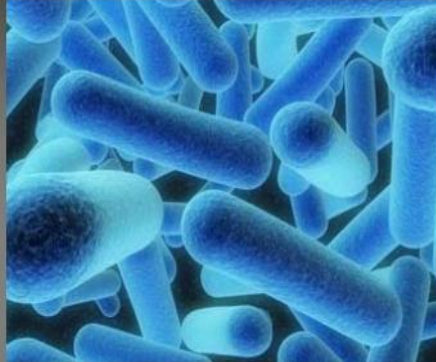
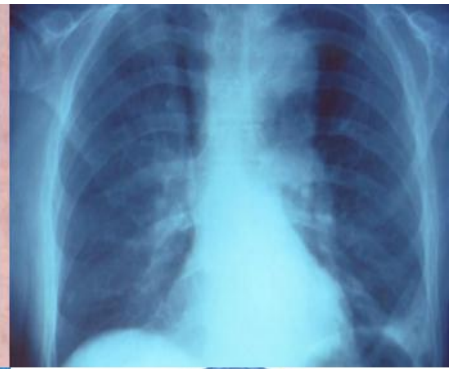
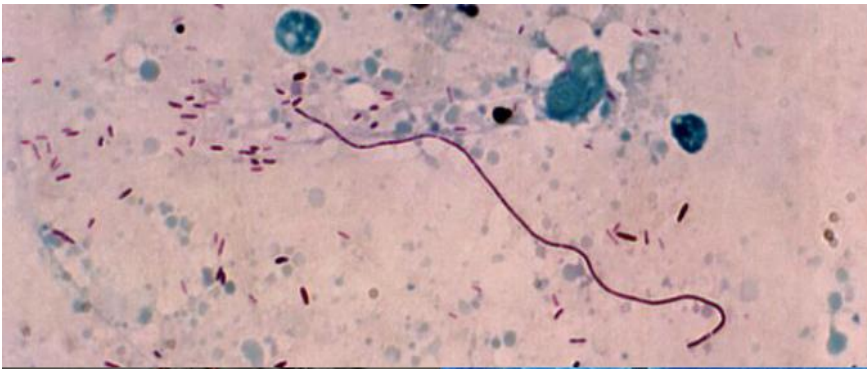


Georgia Legionellosis Control and Investigation Manual 2017



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I. Disclaimer

These materials were prepared and are relevant as of July 31, 2017. Centers for Disease Control and Prevention (CDC), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and other organizations continue to release updated recommendations and guidance. Therefore, DPH policies, procedures, and recommendations will evolve as more information is released. Please do not hesitate to reach out to the DPH *Legionella* surveillance coordinator for updated resources or guidance.

II. Biology of Legionellosis

A. Etiologic Agent

Legionnaires' disease is caused by bacteria called *Legionella*. The bacteria was named in 1976 following an outbreak of pneumonia among attendees at the American Legion convention in Philadelphia.

Legionella is a gram-negative bacterium common in many environments, and is most often found in warm water (25-42°C/77-108°F). There are multiple species and serogroups; however, the most common cause of illness in humans is *Legionella pneumophila* serogroup 1. *Legionella* typically infects individuals when the bacteria are aerosolized and inhaled or aspirated. Exposure can occur from a variety of contaminated sources such as cooling towers, fountains, faucets, showers, and even ice machines. *Legionella* spread from person-to-person is not a meaningful route of transmission.

Legionella bacteria are widely distributed in water systems. They tend to grow in biofilms or slime on the surfaces of lakes, rivers and streams, and they are not eradicated by the chlorination used to purify domestic water systems. Low and even non-detectable levels of the organism can colonize a water source and grow to high concentrations under the right conditions.

Water conditions that tend to promote the growth of *Legionella* include:

- Stagnation, low water flow
- Temperatures between 20° and 50°C (68° - 122°F) (optimal range 35° - 46°C [95° - 115°F])
- pH between 5.0 and 8.5
- Sediment, that can promote growth of commensal microflora
- Growth of micro-organisms including algae, flavobacteria, and *Pseudomonas*, which supply essential nutrients for growth of *Legionella* or harbor the organism (amoebae, protozoa).

B. Clinical Disease

Legionellosis can take one of three forms: Legionnaires' disease, Pontiac fever, and extra-pulmonary infection. People with Legionnaires' disease or Pontiac fever may have appetite loss, malaise, muscle pain, headache, and fever. However, Legionnaires' disease is associated with pneumonia, while Pontiac fever is a milder disease that does not cause pneumonia. The incubation period of Legionnaires' disease is 2-10 days after exposure, most often 5-6 days. The incubation period of Pontiac fever is 5-66 hours, with an average of 24-48 hours. Extra-pulmonary illness is non-respiratory, and may include wound infection with *Legionella* bacteria. Extra-pulmonary illness is extremely rare.

Laboratory tests to confirm the diagnosis of legionellosis include a positive urine antigen, culture, direct fluorescent antibody (DFA) staining of respiratory samples and tissue, PCR assays of urine, respiratory samples, or blood. Serologic tests of antibodies are only diagnostic with a 4-fold or greater rise in antibody titer in paired (acute and convalescent) antibody tests collected 4-8 weeks apart. Serologic testing is not recommended for clinical or public health purposes because of the delay inherent in convalescent testing.

The best practice for clinical *Legionella* testing is to test clinically compatible patients by both urine antigen and respiratory specimen culture as early as possible. It is preferable to collect the respiratory specimen prior to administration of antibiotics, but culture testing should be pursued even if antibiotic treatment has been initiated.

