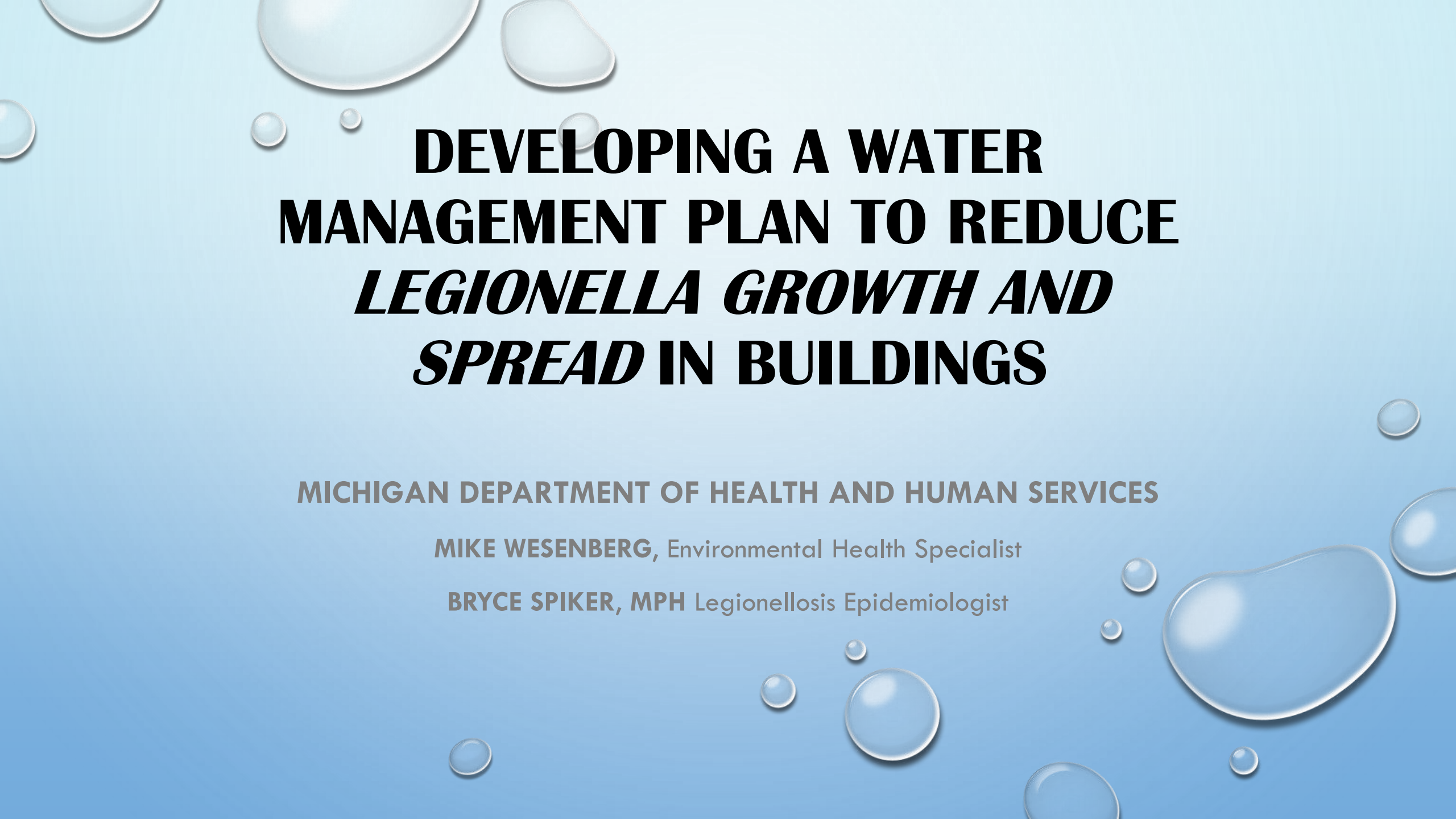


The background is a light blue gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

# **DEVELOPING A WATER MANAGEMENT PLAN TO REDUCE *LEGIONELLA GROWTH AND SPREAD* IN BUILDINGS**

**MICHIGAN DEPARTMENT OF HEALTH AND HUMAN SERVICES**

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# EPIDEMIOLOGY AND LABORATORY CAPACITY (ELC) GRANT

- IDENTIFY AND ASSESS HIGH RISK BUILDINGS TO BETTER UNDERSTAND HOW WMP ARE BEING IMPLEMENTED.
  - INCREASE AWARENESS OF THE CDC'S WATER MANAGEMENT PROGRAM TOOLKIT
  - PROVIDE *LEGIONELLA* TRAINING
- 

