Outsmarting *Legionella*: Effective Surveillance and Response for Health Departments (Part I)

New Jersey Department of Health
Communicable Disease Service
Infection Control, Healthcare, and Environmental Epidemiology Program
Water Systems & Environmental Infection Control Unit
June 3, 2025

NJHealth
New Jersey Department of Health

Meet the Team

Water Systems & Environmental Infection Control Unit
NEW JERSEY DEPARTMENT OF HEALTH

Rebecca Greeley, MPH
Program Manager
Infection Control, Healthcare, & Environmental Epidemiology

Kathleen Ross, MPH
Unit Lead, Epidemiologist
Research Scientist I

Lauren Conner, MPH, REHS
Legionella Epidemiologist
Research Scientist II

Hasan Ali, MS
Water Systems Analyst
Research Scientist II

Today's Agenda

Legionellosis Overview
Etiology, Disease Background, Case Criteria, Transmission, Sources

Case Investigation Guidance
Diagnostic Methods, Clinical Information, Patient Interview, High-Risk Exposures

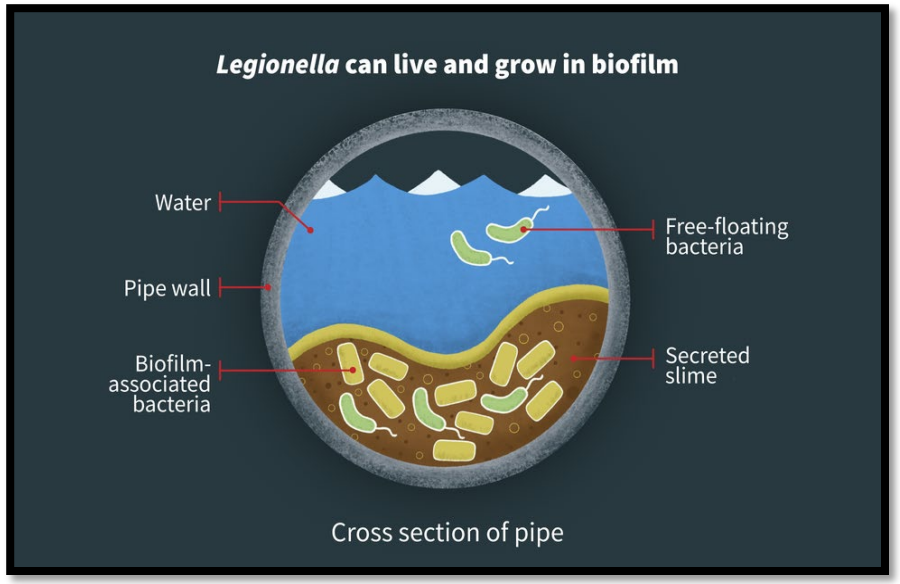
Resources
Legionellosis Disease Chapter, NJDOH Webpage

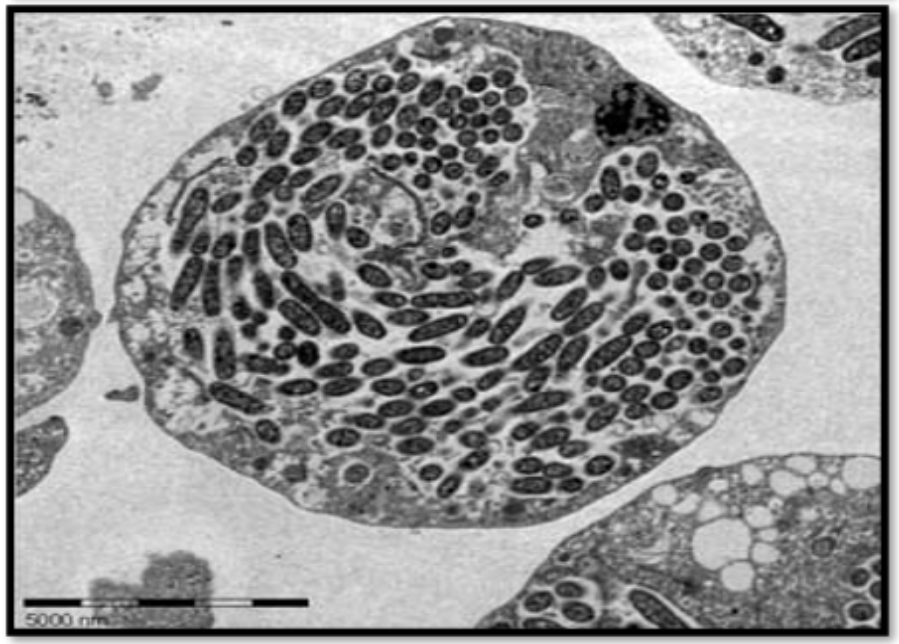
Q+A
Participant questions (if time allows)

NJHealth New Jersey Department of Health

What is *Legionella*?

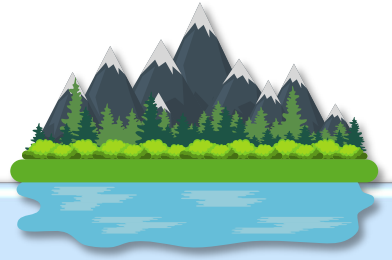
- Bacterium that causes **legionellosis**
- 60+ different species
  - ***Legionella pneumophila*** accounts for ~90% of U.S. reported cases
- Found naturally in **freshwater environments**
- Adheres to surfaces and forms protective **biofilms**
- Grows best in **warm, stagnant water**
- Survives and reproduces inside **single-celled organisms**





NJ Health
New Jersey Department of Health

Legionella in Building Water Systems



SOURCE WATER

Aquifers

Lakes

Rivers

Streams

PUBLIC WATER SUPPLY

State and federal codes regulate disinfectant residual

Chlorine or monochloramine

Water is not sterile leaving the treatment plant

BUILDING WATER SYSTEM

Building owners are responsible for maintaining the water system

Complex water systems

Water may be filtered, conditioned, heated, stored, and distributed

AMPLIFICATION

Warm water temperatures

Water age & stagnation

Sediment

Low or no disinfectant residual

AEROSOLIZATION

Sink faucets

Showerheads

Hot tubs

Decorative fountains

Cooling towers

Medical devices

NJHealth New Jersey Department of Health

Legionellosis: Umbrella term for infections caused by *Legionella*

	Legionnaires' Disease (LD)	Pontiac Fever (PF)	Extrapulmonary Legionellosis (XPL)
Description	Severe form of pneumonia	Flu-like illness	Can occur as a complication of LD or can occur independently
Attack Rate	Low Attack Rate: 5%	High Attack Rate: 90%	Extremely rare
Mortality Rate	High Mortality Rate: 10-25%	No Mortality	Can vary depending on type of infection and immune status of the patient
Signs & Symptoms	Body aches, Fever, Headache, Cough, SOB	Body aches, Fever, Headache	
Incubation Period	2-14 days after exposure	24 to 72 hours after exposure	
Diagnosis	Pneumonia	No Pneumonia	Infection at a body site outside of the lungs
Treatment	Antibiotics	Self-limiting/ Supportive Care	Antibiotics

NJHealth New Jersey Department of Health

Confirmatory Case Criteria

	Legionnaires' disease (LD)	Pontiac fever (PF)	Extrapulmonary Legionellosis
Clinical Criteria	• Presents with **pneumonia** • If "pneumonia" is not recorded explicitly, a description of clinical symptoms that are consistent with a diagnosis of pneumonia: **acute onset of lower respiratory illness with fever and/or cough.** • May also include myalgia, shortness of breath, headache, malaise, chest discomfort, confusion, nausea, diarrhea, or abdominal pain.	• Presents with symptoms of **acute illness**, and **must include one or more** of the following: fever, chills, myalgia, malaise, headaches, fatigue, nausea, and/or vomiting.	• Diagnostic testing reveals evidence of Legionella from an extrapulmonary site of disease
Laboratory Criteria	• Urinary antigen test • Culture of lower respiratory specimen • Polymerase Chain Reaction (PCR) of lower respiratory specimen • Paired serology (fourfold rise)	• Urinary antigen test • Culture of lower respiratory specimen • Polymerase Chain Reaction (PCR) of lower respiratory specimen • Paired serology (fourfold rise)	• Culture from extrapulmonary site • PCR of specimen from extrapulmonary site

NJHealth New Jersey Department of Health

At-Risk Populations

Older individuals (e.g., Age ≥ 50 years)

Those with chronic lung disease such as emphysema or COPD

Current or former smokers

Immune system disorders due to disease or medication

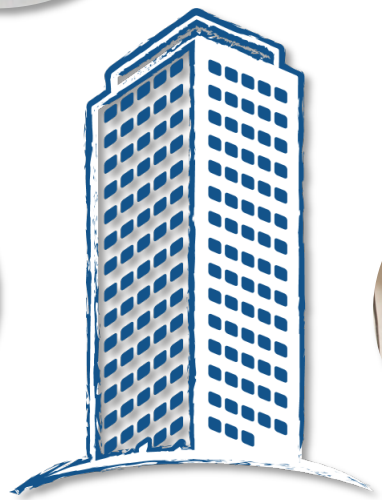
Having underlying illnesses such as diabetes, kidney failure, and/or liver failure

