RESPONDING TO POSITIVE SAMPLES AND CASES

1. **Positive *Legionella* Samples**
2. Facility Associated Cases
3. Water Restrictions

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WHY SAMPLE FOR *LEGIONELLA*

- Prevent infection among residents, staff, and visitors
- Improve system functioning and efficiency as part of a broader water management plan
- Article 28 facilities: required under Subpart 4-2



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BUILDING WATER SYSTEM SAMPLING REQUIREMENT UNDER SUBPART 4-2

- (4-2.4 (a) and (b)):
  - "(…) provisions requiring *Legionella* culture sampling and analysis at intervals not to exceed 90 days for the first year following adoption of the sampling and management plan. Thereafter, the plan shall include provisions for **annual *Legionella* culture sampling** and analysis; provided that the plan shall further require that those portions of any potable water system that serve hematopoietic stem cell transplant or solid organ transplant patients shall continue to be sampled and analyzed at intervals not to exceed 90 days; "

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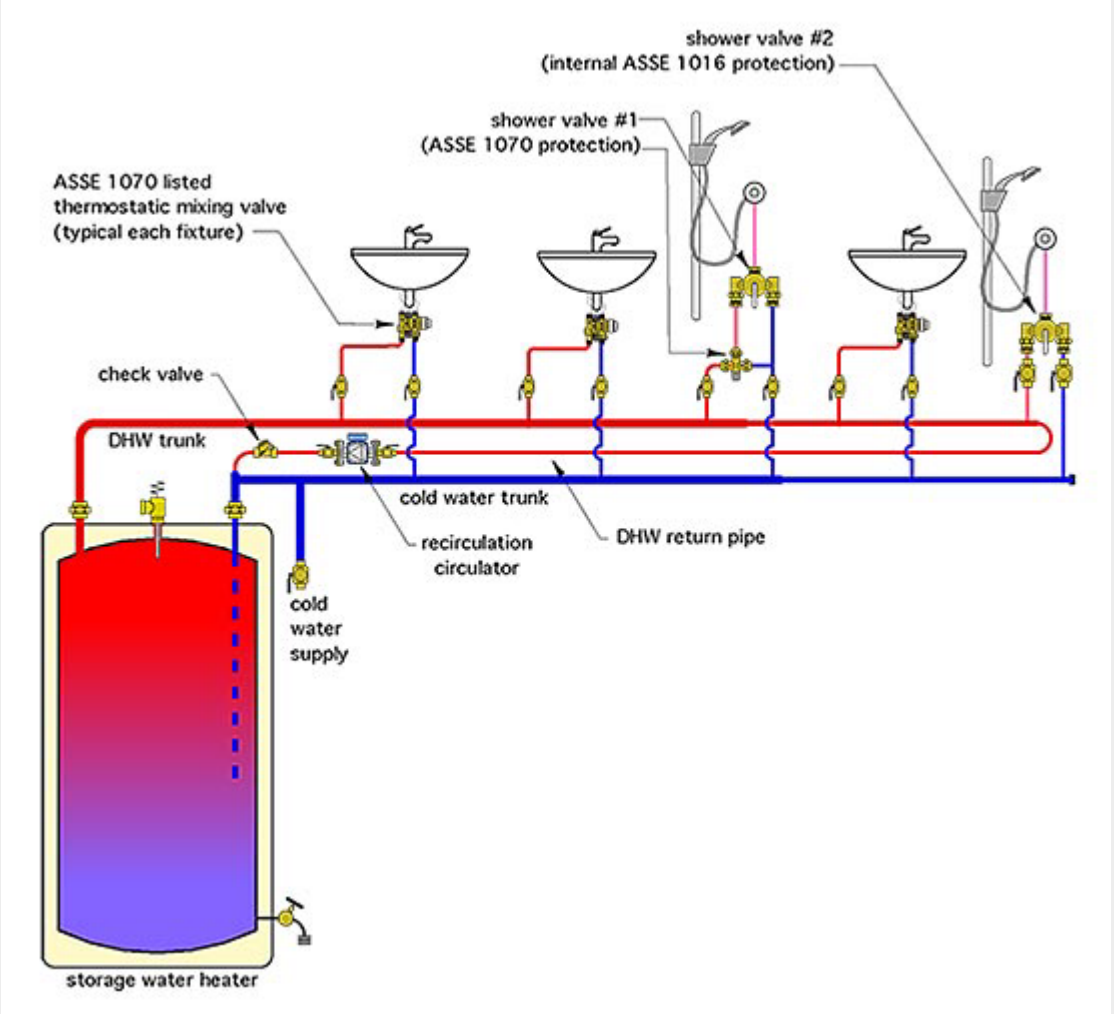
BASIC SAMPLING LOCATIONS