# CMS MEMORANDUM

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



## Center for Clinical Standards and Quality/Survey & Certification Group

Ref: S&C 17-30-*Hospitals/CAHs/NHs*  
**REVISED 06.09.2017**

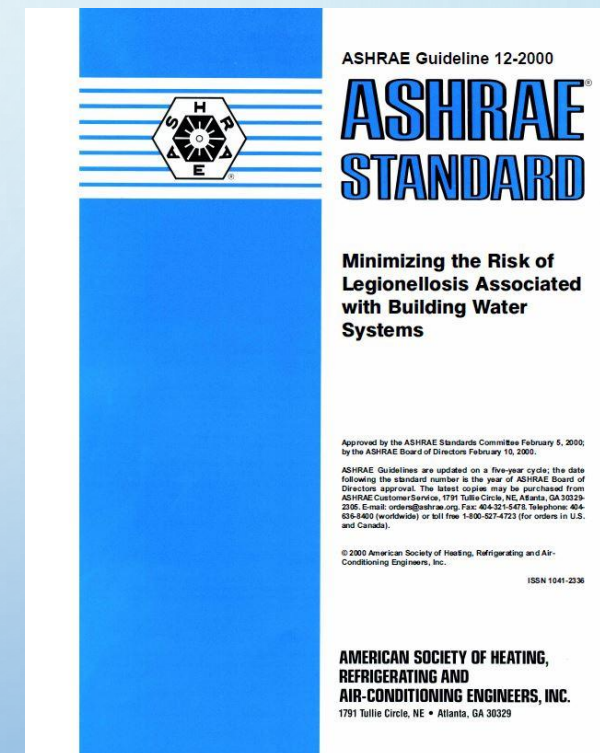
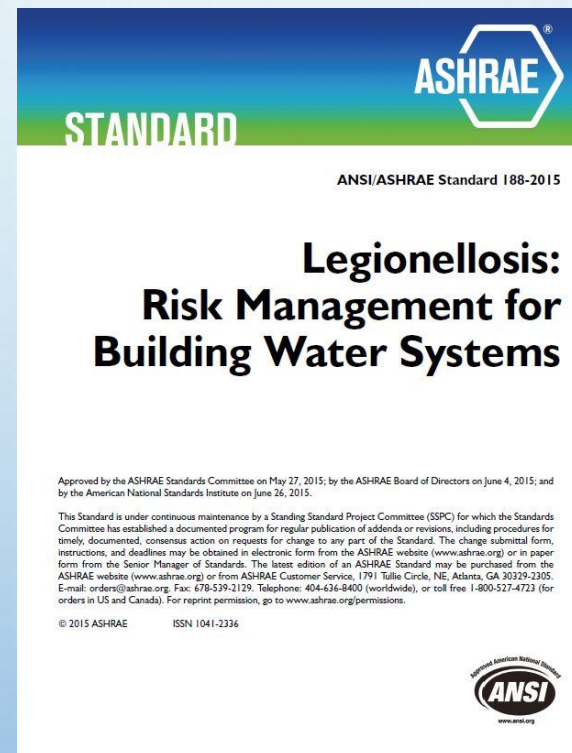
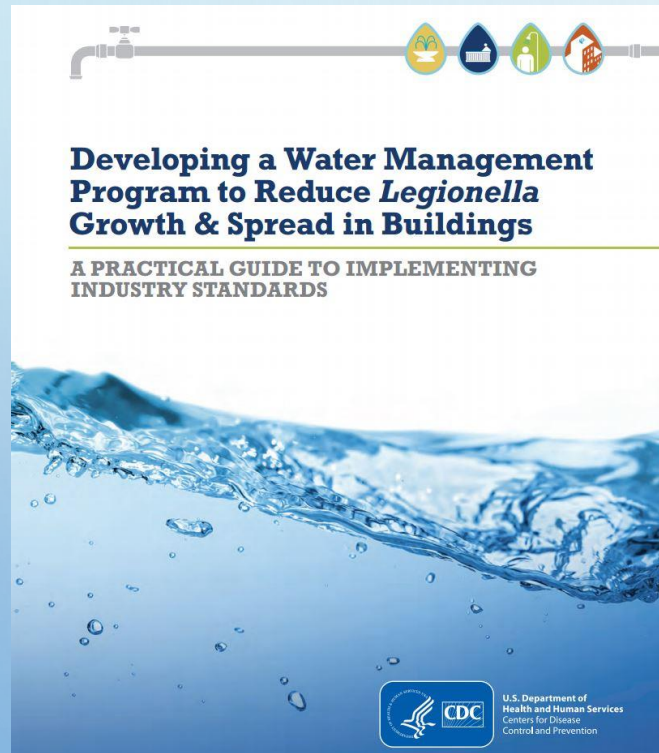
**DATE:** June 02, 2017  
**TO:** State Survey Agency Directors  
**FROM:** Director  
Survey and Certification Group  
**SUBJECT:** Requirement to Reduce *Legionella* Risk in Healthcare Facility Water Systems to Prevent Cases and Outbreaks of Legionnaires' Disease (LD)  
*\*\*\*Revised to Clarify Provider Types Affected\*\*\**

### Memorandum Summary

- ***Legionella Infections:*** The bacterium *Legionella* can cause a serious type of pneumonia called LD in persons at risk. Those at risk include persons who are at least 50 years old, smokers, or those with underlying medical conditions such as chronic lung disease or immunosuppression. Outbreaks have been linked to poorly maintained water systems in buildings with large or complex water systems including hospitals and long-term care facilities. Transmission can occur via aerosols from devices such as showerheads, cooling towers, hot tubs, and decorative fountains.
- ***Facility Requirements to Prevent Legionella Infections:*** Facilities must develop and adhere to policies and procedures that inhibit microbial growth in building water systems that reduce the risk of growth and spread of *legionella* and other opportunistic pathogens in water.
- ***This policy memorandum applies to Hospitals, Critical Access Hospitals (CAHs) and Long-Term Care (LTC). However, this policy memorandum is also intended to provide general awareness for all healthcare organizations.***