NJ Health
New Jersey Department of Health

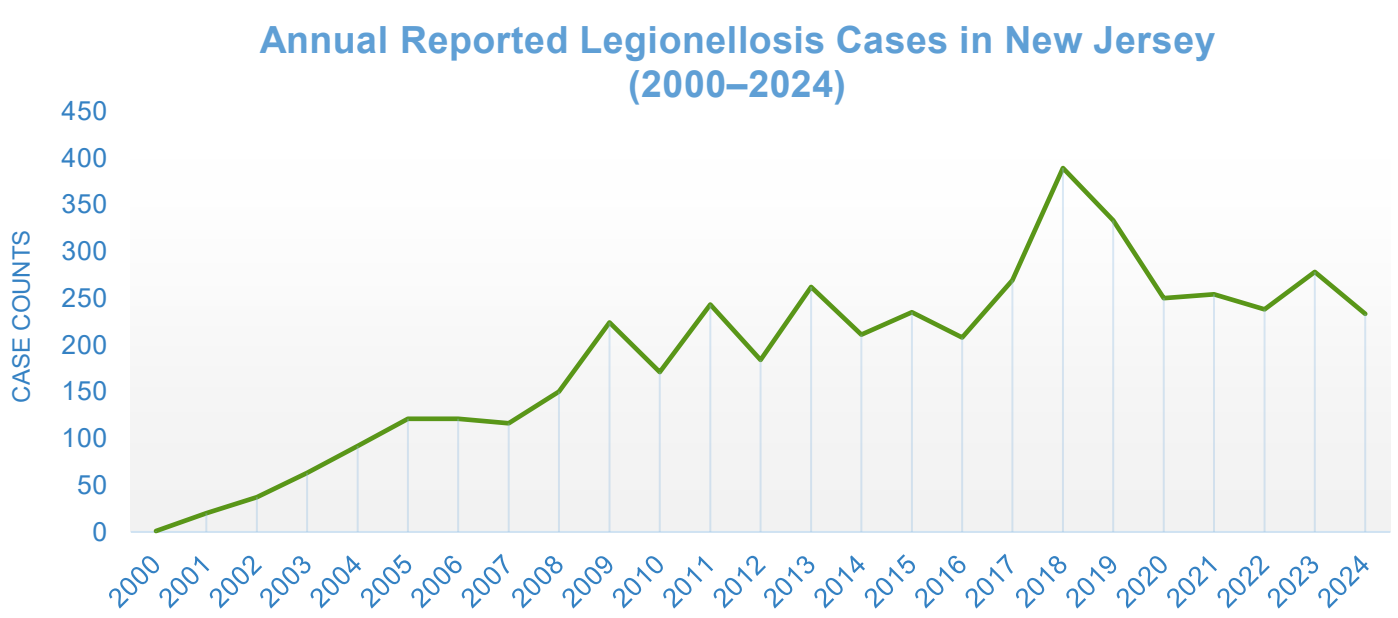
Transmission

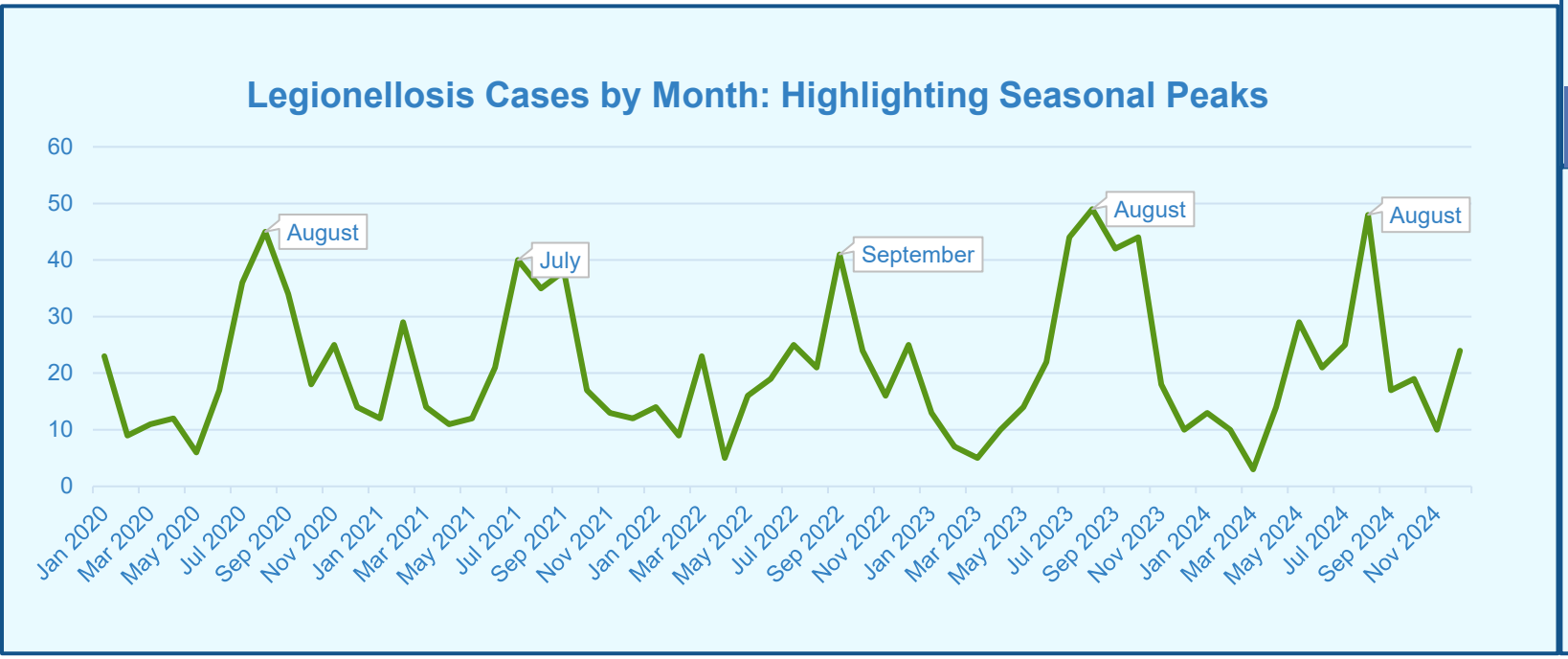
- Primary Mode: Inhalation of **aerosolized water droplets**
  - Sources of exposure include:
    - Fixtures of plumbing systems, such as showers and sinks
    - Devices that aerosolize water, such as hot tubs, cooling towers, and decorative fountains
    - Medical equipment with humidification, such as CPAP machines
- Other less common transmission routes:
  - **Aspiration** of contaminated water/ice (i.e., “water goes down the wrong pipe”)
    - Especially in hospitalized or neurologically impaired patients
  - **Direct inoculation** into wounds (rare)
  - **Soil exposure** (linked to *Legionella longbeachae*, rare in US but more common in other countries such as Australia)



Reported Cases of Legionellosis in NJ by Year and Season





Leading Cause

#1

Legionella-associated outbreaks are now the **leading cause** of reported water-related outbreaks

Healthcare Costs

$402 million

In total U.S. annual direct **healthcare** costs (2014)

Health Disparities

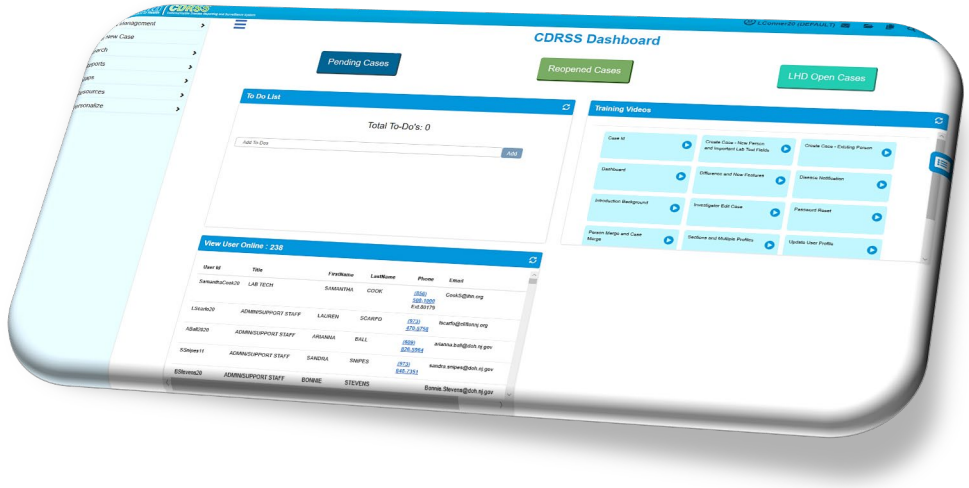
Legionnaires' disease (LD) is increasing in the U.S., and **Black individuals** and people of **lower income** are disproportionately impacted

Legionnaires' Disease: The Tip of the Iceberg

- **Reported Cases**: Only a subset of Legionnaires' disease cases are diagnosed due to limitations in testing and awareness
- **Testing Challenges**:
  - Diagnosis can be difficult without specialized testing
  - Many cases go unrecognized or misdiagnosed
- **Incidence May Be 10x Greater**: Some studies suggest the actual number of Legionnaires' disease cases is far higher than reported

Reportable Disease

- All **legionellosis** cases are reportable within 24 hours (*N.J.A.C. 8:57-1.5*)
- Communicable Disease Reporting and Surveillance System (CDRSS)
- **Local Health Departments** are responsible for performing a disease investigation into each case reported in their jurisdiction(s)



- Prompt case investigations help to quickly identify **epidemiological links** between cases and the need for outbreak investigations
- Legionellosis is a "**Level 3**" per the Disease Prioritization List

Priority Level	Acknowledge notification in CDRSS	Enter initial case information	Respond after acknowledgment	Enter critical details after acknowledgment
3	≤ 2 business days	≤ 2 business days	As appropriate	≤ 5 days

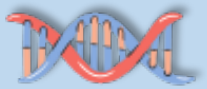
NJHealth New Jersey Department of Health

Steps in a Legionellosis Case Investigation

- Confirm laboratory report accuracy
- Verify the clinical information
- Conduct patient or proxy interview
- Inform relevant parties of high-risk exposures
- Record investigation findings
- Conclude case investigation

NJHealth New Jersey Department of Health

Diagnostic *Legionella* Testing

Test	Specimen Types	Notes
Urinary Antigen 	• Urine	• Rapid (same day) • Can only detect *L. pneumophila* serogroup 1 • Most used diagnostic test
Culture 	• Lower respiratory secretions (e.g., sputum) • Lung tissue • Pleural fluid • Extrapulmonary site	• Detects all species and serogroups • Slow (>5 days to grow) • Affected by some antibiotics • Requires specialized media • Sensitivity highly dependent on technical skill • Ability to compare isolates
Polymerase Chain Reaction (PCR) 	• Lower respiratory secretions (e.g., sputum) • Lung tissue • Pleural fluid • Extrapulmonary site	• Rapid • Possible to detect species and serogroups other than Lp1
Serology (Paired) 	• Serum	• Must have paired sera collected at acute onset to 2 weeks after symptoms and 3 to 6 weeks later

Confirm laboratory report accuracy → Verify the clinical information → Conduct patient or proxy interview → Inform relevant parties of high-risk exposures → Record investigation findings → Conclude case investigation

Diagnostic *Legionella* Testing – Be Careful!

- **Urinary Antigen Test (UAT)**
  - Highly **sensitive** and **specific**
  - **False positives are rare**, especially in patients with compatible clinical symptoms
  - **Negative cultures** do **not** invalidate a **positive UAT result**
- **Other Diagnostic Considerations**
  - Routine "**respiratory panels"** do **not** include *Legionella*
  - **Nasopharyngeal (NP) swabs** are **not appropriate** specimens for *Legionella* testing
  - **Serum antibody (titer) testing** is **not** routinely recommended