Consider at least 10 samples:

- Cold water inlet as a control
- Hot water storage tank
- Beginning, middle, and end of plumbing loops
- Hot water return

Hot Water Recirculating System



Plumbing and Mechanical Magazine

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BASIC SAMPLING SEQUENCE

- Culture samples (tap or shower)
  - First draw hot water sample collected in 100 milliliter laboratory specimen bottles
  - Don’t need to remove aerators
- Next volume of 100 ml:
  - Initial temperature
  - pH
  - Conductivity
  - Chlorine residual
  - ATP
  - Determine time to consistent high temperature



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INTERPRETING POSITIVE TEST RESULTS

- How many samples (number and percent) tested positive?
  - Numerator: total positive sites (first draw hot water)
  - Denominator: total sites sampled, excluding cold-water inlet
  - Collecting inlet and ice machine samples is highly recommended, but are not included in determining percent positivity
- Which *Legionella* species were identified?
- What was the concentration (colony-forming units)
- Which locations tested positive?
- How are results consistent, different over time?

The answers to these questions will help you activate the appropriate response plan and improve your long-term water management plan

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APPENDIX 4-B: INTERPRETATION OF RESULTS

- Recommended for assisted living
- **Required** for Article 28 hospitals and nursing homes

Interpretation of Routine[1] *Legionella* Culture Results from Covered Facilities	
Percentage of Positive *Legionella* Test Sites	Response
< 30%	Maintain environmental assessment and *Legionella* monitoring in accordance with the sampling and management plan.
≥ 30%	o Immediately institute short-term control measures[2] in accordance with the direction of a qualified professional,[3] and notify the department. o The water system shall be re-sampled no sooner than 7 days and no later than 4 weeks after disinfection to determine the efficacy of the treatment. o For persistent results, as determined by the department, showing ≥ 30% positive sites, long-term control measures[5] shall be implemented in accordance with the direction of a qualified professional[3] and the department. • Retreat and retest. If retest is ≥ 30% positive, repeat short-term control measures.[2] • With receipt of results < 30% positive[4], resume monitoring in accordance with the sampling and management plan. o For persistent results, as determined by the department, showing ≥ 30% positive sites, long-term control measures[5] shall be implemented in accordance with the direction of a qualified professional[3] and the department.

[1] In the event that one or more cases of legionellosis are, or may be, associated with the facility, the sampling interpretation shall be in accordance with the direction of a qualified professional and the department.

[2] Short-term control measures are temporary interventions that may include, but are not limited to, heating and flushing the water system, hyperchlorination, or the temporary installation of treatment such as copper silver ionization (CSI).

[3] Control measures shall be conducted in accordance with the direction of a qualified professional. A qualified professional is a New York State licensed professional engineer; certified industrial hygienist; certified water technologist; environmental consultant or water treatment professional with training and experience performing assessments and sampling in accordance with current standard industry protocols.

[4] Positive samples should be minimized.

[5] Long-term control measures may include supplemental disinfection treatments.