# WATER MANAGEMENT PLAN RESOURCES



# 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?

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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 plan even if the building itself does not. If you answer **NO** to all of the 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 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.**

# INTRODUCTION TO *LEGIONELLA*

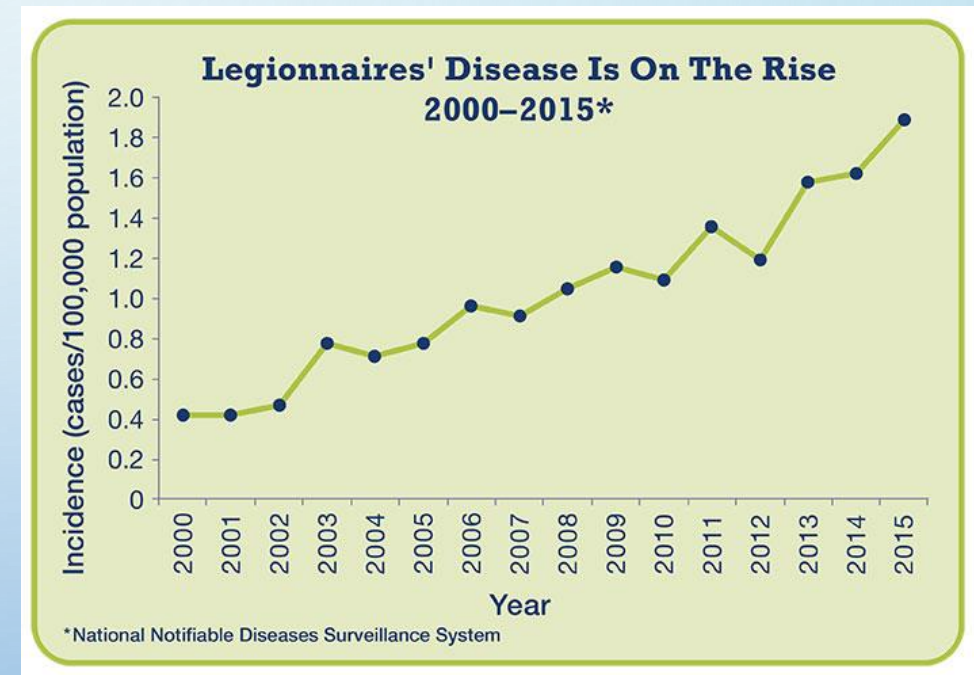
- *Legionella* is found naturally in freshwater environments
- Can become a health problem in building water systems when water is aerosolized
- What devices can spread *Legionella*?
  - Hot tubs
  - Cooling towers
  - Decorative fountains
  - Showers
  - Centrally-installed misters, atomizers, air washers, and humidifiers
  - Medical devices (CPAP, hydrotherapy equipment, bronchoscopes)



