Legionellosis

(Primarily Legionella Pneumophila Pneumonia)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of legionellosis to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at http://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.588.7500, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.

June 2008
THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Legionellosis is an infection caused by the *Legionella* species, with *Legionella pneumophila* being the most common. At least 46 species and 70 serogroups have been identified, although *L. pneumophila* serogroup 1 is most commonly associated with serious illness and outbreaks.

B. Clinical Description

Legionellosis has two distinct forms: legionnaires disease, which is the more severe form of the infection and associated with pneumonia, and Pontiac fever, which is milder and not associated with pneumonia. The most common initial symptoms for legionnaires disease and Pontiac fever are anorexia, myalgia, malaise, and headache, followed by fever (up to 102°F to 105°F), chills, and a nonproductive cough. Other symptoms may include abdominal pain and diarrhea. The case-fatality ratio for legionnaires disease is 5% to 30%, whereas cases of Pontiac fever usually recover in two to five days without treatment. Legionnaires disease usually cannot be distinguished from other forms of pneumonia and requires certain tests to confirm the diagnosis.

C. Reservoirs

*Legionella* species are commonly found in the environment, usually in water. It has been identified in many different kinds of water and water systems, such as hot- and cold-water taps and showers, creeks, ponds, whirlpool spas, and cooling towers and evaporative condensers of large air-conditioning systems. Outbreaks of legionellosis have been linked to these sources, as well as to decorative fountains, humidifiers, respiratory therapy devices, and misters (such as those found in the produce section of grocery stores). These bacteria are most likely to reproduce to high numbers in warm, stagnant water. In this environment, they often live as intracellular parasites of free-living amoebae.
D. Modes of Transmission

Legionellosis is transmitted via the airborne route when aerosols (droplets of water in the air) are inhaled from a water source contaminated with the bacteria or through aspiration. Legionellosis is not transmitted from person to person. There is no evidence to suggest that *Legionella* can be transmitted from automobile air conditioners or household window air-conditioning units since water is not used as a coolant in these devices.

E. Incubation Period

The incubation period for legionnaires disease is from two to ten days, but most often is five to six days. The incubation for Pontiac fever is from five to 66 hours, but most often is 24 to 48 hours.

F. Period of Communicability or Infectious Period

Legionellosis is not transmitted person to person.

G. Epidemiology

Legionnaires disease was named after an outbreak that occurred in Philadelphia in 1976 among people attending a convention of the American Legion. Legionellosis has a worldwide distribution with cases reported from North America, Australia, Africa, South America, and Europe. The Centers for Disease Control and Prevention (CDC) estimates 8,000 to 18,000 people become ill with legionnaires disease in the United States each year; however, because of underdiagnosis and underreporting, only approximately 3,000 cases are reported. Most of the reported cases are single, isolated cases not associated with an outbreak. Outbreaks usually occur in the summer and fall, although sporadic cases can occur year-round. Serologic surveys have shown a prevalence of antibodies to *L. pneumophila* serogroup 1 at a titer of greater than 1:128 in 1% to 20% of the population. *Legionella* is estimated to be responsible for between 0.5% and 5% of cases of community-acquired pneumonias. The illness most often affects persons older than 55 years of age, especially those who smoke cigarettes or have chronic lung disease. Other risk factors include immunosuppressive therapy and immunosuppressive diseases, such as AIDS and diabetes.

2 CASE DEFINITION

The New Jersey Department of Health and Senior Services (NJDHSS) and CDC case definitions are the same.
NOTE: Case definitions establish uniform criteria for identifying and classifying cases for reporting purposes, and should NOT be used for establishing clinical diagnoses or determining the standard of care necessary for a particular patient. For many conditions of public health importance, action to contain disease should be initiated as soon as a problem is identified; in many circumstances, appropriate public health action should be undertaken even though available information is insufficient to determine a clinical diagnosis or case status.

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

1. Clinical Description
Legionellosis is associated with two clinically and epidemiologically distinct illnesses: legionnaires disease, which is characterized by fever, myalgia, cough, and clinical or radiographic pneumonia; and Pontiac fever, a milder illness without pneumonia.

