January 2025

Legionellosis

Surveillance and Investigation Protocol

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Office of Epidemiology and Prevention Services
Division of Communicable Disease Epidemiology
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Legionellosis

Surveillance and Investigation Protocol

I. ABOUT THE DISEASE

Legionellosis is a disease that is caused by the *Legionella* bacteria. *Legionella* can cause both Legionnaires' disease and Pontiac fever. The *Legionella* bacteria lives naturally in freshwater environments and becomes a concern when it is found in human-made building water systems.

In West Virginia (WV), cases of legionellosis have increased since 2020 and were seen in males more than females. Those who are at a higher risk of getting legionellosis are people who are 50 years or older and those who have underlying health conditions. Historically, a spike in cases are seen around June and August in WV.

Legionella is a category 4 disease and cases should be reported to the local health department (LHD) within 1 week of notification. Outbreaks should be reported to the LHD immediately.

A. Clinical Presentation

The *Legionella* bacteria can cause two syndromes: Legionnaires' disease and Pontiac fever. Legionnaires' disease causes pneumonia that may require hospitalization while pontiac fever is a more mild, febrile, influenza-like illness and is not associated with pneumonia. Pontiac fever is self-limited and may resolve on its own. The case-fatality rate for Legionnaires' disease is 10% but around 25% for healthcare-associated cases. Pontiac fever is uncommon, and the case fatality rate is extremely low. Patients usually recover within 1 week. *Legionella* can also cause extrapulmonary infections such as endocarditis and/or wound infections.

Legionnaires' disease

Symptoms may include those typical of pneumonia:

- cough
- shortness of breath
- fever
- muscle aches
- headaches

Other uncommon symptoms may include:

- diarrhea
- nausea
- confusion

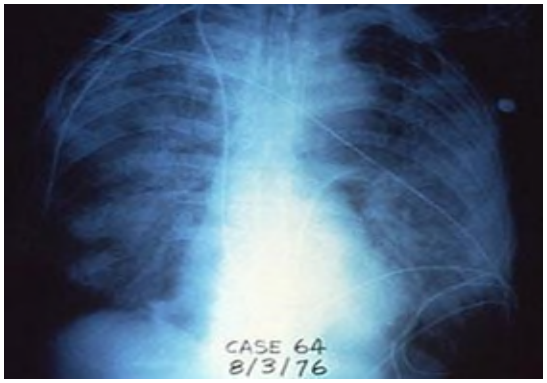

Figure 1: Chest X-ray of Legionnaires' disease pneumonia. Image retrieved from https://www.cdc.gov/Legionella/about/signs-symptoms.html

Pontiac fever

Symptoms are milder, self-limiting, and may include:

- fever
- muscle aches

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- chills
- headaches
- fatigue
- nausea
- vomiting

Those with pre-existing conditions may be at an increased risk of developing disease. Pre-existing conditions include but are not limited to:

- Age ≥50 years
- Smoking (current or historical)
- Chronic lung disease (such as emphysema or COPD)
- Immune system disorders due to disease or medication
- Systemic malignancy
- Underlying illness such as diabetes, renal failure, or hepatic failure

Infection in children is rare, >1% cases of pneumonia are caused by *Legionella* and may be asymptomatic or mild and unrecognized. Severe infection can happen in children with malignancy, severe combined immunodeficiency, chronic granulomatous disease, organ transplantation, end-stage renal disease, and underlying pulmonary disease and those treated with systemic corticosteroids or other immunosuppression. Healthcare-associated cases in newborn infants are often severe and even fatal.

B. Etiologic Agent

Bacteria of the genus *Legionellae* cause Legionnaires' disease, Pontiac fever, and extrapulmonary infections. There are at least 60 different species of the bacteria and at least 20 of them are known to cause human disease. Although there are many species of the bacteria, the majority of infections are caused by *Legionellae* pneumophila with most isolates belonging to serogroup 1.

C. Reservoir

The *Legionella* bacteria is naturally found in the environment such as freshwater environments (i.e. lakes, ponds, creeks, and soil from their banks) but is usually not present in numbers where it can cause disease. It has been isolated in water from human-made water systems such as hot water systems, air conditioning cooling towers, large complex plumbing systems, evaporative condensers, humidifiers, whirlpool spas, respiratory therapy devices, decorative fountains, hot and cold water taps and showers, and hot tubs.