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REPORTING A ≥30% SAMPLING EXCEEDANCE

- Exceedance definition
  - 30% or more of samples testing positive for **ANY amount** of **ANY *Legionella* species**
- Facility information
  - Facility name and permanent facility identifier (PFI)
  - Address
  - Point of contact (name, title, phone, email)
- Sampling information
  - Sampling date
  - Copy of the laboratory results
  - Total number of hot water samples collected
  - Total number that tested positive for *Legionella*
  - Sampling locations (unless they're listed on the laboratory report)

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REPORTING A ≥30% SAMPLING EXCEEDANCE

- Remediation actions taken/planned
  - E.g., hyperchlorination, increasing flushing protocol
- Proposed date for post-remediation resampling
  - 1 to 4 weeks after treatment
- Send all information to hcf.legionella@health.ny.gov

Sample lab results

Result CFU/mL
Legionella: 3.1 -L. pneumophila, serogroup 1 CFU/mL
Legionella: ND
Legionella: 2.0 -L. pneumophila, serogroup 1 CFU/mL
Legionella: 1.5 -L. pneumophila, serogroup 1 CFU/mL
Legionella: ND
Legionella: 17.0 -L. pneumophila, serogroup 1 CFU/mL

Sample type	Water sample		Water sample		Water sample		Water sample	
Volume filtered (ml)	100		100		100		100	
Reporting Units	1 ml		1 ml		1 ml		1 ml	
Volume Examined	1 ml		1 ml		1 ml		1 ml	
	raw ct.	cfu*/unit	raw ct.	cfu*/unit	raw ct.	cfu*/unit	raw ct.	cfu*/unit
L. pneumophila serotype 1								
L. pneumophila serotype 2-15								
Other Legionella species	6	6			4	4	1	1
§TOTAL Legionella	6	6	ND	< 1	4	4	1	1

*cfu = colony forming units ND = none detected

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REPLY TO EXCEEDANCE NOTIFICATION FROM NEW YORK STATE DEPARTMENT OF HEALTH

Thank you for the notification. As required in Appendix 4-B, please keep us updated on the results of the samples collected after corrective measures are instituted and on your next steps. The reporting process must show improved control by having fewer than 30% of the samples collected for *Legionella* culture being positive.

In addition, please ensure that staff in your facility's infection prevention/epidemiology program are aware of these results. There should be increased vigilance for healthcare facility-associated pneumonia and a lower threshold for testing for legionellosis in such cases, as medically indicated; epidemiologists with the Department are available for consultation if needed. Please call your regional epidemiologist directly if you identify possible or confirmed cases of healthcare facility-associated legionellosis. A list of Department regional epidemiologists is available at: https://www.health.ny.gov/professionals/diseases/reporting/communicable/infection/regional_epi_staff.htm.

Please confirm that the remediation approach consists in flushing only and indicate when it is going to take place. We also expect to receive a copy of the laboratory report for *Legionella* culture for the follow-up sample (collected 7-28 days after completing remediation from all representative sites, not just the location that tested positive for *Legionella*.

Please be sure to forward this information to the facility epidemiologist and/or infection control director.

NEW YORK STATE

Sincerely,

SHORT- AND LONG-TERM REMEDIATION

- Short-term remediation
  - Supplemental chlorine
  - Heat and flush is no longer universally recommended due to risk of “rebound”
- Long-term (permanent) secondary treatment systems
  - Chlorine Chlorine dioxide
  - Copper-silver Monochloramine
- A lot of new information and available options
  - Consider a water treatment consultant if you have questions



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RESPONDING TO POSITIVE SAMPLES AND CASES

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DEFINITIONS

- **Community Associated** – Exposure in the community during the entire incubation period
  - Usually recognized as single cases or a cluster of cases in a limited area
  - **Includes assisted living facilities** and other non-Article 28 long-term care facilities and hospitals
- **Healthcare Associated** – related to a health care facility
  - **Possible** Health Care Facility Associated – ≥ 1 overnight stay in an Article 28 health care facility in the 2-14 days before symptom onset
  - **Definite** Health Care Facility Associated – Spent the entire 2-14-day incubation period in an Article 28 health care facility

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COMMUNITY INVESTIGATIONS

- **Two or more cases of confirmed legionellosis** that are epidemiologically linked by person, geographic location, and time
- Epidemiology response
  - An epidemiologic interview is attempted with all cases to obtain local travel history, possible exposure sources
- Environmental response
  - A community environmental assessment form will be requested to help identify any possible system vulnerabilities, develop a sampling plan
  - Review Dear Administrator Letter DACF 24-25: Best Practices to Prevent *Legionella*