While *Legionella* can infect young healthy individuals, those most at risk of getting sick from the bacteria are older people (usually 65 years of age or older), as well as smokers, or those who have a chronic lung disease (like emphysema). People who have weakened immune systems from diseases (such as cancer, diabetes, or kidney failure), or from medication to suppress the immune system (such as chemotherapy or transplant medications) are also more likely to get sick from *Legionella* bacteria.

III. Epidemiology of Legionellosis

A. Case Definition

<i>Legionellosis</i>	
<p>Clinical Criteria: a.) Legionnaires' disease: fever, myalgia, cough, and clinical or radiographic pneumonia, or b.) Pontiac fever: a milder illness without pneumonia.</p>	
Confirmed	Suspect
<p>A confirmed case meets the clinical criteria <i>and</i> at least one of the following laboratory criteria:</p> <ul style="list-style-type: none"> • By culture: isolation of any <i>Legionella</i> organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid, or • By detection of <i>Legionella pneumophila</i> serogroup 1 antigen in urine using validated reagents, or • By seroconversion: fourfold or greater rise in specific serum antibody titer to <i>Legionella pneumophila</i> serogroup 1 using validated reagents. 	<p>A suspect case meets the clinical criteria <i>and</i> at least one of the following laboratory criteria:</p> <ul style="list-style-type: none"> • Fourfold or greater rise in antibody titer to specific species or serogroups of <i>Legionella</i> other than <i>L. pneumophila</i> serogroup 1 (e.g., <i>L. micdadei</i>, <i>L. pneumophila</i> serogroup 6), or • Fourfold or greater rise in antibody titer to multiple species of <i>Legionella</i> using pooled antigen and validated reagent, or • Detection of specific <i>Legionella</i> antigen or staining of the organism in respiratory secretions, lung tissue, pleural fluid, or blood by direct fluorescent antibody (DFA) staining, immunohistochemistry (IHC), or other similar method, using validated reagents, or • Detection of <i>Legionella</i> species by a validated nucleic acid assay.

Clinical symptoms can include:

- | | |
|------------|------------------|
| • Anorexia | • Fever |
| • Malaise | • Cough |
| • Myalgia | • Abdominal pain |
| • Headache | • Diarrhea |

Laboratory confirmation includes:

- Isolation of any *Legionella* species from involved tissue or respiratory secretions
- Positive *Legionella pneumophila* serogroup 1 urine antigen
- 4-fold or greater rise in antibody titer in paired (acute and convalescent) antibody tests paired 4-8 weeks apart
- Detection of specific *Legionella* antigen by direct fluorescent antibody (DFA) staining in respiratory secretions, tissue, or blood.
- PCR assay detection of *Legionella* species

Clinical compatibility for Legionnaires' disease:

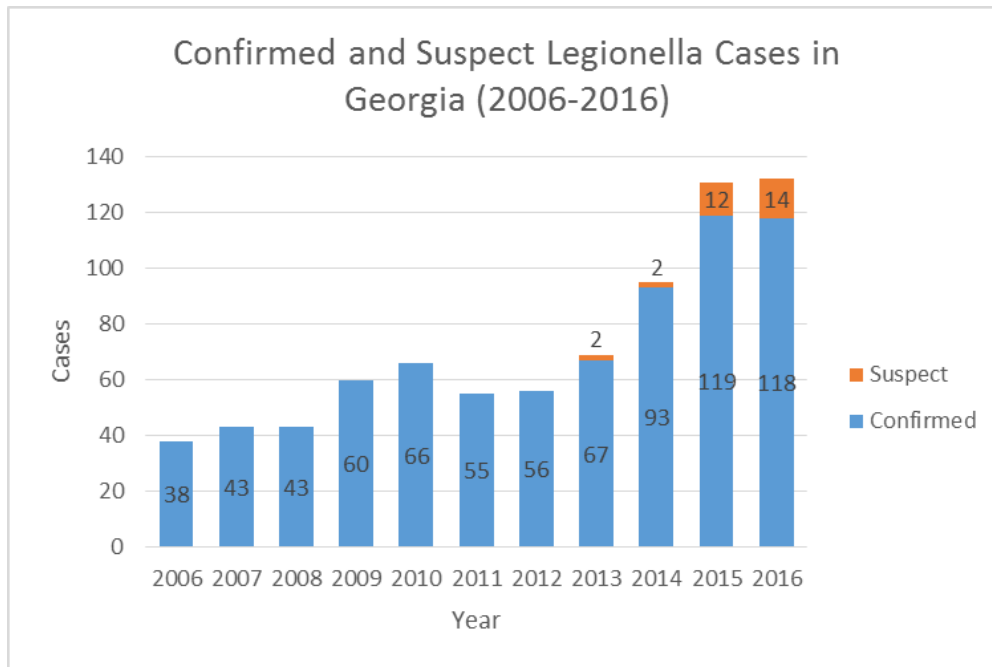
- Pneumonia diagnosis with radiographic evidence: Patchy or focal areas of consolidation that may progress to bilateral involvement on chest x-ray is consistent with Legionnaires' disease
- Pneumonia diagnosis without radiographic evidence: Physician diagnosis of pneumonia in absence of radiographic testing is sufficient for classification as Legionnaires' disease
- Absence of pneumonia: Clinical symptoms without radiographic or physician diagnosis of pneumonia is considered Pontiac fever