NJHealth New Jersey Department of Health

Lab Results – CDRSS

Laboratory Evaluation:
- Can be confusing
- Urine = antigen
- Serum = antibody

Laboratory and Diagnostic Test Information

Laboratory Information

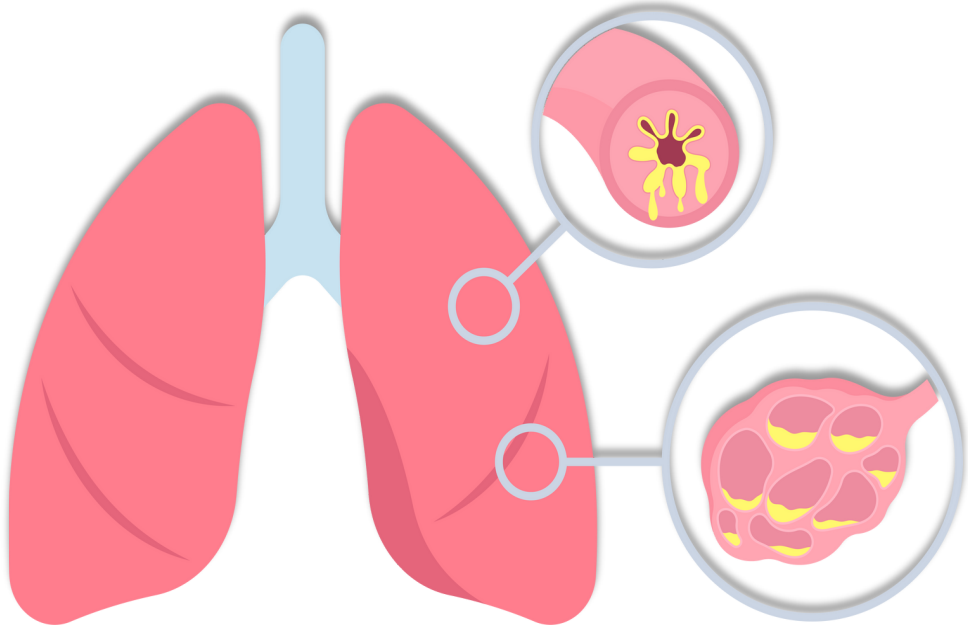
Test	Specimen	Lab Name	Lab Specimen ID	Date Specimen Collected	Value	Report Units	Result	Delete
LEGIONELLA PNEUMOPHILA 1 AG	URINE	PUBLIC HEALTH AND ENVIRONMENTAL LABORATORIES (NJPHEL)	11223344	07/16/2021	DETECTED		POSITIVE/REACTIVE	
MICROORGANISM IDENTIFIED BY CULTURE	SPUTUM	PUBLIC HEALTH AND ENVIRONMENTAL LABORATORIES (NJPHEL)	12345678	07/16/2021	LEGIONELLA PNEUMOPHILA SEROGROUP 1		POSITIVE/REACTIVE	
LEGIONELLA SP DNA	SPUTUM	PUBLIC HEALTH AND ENVIRONMENTAL LABORATORIES (NJPHEL)	55667788	07/16/2021	LEGIONELLA PNEUMOPHILA SEROGROUP 1		POSITIVE/REACTIVE	
LEGIONELLA PNEUMOPHILA 1 AB	SERUM	PUBLIC HEALTH AND ENVIRONMENTAL LABORATORIES (NJPHEL)	358426	07/16/2021	>1:16		TITER/ANTIBODY PRESENT	

- Urine antigen confirmatory with clinical symptoms
- *Legionella* culture and PCR (DNA) of lower respiratory specimen (e.g., sputum, bronchial, lung tissue, etc.) confirmatory with clinical symptoms
- Serology (serum) needs to be paired to show 4-fold rise in titer (E-sorted/E-closed)

NJHealth New Jersey Department of Health

Clinical Presentation

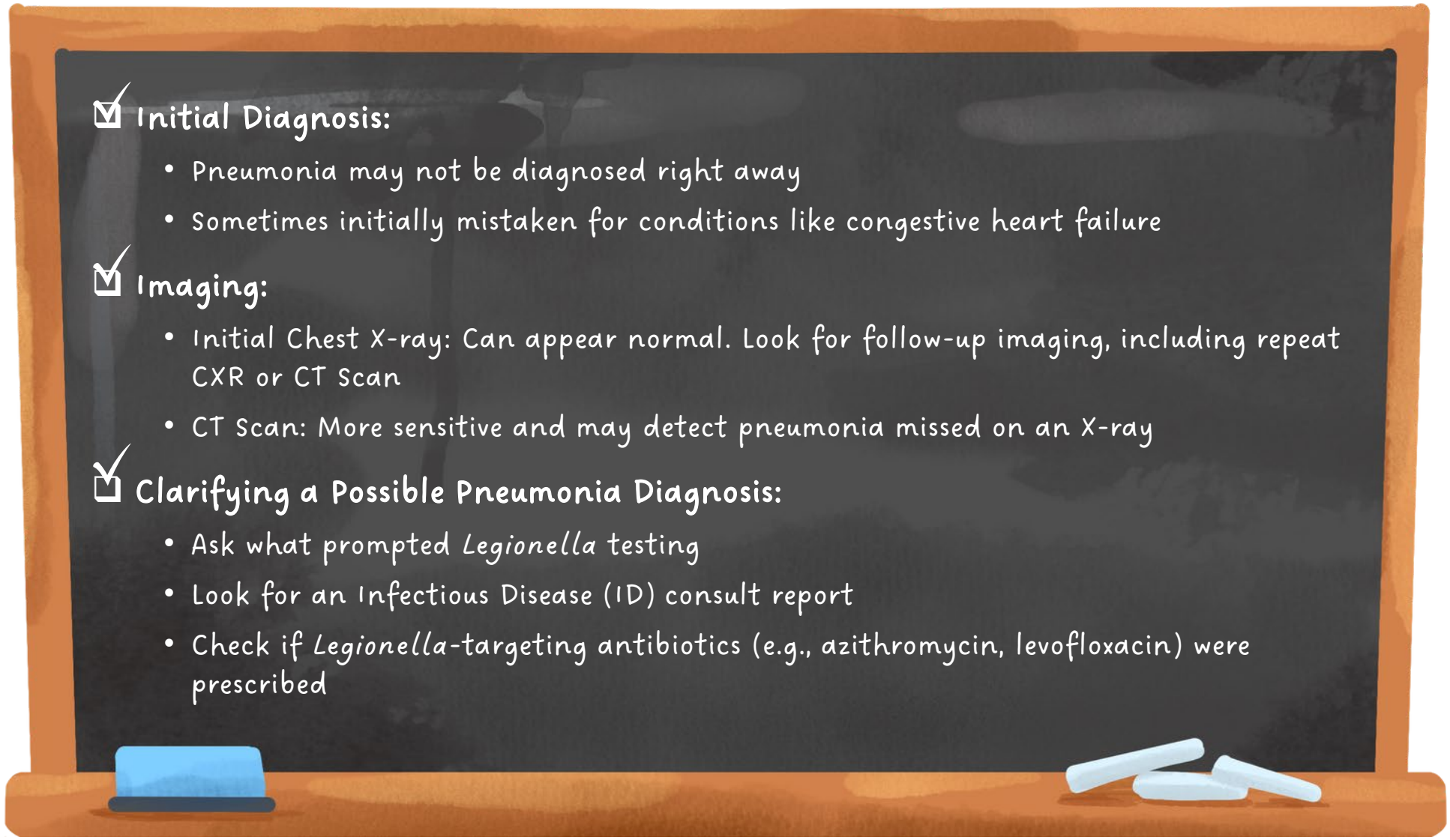
- Most case-patients require treatment in a hospital
- Contact the hospital **Infection Preventionist** (IP) and/or review **medical records**
- **Key information to collect:**
  - **Pneumonia** diagnosis? Verified with chest x-ray or CT scan?
  - Presenting **symptoms** and **illness onset date**
  - **ED visit** or **hospital admission**? Note date(s)
  - Underlying **health conditions**?
  - Clinical **outcome**? Survived, recovering, or deceased
    - If still hospitalized, follow up until discharge (as resources permit)



Confirm laboratory report accuracy → **Verify the clinical information** → Conduct patient or proxy interview → Inform relevant parties of high-risk exposures → Record investigation findings → Conclude case investigation

NJHealth New Jersey Department of Health

Clinical Information – Tips and Tricks!

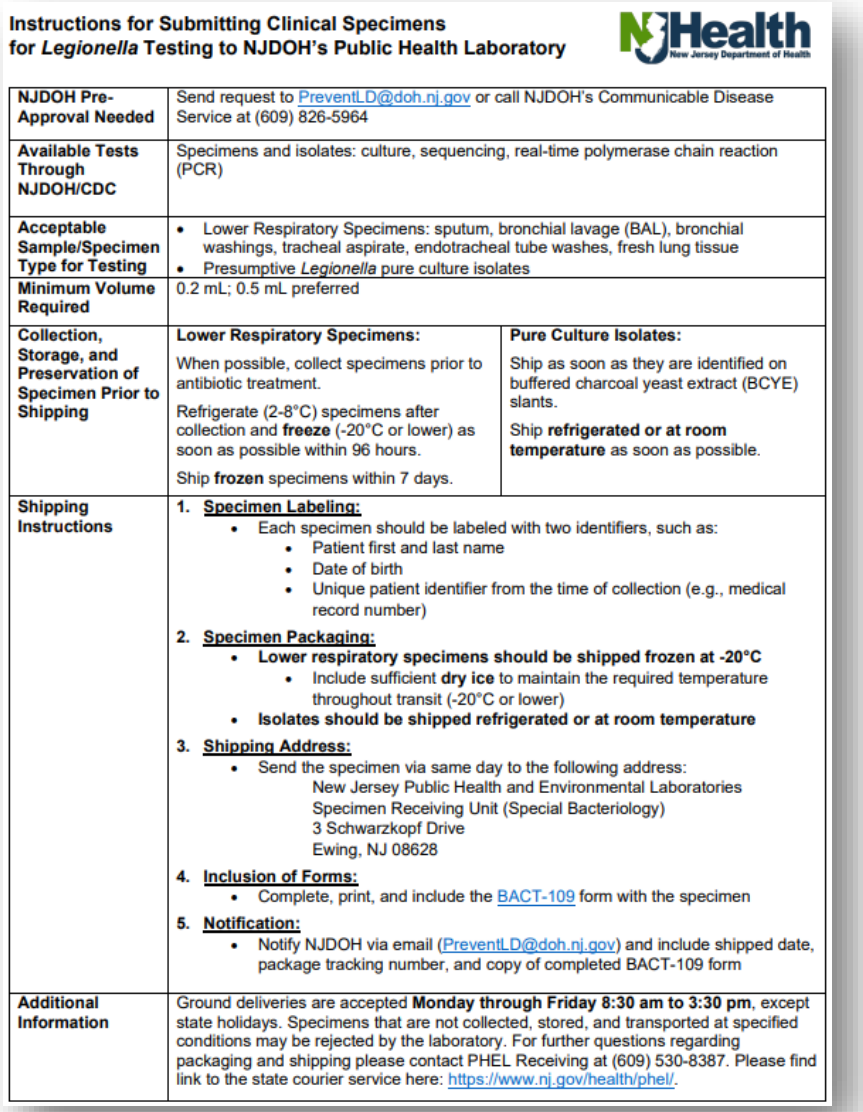


- **Initial Diagnosis:**
  - Pneumonia may not be diagnosed right away
  - Sometimes initially mistaken for conditions like congestive heart failure
- **Imaging:**
  - Initial Chest X-ray: Can appear normal. Look for follow-up imaging, including repeat CXR or CT Scan
  - CT Scan: More sensitive and may detect pneumonia missed on an X-ray
- **Clarifying a Possible Pneumonia Diagnosis:**
  - Ask what prompted *Legionella* testing
  - Look for an Infectious Disease (ID) consult report
  - Check if *Legionella*-targeting antibiotics (e.g., azithromycin, levofloxacin) were prescribed

NJHealth New Jersey Department of Health

Specimen Collection

- Check for a **lower respiratory specimen** (e.g., sputum).
  - If available, ensure it is **frozen immediately at -20°C or below**
  - If not available, **request the collection** and freezing of a new specimen
- **Timing is critical:**
  - Ideally, collect the specimen before antibiotics
  - The sooner the specimen is collected, the higher the chance of recovering *Legionella*
  - Generally, specimens collected < **7 days of starting antibiotics** will still be accepted
- **Submit the specimen:**
  - Send **the frozen specimen** to PHEL with **DRY ICE**
- There is **no cost** for testing the specimen at PHEL