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DAL DACF 24-25: BEST PRACTICES TO PREVENT *LEGIONELLA*

The Department of Health ("Department") recommends the following water management practices, which are not to be considered all-inclusive:

- Store hot water at temperatures above 140°F. Recirculate hot water continuously, if possible.
- Store and circulate cold water at temperatures below the growth range, ideally below 65°F.
- Flush low-flow piping runs and dead legs at least weekly.
- Flush infrequently used fixtures (e.g., vacant rooms, emergency showers) regularly as needed to maintain water quality parameters within control limits.
- Drain shower hoses after use and store them hanging down.
- Ensure disinfectant residual is detectable throughout the potable water system.
- Regularly monitor chemical levels in cooling towers and hot tubs.
- Clean and maintain water system components, such as thermostatic mixing valves, aerators, showerheads, hoses, filters, and storage tanks, regularly.
- Consider testing for *Legionella* annually.
- Develop and follow a water management plan specific to your facility and its water system.

DAL DACF 24-25: BEST PRACTICES TO PREVENT *LEGIONELLA*

- Contact your local health department if multiple residents are hospitalized with the same pneumonia-like illness or signs and symptoms
- Become familiar with Legionnaires' disease, your facility's water system, the CDC worksheet and toolkit, and the Department's *Legionella* resources
- Implement control measures that are appropriate and effective for your facility's specific needs

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ARTICLE 28 FACILITY INVESTIGATIONS

- **All healthcare facility-associated cases** in Article 28 facilities are investigated
  - Hospitals
  - Residential health care facilities (nursing homes)
- Assisted living, other congregate facilities considered "community" investigations
- Environmental protocol
  - Sampling: 3 successive monthly rounds of <30% positivity
  - Submit Environmental Assessment Form
  - Submit water management plan for scoring, feedback
- Epidemiology protocol
  - Conduct retrospective and prospective case surveillance

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ARTICLE 28 FACILITY INVESTIGATIONS

New York State Department of Health investigation team

- Regional epidemiology and environmental health staff
  - Primary facility contacts for community investigations
- Bureau of Healthcare Associated Infections
  - Primary contact for Article 28 facilities
- Bureau of Water Supply Protection
  - Water Systems Control and Analysis section

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RESPONDING TO POSITIVE SAMPLES AND CASES

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WATER RESTRICTIONS

- An emergency response to high-risk conditions
- Can be highly disruptive to residents and staff
- Can cause second-order complications if not done correctly
  - E.g., restricted water flow = stagnation = more bacterial growth
  - An exit plan for lifting restrictions should be in place before restrictions are started

Facilities should NOT place themselves on water restrictions without consulting the New York State Department of Health!

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WATER RESTRICTION OPTIONS

- Bottled water
  - Easily accessible, so a common first step
  - Used for drinking, oral care, etc.
- Disposable personal hygiene cloths
  - Disruptive to residents but may be necessary
- Point of use filters
  - Effective but need planning and can be costly



CDC

POINT OF USE FILTERS

- Effective size: 0.2 microns
- Shower heads and faucets
- Most need to be changed every 60-90 days
- Confirm fit prior to purchasing!
  - Some facilities have had to replace FAUCETS to make the filters fit!
- A **proactive** approach is best
  - List the model, seller, cost, and delivery time in the water management plan
  - Consider keeping some on hand for emergencies (*Legionella* likes to appear on Friday afternoons of holiday weekends…)



Legionella Control Systems

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BUREAU OF WATER SUPPLY PROTECTION

- Main program website:
  https://www.health.ny.gov/environmental/water/drinking/legionella/index.htm
- Part 4 full text:
  https://regs.health.ny.gov/content/part-4-protection-against-legionella
- 4-1 Cooling towers, registry email:
  cooling.tower@health.ny.gov
- 4-2 Healthcare facilities email:
  hcf.legionella@health.ny.gov



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MANY THANKS TO ALL OUR COLLABORATORS!

- New York State Department of Health
  - Bureau of Healthcare Acquired Infections
  - Bureau of Communicable Disease Control
  - Regional Offices
  - Office of Aging and Long-Term Care
- Centers for Disease Control and Prevention
- National Science Foundation
- Project LegEnd volunteer facilities!

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