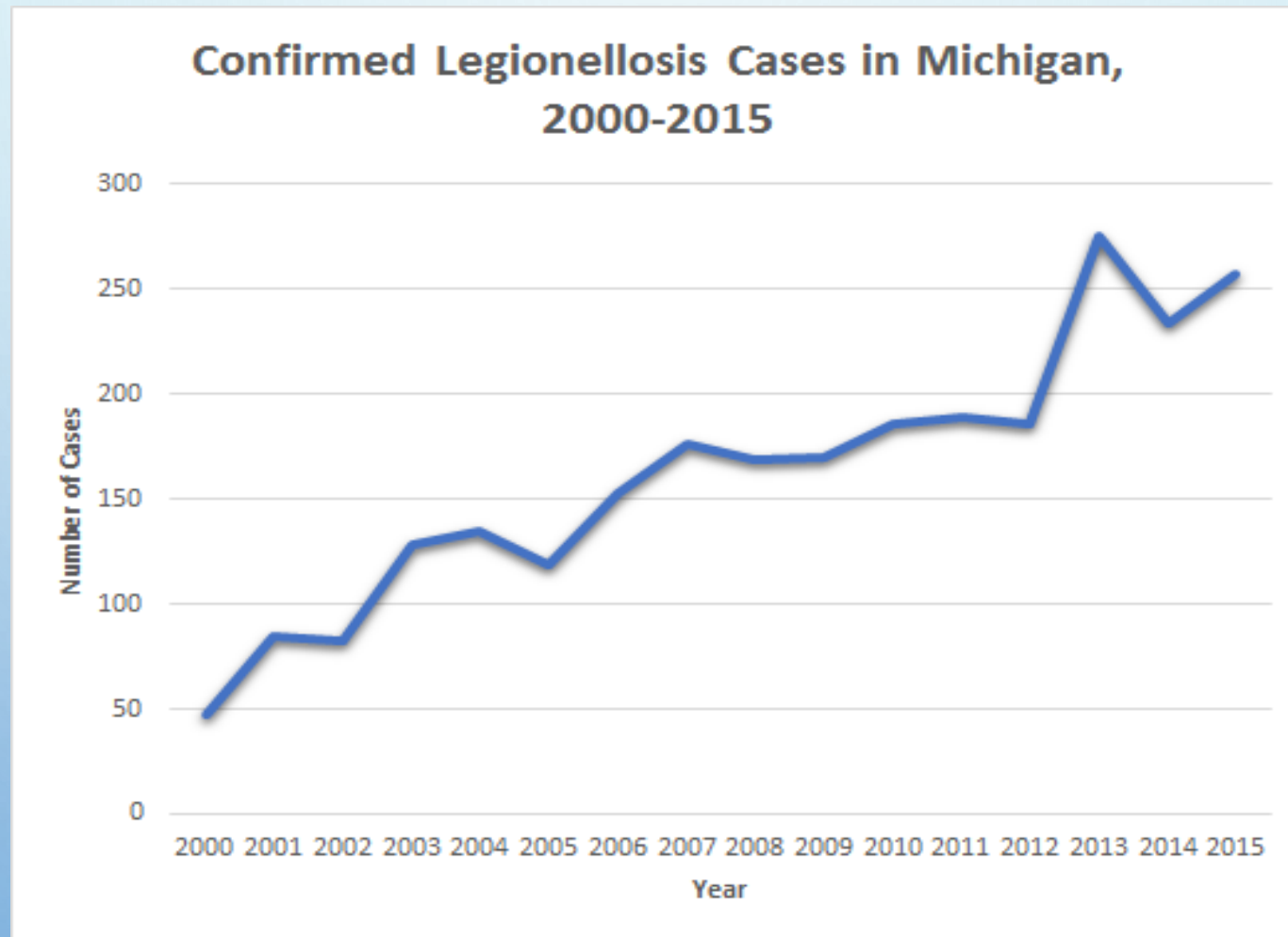


# INTRODUCTION TO LEGIONELLOSIS

- Legionnaires' Disease, a severe sometimes fatal pneumonia, can occur in persons who inhale aerosolized droplets of water contaminated with *Legionella* bacteria
- From 2000-2014 in the United States:
  - Reported cases increased 286%
  - Long term care facilities – 19% of outbreaks
  - Hospitals – 15% of outbreaks
- Approximately 9% of legionellosis cases are fatal



# LEGIONELLOSIS IN MICHIGAN





# INTRODUCTION TO LEGIONELLOSIS

- **People at increased risk for legionellosis:**
  - Being 50 years or older
  - Being a current or former smoker
  - Having a chronic lung disease (like COPD or emphysema)
  - People with weak immune systems
  - Taking medication that weakens an individual's immune system
  - People with cancer
  - People with underlying illnesses such as diabetes, kidney failure, or liver failure

# FACTORS LEADING TO *LEGIONELLA* GROWTH

## INTERNAL FACTORS

- Biofilm
  - Protects *Legionella* from heat and disinfectant
- Scale and Sediment
  - Uses up disinfectant
- Water temperature fluctuations
  - *Legionella* grows best at 77°F-108°F
- pH
- Water Pressure Changes
- Inadequate disinfectant
- Water stagnation
  - Encourages biofilm growth, reduces temperature, and levels of disinfectant

## EXTERNAL FACTORS

- Construction
  - Vibration can dislodge biofilm
- Water Main breaks
  - Changes in water pressure can dislodge biofilm and increase scale and sediment
- Changes in municipal water quality

# ELEMENTS OF A WATER MANAGEMENT PROGRAM



## Program Review

Programs should be reviewed yearly and when the following events occur:

- Data review shows control measures are persistently outside of control limits
- A major maintenance or water service changes occurs
- One or more cases of disease are thought to be associated with your system
- Changes occur in laws, regulations, standards, or guidelines



# ESTABLISH A WATER MANAGEMENT TEAM



## Possible Water Management Team Members

- Building owner
- Building manager
- Maintenance or engineering employees
- Equipment or chemical suppliers
- Certified industrial hygienist
- Microbiologists
- Environmental health specialists
- Contractors/consultants

## Healthcare Facilities

The team should also include:

- Someone who understands accreditation standards and licensing requirements
- Someone with expertise in infection prevention
- A clinician with expertise in infectious diseases
- Risk and quality management staff

# BUILDING WATER SYSTEM DESCRIPTION

Include:

- Municipal water supply connections
- How the cold water is distributed
- How cold water is heated, to what temp.
- Water heater locations, what do they serve
- How the hot water is distributed
- Location of cooling towers, pools, hot tubs, water heaters, and boilers
- Where is waste water discarded