B. National Data

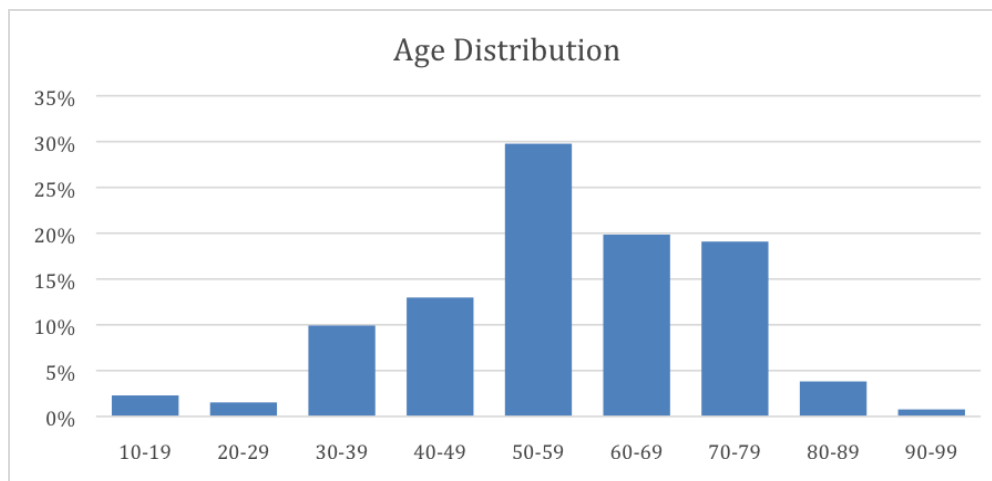
According to CDC, each year, between 8,000 and 18,000 people are hospitalized with Legionnaires' disease in the U.S. However, many infections are not diagnosed or reported, so this number may be higher. More illness is usually found in the summer and early fall, but it can happen any time of year.

C. Georgia Data

In Georgia, between 40 and 140 cases have been reported per year over the past several years.



In 2016, 66% of Georgia Legionellosis cases were male. Race was reported as White/Caucasian for 60%, Black/African-American for 36%, Asian for 3%, and not available for 1% of cases. Ethnicity was reported as non-Hispanic for 98%, Hispanic for 1%, and not available for 2% of cases.



Legionellosis cases in Georgia do exhibit seasonality similar to national trends.

IV. Case Investigation

A. Epidemiologic Case Investigation

Reported cases of legionellosis should be investigated initially at the local level. It is the responsibility of the District Epidemiologist to interview the case in accordance with the Georgia Case Report Form (Appendix A). If the case cannot be interviewed, a family member or someone that is knowledgeable of the patient's exposure history may function as a proxy. **Case investigation should be initiated in a timely manner, including attempting to contact the case or proxy for interview within seven days of report.** If the district is unable to initiate contact within seven days, please communicate directly with the State *Legionella* Coordinator to arrange for temporary assistance.

Investigators should interview cases about specific risk factors for legionellosis, including:

- Overnight travel, especially hotel/motel stays
- Pool and spa use
- Recent hospitalizations or other healthcare facility exposure
- Recent dental work
- Occupation and employer
- Other potential exposures included in the Georgia Case Report Form

Please enter the completed Georgia Case Report Form into SendSS. It is not necessary to complete the CDC Case Report Form. The State *Legionella* Coordinator will report data to CDC.

Of note, CDC recommends using a 10-day exposure history period for routine case investigation purposes, however CDC also recommends using a 14-day exposure history period for cluster or outbreak investigation. In order to better detect clusters and outbreaks, Georgia has adopted the more conservative exposure history period of 14 days.

If the case reports any travel or healthcare exposure during the 14 days prior to illness onset, notify the State *Legionella* Coordinator by email or phone as soon as travel/healthcare information is available, even if other information is pending. The State *Legionella* Coordinator will advise the Centers for Disease Control and Prevention (CDC) of the travel history and communicate with affected districts regarding travel and healthcare history. If travel is reported to a state other than Georgia, CDC will advise that state's *Legionella* Coordinator of the potential exposure. If the travel is within Georgia, the State *Legionella* Coordinator will advise the District Epidemiologist for the exposure location of the potential exposure. When CDC advises the State *Legionella* Coordinator of a potential exposure that occurred in Georgia, the Coordinator will update the District Epidemiologist for the location of the potential exposure.

B. Healthcare-Associated Cases

If a person with *Legionella* infection reports exposure to a single healthcare facility for the duration of the entire 10 days prior to illness onset, they will be classified as a **definite healthcare-associated case**. Note that a single definite healthcare-associated case triggers a cluster or outbreak investigation. See the "Cluster or Outbreak Investigation" section for more information.

If a person with *Legionella* infection reports exposure to any healthcare facility for any reason during a portion of the 14 days prior to illness onset, they will be classified as a **possible healthcare-**

associated case. If two or more possible healthcare-associated cases are identified for the same facility within twelve months, a full cluster or outbreak investigation should be initiated. See the “Cluster or Outbreak Investigation” section for more information.

If a single possible healthcare-associated case is reported for a healthcare facility, the facility should be notified for their situational awareness. If the facility is within the same district, the District Epidemiologist should notify the facility. If the facility is in another Georgia health district or out-of-state, notify the state *Legionella* coordinator, who will notify the appropriate jurisdiction.

When notifying healthcare facilities of a single possible healthcare-associated case, provide the facility with DPH educational material about prevention of *Legionella* for healthcare facilities, including a link to the CDC Water Management Program Toolkit. The facility should ensure appropriate testing and reporting for case identification. They should also have a robust water management plan to prevent *Legionella* in place, per Centers for Medicare & Medicaid Services (CMS) requirements and CDC recommendations. Continue to monitor for any additional cases.

Should a case report exposure to multiple healthcare facilities during the 14 days prior to illness onset, they will be classified as a possible healthcare-associated case for each of the facilities. Therefore, all facilities reported should be notified.

Although senior and assisted living facilities may not be classified as healthcare facilities depending on the care services offered, it is important to extend similar considerations to these facilities as they often serve an elderly population with increased susceptibility to *Legionella*.