Travel is also a risk factor as hotels, resorts, and cruise ships have large complex plumping devices and aerosol-generating devices. Healthcare facilities such as hospitals and long-term care facilities have these as well. Healthcare associated cases in newborn infants have been documented after using a humidifier or utilizing a birthing pool or hot tub.

D. Incubation Period

The incubation period for Legionnaires' disease is 2 to 14 days, usually 5 to 6 days. The incubation period for Pontiac fever is a few hours to 3 days, usually 24 to 48 hours.

E. Mode of Transmission

In water, *Legionella* bacteria grows and multiples within other organisms that protects them from adverse environments such as extreme temperatures and chemicals like chlorine. After they multiply, water droplets contaminated with the bacteria can be small enough for humans to breathe in, therefore causing disease. Less commonly, aspiration of the lungs can happen when a person drinks contaminated water. Those with swallowing difficulties are most at risk for this. There is only one documented case of person to person transmission.

F. Period of Communicability

Legionella is generally not transmitted person-to-person.

II. DISEASE CONTROL AND PREVENTION

A. Disease Control Objectives

Prevent additional cases of legionellosis by:

1. Early recognition and investigation of outbreaks to determine the source.
2. Early recognition and investigation of cases of legionellosis or unexplained pneumonia.
3. Implement *Legionella* control measures.

B. Disease Prevention Objectives

Prevent cases through:

1. Healthcare provider education about testing for *Legionella* for cases of unexplained pneumonia or symptoms of Pontiac fever.
2. Healthcare provider education about timely reporting of cases and/or suspected outbreaks.
3. Healthcare provider education about the importance of asking about travel and healthcare exposures.
4. Minimizing *Legionella* growth in complex building water systems and devices.

NOTE: There is very little that can be done to prevent sporadic cases of legionellosis at the community level.

C. Disease Prevention and Control Intervention

Environmental Health can consider engaging and educating partners on the following to prevent disease occurrence:

1. Healthcare facilities should establish a water management program to identify hazardous conditions. Visit the CDC's toolkit for developing a water management program: https://www.cdc.gov/control-legionella/php/toolkit/wmp-toolkit.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/toolkit/index.html.
2. Key elements of a water management program include:

a. Establish a water management team.
b. Describe the building water systems using text and flow diagrams.
c. Identify areas where Legionella could grow and spread.
d. Decide where control measures should be applied and how to monitor them.
e. Establish ways to intervene when control limits are not met.
f. Make sure the program is running as designed and is effective.
g. Document and communicate all the activities.

3. The Centers for Medicare and Medicaid Services (CMS) requires healthcare facilities to develop and adhere to ASHRAE-compliant water management programs per CMS memo QSO-17-30. Visit the CDC's toolkit for developing a water management program in healthcare facilities: https://www.cdc.gov/control-legionella/php/healthcare/water-management.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/healthcare-facilities/water-mgmt-facilities.html.
4. Implement Legionella control measures per ASHRAE Guideline 12-2020**.** Visit the CDC's Legionella Control toolkit here for more information: https://www.cdc.gov/control-legionella/php/toolkit/control-toolkit.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/control-toolkit/index.html.
5. Regularly monitor water quality parameters, such as disinfectant residual and temperature levels. By monitoring these parameters, the team can ensure that building water systems are operating in a way to minimize hazardous conditions that could encourage *Legionella* and other waterborne pathogens to grow.
6. Considerations for hotel owners and managers: https://www.cdc.gov/control-legionella/php/hospitality/considerations-for-hotel-owners-and-managers.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/hotel-owners-managers.html.
7. Considerations for vacation rental owners and managers: https://www.cdc.gov/control-legionella/php/hospitality/considerations-for-vacation-rental-owners-and-managers.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/vacation-rental.html.
8. Considerations for cruise ship operators: https://www.cdc.gov/control-legionella/php/guidance/cruise-ship-operators.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/cruise-ship-operators/index.html.
9. Considerations for public hot tub operators: https://www.cdc.gov/control-legionella/php/hospitality/considerations-for-public-hot-tub-operators.html?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/hotTub-operators.html.