2. Laboratory Criteria for Diagnosis:

SUSPECT
- By seroconversion: 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)
- By seroconversion: fourfold or greater rise in antibody titer to multiple species of *Legionella* using pooled antigen and validated reagents
- By the detection of specific *Legionella* antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody (DFA) staining, immunohistochemistry (IHC), or other similar method, using validated reagents
- By detection of *Legionella* species using by a validated nucleic acid assay

CONFIRMED
- By culture: isolation of any *Legionella* organism from respiratory secretions, lung tissue, pleural fluid, or other normally sterile fluid
- By detection of *L. pneumophila* serogroup 1 antigen in urine using validated reagents
- By seroconversion: fourfold or greater rise in specific serum antibody titer to *L. pneumophila* serogroup 1 using validated reagents

3. Case Classification

SUSPECT
- A clinically compatible case that meets at least one of the presumptive (suspect) laboratory criteria
NOTE: Travel-associated is a patient who has a history of spending at least one night away from home, either in the same country of residence or abroad, in the ten days before onset of illness.

CONFIRMED
- A clinically compatible case that meets at least one of the confirmatory laboratory criteria

NOTE: Travel-associated is a patient who has a history of spending at least one night away from home, either in the same country of residence or abroad, in the ten days before onset of illness.

3 LABORATORY TESTING AVAILABLE

Laboratory confirmation is based on isolation of *Legionella* species from clinical specimens (lung tissue, respiratory secretions, pleural fluid, blood, or other normally sterile body site), demonstration of *L. pneumophila* serogroup 1 antigen in urine using validated reagents, or a fourfold or greater rise in specific serum antibody titer to *L. pneumophila* serogroup 1 using validated reagents.

- Laboratory testing for clinical/diagnostic purposes is available at most commercial laboratories. The most common testing performed is a Urinary Antigen test for *L. pneumophila* serogroup 1 because of the ease in obtaining a urine sample for testing. Additionally, serology (performed on serum), culture (performed usually on respiratory tract specimens, such as lung biopsies, sputa, and bronchial washings, but may also be on normally sterile body fluids), and polymerase chain reaction (PCR) testing are available.

- All testing mentioned above can be used for surveillance purposes. However, if serology is used, two specimens are necessary to obtain a fourfold increase in titer to meet case definition. (After three months from entry into the Communicable Disease Reporting and Surveillance System [CDRSS], a single titer will be deemed “NOT A CASE.”)

- The Public Health and Environmental Laboratories (PHEL) provides services for the isolation of *Legionella* species from lung biopsy, sputum, bronchial washings, pleural fluid, and other normally sterile body fluids. PHEL also provides indirect fluorescent antibody (IFA) testing on paired sera. Questions regarding sample submission may be directed to the Special Immunology Laboratory at 609.292.5819.

- Environmental specimens can also be tested at PHEL for the presence of *Legionella* species with prior authorization from the Division of Epidemiology, Environmental and Occupational Health Services in the case of a suspected positive clinical sample.

- Isolates of *L. pneumophila* must be submitted within three working days to the NJDHSS, Division of Public Health and Environmental Laboratories, Specimen Receiving and Records, PO Box 361, John Fitch Plaza, Trenton, NJ 08625-0361.
4 PURPOSE OF SURVEILLANCE AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

- To identify sources of major public health concern (e.g., a contaminated water source, especially those associated with an acute or long-term healthcare facility)
- To stop transmission from a contaminated water source
- To prevent future transmission from a similar water source

B. Laboratory Reporting Requirements

1. The New Jersey Administrative Code (NJAC 8:57-1.6) stipulates that laboratories report (by telephone, confidential fax, or over the Internet using CDRSS) all positive culture or positive laboratory test results for legionellosis to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located.

2. The report shall contain, at a minimum, the reporting laboratory’s name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of person tested; the date of testing; the test results; and the healthcare provider’s name and address.

C. Healthcare Reporting Requirements

1. The New Jersey Administrative Code (NJAC 8:57-1.6) stipulates that healthcare providers report (by telephone, confidential fax, or over the Internet using CDRSS) all cases of legionellosis to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located.

2. The report shall contain, at a minimum, the reporting laboratory’s name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of person tested; the date of testing; the test results; and the healthcare provider’s name and address.