Instructions for Submitting Clinical Specimens for *Legionella* Testing to NJDOH's Public Health Laboratory

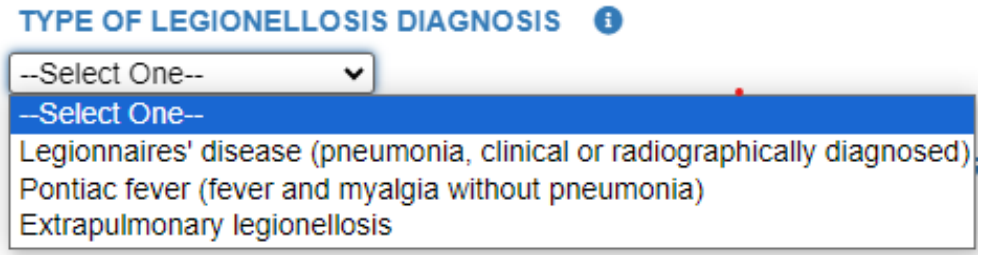
NJHealth New Jersey Department of Health

NJDOH Pre-Approval Needed	Send request to PreventLD@doh.nj.gov or call NJDOH's Communicable Disease Service at (609) 826-5964	
Available Tests Through NJDOH/CDC	Specimens and isolates: culture, sequencing, real-time polymerase chain reaction (PCR)	
Acceptable Sample/Specimen Type for Testing	• Lower Respiratory Specimens: sputum, bronchial lavage (BAL), bronchial washings, tracheal aspirate, endotracheal tube washes, fresh lung tissue • Presumptive *Legionella* pure culture isolates	
Minimum Volume Required	0.2 mL; 0.5 mL preferred	
Collection, Storage, and Preservation of Specimen Prior to Shipping	**Lower Respiratory Specimens:** When possible, collect specimens prior to antibiotic treatment. Refrigerate (2-8°C) specimens after collection and **freeze** (-20°C or lower) as soon as possible within 96 hours. Ship **frozen** specimens within 7 days.	**Pure Culture Isolates:** Ship as soon as they are identified on buffered charcoal yeast extract (BCYE) slants. Ship **refrigerated or at room temperature** as soon as possible.
Shipping Instructions	1. **Specimen Labeling:** • Each specimen should be labeled with two identifiers, such as: ◦ Patient first and last name ◦ Date of birth ◦ Unique patient identifier from the time of collection (e.g., medical record number) 2. **Specimen Packaging:** • **Lower respiratory specimens should be shipped frozen at -20°C** ◦ Include sufficient **dry ice** to maintain the required temperature throughout transit (-20°C or lower) • **Isolates should be shipped refrigerated or at room temperature** 3. **Shipping Address:** • Send the specimen via same day to the following address: New Jersey Public Health and Environmental Laboratories Specimen Receiving Unit (Special Bacteriology) 3 Schwarzkopf Drive Ewing, NJ 08628 4. **Inclusion of Forms:** • Complete, print, and include the BACT-109 form with the specimen 5. **Notification:** • Notify NJDOH via email (PreventLD@doh.nj.gov) and include shipped date, package tracking number, and copy of completed BACT-109 form	
Additional Information	Ground deliveries are accepted **Monday through Friday 8:30 am to 3:30 pm**, except state holidays. Specimens that are not collected, stored, and transported at specified conditions may be rejected by the laboratory. For further questions regarding packaging and shipping please contact PHEL Receiving at (609) 530-8387. Please find link to the state courier service here: https://www.nj.gov/health/phel/.	

Guidance for Submitting Clinical Specimens for *Legionella* Testing

NJHealth New Jersey Department of Health

Clinical Information – CDRSS



Legionellosis is the collective term for all types of *Legionella* infections including:

1. **Legionnaires' disease**: presents as pneumonia often requiring treatment in a hospital
2. **Pontiac fever**: a milder, self-limited illness
3. **Extrapulmonary:** infections at a body site outside of the lungs

Diagnostic Information

Test Name	Findings	Test Result Data	Test Date	Medical Facility	Delete
C-SCAN	ABNORMAL	RLL pneumonia	07/17/2021	NJPHEL	
X-RAY	ABNORMAL	Infiltrates	07/16/2021	NJPHEL	

Add Diagnostic Test

Add Comment

All abnormal radiographic tests of the chest should be entered into CDRSS under "Diagnostic Information". To enter a CXR or CT scan result, click on the button "Add Diagnostic Test".

Legionella infection almost always produces an abnormal chest radiographic finding. Abnormalities are variable and no typical radiographic presentation exists for Legionnaires' disease. Radiographic tests often show infiltrates with consolidation. Many patients also have a pleural effusion.

NJ Health New Jersey Department of Health

Patient status:
- Was the patient admitted?
- Inpatient or ED only?

Dates of hospitalization:
- Important because the patient may have developed symptoms AFTER hospitalization
  - Potential healthcare-associated case

Medical Facility and Provider Information

Medical Facility Information

Medical Facility Name	Patient Status	Dates of Hospitalization	Medical Facility Type
(NY) NYC HEALTH AND HOSPITALS/BELLEVUE	INPATIENT	06/10/2014 - 06/14/2014	ACUTE CARE

Signs and Symptoms

Sign/Symptom	Response	Attribute	Onset Date
PNEUMONIA	YES		06/12/2019
CHILLS	YES		06/10/2019
COUGH	YES		06/10/2019
FEVER	YES	LOW	06/10/2019
MALAISE (DISCOMFORT)	YES		06/10/2019
MYALGIA (MUSCLE ACHES)	YES		06/10/2019
ANOREXIA	YES		
ABDOMINAL PAIN/CRAMPS	NO		
ALTERED MENTAL STATUS	NO		
CHEST PAIN	NO		
DIARRHEA	NO		
HEADACHE	NO		
SHORTNESS OF BREATH	NO		

Add/Edit Signs and Symptoms

Add Comment

Signs and Symptoms:
- Part of case definition
- Add all symptoms
- Dates and attributes
- Pneumonia?

Clinical Status

Clinical Status Information

Illness Onset Date:	**06/10/2014**
Date of Initial Health Care Evaluation:	**06/14/2014**
Reason for Testing:	
Pre-Existing Conditions:	**CANCER, DIABETES**
Patient Died?	**YES**
Date of Death:	**06/14/2014**

Patient outcome:
- Survived or deceased
- Date of death

NJHealth New Jersey Department of Health

Patient Interview

- Verify **illness onset date**
- Define the **exposure period**
  - Use a calendar to count **14 days back** from the symptom onset date
- **Interview the patient about potential exposures** during these 14 days
  - If the patient is too ill, interview a surrogate first, then follow up with the patient when possible
  - Encourage the patient to review bank statements, receipts, text messages, or calendar entries to help jog memory

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3 1st day of exposure period	4	5
6	7	8	9	10	11	12
13	14	15	16	17 Date of onset	18	19

Confirm laboratory report accuracy → Verify the clinical information → **Conduct patient or proxy interview** → Inform relevant parties of high-risk exposures → Record investigation findings → Conclude case investigation

NJHealth New Jersey Department of Health

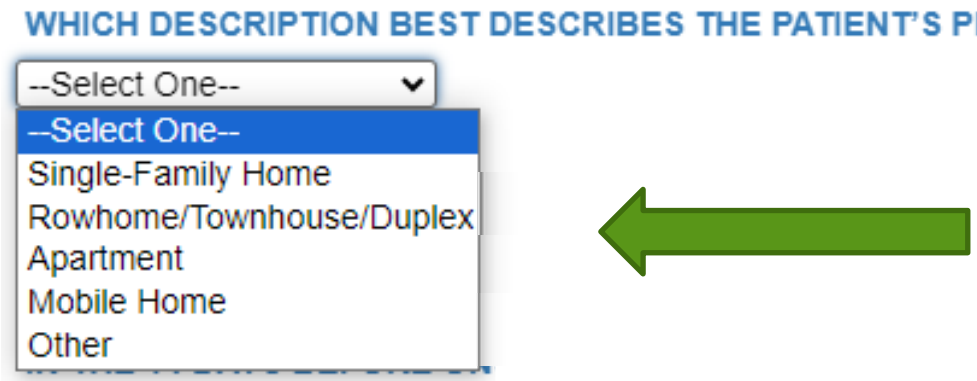
Legionellosis Risk Factor Form – CDRSS

- Utilize the **Legionellosis Risk Factor Form** in CDRSS to interview the patient

- *If at least **three unsuccessful attempts** were made to contact the case-patient or surrogate, complete the case in CDRSS with available information and indicate the reason for missing information (e.g., lost to follow-up) in the comments section.*

⬇ LEGIONELLOSIS RISK FACTORS
TYPE OF LEGIONELLOSIS DIAGNOSIS
WHICH DESCRIPTION BEST DESCRIBES THE PATIENT'S PRIMARY RESIDENCE?
IS THE RESIDENCE OWNER OR RENTER OCCUPIED?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT SPEND ANY NIGHTS AWAY FROM HOME (EXCLUDING HEALTHCARE SETTINGS)?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT VISIT OR STAY IN A HEALTHCARE SETTING?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT VISIT OR STAY IN ANY ADDITIONAL HEALTHCARE SETTINGS?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT VISIT OR STAY IN AN ASSISTED LIVING FACILITY OR SENIOR LIVING FACILITY (INCLUDING INDEPENDENT LIVING)?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT USE A NEBULIZER, CPAP, BIPAP, ROOM HUMIDIFIER, OR ANY OTHER RESPIRATORY THERAPY EQUIPMENT FOR THE TREATMENT OF SLEEP APNEA, COPD, ASTHMA OR FOR ANY OTHER REASON?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT GET IN OR SPEND TIME NEAR A WHIRLPOOL SPA OR HOT TUB?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT SHOWER AWAY FROM HOME?
IN THE 14 DAYS BEFORE ONSET, WAS THE PATIENT NEAR A DECORATIVE FOUNTAIN OR WATER FEATURE?
IN THE 14 DAYS BEFORE ONSET, WAS THE PATIENT NEAR A WATER MISTER?
IN THE 14 DAYS BEFORE ONSET, WAS THE PATIENT NEAR AN OPERATING WATER SPRINKLER SYSTEM?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT VISIT A WATER PARK?
IN THE 14 DAYS BEFORE ONSET, WAS THE PATIENT NEAR ANY OTHER TYPE OF WATER AEROSOLIZING DEVICE?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT HAVE ANY EXPOSURE TO AEROSOLIZED WATER AT HOME?
DOES THE PATIENT WORK OR VOLUNTEER IN CONSTRUCTION OR OTHER OCCUPATIONS INVOLVING WATER EXPOSURES?
HAS THERE BEEN ANY RECENT (LAST 6-12 MONTHS) OR ONGOING MAJOR CONSTRUCTION AT OR AROUND THE PATIENT'S RESIDENCE?
IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT ATTEND A CONVENTION, RECEPTION, CONFERENCE, OR OTHER PUBLIC GATHERING?