D. Treatment

Pontiac fever is self-limited and does not require antibiotic treatment. The first line of treatment for Legionnaires' disease does not always include *Legionella*-directed antibiotics. It is preferred that testing should be performed before administration of antibiotics; however, treatment should not be delayed. The recommended treatment for Legionnaires' disease is intravenous azithromycin or levofloxacin (or another respiratory fluoroquinolone). Once the condition of the patient is improving, oral therapy can be substituted.

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Doxycycline can be an alternative agent for treatment; however, some species of *Legionella* are resistant. Duration of therapy is 5 to 10 days for azithromycin and 14 to 21 days for other drugs. Longer courses of therapy are recommended for patients who are immunocompromised or who have severe disease. For more information on treatment, please see the most recent IDSA-ATS guidelines for treatment of community-acquired pneumonia and the most recent IDSA-ATS guidelines for treatment of hospital-acquired pneumonia.

III. DISEASE INVESTIGATION

A. CDC Surveillance Classifications

Exposure Categories for Surveillance Purposes

- **Travel-associated:** The patient spent at least one night away from home (in the state of residence, another state, or another country) in the 14 days before date of symptom onset, not including nights spent in a healthcare facility.
- **Presumptive healthcare-associated:** A case with ≥10 days of continuous stay at a healthcare facility during the 14 days before onset of symptoms.
- **Possible healthcare-associated:** A case that spent a portion of the 14 days before date of symptom onset in one or more healthcare facilities, but does not meet the criteria for presumptive healthcare-associated Legionnaires' disease.
- **Assisted living associated:** The patient spent a portion of the 14 days before date of symptom onset in a facility that provides custodial care without skilled nursing (e.g., assistance with activities of daily living, like bathing and dressing).
- **Senior living associated:** The patient spent a portion of the 14 days before date of symptom onset in a facility that provides independent living for the elderly.

- A patient who spent ≥10 days of continuous stay in multiple healthcare facilities would be considered a presumptive healthcare-associated case for surveillance purposes.
- If the date of symptom onset is difficult to define (e.g., in patients with chronic underlying illness), date determination is deferred to the judgment of the clinicians providing care and the public health officials performing the investigation.

B. Case Definition and Case Classification

Clinical Criteria

Legionellosis is associated with three clinically and epidemiologically distinct illnesses: Legionnaires' disease, Pontiac fever, or extrapulmonary legionellosis.

Legionnaires' disease (LD): Legionnaires' disease presents as pneumonia, diagnosed clinically and/or radiographically.

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Evidence of clinically compatible disease can be determined several ways: a) a clinical or radiographic diagnosis of pneumonia in the medical record OR b) if "pneumonia" is not recorded explicitly, a description of clinical symptoms that are consistent with a diagnosis of pneumonia1.

Pontiac fever (PF): PF is a milder respiratory illness. It begins from a few hours to 3 days following exposure to the bacteria. While symptoms of PF2 could appear similar to those described for Legionnaires' disease, there are distinguishing clinical features. PF presents with headache, muscle ache, chills, fever, cough, and fatigue, and lasts less than 1 week. PF does not present as pneumonia. It is less severe than LD, rarely requiring hospitalization. PF is self-limited, meaning it resolves without antibiotic treatment.

Extrapulmonary legionellosis (XPL): *Legionella* can cause disease at sites outside the lungs (for example, associated with endocarditis, wound infection, joint infection, graft infection). A diagnosis of extrapulmonary legionellosis is made when there is clinical evidence of disease at an extrapulmonary site and diagnostic testing indicates evidence of *Legionella* at that site.