C. Tourist Accommodation-Associated Cases

If a person with *Legionella* reports overnight stay at a tourist accommodation, they will be classified as a **travel-associated** case.

If a single travel-associated case is reported for a tourist accommodation, the facility should be notified for their situational awareness. If the facility is within the same district, the District Epidemiologist should communicate with Environmental Health to notify the facility. If the facility is in another Georgia health district or out-of-state, notify the State *Legionella* Coordinator, who will notify the appropriate jurisdiction.

When notifying tourist accommodations of a single travel-associated case, provide the facility with educational material about prevention of *Legionella* for tourist accommodations, including the CDC Water Management Program Toolkit. The facility should implement a water management plan to prevent *Legionella*, per CDC recommendations. If the facility has a water management plan in place, they should review the plan and revise as needed.

If two or more travel-associated cases are identified for the same facility within twelve months, a full cluster or outbreak investigation should be initiated. See the “Cluster or Outbreak Investigation” section for more information.

D. Pool and/or Hot Tub-Associated Cases

If a case reports exposure to a regulated recreational water facility (e.g. pool and/or hot tub), the facility should be notified for their situational awareness. If the facility is within the same district, the District Epidemiologist should communicate with Environmental Health to notify the facility. If the facility is in another Georgia health district or out-of-state, notify the State *Legionella* Coordinator who will notify the appropriate jurisdiction. If a case reports exposure to a recreational water facility that is not regulated (e.g. private hot tub), notification of the facility or owner/operator is at the discretion of the district.

When notifying regulated recreational water facilities of a single associated case, provide the facility with educational material about prevention of *Legionella*, including the CDC Water Management Program Toolkit. Per CDC recommendations, all hot tubs should have a water management plan to prevent *Legionella*. Some pools may benefit from a water management plan. Additionally, facilities with pools and/or hot tubs may benefit from a facility-wide water management plan. For example, gyms may want to implement a water management plan for the entire facility, as patrons often shower at these locations.

E. Other Settings

It is important to be mindful of settings not already described that serve a population at increased risk for *Legionella* or a population that is unable to leave the premises (e.g. prisons).

F. Cluster or Outbreak Definition

A cluster or outbreak of legionellosis is defined as two or more people diagnosed with legionellosis with exposure to the same location during the 14 days prior to illness onset. Outbreaks have been linked to water sources in the community, hospitals, cruise ships, and hotels. Common sources are whirlpool spas, cooling towers (air-conditioning units from large buildings), and water used for drinking and bathing. Keep in mind that “the same location” therefore could be anywhere within the aerosol distribution plume of a cooling tower, or in different buildings that are served by the same potable water system. For example, a medical office building on a hospital campus may have a plumbing system connected to the adjacent hospital. A cooling tower on the hospital may be a potential exposure for a patient at the medical office building.

A cluster or outbreak associated with a single location will warrant an immediate investigation by the state and district epidemiologists. An appropriate response will vary depending on the location and circumstances of the cluster/outbreak. Regardless of the details, cooperation and open communication are necessary at all levels of the investigation. Coordination of the epidemiologic investigation and the environmental assessment should begin as early as possible. The initial epidemiologic investigation should include active case finding and establishing links between ill persons and possible exposures. Strong epidemiological data may be important in the absence of environmental cultures.

If a cluster or outbreak is detected, see the “Cluster or Outbreak Investigation” section for more information.

VI. Cluster or Outbreak Investigation

A. Threshold for Public Health Investigation

Environmental investigations are triggered by either of the following situations:

1. Two or more cases report exposure to the same location/facility/water feature/etc. during the 14 days prior to illness onset within twelve months of each other
2. A single case reports exposure to a group living facility for the duration of the entire 10 days prior to illness onset. For example, if a patient is hospitalized, a resident does not leave the assisted living facility, or an inmate is incarcerated for the entire incubation period. In this instance, DPH will use the CDC's recommended 10-day exposure period as this is the more conservative approach.

In a cluster or outbreak situation, it is important to begin investigating immediately. Notify both the State *Legionella* Coordinator and the facility within one business day to initiate investigation and response activities. If the investigation involves a facility that is permitted for operation by Environmental Health (e.g. tourist accommodations or recreational water facilities), district and state Environmental Health should be notified, as well.

B. Communication

All investigation and response activities must be conducted in conjunction with public health and will require communication between public health and the facility throughout the investigation.

Best practice for coordinating response communication is to identify a single point of contact for the facility (often the infection control manager) and a single point of contact for public health (often the District Epidemiologist) through which all communication is relayed. Although technical information may need to be relayed to various subject matter experts, staff members, or contractors, this ensures a streamlined process for, and accountability of, all communications.

Depending on the circumstances, it may be appropriate for the facility to notify the patients/residents/clients, staff, and visitors regarding the possibility for *Legionella* exposure. Template letters can be provided by the State *Legionella* Coordinator as needed.

If the facility has any concerns regarding public communication, or if the facility or public health receive media requests, public health can work with the facility to craft and release joint and/or complimentary statements. Public health messaging will include epidemiology and public information officers at the local and state levels, as well as environmental health, if applicable.

DPH has found that best practice is to always provide recommendations and requests to facilities in writing on public health letterhead and signed by a district or state public health representative. This is often the district health director or DPH Medical Epidemiologist, depending on the preference of the district. Additionally, DPH Epidemiology can coordinate involvement of the DPH Office of General Counsel if facilities are not responsive during a public health investigation.

C. Clinical Investigation

The clinical investigation should include retrospective chart review, active surveillance, and testing of additional persons that are clinically compatible with Legionellosis.