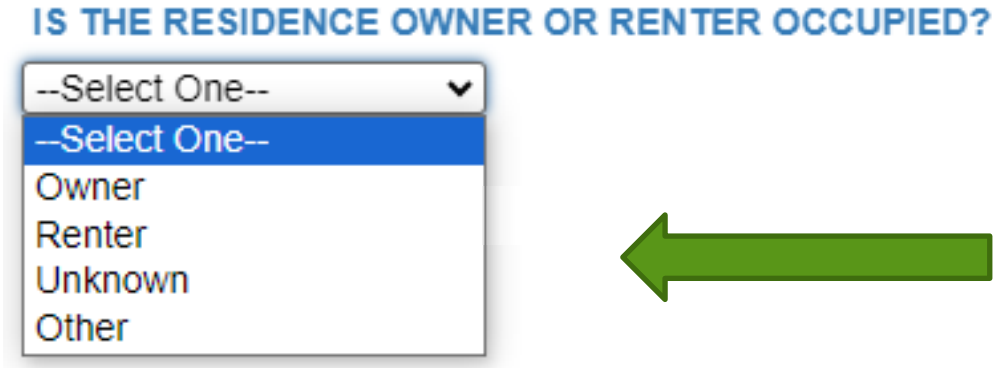
Residential Type – CDRSS



Why is it important?

It is important to search the patient's primary residential address to ensure it is not a high-risk setting, such as an assisted living or long-term care facility.

If the address is not a single-family home, rowhome, apartment, or mobile home, please select "other".



Why is it important?

Renter-occupied residences may be at increased risk for *Legionella* growth and transmission.

NJHealth New Jersey Department of Health

Travel History – CDRSS

IN THE 14 DAYS BEFORE ONSET, DID THE PATIENT SPEND ANY NIGHTS AWAY FROM HOME (EXCLUDING HEALTHCARE SETTINGS)?

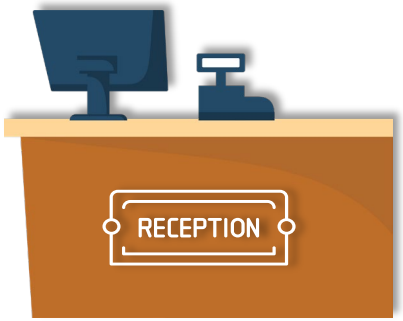
--Select One--
--Select One--
Yes
No
Unknown

This can include but is not limited to hotels and resorts, vacation/home rentals (Airbnb, VRBO), RV parks, campgrounds, truck stops, and homes of family and friends.

Name of Accommodation

Address (Street, City, State, Zip)

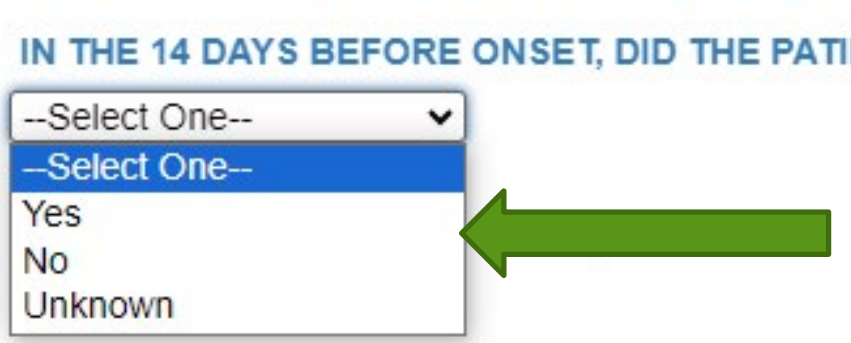
Room Number



Arrival and Departure Dates

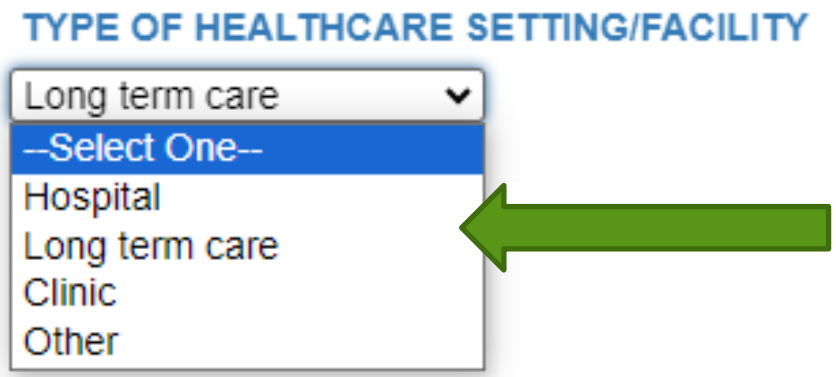
NJHealth New Jersey Department of Health

Healthcare Exposures – CDRSS



Why is it important?

Exposure to *Legionella* can occur in healthcare settings. CDC reports that 18% of patients with Legionnaires' disease report visiting a healthcare facility during their incubation period.



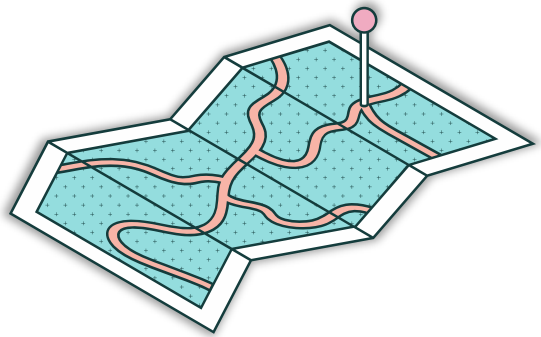
Why is it important?

It's important to specify the healthcare setting type, such as an acute care hospital, long-term care facility, or outpatient clinic (e.g., dialysis center, dental clinic).

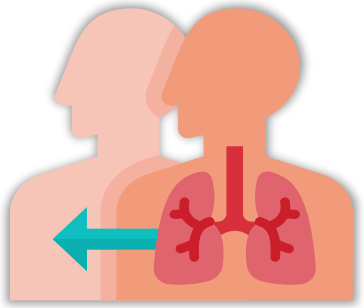
NJ Health
New Jersey Department of Health

Healthcare Exposures – CDRSS

Name of Facility



Address (Street, City, State, Zip)



Transplant Facility?

Type of Exposure
(inpatient, outpatient, employee, visitor)

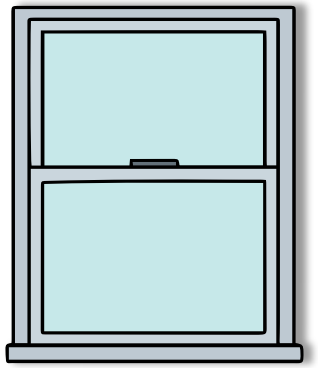
Reason for Visit

Admission/Visit and Discharge Date(s)

NJHealth New Jersey Department of Health

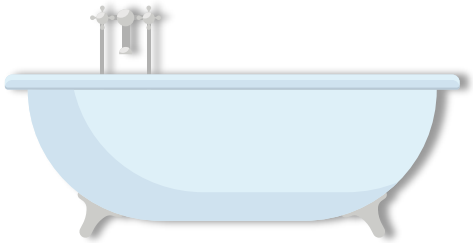
Additional Inpatient Information – CDRSS

Room Numbers and Other Areas



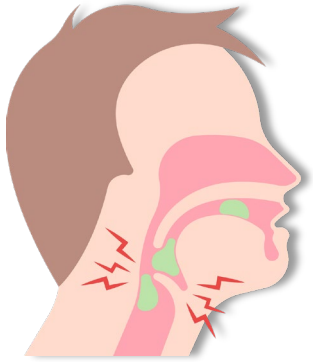
Do Windows Open?

Is the Patient Ambulatory?



Bathing

Other Water Exposures



Aspiration Risk?

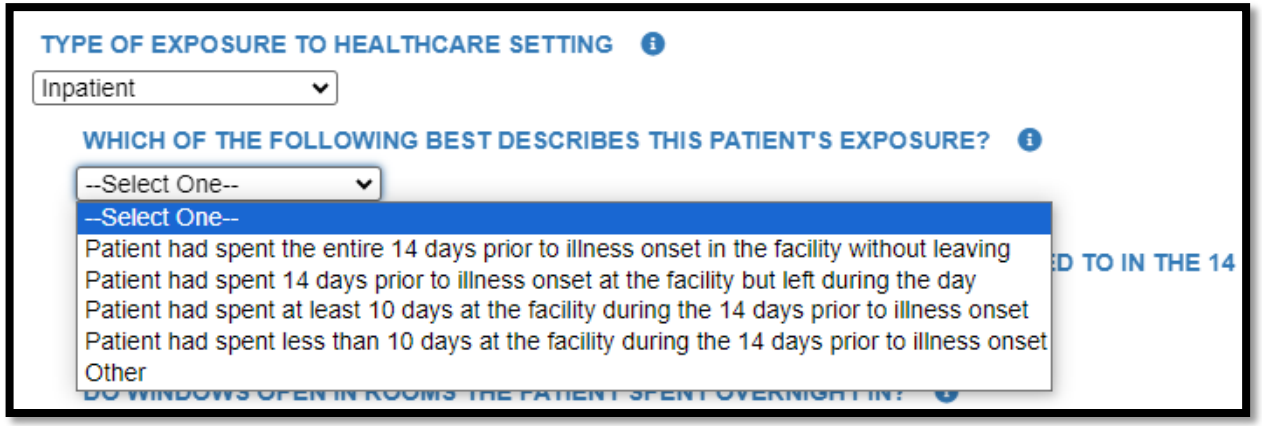
NJHealth New Jersey Department of Health

Healthcare Exposure Classifications – CDRSS

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

"Confirmed" and "suspect" are CSTE surveillance case classifications, based on type of laboratory testing.