D. Health Officer Reporting and Follow-up Responsibilities

1. NJAC 8:57 stipulates that each local health officer must report the occurrence of any case of legionellosis, as defined by the reporting criteria above, to NJDHSS Infectious and Zoonotic Diseases Program (IZDP) by entering it electronically over the Internet using the confidential and secure CDRSS.
2. NJAC 8:57 also stipulates that a health officer shall, upon receipt of a suspect or confirmed report of legionellosis, investigate the facts contained in the report. See Case Investigation below. Additionally, a health officer shall follow such direction regarding the investigation as may be given by the Department.

5 CASE INVESTIGATION

A. Form

It is the local health officer’s responsibility to complete a CDC Legionellosis Case Report form (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/files/52_56_8_99_Legionella.pdf) by interviewing the patient and others (i.e., a family member, healthcare provider, or Infection Control Professional) who may be able to provide information. Although much of the information required on the form can be obtained from the patient’s healthcare provider and/or the medical record, timeliness in completion of the form may dictate speaking with the ICP and/or a family member.

B. Laboratory Reports

1. If the local health department receives the lab or provider report, the local health department should investigate the case by contacting the patient or a family member or the healthcare provider to complete the information requested on the Legionellosis Case Report form. Additionally, the local health department should then enter the information into CDRSS as instructed below.

2. If the lab or provider report is received by NJDHSS, and includes the patient’s address, the report will be entered into CDRSS and not mailed to the local health department.

3. If the lab or provider report received by NJDHSS does not include the patient’s address, the report will be returned to the sending laboratory or healthcare provider or they will be telephoned to obtain a complete address. Once it is received, the report will be entered into CDRSS as PENDING.

C. CDRSS

The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of cases of legionellosis. The “CDRSS Screen” column includes the tabs which appear along the top of the CDRSS screen. The “Required Information” column provides detailed explanations of what data should be entered.
<table>
<thead>
<tr>
<th>CDRSS Screen</th>
<th>Required Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Info</td>
<td>Enter the disease name (&quot;LEGIONELLOSIS&quot;), patient demographic information, illness onset date, and the date the case was reported to the local health department (LHD). There are no subgroups for legionellosis.</td>
</tr>
<tr>
<td>Addresses</td>
<td>Enter any alternate address. Use the Comments section in this screen to record any pertinent information about the alternate address. Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.</td>
</tr>
<tr>
<td>Clinical Status</td>
<td>Enter any treatment that the patient received and record the names of the medical facilities (include all acute care and LTC facilities case-patient was in during the incubation period) and physician(s) involved in the patient’s care. If the patient received care from two or more hospitals, be sure that all are entered so the case can be accessed by all infection control professionals (ICPs) covering these facilities. If immunization status is known, it should also be entered here. If the patient is alive, select “NO” in the Mortality section. If the patient died, select “YES” in the Mortality section with the date of death.</td>
</tr>
<tr>
<td>Signs/Symptoms</td>
<td>Check appropriate boxes for signs and symptoms and indicate their onset. Make every effort to get complete information by interviewing the physician, the case patient, family members, ICP, or others who might have knowledge of the patient’s illness. Also, information regarding the resolution of signs and symptoms should be entered.</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>Enter complete information about risk factors (exposure to any potential contaminated water, any travel or over night stay outside the home) to facilitate study of legionellosis disease in New Jersey or travel-associated cases.</td>
</tr>
<tr>
<td>CDRSS Screen</td>
<td>Required Information</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td><strong>Laboratory Eval</strong></td>
<td>Most case of legionellosis caused by <em>Legionella pneumophila</em> are supported by urine antigen testing. There are two listings for this test in the drop down list. Select either “LEGIONELLA PNEUMOPHILA 1 AG” or “LEGIONELLA PNEUMOPHILA AG.” If antibody testing has been performed, find the specific test among the drop down list. Specimen type, specimen collection date, test result, and, if applicable, test value should also be recorded. If a test NAME cannot be found in the drop down list, please document in the Comments section.</td>
</tr>
<tr>
<td><strong>Contact Tracing</strong></td>
<td>Information regarding contacts is not required for sporadic cases of this disease.</td>
</tr>
<tr>
<td><strong>Case Comments</strong></td>
<td>Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the Comments section. <strong>NOTE:</strong> Select pieces of information entered in the Comments section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.</td>
</tr>
<tr>
<td><strong>Epidemiology</strong></td>
<td>Information regarding contacts is not required for sporadic cases of this disease.</td>
</tr>
</tbody>
</table>
| **Case Classification Report Status** | Case status options are: “REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”
  - All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”
  - Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”
  - Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED” and “NOT A CASE” are the only appropriate options for classifying a case of legionellosis (see section 2A).

Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS
### D. Other Reporting/Investigation Issues

1. It is not always possible to obtain all the information necessary to determine the case status of a patient. A minimum of three attempts (not necessarily to the same person, not at the same time during the day, and only one attempt through a letter/form by mail) should be made to obtain necessary information. If at this time information is not acquired, the case should be entered into CDRSS with as much information as is known, with attempts (dates and results of attempts) documented in the comments section and the case status changed to “NOT A CASE” and report status to “LHD CLOSED.”

2. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS and marked as “NOT A CASE.”

3. Mail completed CDC Legionellosis Case Report forms to NJDHSS or fax completed forms to 609.631.4863. DHSS will forward forms to CDC within 30 days without patient-identifying information.
The mailing address is:

NJDHSS
Division of Epidemiology, Environmental and Occupational Health
Infectious and Zoonotic Diseases Program
PO Box 369
Trenton, NJ 08625-0369

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)
   Not applicable.

B. Protection of Contacts of a Case
   Not applicable.

C. Managing Special Situations
   1. One case of legionellosis does not require any further investigation other than completing the CDC Legionellosis Case Report form (http://www.cdc.gov/ncidod/dbmd/diseaseinfo/files/52_56_8_99_Legionella.pdf). See section 5A, Case Investigation. Sporadic case-patients typically report that they may have been infected from a particular place such as work or their places of worship or recreation. Since Legionella can be found in a wide variety of water sources at low levels, unless another case occurs that also implicates the reported “source,” it is difficult to prove a particular source was the cause of illness. Alleged sources should not be tested or decontaminated based on the identification of only one community-acquired case.

   2. A laboratory-confirmed case of legionellosis that occurs in a patient who has been hospitalized or lives in a long-term care facility continuously for more than ten days before the onset of illness is considered a case of nosocomial/healthcare acquired legionellosis. When a case of nosocomial legionellosis occurs in a hospital or long-term care facility, surveillance efforts for additional cases should be enhanced by the infection control official at the facility in conjunction with the regional epidemiologist and NJDHSS (i.e., obtaining historical data for the facility and surrounding area, comparing these data to facilities of similar size and care parameters, determining if there are other cases of pneumonia that were not tested for legionellosis, and so forth). Confirmed cases of nosocomial legionellosis or two persons with possible nosocomial legionellosis within six months should prompt an epidemiological investigation to identify the source and prevent future cases.

   • See section 8, Preventive Measures for a list of measures.
7 OUTBREAK SITUATIONS

If the number of reported cases in an institutional setting or jurisdiction is higher than usual for the time of year, an outbreak might be occurring. In accordance with NJAC 8:57, IZDP should be contacted immediately at 609.588.7500. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. In contrast to what routinely occurs at the local level, IZDP staff can perform surveillance for clusters of illness that may cross several jurisdictions and thereby be better able to assess the extent of an outbreak during its infancy.

If evidence indicates a common source, applicable laboratory testing and preventive or control measures will be recommended and should be instituted. Ongoing surveillance of cases of legionellosis and a schedule of continued surveillance testing will be put in place for a period of time that will be determined on a case-by-case basis.

NOTE: Testing water sources for legionellosis without epidemiologic evidence as determined through consultation with IZDP staff is NOT recommended. Testing is a specialized procedure and will require the assistance of environmental professionals.

8 PREVENTIVE MEASURES

To prevent legionellosis:

- Cooling towers should be drained when not in use and mechanically cleaned and maintained according to the manufacturer’s recommendations.
- Tap water should not be used in respiratory therapy devices.
• Whirlpool spas and decorative fountains should be maintained according to the manufacturer’s recommendations. Persons responsible for maintenance of these items should regularly review up-to-date maintenance protocols.
• After outbreaks, vigilant monitoring of proven infection sources should be maintained.

Additional Information
A Legionellosis Fact Sheet can be obtained at the NJDHSS Web site at http://www.state.nj.us/health. Click on the “Topics A to Z” link and scroll down to Legionellosis.

The formal CDC surveillance case definition for legionellosis is the same as the criteria outlined in section 2A of this chapter. CDC case definitions are used by state departments of health and CDC to maintain uniform standards for national reporting. For reporting to the NJDHSS, always use the criteria outlined in section 2A.

References