Laboratory Criteria

Confirmatory laboratory evidence:

- Isolation of any *Legionella* organism from lower respiratory secretions, lung tissue, pleural fluid, or extrapulmonary site
- Detection of any *Legionella* species from lower respiratory secretions, lung tissue, pleural fluid, or extrapulmonary site by a validated nucleic acid amplification test
- Detection of *Legionella pneumophila* serogroup 1 antigen in urine using validated reagents
- Fourfold or greater rise in specific serum antibody titer to *Legionella pneumophila* serogroup 1 using validated reagents

Presumptive laboratory evidence:

None required for case classification

Supportive laboratory evidence:

- Fourfold or greater rise in antibody titer to specific species or serogroups of *Legionella* other than *L. pneumophila* serogroup 1 (e.g., *L. micdadei*, *L. pneumophila* serogroup 6)
- Fourfold or greater rise in antibody titer to multiple species of *Legionella* using pooled antigens.
- Detection of specific *Legionella* antigen or staining of the organism in lower respiratory secretions, lung tissue, pleural fluid, or extrapulmonary site associated with clinical disease by direct fluorescent antibody (DFA) staining, immunohistochemistry (IHC), or other similar method, using validated reagents

Epidemiologic Linkage

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1. Epidemiologic link to a setting with a confirmed source of *Legionella* (e.g., positive environmental sampling result associated with a cruise ship, public accommodation, cooling tower, etc.).
   OR
2. Epidemiologic link to a setting with a suspected source of *Legionella* that is associated with at least one confirmed case.

Criteria to Distinguish a New Case from an Existing Case

An individual should be considered a new case if their previous illness was followed by a period of recovery prior to acute onset of clinically compatible symptoms and subsequent laboratory evidence of infection. The recovery period for legionellosis can vary based on patient-specific factors. CDC consultation is encouraged for case classification of individuals without clear periods of recovery or subsequent acute illness onset.

Case Classifications

Suspect

Suspect Legionnaires' disease (LD): A clinically compatible case of LD with supportive laboratory evidence for *Legionella*.

Suspect Pontiac fever (PF): A clinically compatible case of PF with supportive laboratory evidence for *Legionella*.

Suspect Extrapulmonary legionellosis (XPL): A clinically compatible case of XPL with supportive laboratory evidence of *Legionella* at an extrapulmonary site.

Probable

Probable Legionnaires' disease (LD): A clinically compatible case with an epidemiologic link during the 14 days before onset of symptoms.

Probable Pontiac fever (PF): A clinically compatible case with an epidemiologic link during the 3 days before onset of symptoms.

Confirmed

Confirmed Legionnaires' disease (LD): A clinically compatible case of LD with confirmatory laboratory evidence for *Legionella*.

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Confirmed Pontiac fever (PF): A clinically compatible case of PF with confirmatory laboratory evidence for *Legionella*.

Confirmed Extrapulmonary legionellosis (XPL): A clinically compatible case of XPL with confirmatory laboratory evidence of *Legionella* at an extrapulmonary site.

C. Reporting Timeframe to Public Health

Legionellosis is reportable within 1 week to the local health department. Outbreaks should be reported immediately to the local health department.

D. Outbreak Recognition

If multiple cases of Legionellosis are identified in your local health jurisdiction, contact the OEPS Epi on-call at (304) 558-5358 ext. 2 to notify the team of a suspected outbreak to initiate an appropriate response. Typically, potential outbreaks of Legionellosis are recognized by the CDC Legionellosis surveillance team as they review all travel associated sporadic cases looking for commonalities. If a suspected source is identified in the state, the appropriate local health department will be notified to begin an investigation. Please utilize the *Legionella* Outbreak Manual for additional information and resources during an outbreak.

Community Outbreak: A greater than expected number of cases reported during a certain time frame.

Travel-associated outbreak: two or more Legionnaires' disease cases associated with the same travel accommodation in a 12-month period.

Healthcare-associated outbreak: one presumptive healthcare-associated cases or two possible healthcare-associated cases within a 12-month period.

- Presumptive healthcare-associated Legionnaires' disease: A case with ≥10 days of continuous stay at a healthcare facility during the 14 days before onset of symptoms.
- Possible healthcare-associated Legionnaires' disease: A case that spent a portion of the 14 days before date of symptom onset in one or more healthcare facilities but does not meet the criteria for presumptive healthcare-associated Legionnaires' disease.

Resources for Outbreak Response:

- Outbreak investigations: https://www.cdc.gov/investigate-legionella/php/public-health-strategy/investigations.html?CDC_AAref_Val=https://www.cdc.gov/legionella/health-depts/epi-resources/outbreak-investigations.html.
- Healthcare Outbreak Resources: https://www.cdc.gov/investigate-legionella/php/healthcare-resources/?CDC_AAref_Val=https://www.cdc.gov/legionella/health-depts/healthcare-resources/index.html.