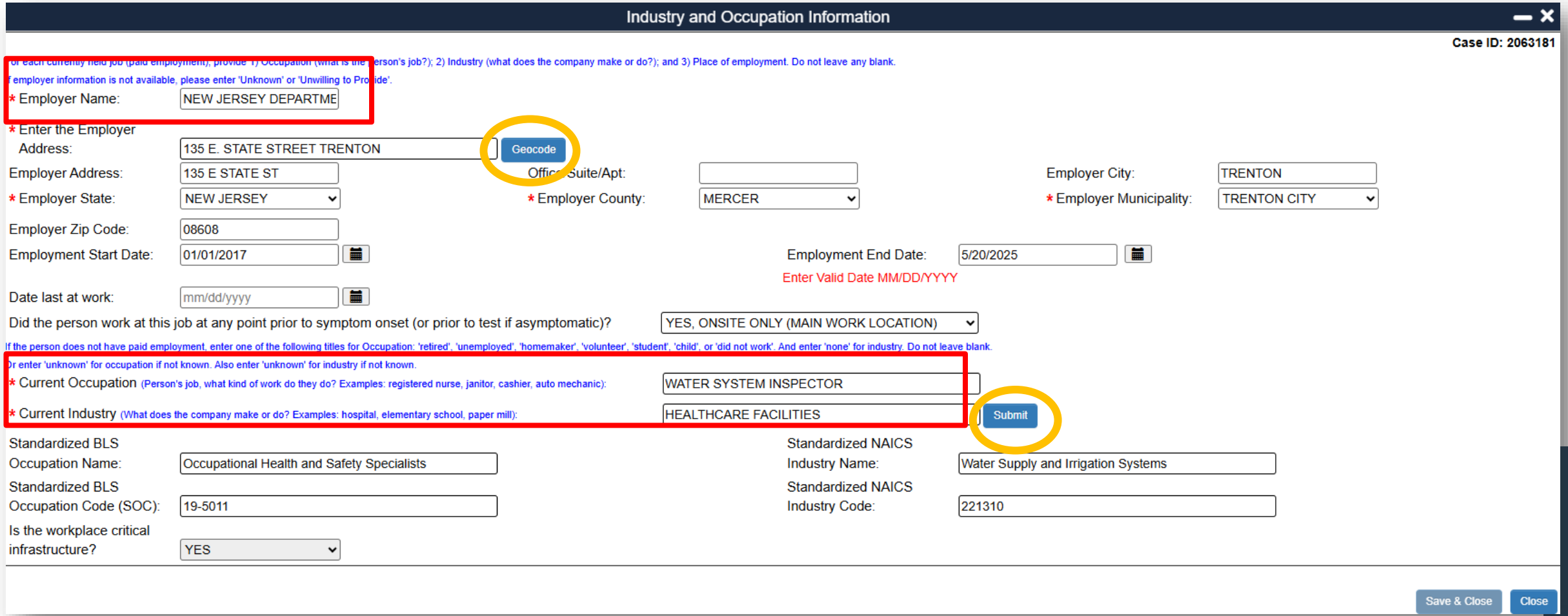
"Presumptive" and "possible" are healthcare exposure case classifications and can apply to both confirmed and suspect cases.



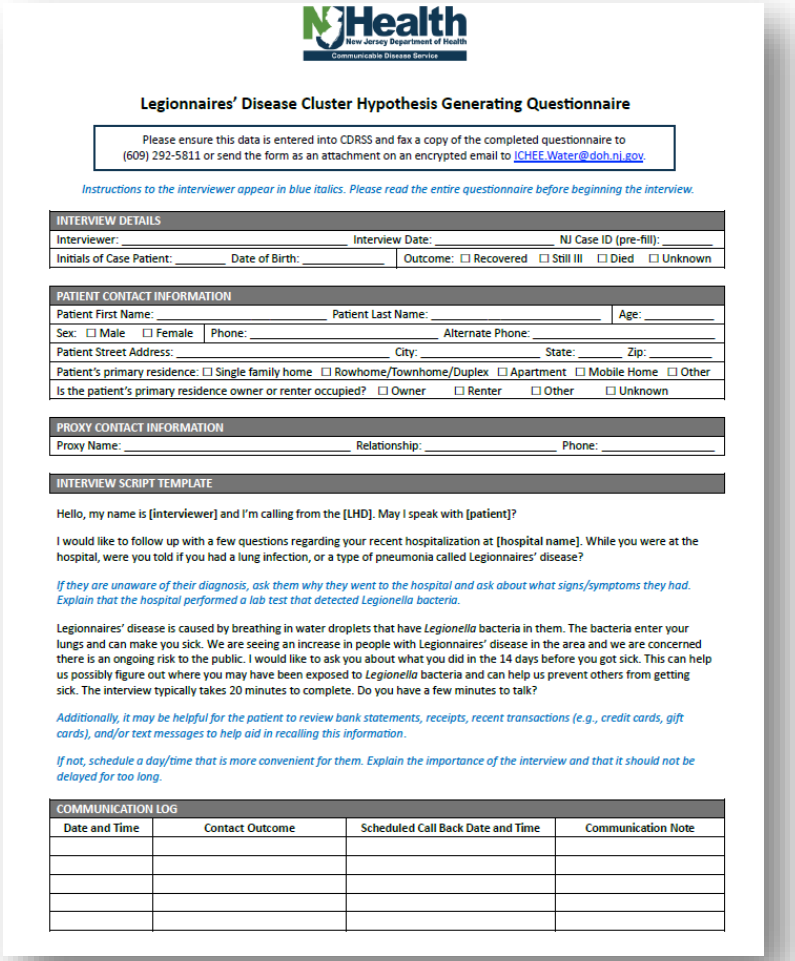
NJ Health New Jersey Department of Health

NJHealth New Jersey Department of Health

Occupation – CDRSS



Interview Tools



NJHealth
New Jersey Department of Health
Communicable Disease Service

Legionnaires' Disease Cluster Hypothesis Generating Questionnaire

Please ensure this data is entered into CDRSS and fax a copy of the completed questionnaire to (609) 292-5811 or send the form as an attachment on an encrypted email to ICHEE.Water@doh.nj.gov.

Instructions to the interviewer appear in blue italics. Please read the entire questionnaire before beginning the interview.

INTERVIEW DETAILS

Interviewer: _____ Interview Date: _____ NJ Case ID (pre-fill): _____

Initials of Case Patient: _____ Date of Birth: _____ Outcome: ☐ Recovered ☐ Still Ill ☐ Died ☐ Unknown

PATIENT CONTACT INFORMATION

Patient First Name: _____ Patient Last Name: _____ Age: _____

Sex: ☐ Male ☐ Female Phone: _____ Alternate Phone: _____

Patient Street Address: _____ City: _____ State: _____ Zip: _____

Patient's primary residence: ☐ Single family home ☐ Rowhome/Townhome/Duplex ☐ Apartment ☐ Mobile Home ☐ Other

Is the patient's primary residence owner or renter occupied? ☐ Owner ☐ Renter ☐ Other ☐ Unknown

PROXY CONTACT INFORMATION

Proxy Name: _____ Relationship: _____ Phone: _____

INTERVIEW SCRIPT TEMPLATE

Hello, my name is **[interviewer]** and I'm calling from the **[LHD]**. May I speak with **[patient]**?

I would like to follow up with a few questions regarding your recent hospitalization at **[hospital name]**. While you were at the hospital, were you told if you had a lung infection, or a type of pneumonia called Legionnaires' disease?

If they are unaware of their diagnosis, ask them why they went to the hospital and ask about what signs/symptoms they had. Explain that the hospital performed a lab test that detected Legionella bacteria.

Legionnaires' disease is caused by breathing in water droplets that have *Legionella* bacteria in them. The bacteria enter your lungs and can make you sick. We are seeing an increase in people with Legionnaires' disease in the area and we are concerned there is an ongoing risk to the public. I would like to ask you about what you did in the 14 days before you got sick. This can help us possibly figure out where you may have been exposed to *Legionella* bacteria and can help us prevent others from getting sick. The interview typically takes 20 minutes to complete. Do you have a few minutes to talk?

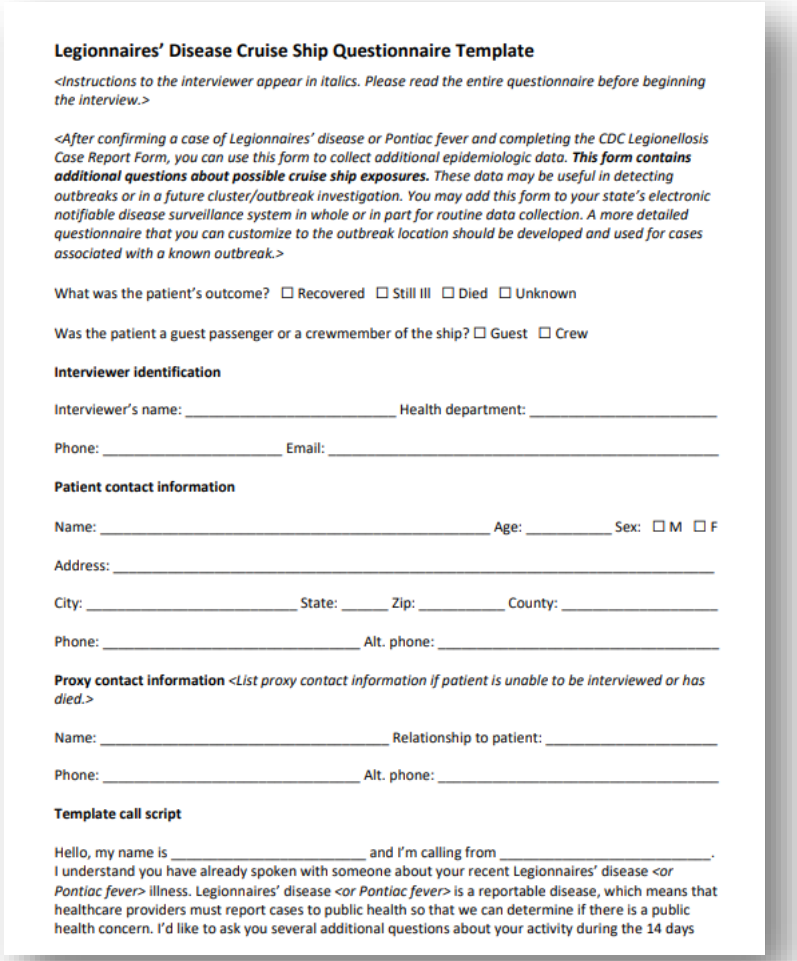
Additionally, it may be helpful for the patient to review bank statements, receipts, recent transactions (e.g., credit cards, gift cards), and/or text messages to help aid in recalling this information.

If not, schedule a day/time that is more convenient for them. Explain the importance of the interview and that it should not be delayed for too long.

COMMUNICATION LOG

Date and Time	Contact Outcome	Scheduled Call Back Date and Time	Communication Note

Cluster Questionnaire



Legionnaires' Disease Cruise Ship Questionnaire Template

<Instructions to the interviewer appear in italics. Please read the entire questionnaire before beginning the interview.>

<After confirming a case of Legionnaires' disease or Pontiac fever and completing the CDC Legionellosis Case Report Form, you can use this form to collect additional epidemiologic data. ***This form contains additional questions about possible cruise ship exposures.*** *These data may be useful in detecting outbreaks or in a future cluster/outbreak investigation. You may add this form to your state's electronic notifiable disease surveillance system in whole or in part for routine data collection. A more detailed questionnaire that you can customize to the outbreak location should be developed and used for cases associated with a known outbreak.>*

What was the patient's outcome? ☐ Recovered ☐ Still Ill ☐ Died ☐ Unknown

Was the patient a guest passenger or a crewmember of the ship? ☐ Guest ☐ Crew

Interviewer identification

Interviewer's name: _____ Health department: _____

Phone: _____ Email: _____

Patient contact information

Name: _____ Age: _____ Sex: ☐ M ☐ F

Address: _____

City: _____ State: _____ Zip: _____ County: _____

Phone: _____ Alt. phone: _____

Proxy contact information *<List proxy contact information if patient is unable to be interviewed or has died.>*