- Retrospective chart review should be conducted for the period six months prior to the earliest associated case through the point of notification. A line list should be provided to public health for all persons with positive results for *Legionella*, pneumonia (diagnosed by clinician or chest x-ray), or severe respiratory illness requiring hospitalization. The line list should include patient name, date of birth, symptom onset date, symptoms, outcome, diagnosis, chest x-ray results, and any lab results for *Legionella*.
- Retrospective testing of cases may be warranted. Persons diagnosed with pneumonia (clinical or chest x-ray) with illness onset within the past month should be tested for *Legionella*. If symptoms are ongoing or resolved within the past 7 days, they should be tested by both urine antigen and respiratory specimen culture. If symptoms resolved more than 7 days prior, they should be tested by urine antigen only.
- Conduct prospective active surveillance for at least six months following onset of the last known associated case or the last positive environmental sample, whichever is later.
- Specific recommendations for who to test and how to test are provided by CDC and available online <https://www.cdc.gov/legionella/clinicians/diagnostic-testing.html>
- The facility should immediately report to public health any persons identified as clinically compatible with *Legionella*, and ensure they are tested appropriately.

D. Environmental Assessment

An Environmental assessment should be conducted in conjunction with public health as soon as possible. The environmental assessment is important for providing both the facility and public health with a better understanding of the water distribution systems, and to identify water features that may present risk for *Legionella*. Conduct the environmental assessment either in-person (preferable) or over the phone using the CDC *Legionella* Environmental Assessment Form:

<https://www.cdc.gov/legionella/downloads/legionella-environmental-assessment.pdf>

The environmental assessment should include infection control, facilities management, and administrative personnel from the facility. Local and state epidemiology personnel must participate in the environmental assessment, either in-person or by conference call. Local environmental health personnel must participate if a regulated facility (e.g. tourist accommodation) or water feature (e.g. pool/hot tub) is under investigation. For facilities not directly regulated by environmental health (e.g. healthcare facilities, prisons), inclusion of environmental health personnel is at the discretion of the district.

The environmental assessment in conjunction with public health is **not sufficient** for identification of all plumbing features likely to promote *Legionella* contamination, survival, growth, or dispersal. These factors must be considered when implementing an environmental sampling plan. Therefore, **the facility must also work with a third-party vendor (Plumbing Engineer or Industrial Hygienist with expertise in *Legionella* investigations) to conduct a technical assessment of the facility and develop a sampling plan accordingly.**

E. Environmental Sampling

Environmental sampling is a required component of *Legionella* cluster or outbreak investigations. The Georgia Public Health Laboratory does not have the capacity to test environmental samples (nor clinical samples) for *Legionella*. Therefore, the facility will need to employ a third-party vendor to

test environmental samples for *Legionella*. Labs must be CDC ELITE Program members for environmental testing. <https://wwwn.cdc.gov/elite/public/memberlist.aspx>

The *Legionella* sampling plan must be comprehensive and representative of the entire water distribution system to which associated cases were possibly exposed. Because *Legionella* colonization anywhere within a water distribution system may result in exposure at any particular point, it is necessary to assess the entire system. It is not appropriate to conduct testing at only locations where cases were in contact with the water system. Sampling must include storage tanks, proximal, medial, and distal locations along the water delivery system, and plumbed water features. Sampling should also include, but must not be limited to, specific rooms or water features epidemiologically associated with cases.

Samples should include bulk water and swabs. Bulk water samples should be 1L in volume, and it is important to ensure that the testing laboratory will process the entire sample. Samples (bulk water and swabs) must be treated with 0.1N sodium thiosulfate solution to neutralize residual disinfectant at the time of collection. Samples must be collected by persons with experience collecting environmental samples for *Legionella* testing. See the CDC sampling guidance for additional recommendations regarding testing practices. <https://www.cdc.gov/legionella/downloads/cdc-sampling-procedure.pdf>

Environmental sampling and testing is a resource-intensive process, both in terms of personnel and finances. In order to ensure that sampling is appropriate for public health purposes, **it is critical that facilities provide the sampling plan to public health for review prior to sample collection.** Many vendors (including ELITE labs) do not routinely conduct testing in accordance with parameters requested by DPH and CDC.

Ensure that any samples that test positive will be held by the private lab for further characterization by public health. If appropriate, DPH will coordinate sample submission to CDC for additional testing (e.g. genome sequencing).

F. Remediation and follow-up testing

If a comprehensive sampling plan and appropriate testing (as approved by public health) is conducted and all results are negative, then no remediation activities are required at that time. All facilities undergoing investigation should proceed with implementing and/or updating their water management program regardless of environmental sampling results.

If environmental sampling yields any positive results, the facility must immediately implement short-term remediation activities to reduce the ongoing risk of exposure to *Legionella*. Upon conclusion of the short-term remediation actions to address the current colonization of *Legionella*, the facility must implement long-term activities to prevent re-colonization with *Legionella*. **Short-term remediation and long-term prevention activities will vary by facility, water distribution system components, water parameters, plumbed water features involved, and several other site-specific aspects.** Therefore, the facility must work with an appropriately-credentialed consultant (e.g. Plumbing Engineer or Industrial Hygienist with *Legionella* expertise) to determine site-specific remediation and prevention activities.

After the facility conducts short-term remediation activities, they must perform follow-up testing to ensure that the remediation effectively eliminated existing *Legionella* and effectively prevents re-

establishment of *Legionella*. The follow up testing must be conducted per the previously described sampling plan, where all positive water delivery systems or plumbed water features are sampled to represent the entire system. Separate, closed water systems that tested negative do not need follow-up testing unless cases were associated with that water system.

Follow-up sampling should be conducted on the following schedule:

- Every two weeks for three months
- Monthly for three months

Should any positive results be identified during the follow-up testing, additional short-term remediation activities and long-term prevention strategies should be implemented, and the follow-up testing schedule should be re-started from the beginning.