- Environmental Resources: https://www.cdc.gov/investigate-legionella/php/resources/environmental.html?CDC_AAref_Val=https://www.cdc.gov/legionella/health-depts/environmental-inv-resources.html.

E. Healthcare Provider Responsibilities

1. Report all cases to your local health department within the timeframe indicated:
   Sporadic case of Legionellosis – should be reported within 1 week of diagnosis.
   Outbreaks of Legionellosis – should be reported immediately (see definition of outbreaks under local health department responsibility section).
2. Assist LHD's with case and outbreak investigations. This may include collaborating to obtain the appropriate diagnostic testing for suspected cases, to institute appropriate control and prevention measures (e.g. environmental sampling), and providing LHD's with a line listing of ill persons, clinical and laboratory information with legionellosis and other epidemiologically necessary information for the investigation and control of an outbreak.
3. Healthcare associated outbreaks require an extensive investigation. Please utilize the *Legionella* Outbreak Manual and the CDC website for additional information and resources during an outbreak.
4. Consider testing for *Legionella* in patients with pneumonia with the following indications:
   - Patients who have failed outpatient antibiotic treatment for community-acquired pneumonia
   - Patients with severe pneumonia, in particular those requiring intensive care
   - Immunocompromised patients with pneumonia
   - Patients with a travel history (patients who have traveled away from their home overnight within 14 days before symptom onset)
   - Hospitalized patients with healthcare-associated pneumonia (pneumonia with onset ≥48 hours after admission) at risk for Legionnaires' disease
   - Patients with an overnight stay in a healthcare facility within 14 days before symptom onset
   - Patients with an epidemiologic link to a setting with a confirmed source of *Legionella* or that has been associated with at least one laboratory-confirmed case of Legionnaires' disease
5. Testing for healthcare-associated Legionnaires' disease is especially important if any of the following are identified in a healthcare facility:
   - Other patients with healthcare-associated Legionnaires' disease diagnosed in the past 12 months
   - Positive environmental tests for *Legionella*
   - Current changes in water quality that may lead to *Legionella* growth (such as low chlorine levels or nearby construction)
6. Laboratory diagnosis for *Legionella* is done by the following:
   When a patient is suspected of having LD, it is recommended that both a culture of a lower respiratory tract specimen and a urine antigen test (UAT) is collected. Culturing specimens can

detect *Legionella* species and serogroups that the urinary antigen test does not. Both the culture and UAT are preferred over the other tests.

Table 1: Advantages and Disadvantages for Each Diagnostic Test. Retrieved from https://www.cdc.gov/legionella/php/laboratories/?CDC_AAref_Val=https://www.cdc.gov/legionella/clinicians/diagnostic-testing.html.

Test	Advantages	Disadvantages
Culture	• Detects all species and serogroups • Clinical and environmental isolates can be compared • Confirmatory laboratory evidence	• Technically difficult • Slow (>5 days to grow) • Sensitivity highly dependent on technical skill • Affected by appropriate antibiotic treatment • Requires BCYE agar, which some laboratories may not have readily available
Urinary Antigen	• Rapid (same day) • Confirmatory lab evidence	• Can only be used to detect L. pneumophila serogroup 1 • Does not allow for molecular comparison to environmental isolates
PCR	• Can be performed on pathologic specimens (usually lung tissue) • Rapid • Possible to detect species and serogroups other than L. pneumophila serogroup 1 • Confirmatory lab evidence	• Assays vary by laboratory and commercial availability may be limited in the United States
DFA	• Can be performed on pathologic specimens (usually lung tissue) • Possible to detect species and serogroups other than L. pneumophila serogroup 1 • Supportive lab evidence	• Technically difficult • Reagents may be difficult to obtain
Serology	• Possible to detect species and serogroups other than L. pneumophila	• Must have paried sera collected at acute onset to 2 weeks after symptoms and 3

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	serogroup 1 ● Confirmatory lab evidence	to 6 weeks later ● Approximately 5 to 10% of the population has acute phase antibody titers that do not discriminate between cases of Legionnaires' disease and other causes of pneumonia

Ensure the facility has a water management program to identify hazardous conditions and take steps to minimize the growth and transmission of *Legionella* and other waterborne pathogens in building water systems. This is in accordance to the federal requirement for healthcare facilities: https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/QSO17-30-HospitalCAH-NH-REVISED-.pdf. For more information on how to establish and maintain a water management program, please visit https://www.cdc.gov/control-legionella/php/wmp/?CDC_AAref_Val=https://www.cdc.gov/legionella/wmp/overview.html.