Name: _____ Relationship to patient: _____

Phone: _____ Alt. phone: _____

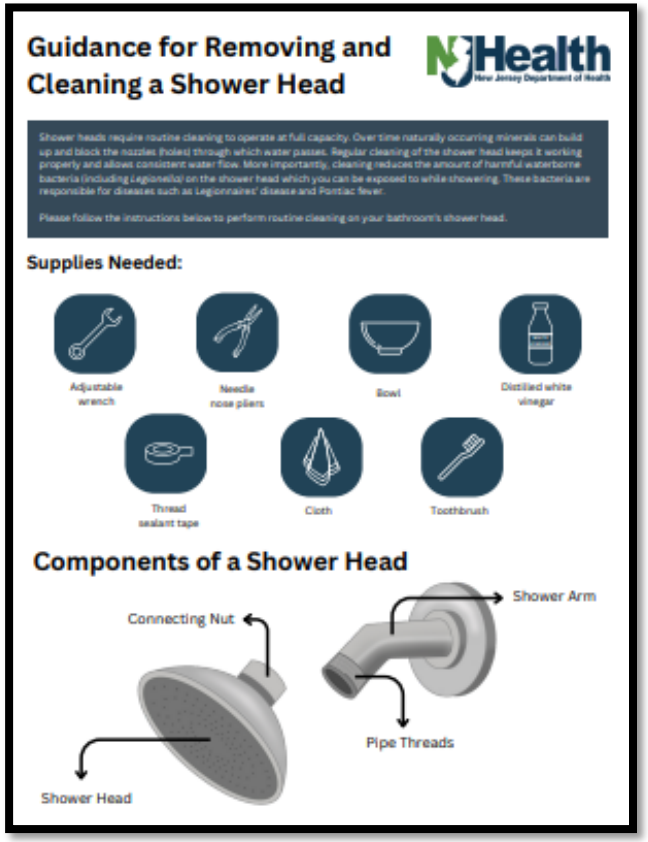
Template call script

Hello, my name is _____ and I'm calling from _____.
I understand you have already spoken with someone about your recent Legionnaires' disease *<or Pontiac fever>* illness. Legionnaires' disease *<or Pontiac fever>* is a reportable disease, which means that healthcare providers must report cases to public health so that we can determine if there is a public health concern. I'd like to ask you several additional questions about your activity during the 14 days

Cruise Ship Questionnaire

NJHealth
New Jersey Department of Health

Educational Resources – General Public



Guidance for Removing and Cleaning a Shower Head

NJHealth New Jersey Department of Health

Shower heads require routine cleaning to operate at full capacity. Over time naturally occurring minerals can build up and block the nozzles (holes) through which water passes. Regular cleaning of the shower head keeps it working properly and allows consistent water flow. More importantly, cleaning reduces the amount of harmful waterborne bacteria (including *Legionella*) on the shower head which you can be exposed to while showering. These bacteria are responsible for diseases such as Legionnaires' disease and Pontiac fever.

Please follow the instructions below to perform routine cleaning on your bathroom's shower head.

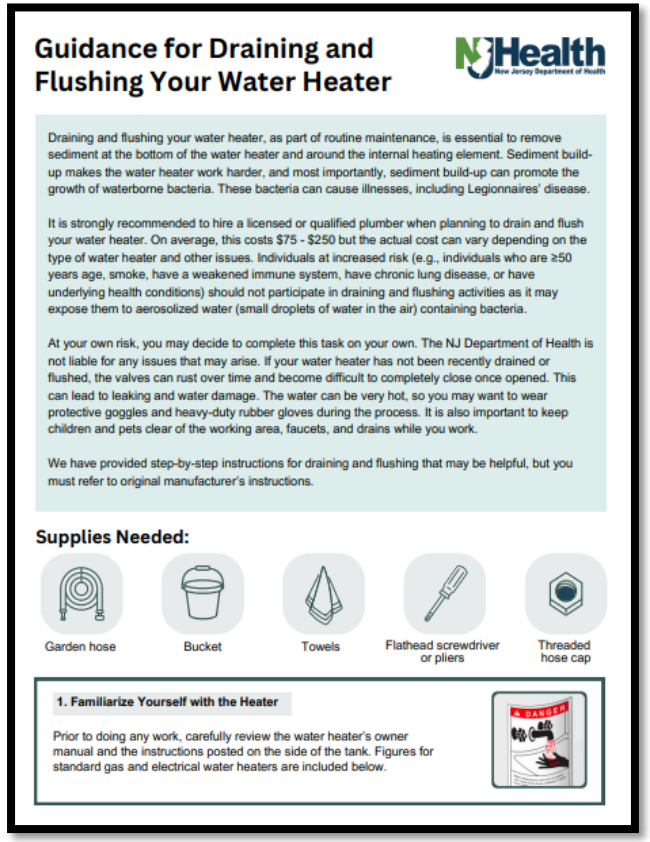
Supplies Needed:

Adjustable wrench; Needle nose pliers; Bowl; Distilled white vinegar; Thread sealant tape; Cloth; Toothbrush

Components of a Shower Head

Connecting Nut; Shower Arm; Pipe Threads; Shower Head

[Guidance for Cleaning A Shower Head]



Guidance for Draining and Flushing Your Water Heater

NJHealth New Jersey Department of Health

Draining and flushing your water heater, as part of routine maintenance, is essential to remove sediment at the bottom of the water heater and around the internal heating element. Sediment build-up makes the water heater work harder, and most importantly, sediment build-up can promote the growth of waterborne bacteria. These bacteria can cause illnesses, including Legionnaires' disease.

It is strongly recommended to hire a licensed or qualified plumber when planning to drain and flush your water heater. On average, this costs $75 - $250 but the actual cost can vary depending on the type of water heater and other issues. Individuals at increased risk (e.g., individuals who are ≥50 years age, smoke, have a weakened immune system, have chronic lung disease, or have underlying health conditions) should not participate in draining and flushing activities as it may expose them to aerosolized water (small droplets of water in the air) containing bacteria.

At your own risk, you may decide to complete this task on your own. The NJ Department of Health is not liable for any issues that may arise. If your water heater has not been recently drained or flushed, the valves can rust over time and become difficult to completely close once opened. This can lead to leaking and water damage. The water can be very hot, so you may want to wear protective goggles and heavy-duty rubber gloves during the process. It is also important to keep children and pets clear of the working area, faucets, and drains while you work.

We have provided step-by-step instructions for draining and flushing that may be helpful, but you must refer to original manufacturer's instructions.

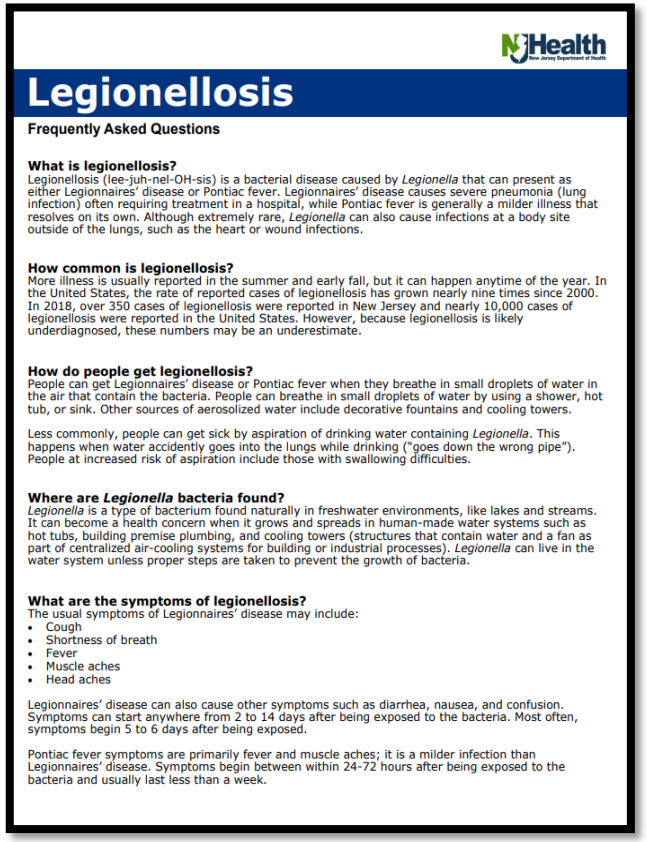
Supplies Needed:

Garden hose; Bucket; Towels; Flathead screwdriver or pliers; Threaded hose cap

1. Familiarize Yourself with the Heater

Prior to doing any work, carefully review the water heater's owner manual and the instructions posted on the side of the tank. Figures for standard gas and electrical water heaters are included below.

[Guidance for Cleaning A Water Heater]



NJHealth New Jersey Department of Health

Legionellosis

Frequently Asked Questions

What is legionellosis?
Legionellosis (lee-juh-nel-OH-sis) is a bacterial disease caused by *Legionella* that can present as either Legionnaires' disease or Pontiac fever. Legionnaires' disease causes severe pneumonia (lung infection) often requiring treatment in a hospital, while Pontiac fever is generally a milder illness that resolves on its own. Although extremely rare, *Legionella* can also cause infections at a body site outside of the lungs, such as the heart or wound infections.

How common is legionellosis?
More illness is usually reported in the summer and early fall, but it can happen anytime of the year. In the United States, the rate of reported cases of legionellosis has grown nearly nine times since 2000. In 2018, over 350 cases of legionellosis were reported in New Jersey and nearly 10,000 cases of legionellosis were reported in the United States. However, because legionellosis is likely underdiagnosed, these numbers may be an underestimate.

How do people get legionellosis?
People can get Legionnaires' disease or Pontiac fever when they breathe in small droplets of water in the air that contain the bacteria. People can breathe in small droplets of water by using a shower, hot tub, or sink. Other sources of aerosolized water include decorative fountains and cooling towers.

Less commonly, people can get sick by aspiration of drinking water containing *Legionella*. This happens when water accidently goes into the lungs while drinking ("goes down the wrong pipe"). People at increased risk of aspiration include those with swallowing difficulties.

Where are *Legionella* bacteria found?
Legionella is a type of bacterium found naturally in freshwater environments, like lakes and streams. It can become a health concern when it grows and spreads in human-made water systems such as hot tubs, building premise plumbing, and cooling towers (structures that contain water and a fan as part of centralized air-cooling systems for building or industrial processes). *Legionella* can live in the water system unless proper steps are taken to prevent the growth of bacteria.

What are the symptoms of legionellosis?
The usual symptoms of Legionnaires' disease may include:
- Cough
- Shortness of breath
- Fever
- Muscle aches
- Head aches

Legionnaires' disease can also cause other symptoms such as diarrhea, nausea, and confusion. Symptoms can start anywhere from 2 to 14 days after being exposed to the bacteria. Most often, symptoms begin 5 to 6 days after being exposed.

Pontiac fever symptoms are primarily fever and muscle aches; it is a milder infection than Legionnaires' disease. Symptoms begin between within 24-72 hours after being exposed to the bacteria and usually last less than a week.