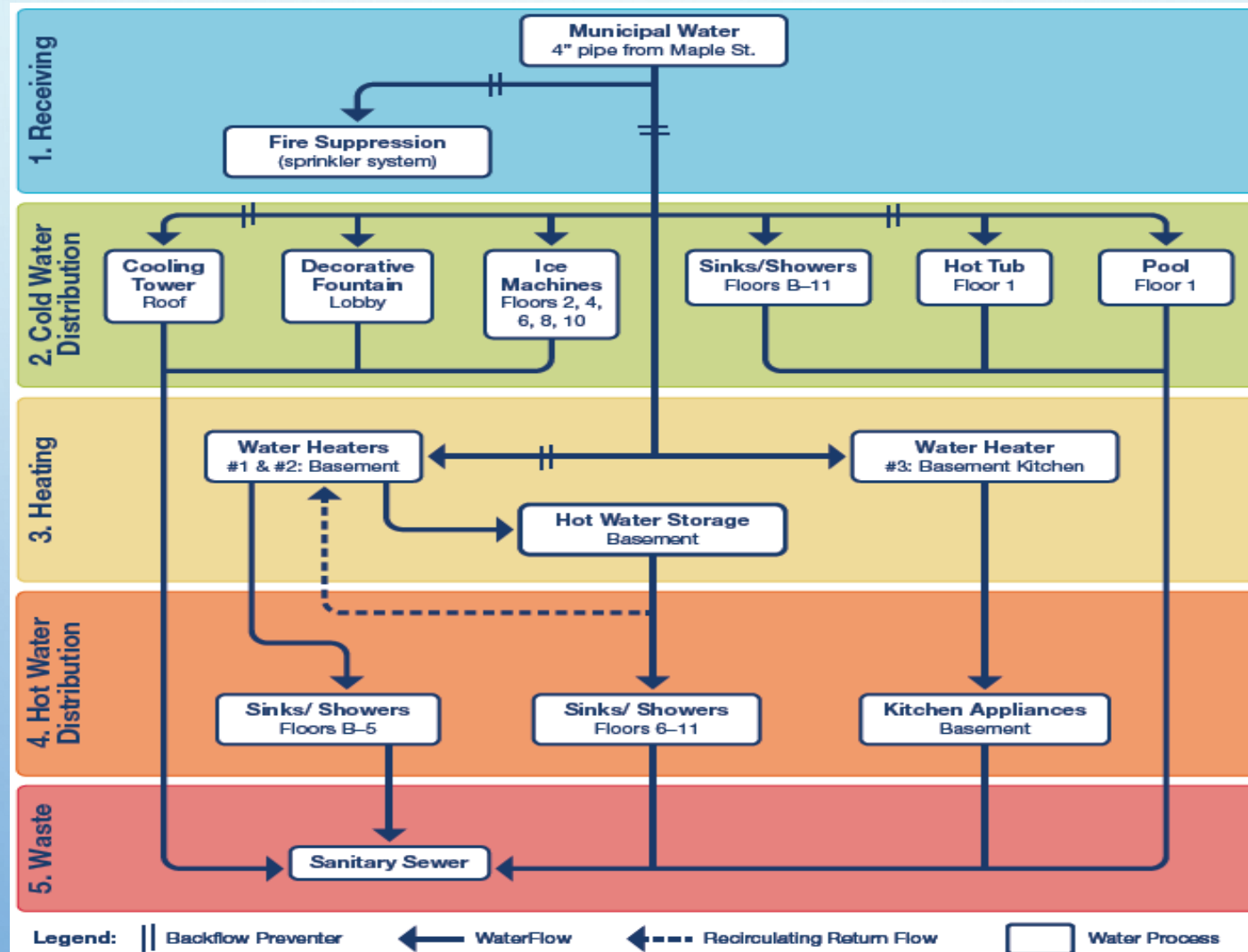
## Healthcare Facilities

Be sure to include descriptions of water sources relevant to:

- Patient care areas
- Clinical support areas
- Components and devices that can expose patients to contaminated water

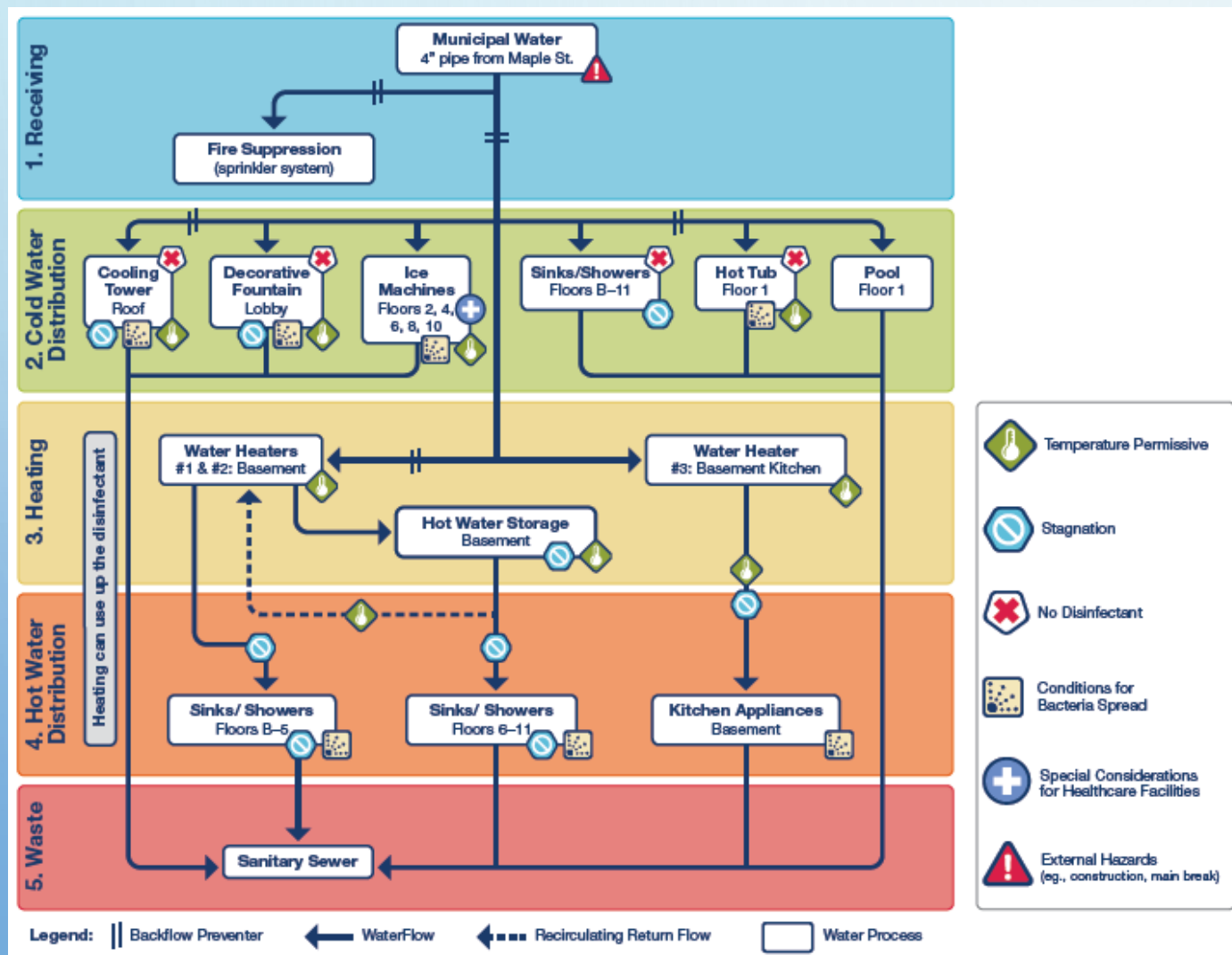
You should also develop an ongoing dialogue with your drinking water provider so that you are aware of changes that may affect your building's water supply.