7. Standard precautions are appropriate for patients with *Legionella*.

F. Laboratory Responsibilities

1. Report all positive *Legionella* tests to the local health department in the patient's county of residence within 1 week of result. Report the result by electronic messaging when possible, or send or fax a copy of the laboratory result to the local health department in the county of residence of the case patient.

F. Local Health Responsibilities

1. Educate laboratories and providers to report suspected and confirmed cases and outbreaks including foodborne and waterborne disease outbreaks to the local health department immediately upon recognition of the outbreak.
2. Complete the CDC Extended Case Report for all cases. This will prompt a complete and appropriate investigation, to include:
    a. Identification of specific behaviors or factors associated with *Legionella* infection (i.e., smoking, chronic or underlying medical condition, emphysema or other chronic lung disease, immunocompromised)
    b. Identify cases that have travel (including cruises) and other exposure history in the 2 weeks prior to illness onset
    c. Identify possible healthcare associated exposures in the 2 weeks prior to illness onset
        i. These exposures not only include inpatient stays (hospitalizations, nursing home residents, etc.), but also include outpatient visits, procedures, or instances of visiting others in healthcare facilities. Examples include dialysis treatment, doctor's appointments, dentist visits, someone visiting a loved one at a nursing home, etc.

3. If the case reports travel history in the 2 weeks prior to illness, more detailed information regarding travel history is needed. Collect information on:
    a. Destination(s) and specific date(s) of travel (including stops along the way)
    b. Lodging accommodations with room numbers and address
    c. Method of travel (flying, driving, etc.)
    d. Any water exposures (i.e. hot tubs, pools, showers)
    e. Anyone else in the travel party or that they know who got sick
4. If the case reports a healthcare associated exposure in the 2 weeks prior to illness, more detailed information is needed. Collect information on:
    a. Type of setting (e.g. hospital, long term care, clinic, other), type of facility(e.g. assisted living or senior living), and type of exposure (e.g. inpatient, outpatient, resident, visitor/volunteer, employee)
    b. Name of facility
    c. Reason for visit
    d. City and State and address of facility
    e. Dates of visit (start and end date)
5. Notify the state epidemiologist for Legionella of travel and healthcare-associated cases as soon as possible.
6. Educate cases about appropriate prevention measures.
    a. Take steps at home to avoid getting sick from the germs that grow in pipe slime and devices that use water:
        i. **Flush faucets and showerheads if**:
            1. It has not been used in a while (a week or more)
            2. After water pressure drops
        ii. Clean and maintain devices that use water
            1. *Portable humidifiers:* Germs can live in humidifiers and spread through the mist humidifiers make. To further reduce germ growth in humidifiers, use distilled water or boiled (and then cooled) water. To prevent germs from growing:
                a. Empty all water from humidifiers every day
                b. Regularly clean them according to the manufacturer's instructions
                c. Air dry after cleaning
            2. *CPAP machines:* Germs can live in the humidifiers of CPAP (continuous positive airway pressure) machines and connected parts, such as masks and tubing. These germs can spread through the mist from CPAP humidifiers. To prevent germs from growing:
                a. Regularly clean the mask, humidifier, and tubing
                b. Use and maintain the machine according to the manufacturer’s instructions
                c. Use distilled or sterilized water in the humidifier

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d. Regularly replace the humidifier water according to the manufacturer's instructions