[Frequently Asked Questions]

NJHealth New Jersey Department of Health

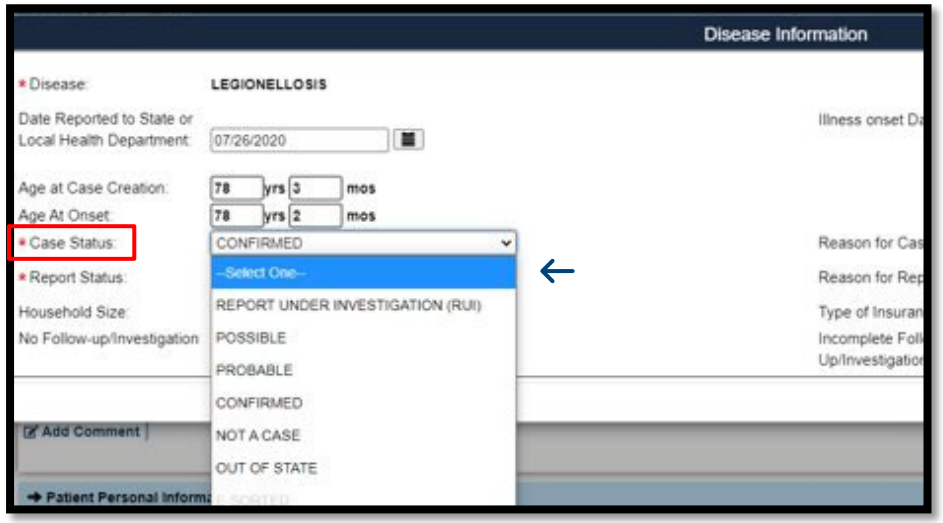
Notifying Relevant Groups of High-Risk Exposures

- **Exposures Outside Jurisdiction:**
  - Notify NJDOH via email within 1 business day if case-patient reports exposure to: Hot tubs or travel, healthcare, assisted/senior living, correctional, or fitness/spa facilities
  - Add as an additional address in CDRSS
- **Exposures Within Jurisdiction:**
  - *Verify with NJDOH for:*
    - Related cases outside your jurisdiction and prior investigations linked to the same facility
  - *If the case is a resident of a long-term care facility:*
    - Refer to ***Long-Term Care Facility Exposure Guidance*** for additional investigation steps
  - *If the case reports exposure to the following settings:*
    - Hotel, apartment building, healthcare, assisted/senior, or congregate living setting:
      - Notify the facility and recommend a review of water management practices
      - See ***Managing Special Situations of Single Cases*** for templates

NJHealth New Jersey Department of Health

Case and Report Status – CDRSS

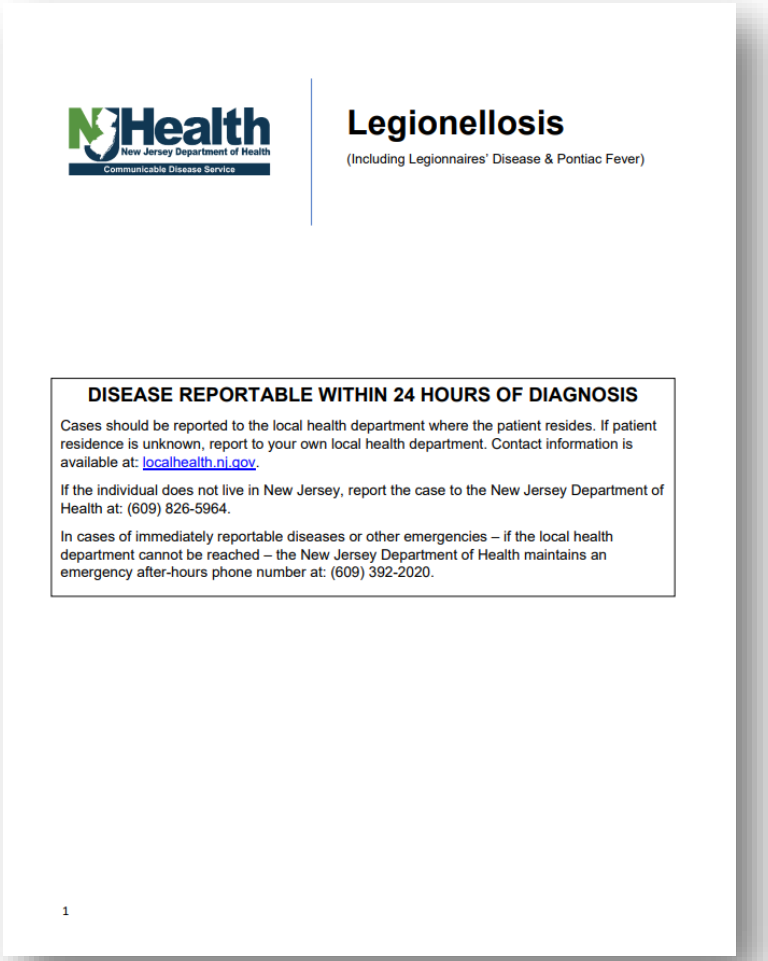
- **Case Status:**
  - **Confirmed**: if the case meets the confirmatory laboratory criteria AND clinical criteria.
  - **Not a Case:** If the case doesn't meet the confirmed or suspected clinical AND laboratory criteria. Provide detailed reasoning.
  - **Out of State:** If the patient resides outside of New Jersey.
  - **Probable:** Reserved for NJDOH use only. *Do not select.*
  - **Possible:** Not an acceptable case status for legionellosis cases. *Do not select.*
- **Report Status:**
  - Select **"LHD closed"** once the investigation is complete.
  - Ensure that all information is entered into CDRSS.
  - NJDOH no longer requests the CDC Legionellosis Case Report Form be completed.



Confirm laboratory report accuracy → Verify the clinical information → Conduct patient or proxy interview → Inform relevant parties of high-risk exposures → Record investigation findings → Conclude case investigation

NJHealth New Jersey Department of Health

Additional Single Case Resources



NJHealth New Jersey Department of Health
Communicable Disease Service

Legionellosis

(Including Legionnaires' Disease & Pontiac Fever)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

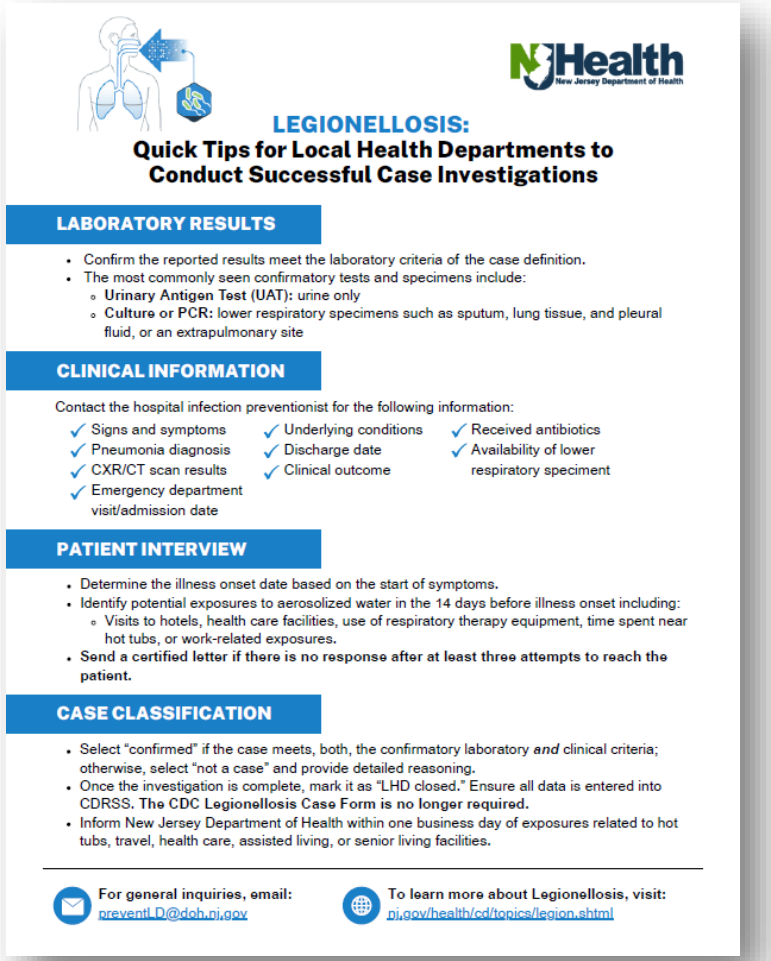
Cases should be reported to the local health department where the patient resides. If patient residence is unknown, report to your own local health department. Contact information is available at: localhealth.nj.gov.

If the individual does not live in New Jersey, report the case to the New Jersey Department of Health at: (609) 826-5964.

In cases of immediately reportable diseases or other emergencies – if the local health department cannot be reached – the New Jersey Department of Health maintains an emergency after-hours phone number at: (609) 392-2020.

1

[Disease Chapter]



NJHealth New Jersey Department of Health

LEGIONELLOSIS:
Quick Tips for Local Health Departments to Conduct Successful Case Investigations

LABORATORY RESULTS

- Confirm the reported results meet the laboratory criteria of the case definition.
- The most commonly seen confirmatory tests and specimens include:
  - **Urinary Antigen Test (UAT):** urine only
  - **Culture or PCR:** lower respiratory specimens such as sputum, lung tissue, and pleural fluid, or an extrapulmonary site

CLINICAL INFORMATION

Contact the hospital infection preventionist for the following information:

- ✓ Signs and symptoms
- ✓ Pneumonia diagnosis
- ✓ CXR/CT scan results
- ✓ Emergency department visit/admission date
- ✓ Underlying conditions
- ✓ Discharge date
- ✓ Clinical outcome
- ✓ Received antibiotics
- ✓ Availability of lower respiratory speciment

PATIENT INTERVIEW

- Determine the illness onset date based on the start of symptoms.
- Identify potential exposures to aerosolized water in the 14 days before illness onset including:
  - Visits to hotels, health care facilities, use of respiratory therapy equipment, time spent near hot tubs, or work-related exposures.
- **Send a certified letter if there is no response after at least three attempts to reach the patient.**

CASE CLASSIFICATION

- Select "confirmed" if the case meets, both, the confirmatory laboratory ***and*** clinical criteria; otherwise, select "not a case" and provide detailed reasoning.
- Once the investigation is complete, mark it as "LHD closed." Ensure all data is entered into CDRSS. **The CDC Legionellosis Case Form is no longer required.**
- Inform New Jersey Department of Health within one business day of exposures related to hot tubs, travel, health care, assisted living, or senior living facilities.

For general inquiries, email: preventLD@doh.nj.gov

To learn more about Legionellosis, visit: nj.gov/health/cd/topics/legion.shtml

[One-Page Guide]

NJHealth New Jersey Department of Health

Resources

- **General Public**
  - Guidance for Removing and Cleaning a Shower Head
  - Guidance for Draining and Flushing Your Water Heater
  - Legionnaires' Disease and Your Household Water

- **Local Health Departments**
  - Communicable Disease Manual Chapter
    - Notification Letter Templates (healthcare, hotels, apartment buildings)
  - Quick Tips for Successful Case Investigations
  - Legionnaires' Disease Cluster Hypothesis-Generating Questionnaire Template
  - Guidance for Submitting Clinical Specimens for *Legionella* Testing

NJHealth New Jersey Department of Health

Promote Our Survey!

- **Survey Title:** Water Management Program Questionnaire
- **Target Audience**: Long-Term Care Facilities
- **Purpose**: Better understand how LTCFs are implementing Water Management Programs
- **Survey Link**: https://forms.office.com/g/Wr8CZxk9MD

NJHealth New Jersey Department of Health

Thank You – Any Questions?