# BUILDING WATER SYSTEM FLOW DIAGRAM





# IDENTIFY AREAS WHERE *LEGIONELLA* COULD GROW AND SPREAD



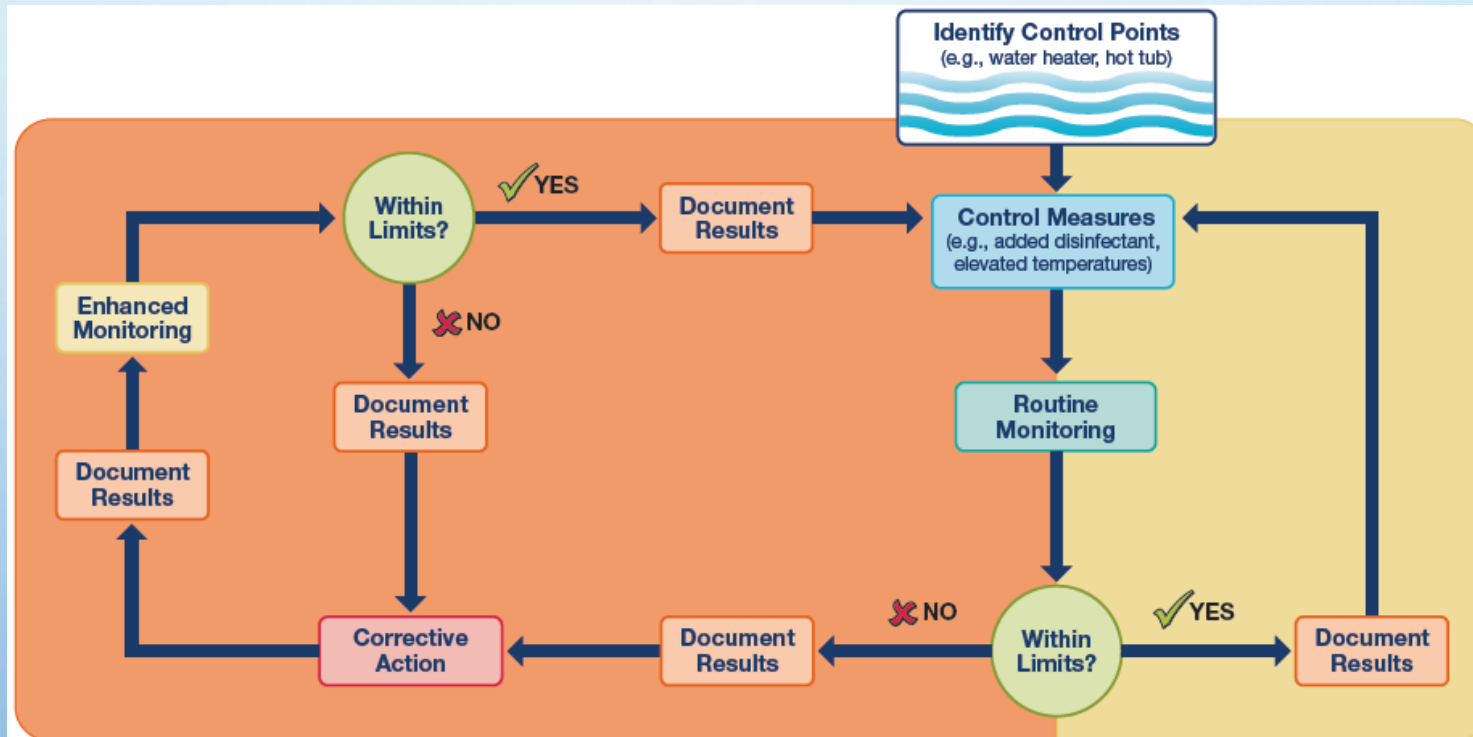
## Healthcare Facilities

Think about:

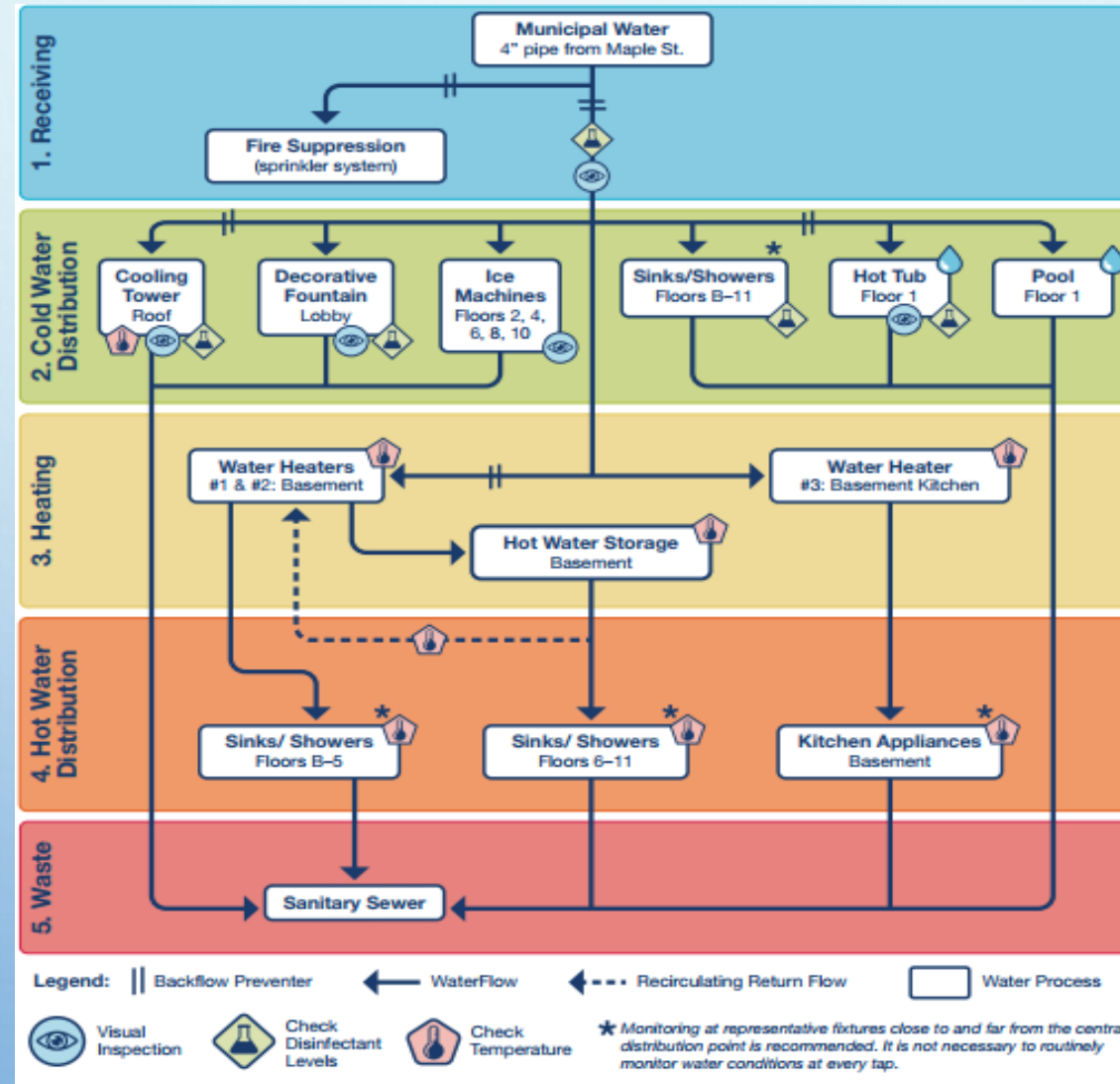
- Areas where medical procedure may expose patients to water droplets, such as hydrotherapy
- Areas where patients are more vulnerable to infection, such as bone marrow transplant units, oncology floors, or intensive care units

The ice machine is included to illustrate that patients with problems swallowing may be at increased risk *Legionella* spread by aspiration"

# CONTROL MEASURES & CORRECTIVE ACTIONS



# LOCATING & MONITORING YOUR CONTROL MEASURES





# INTERVENTION WHEN CONTROL LIMITS NOT MET

## Corrective action example:

Biofilm growth in the fountain

- Shutdown fountain
- Drain fountain
- Scrub clean with manufacture recommended detergent
- Follow program startup procedure
- Document and communicate observations/corrective actions





# IS THE PROGRAM RUNNING AS DESIGNED? IS IT EFFECTIVE?

## VERIFICATION

**Are we doing what we said we would?**

- Observing when we said we would
- Testing intervals being met
- Documentation
- Communications as decided upon

## VALIDATION

**Is our program actually working?**

- Is it controlling hazardous conditions?
- Environmental testing can validate your program
- HAP active surveillance for Legionnaire's disease in healthcare facilities

# DOCUMENT & COMMUNICATE

## DOCUMENT

- Building description
- Program team
- Water system description
- Control measures
- Confirmatory procedures

## COMMUNICATE

Examples:

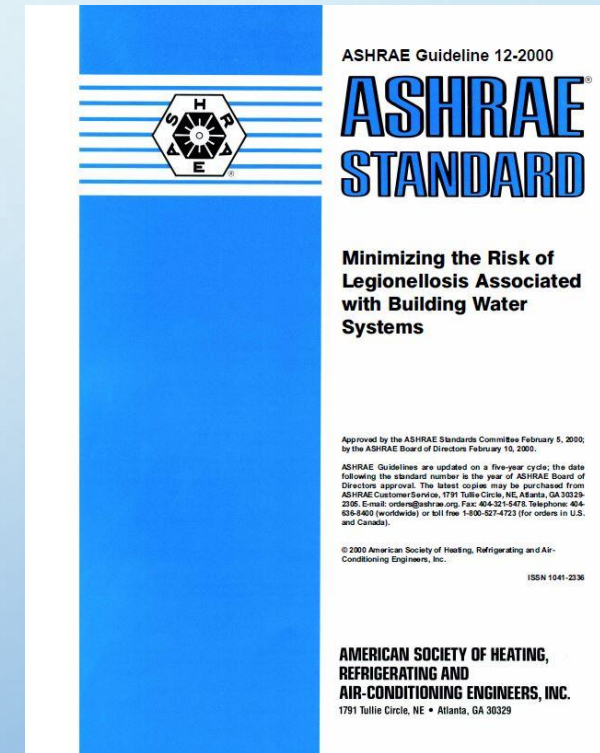
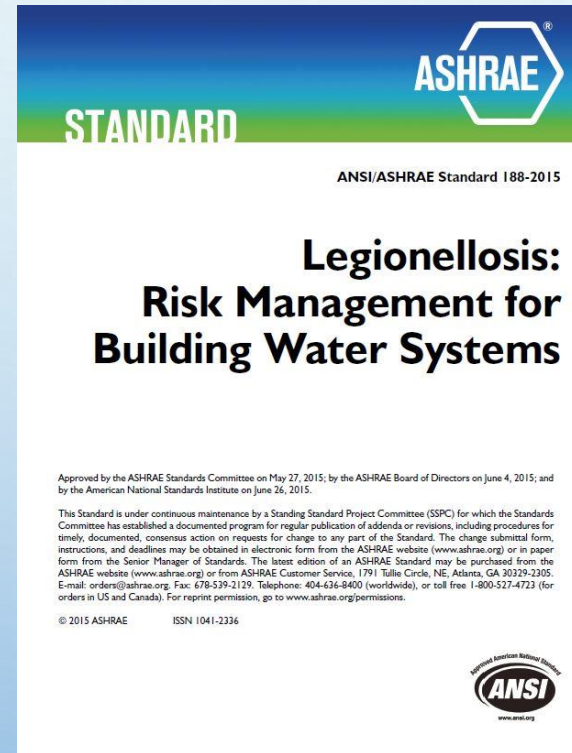
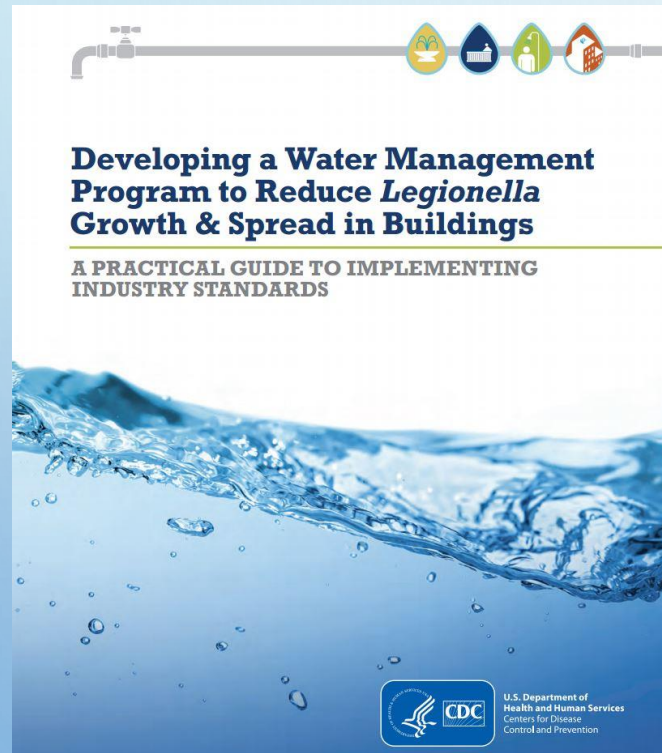
- Notifying building residents of plan
- Inform employees on a regular basis
- Continue to train individuals with program responsibilities

# COMMON QUESTIONS

- **DOES THE STATE (MDHHS) DO ENVIRONMENTAL TESTING?**
  - YES – DURING PUBLIC HEALTH INVESTIGATION
  - NO – ROUTINE MONITORING OR PRIVATE TESTING
- **DO ALL BUILDINGS WITH A WMP NEED TO TAKE ENVIRONMENTAL SAMPLES?**
  - NO – COMPLETE ENVIRONMENTAL ASSESSMENT TO SEE IF APPROPRIATE
- **WHAT LABORATORIES DO ENVIRONMENTAL SAMPLING/TESTING?**
  - ELITE CERTIFIED LABORATORIES
  - [HTTPS://WWWN.CDC.GOV/ELITE/PUBLIC/MEMBERLIST.ASPX](https://wwwn.cdc.gov/elite/public/memberlist.aspx)



# WATER MANAGEMENT PLAN RESOURCES



# REFERENCES

- [CDC TOOLKIT](#)
- [ASHRAE 188-2015](#)
- [ASHRAE 12-2000](#)

## ADDITIONAL RESOURCES

[ABOUT THE DISEASE: LEGIONELLOSIS](#)

The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

**QUESTIONS?**