3. *Neti pots or nasal rinses:* Some germs that are harmless if you drink them can make you sick if they go up your nose. To avoid getting sick, follow the manufacturer's instructions when using and cleaning devices, like neti pots and nasal rinses, to clear sinuses. Use distilled or sterilized water, or tap water that you have boiled (and then cooled) to rinse your sinuses. Never use water straight from the tap to rinse your sinuses.
4. *Showerheads and faucet aerators:* Clean showerheads and faucet aerators whenever you can see buildup on them. This helps prevent germs from growing inside showerheads and faucets. The aerator is the mesh screen screwed into your faucet that helps with water flow. You may need to remove the showerhead and hose and soak them in a solution (such as white vinegar) to remove buildup. Follow the manufacturer's instructions for cleaning.
5. *Water filters*: Maintain and replace all water filters according to the manufacturer's instructions, including:
    a. Pitcher and countertop filters
    b. Refrigerator and icemaker filters
    c. Under sink filters
    d. Showerhead and faucet filters

iii. Check and flush water heaters

1. *Setting the temperature*: Keeping your home water heater between 130°F–140°F can kill germs like *Legionella* in water, but also increases your risk of burns. If you set your water heater above 120°F, use valves that mix cold and hot water at the tap (called thermostatic valves) to avoid burns. This is especially important if young children, older adults, or other people at increased risk of burns live in your home.

Ask your healthcare provider about your risk of getting sick from *Legionella*. Discuss if setting your water heater to 130°F or above to prevent *Legionella* growth is right for you.

2. *Flushing*: Regularly flushing your water heater can prevent germs from growing, make it last longer, and is recommended by most manufacturers. Follow the manufacturer's instructions when flushing your water heater or have a professional do it. Many manufacturers recommend flushing your water heater:
    a. Annually
    b. Before you move into a home
    c. After plumbing work
    d. If tap water is discolored

iv. **Communicate with your water utility**
    1. Taking the following steps can help you stay informed and make sure your tap water is safe to use:
        a. Sign up to get tap water alerts from your utility of local government
        b. Follow recommendations during drinking water advisories
        c. Contact your utility if your water is brown or discolored
        d. Contact your utility if you notice a decrease in water pressure

v. **Keep your well safe**

vi. **Check with your building manager or owner**
    1. Building managers and owners can take steps to protect the people who live in their buildings from germs in water. If you live in an apartment building or other building with multiple units, check with your building's owner or manager about the steps they are taking.

7. Complete a WVHIN review or medical record review for each case of Legionellosis to determine if there are any healthcare visits in the 14 days prior to symptom onset.
8. Enter investigation information into WVEDSS and attach the CDC Extended Case Report Form to *the Attachments* section in the *Supplemental Info* tab.
9. Although they are routinely requested, it is **not** necessary or recommended to conduct an environmental investigation- this includes environmental testing, for the source of infection, for a single, sporadic case. Since *Legionella* can be found in a wide variety of water sources at low levels, it is difficult to prove a particular source was the cause of illness unless another case occurs that also implicates the suspected "source". Suspected sources should not be tested or decontaminated based on one sporadic case. Environmental investigations and testing should only be undertaken in the context of a legionellosis outbreak.
10. Because legionellosis is not transmitted person-to-person, there are no isolation control measures necessary.
11. Report outbreaks of legionellosis to the OEPS Epi on-call at (304) 558-5358 ext. 2 within 1 hour of notification to the LHD.
12. Assist the outbreak team with outbreak investigations. Duties may include:
    a. Prompt interviewing of cases
    b. Collaborating with healthcare providers to obtain case and laboratory information
    c. Implementing control and prevention measures
    d. Communicate with DIDE, the facility and other outbreak partners on a regular basis for the duration of the outbreak
    e. Completing water parameter testing in the facility

See **Outbreak Recognition** section for more information.

For the purpose of case investigation, ***lost to follow-up*** **(LTF)** is defined as a disease investigation outcome reported by a local health department staff in WVEDSS after:

- Three phone calls have been made on three separate occasions (different days and times) **AND**
- A letter was mailed to the patient's address asking them to call the local health department **AND**
- A medical record review has been conducted via WVHIN or obtaining medical records from the facility where the patient was seen **AND**
- Attempts to contact patient or obtain information has been clearly documented in WVEDSS *General Comments* section, **AND**
- Documentation has been completed within 30 days of the patient's laboratory report.

F. Regional Epidemiologist Responsibilities

1. Review *Legionella* reports in WVEDSS for completeness.
2. Ensure the case report form is attached to the case investigation.

