	Rare	Very Low	Very Low	Low	Moderate



# Identify Areas, Equipment & Systems at Risk

- Systematically evaluate physical and chemical condition of each step in water system flow diagram (slow/stagnant water)
- Systematically identify areas housing populations with low immunity
- Estimate risk level
- Consider risk from water supply; If risky test and document disinfectant levels



# Identify Strategies, Establish Program, & Determine Response

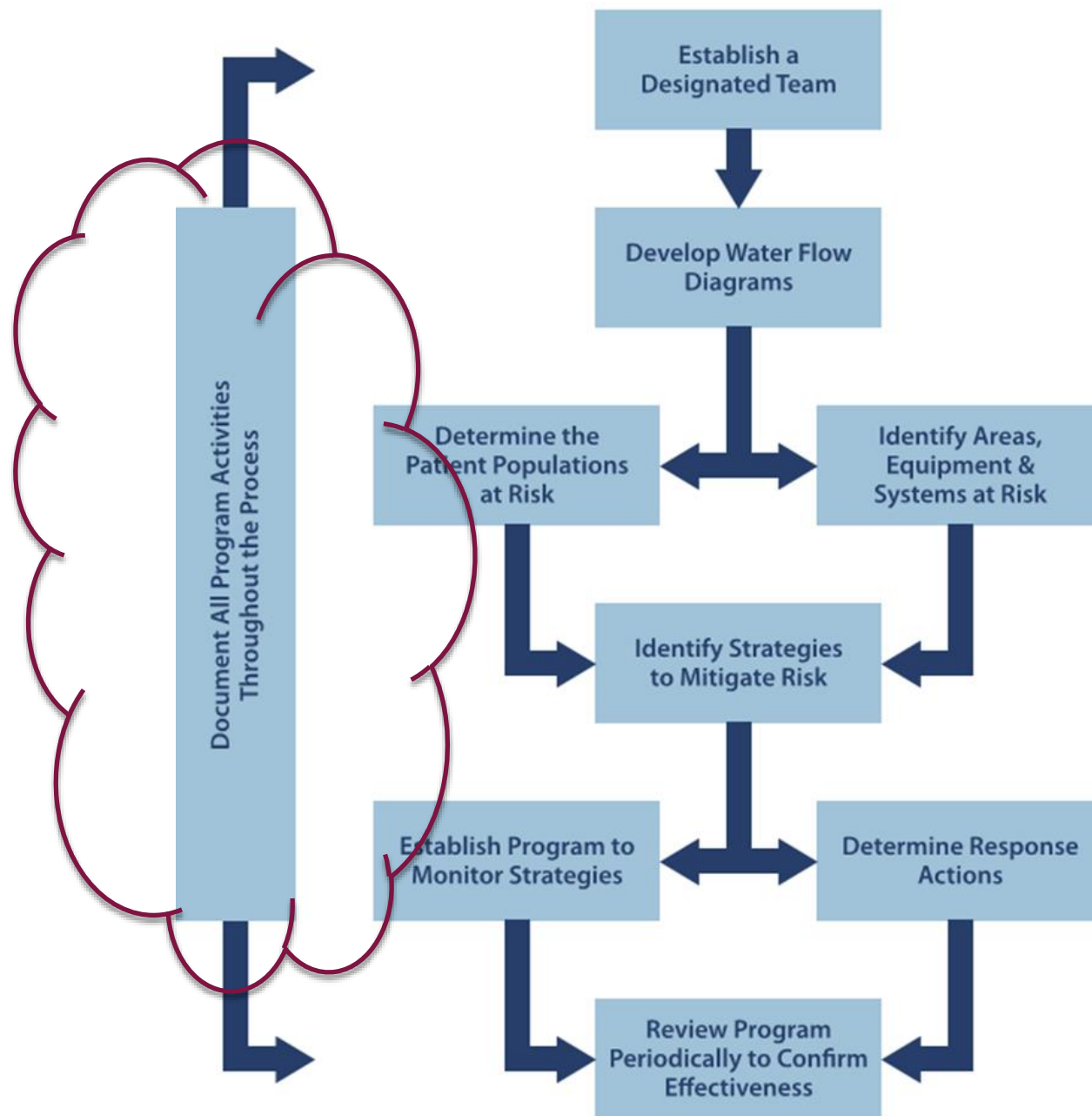
## Control measures could include:

- Disinfectant
- Heating
- Cooling
- Filtering and flushing

Develop monitoring procedures to monitor and maintain control measures

## Ornamental Fountain

1. Risk Mitigation Strategy
  - Maintain a minimum chlorine level of 0.5ppm to ensure no algae or slime build-up
2. Methodology
  - Test water weekly to ensure chlorine Level; add chlorine as appropriate
  - Visual inspection for algae or slime
  - Document Results
3. Remediation Actions
  - Drain and clean fountain, refill and bring chlorine levels to 1.0ppm



# Document and Communicate

- Once plan is developed and implemented, document everything
- Communicate to everyone impacted by plan
- Document all actions and changes



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# Questions







# THANK YOU!

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