G. Water Management Program

All facilities undergoing investigation should proceed with implementing and/or updating their water management program regardless of environmental sampling results. A written water management plan should include routine maintenance and activities to prevent *Legionella*, ongoing measurement of water parameters, and specific response activities should water parameters favorable to *Legionella*, positive environmental results, or associated cases be identified. The water management plan should incorporate findings from the environmental assessment, technical assessment by a *Legionella* expert, sampling results, and any other possible contributing factors identified during the investigation.

Implementing long-term prevention strategies can be a lengthy process, but it is reasonable for facilities to submit the water management plan for public health review within six months of the first round of negative environmental results.

H. Investigation Conclusion

The investigation can be considered concluded when the following measures are met.

- Active prospective surveillance has continued without identification of any new cases for at least six months from the last associated case or positive environmental sample (whichever is later).
- If positive environmental samples were identified, remediation has been conducted and the follow-up testing schedule is complete (every two weeks for three months and then monthly for three months, without additional positive results).
- A water management program has been implemented and/or updated, and the water management plan has been submitted for public health approval.

Appendix A: DPH Legionellosis Case Report Form

Legionellosis Case Investigation Form

I. DEMOGRAPHICS																										
Name: _____ Last, _____ First	Date of Birth: ____/____/____ Age: _____																									
Address: _____ Street _____ City _____ Zip Code _____	Sex: <input type="checkbox"/> Female <input type="checkbox"/> Male Race: <input type="checkbox"/> White <input type="checkbox"/> Multiracial <input type="checkbox"/> Black <input type="checkbox"/> American Indian/Alaska <input type="checkbox"/> Asian <input type="checkbox"/> Native Hawaiian/Pacific Islander <input type="checkbox"/> Other _____																									
County/District: _____/_____	Ethnicity: <input type="checkbox"/> Hispanic <input type="checkbox"/> Non-Hispanic <input type="checkbox"/> Unknown																									
Home Phone: (_____) _____	Cell Phone: (_____) _____																									
Work Phone: (_____) _____																										
II. CASE INVESTIGATION																										
Date of first report: ____/____/____	Date of first interview attempt: ____/____/____																									
Interviewer information:	Date of interview: ____/____/____																									
Name _____	Respondent was: <input type="checkbox"/> Case <input type="checkbox"/> Surrogate																									
Affiliation: _____	Surrogate Name _____																									
Phone: (_____) _____	Surrogate Relation to Case _____																									
	Surrogate Phone (_____) _____																									
III. CLINICAL INFORMATION																										
Date of Onset: ____/____/____	Outcome: <input type="checkbox"/> Survived <input type="checkbox"/> Died <input type="checkbox"/> Still Ill <input type="checkbox"/> Unknown																									
1. What type of medical care was sought for this illness? (Mark all that apply)																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: center;">YES</td> <td style="width: 10%; text-align: center;">NO</td> <td style="width: 10%; text-align: center;">DK</td> <td style="width: 30%;">Primary Care Doctor</td> <td style="width: 40%;">Facility Name _____ Visit Date ____/____/____</td> </tr> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> <td style="text-align: center;">DK</td> <td>Urgent Care Facility</td> <td>Facility Name _____ Visit Date ____/____/____</td> </tr> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> <td style="text-align: center;">DK</td> <td>Emergency Room</td> <td>Facility Name _____ Visit Date ____/____/____</td> </tr> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> <td style="text-align: center;">DK</td> <td>Hospital Admission, not ICU</td> <td>Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____</td> </tr> <tr> <td style="text-align: center;">YES</td> <td style="text-align: center;">NO</td> <td style="text-align: center;">DK</td> <td>Hospital Admission, ICU</td> <td>Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____</td> </tr> </table>	YES	NO	DK	Primary Care Doctor	Facility Name _____ Visit Date ____/____/____	YES	NO	DK	Urgent Care Facility	Facility Name _____ Visit Date ____/____/____	YES	NO	DK	Emergency Room	Facility Name _____ Visit Date ____/____/____	YES	NO	DK	Hospital Admission, not ICU	Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____	YES	NO	DK	Hospital Admission, ICU	Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____	
YES	NO	DK	Primary Care Doctor	Facility Name _____ Visit Date ____/____/____																						
YES	NO	DK	Urgent Care Facility	Facility Name _____ Visit Date ____/____/____																						
YES	NO	DK	Emergency Room	Facility Name _____ Visit Date ____/____/____																						
YES	NO	DK	Hospital Admission, not ICU	Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____																						
YES	NO	DK	Hospital Admission, ICU	Facility Name _____ Admission Date ____/____/____ Discharge Date ____/____/____																						
2. Did you experience the following symptoms?																										
Fever: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> DK Date of fever onset: ____/____/____	Pneumonia: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> DK If yes, how was pneumonia diagnosed? <input type="checkbox"/> Clinician <input type="checkbox"/> Chest X-Ray																									
Cough: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> DK Shortness of breath: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> DK	Other: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> DK Specify: _____																									
IV LABORATORY INFORMATION																										
1. Laboratory: _____	Collection Date: ____/____/____																									
2. Laboratory: _____	Collection Date: ____/____/____																									
3. Laboratory: _____	Collection Date: ____/____/____																									
	Test: _____ Specimen: _____																									
	Test: _____ Specimen: _____																									
	Test: _____ Specimen: _____																									

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V. POTENTIAL SOURCES OF EXPOSURE (14 days prior to onset)

1. Occupation: _____ **Employer Address** Street: _____

Employer: _____ City: _____ State: _____ Zip: _____

2. Does work involve contact with industrial water? YES NO DK County/District: _____

3. Do you recall any general construction, plumbing projects, water main breaks, or other water line work in the 14 days prior to illness onset at your home, workplace, or travel destinations? YES NO DK