G. State Health Responsibilities

1. Review *Legionella* reports in WVEDSS for completeness.
2. Provide feedback to LHD's and Regional Epidemiologist (RE) about case completeness and timely reporting.
3. Review and ascertain cases submitted in WVEDSS. Ensure information is correct and complete.
    a. **No Local Health Action** is defined as incomplete disease investigation and no activity occurring at the local level for at least 60 days since the date the investigation was opened. The state health department staff should document "no local health action" in WVEDSS General Comments section before administratively closing the investigation.
4. Summarize surveillance data for cases of legionellosis on an annual basis.
5. Prompt and complete reporting of legionellosis cases to the CDC through WVEDSS.
6. Prompt and complete reporting of legionellosis outbreaks to the CDC through the National Outbreak Reporting System (NORS).
7. Collaborate with LHD's, OEHS, the CDC, and facilities for outbreak management, prevention and control.
8. Report travel-associated cases of legionellosis to the CDC email travelLegionella@cdc.gov within 7 days of notification.
9. Provide technical expertise, training and consultation regarding surveillance, investigation, control measures and prevention of legionellosis.
10. Provide education to healthcare providers about testing for *Legionella*, timely reporting of outbreaks and cases, and environmental assessments.

No Public Health Action is defined as incomplete disease investigation and no activity occurring at the local level for at least 60 days since the date of the patient's laboratory report. The state health department staff should document "no public health action" in WVEDSS *General Comments* section before administratively closing the investigation.

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H. Occupational Health

1. For those conducting routine work on building water systems and components, personal protective equipment (PPE) is not required.
2. A respirator should be worn during an outbreak of legionellosis and there is a significant potential for exposure to high concentrations of contaminated aerosol when investigating a building water system and participating in environmental sampling.

IV. DISEASE SURVEILLANCE

A. Public Health Significance

Legionella was discovered after an outbreak in 1976 among people who attended a convention of the American Legion in Philadelphia. Those affected suffered from a serious form of pneumonia that is now known as Legionnaires' disease. Pontiac fever was identified in 1968 in Pontiac, Michigan, among people who worked at and visited the city's health department. The cause of this remained unidentified until the 1976 Legionnaires' disease outbreak when officials were able to show that *Legionella* causes both diseases.

The *Legionella* bacteria can cause a mild disease called Pontiac fever but also a serious type of pneumonia called legionnaires' disease. Nationally, cases have been on the rise since the year 2000 but in WV, since 2020. In 2018 the number of cases increased by 6.5-fold from 0.42 per 100,000 cases to 2.71 per 100,000 cases. Legionellosis is more common in individuals who are immunocompromised, have chronic disease and those who are 50 years or older with a case fatality rate of 10% and 25% for healthcare-associated cases.

Due to difficulty with diagnosis and ready availability of broad spectrum antibiotics effective against *Legionella*, the disease is often under-diagnosed and under-reported. A recent study estimated that the true number of Legionnaires' disease cases may be 1.8–2.7 times higher than what is reported. Outbreaks of legionnaires' disease can be difficult to detect because of:

- Low attack rate
- Time interval between exposure and symptom onset
- Dispersal of people from the source of the outbreak
- Underdiagnosis of cases

Strong surveillance helps to quickly identify new cases, epidemiologic links between cases, and the need for outbreak investigations. Such investigations are critical for detecting sources of transmission and implementing control measures. Most cases of legionnaires' disease are not associated with a known outbreak. However, improved ascertainment and reporting of exposure information helps identify possible sources of exposure and can increase detection of outbreaks.

B. Disease Surveillance Objectives

1. Rapidly recognize cases that occur in similar locations or with similar exposures to detect outbreaks.

2. Monitor and describe incidence and trends.
3. Understand risk factors for infection.
4. Identify opportunities for control and prevention.
5. Monitor effectiveness of interventions implemented as part of an outbreak investigation.

C. Surveillance Indicators

1. Proportion of investigations with complete clinical and demographic information.
2. Proportion of cases with complete clinical severity information (hospitalization and death).
3. Proportion of cases with complete two to 10 day history of high-risk activities and travel.
4. Proportion of cases with complete healthcare exposure information (14 days prior to onset).

V. REFERENCES

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