If yes, describe incident and provide location: _____

4. Did you enter (visit, work, or volunteer at) any healthcare facility (e.g. hospital, long term care, assisted living, senior living, clinic, doctor or dentist office, rehab, or any other healthcare facility)? YES NO DK

If yes or possibly, provide information for each visit:

<input type="checkbox"/> Inpatient	Facility Name: _____	Reason for Visit: _____
<input type="checkbox"/> Outpatient	Facility Location: _____	_____
<input type="checkbox"/> Employee	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Volunteer	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Visitor	Facility Type: _____	Dates: _____

<input type="checkbox"/> Inpatient	Facility Name: _____	Reason for Visit: _____
<input type="checkbox"/> Outpatient	Facility Location: _____	_____
<input type="checkbox"/> Employee	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Volunteer	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Visitor	Facility Type: _____	Dates: _____

<input type="checkbox"/> Inpatient	Facility Name: _____	Reason for Visit: _____
<input type="checkbox"/> Outpatient	Facility Location: _____	_____
<input type="checkbox"/> Employee	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Volunteer	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Visitor	Facility Type: _____	Dates: _____

<input type="checkbox"/> Inpatient	Facility Name: _____	Reason for Visit: _____
<input type="checkbox"/> Outpatient	Facility Location: _____	_____
<input type="checkbox"/> Employee	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Volunteer	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Visitor	Facility Type: _____	Dates: _____

<input type="checkbox"/> Inpatient	Facility Name: _____	Reason for Visit: _____
<input type="checkbox"/> Outpatient	Facility Location: _____	_____
<input type="checkbox"/> Employee	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Volunteer	City _____ State _____ Zip _____	_____
<input type="checkbox"/> Visitor	Facility Type: _____	Dates: _____

Comments: _____

5. In the 14 days prior to your illness onset, did you use a nebulizer, CPAP, BiPAP, or other respiratory therapy equipment? YES NO DK

If yes, dates of use _____

If yes, does this device use a humidifier? YES NO DK

If yes, what type of water is used in the device? Check all that apply.

Sterile Distilled Bottled Tap Unknown Other, please specify: _____

Legionellosis Case Investigation Form

6. Did you spend any nights away from home (excluding health care facilities)? YES NO DK

If yes (or possibly), please provide information for each stay away from home:

Accommodation Name (or private residence): _____	Room # _____
Address: _____	Arrival ____/____/____
City _____ State _____ Zip _____ Country _____	Departure ____/____/____

Accommodation Name (or private residence): _____	Room # _____
Address: _____	Arrival ____/____/____
City _____ State _____ Zip _____ Country _____	Departure ____/____/____

Accommodation Name (or private residence): _____	Room # _____
Address: _____	Arrival ____/____/____
City _____ State _____ Zip _____ Country _____	Departure ____/____/____

Comments: _____

7. Did you have exposure to any of the following during the 14 days prior to onset?

YES	NO	DK	Hot tub or whirlpool spa (entered)	Name/Location: _____ Date(s): _____
YES	NO	DK	Hot tub or whirlpool spa (near, not entered)	Name/Location: _____ Date(s): _____
YES	NO	DK	Jacuzzi bathtub	Name/Location: _____ Date(s): _____
YES	NO	DK	Pool	Name/Location: _____ Date(s): _____
YES	NO	DK	Recreational misters	Name/Location: _____ Date(s): _____
YES	NO	DK	Steam room or wet sauna	Name/Location: _____ Date(s): _____
YES	NO	DK	Decorative fountain	Name/Location: _____ Date(s): _____
YES	NO	DK	Humidifier	Name/Location: _____ Date(s): _____
YES	NO	DK	Shower (away from home only)	Name/Location: _____ Date(s): _____
YES	NO	DK	Gym facility	Name/Location: _____ Date(s): _____
YES	NO	DK	Hotel (without overnight stay)	Name/Location: _____ Date(s): _____
YES	NO	DK	Grocery store with produce mister	Name/Location: _____ Date(s): _____

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YES	NO	DK	Public gathering	Name/Location: _____ Date(s): _____
YES	NO	DK	Mall/department store	Name/Location: _____ Date(s): _____
YES	NO	DK	Home improvement or other large store	Name/Location: _____ Date(s): _____

Comments: _____

8. Are there other locations where you spent several hours away from home in the 14 days prior to onset? YES NO DK
 If yes (or possibly), please provide information for location:
 Location name _____
 Type of facility _____
 Address: _____
 City _____ State _____ Zip _____ County/District _____ / _____
 Dates _____
 Activities while at location _____

9. Do you know anyone else with similar symptoms? YES NO DK
 If yes, please provide information about shared exposure, including dates and location: _____

VI. MEDICAL HISTORY

1. Have you ever been told by a healthcare provider that you had the following?
 YES NO DK Chronic lung disease (COPD, emphysema)
 YES NO DK Asthma
 YES NO DK Weakened immune system (cancer, organ transplant, HIV, immune-suppressive meds)
 YES NO DK Diabetes
 YES NO DK Chronic Kidney Disease
 YES NO DK Heart Disease or CHF
 YES NO DK Liver disease
 YES NO DK Other conditions Specify: _____

Comments: _____

2. Are you a current smoker? YES NO Packs per day _____ Duration (years) _____
 3. Are you a former smoker? YES NO Packs per day _____ Duration (years) _____
 4. Do you drink alcohol? YES NO Drinks per day _____ Duration (years) _____

Appendix B: DPH Recommendations for Healthcare Facilities with a Single Possible Healthcare-Associated Case



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Legionellosis

Georgia Department of Public Health Recommendations for Healthcare Facilities with a single Possible Healthcare-Associated Case

Recommendations are different for facilities with two or more possible healthcare-associated cases.

A possible healthcare-associated case of Legionellosis is a patient who spent part of the 10 days prior to illness onset in the facility.¹

Increase Surveillance Activities

- Review records for other patients that tested positive for *Legionella* infection in the past six months. Ensure that all cases are reported to the Georgia Department of Public Health (GDPH) or to your District Epidemiologist.
- Review clinical protocols for testing. Encourage physicians to test for *Legionella* per CDC and Infectious Diseases Society of America (IDSA) recommendations²:
 - Patients with healthcare-associated pneumonia
 - Patients who have failed outpatient antibiotic therapy for community-acquired pneumonia
 - Patients with severe pneumonia, in particular those requiring intensive care
 - Immunocompromised patients with pneumonia
 - Patients with pneumonia in the setting of a Legionellosis outbreak
 - Patients with a travel history within two weeks of illness onset
- Order appropriate testing. Best practice is to obtain lower respiratory specimens for culture at the time of urine antigen and/or PCR testing, preferably before antibiotic administration.²

Review your Water Management Program

- You should have a water management program for your hot and cold water distribution system, and it should be reviewed at this time. The CDC toolkit, **Developing a Water Management Program to Reduce *Legionella* Growth & Spread in Buildings**, can assist with development and review of your water management program.¹
- Inform members of the water management program team of the possible healthcare-associated case.
- Assess the circulating water temperatures and chlorine levels in your facility. Hot water should circulate above 125°F, cold water should circulate below 68°F, and free chlorine should be greater than 0.5ppm throughout the system.

What to do if you identify possible or definite healthcare-associated *Legionella* cases:

- Contact GDPH or your District Epidemiologist for additional recommendations if you identify any additional Legionellosis cases.

References

1. CDC: Developing a Water Management Program to Reduce *Legionella* Growth and Spread in Buildings <http://www.cdc.gov/legionella/downloads/toolkit.pdf>
2. CDC: Diagnosis, Treatment, and Prevention <http://www.cdc.gov/legionella/clinicians/diagnostic-testing.html>



We Protect Lives.

Appendix C: Legionellosis Investigation Resources

References

1. ASHRAE Standard 188-2015. Legionellosis: Risk Management for Building Water Systems. (2015)
2. CDC: Developing a Water Management Program to Reduce Legionella Growth and Spread in Buildings <http://www.cdc.gov/legionella/downloads/toolkit.pdf>
3. CDC: Diagnosis, Treatment, and Prevention <http://www.cdc.gov/legionella/clinicians/diagnostic-testing.html>
4. CDC ELITE Program Member List <https://wwwn.cdc.gov/elite/Public/MemberList.aspx>
5. CDC: Sampling Procedure and Potential Sampling Sites <https://www.cdc.gov/legionella/downloads/cdc-sampling-procedure.pdf>
6. Department of Veterans Affairs: Prevention of Healthcare-Associated Legionella Disease and Scald Injury from Potable Water Distribution Systems. Directive 1061. Appendix A. Emergency Remediation of the Potable Water Distribution Systems. (2014) Page A-6. http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=3033
7. EPA: Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100C8XW.txt>
8. OSHA Technical Manual Section III: Chapter 7 https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_7.html

Appendix D: Regulatory Statutes and Authority

A. Tourist Accommodations and Pools/Hot Tub Spas

Environmental Health, under Georgia Department of Public Health, has direct regulatory authority over the operations of tourist accommodation and pools/hot tub spas. This authority is pursuant to the Official Code of Georgia (O.C.G.A.) §§ 31-2A-6 and 31-28-5 (for tourist accommodations) and O.C.G.A. Secs. 31-2A-6, 31-12-8, 31-45-10 (for pools/hot tub spas). Under O.C.G.A., the local Environmental Health Department has the authority to respond to imminent health hazards in order to prevent a significant threat of danger or death, injury or illness, including ceasing operations of tourist accommodations or pools/hot tub spas. Although the code language is not specific to *Legionella*, it does provide clear authority for Environmental Health intervention should a facility be associated with *Legionella* cases.

B. Other Facilities

Although Georgia Department of Public Health is not the regulatory authority for numerous other facility types (e.g. healthcare facilities, occupational settings, corrections facilities, etc.), Public Health does have the ability to intervene in other *Legionella* investigation situations. Per the DPH Office of General Counsel, the District Health Director has the authority to issue an administrative order compelling persons or entities to take or cease actions necessary to protect the public health.

O.C.G.A. Section 31-3-4(a)(3) authorizes the county board of health to “take such steps as may be necessary to prevent and suppress disease and conditions deleterious to health and to determine compliance with health laws and rules, regulations, and standards adopted thereunder.” O.C.G.A. Section 31-3-5-(a) authorized the county board of health to “secure compliance with the rules and regulations of the department that have local application” and to “enforce, or cause enforcement of, all laws pertaining to health.” Those powers are delegated by law to the District Health Director, as “chief executive office” of the County Board of Health.

Code Section 31-5-3(a)(1) provides that “any party to a proceeding and who is aggrieved or adversely affected by any final order or action of a county board of health” may appeal to the Georgia Department of Public Health. The Department’s decision is subject to petition for judicial review in Superior Court. *Id.*

The Code does not specify an enforcement mechanism for administrative orders. If a District Health Director issues an order and the person or entity refuses to comply, then the remedy is for the District Health Director to petition the Superior Court for a mandatory injunction. In addition, the County Commission may by ordinance impose penalties, including fines and imprisonment, for the violation of public health regulations and orders.