Legionellosis
Investigation Guideline

Contents

CASE DEFINITION.................................................................1
LABORATORY ANALYSIS..........................................................2
EPIDEMIOLOGY .......................................................................2
DISEASE OVERVIEW ...............................................................2
NOTIFICATION TO PUBLIC HEALTH AUTHORITIES ..................3
INVESTIGATOR RESPONSIBILITIES ........................................4
STANDARD CASE INVESTIGATION AND CONTROL ................4
  Case Investigation ................................................................4
  Contact Investigation ............................................................5
  Isolation, Work and Daycare Restrictions .................................5
  Case Management ..................................................................5
  Contact Management .............................................................5
  Environmental ........................................................................6
MANAGING SPECIAL SITUATIONS .........................................6
  A. Outbreak Investigation: .......................................................6
DATA MANAGEMENT AND REPORTING .................................7
ADDITIONAL INFORMATION / REFERENCES ..........................8
ATTACHMENTS ........................................................................8

Attachments can be accessed through the Adobe Reader’s navigation panel for attachments. Throughout this document attachment links are indicated by this symbol [ ]; when the link is activated in Adobe Reader it will open the attachments navigation panel. The link may not work when using PDF readers other than Adobe.
**Revision History:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Replaced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/2018</td>
<td>07/2013</td>
<td>Updated Notification sections and Isolation, Work and Daycare Restrictions sections with updated regulations.</td>
</tr>
<tr>
<td>05/2014</td>
<td>05/2013</td>
<td>Edited notification section in association to travel/hotel related notifications.</td>
</tr>
<tr>
<td>05/2013</td>
<td>09/2009</td>
<td>Added notification section. Removed references to KS-EDSS (02/2012).</td>
</tr>
</tbody>
</table>
CASE DEFINITION (CDC 2005)

Clinical Description for Public Health Surveillance:
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.

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

Suspect (presumptive) lab results:
- 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 by a validated nucleic acid assay.

Case Classification:
- **Confirmed:**
  - A clinically compatible case that meets at least one of the confirmatory laboratory criteria.
- **Suspected:**
  - A clinically compatible case that meets at least one of the presumptive (suspect) laboratory criteria.
- **Travel-associated:** a suspect or confirmed case that 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.
LABORATORY ANALYSIS
Isolates are not required to be sent to the State Public Health Laboratory (KHEL); but they are equipped to confirm isolates of *Legionella spp*. Specimens for *Legionella* testing will be forwarded to the CDC only after prior clearance by the CDC Respiratory Diseases Branch.

- When sending isolates to the state laboratory:
  - Contact the laboratory at 785-620-1620.
  - Use IDS (infectious disease shipper) for shipping.
- When sending serology, urine, or pathologic specimens for testing at the CDC:
  - Contact the Epidemiology services for approval at 1-877-427-7317.
  - An epidemiologist will request the information needed to verify an outbreak related case or if other special circumstances exist in which the CDC would need to assist. The epidemiologist will contact the Respiratory Disease Branch within the CDC Division of Bacterial Disease at 404-639-2215.
  - After approval, specimen collection and delivery instructions will be given.

  **Note:** For serology, paired serum specimens taken at least 14 days apart are required. A single antibody titer at any level is not diagnostic to Legionellosis.

- For additional information, call (785) 296-1620.

EPIDEMIOLOGY
Legionellosis has a worldwide distribution. In the United States an estimated 8,000 - 18,000 cases occur annually; most are isolated and are not associated with outbreaks. Outbreaks usually occur in the summer and fall, although cases may occur year-round. Serologic surveys show a prevalence of antibodies to *L. pneumophila* serogroup 1 in up to 20% of the population. Risk factors include increased age (i.e., >50 years), cigarette smoking, chronic lung disease and immunosuppressive therapy. *Legionella* accounts for 0.5-5% of community-acquired pneumonias each year.

DISEASE OVERVIEW

A. **Agent:**
   Legionellosis is an illness caused by *Legionella* species. There are many serogroups, but serogroup 1 is the most frequently linked with serious illness.

B. **Clinical Description:**
   Legionellosis is associated with two distinct illnesses:
   - Legionnaire’s disease characterized by fever, myalgia, cough, and pneumonia.
     - Legionnaires’ disease has a case-fatality rate of 5-30%
   - Pontiac fever is a milder form of illness without pneumonia. The most common symptoms are anorexia, myalgia, malaise and headache. This is followed by fever, chills and a non-productive cough. Other symptoms include abdominal pain and diarrhea.
     - Pontiac fever cases usually recover in 2-5 days without treatment.

C. **Reservoirs:**
   *Legionella* is commonly found in aquatic environments. Outbreaks and sporadic cases have been linked to air conditioning cooling towers, evaporative condensers, humidifiers, whirlpool spas, respiratory therapy devices, decorative fountains and potable water systems.
D. **Mode(s) of Transmission:**
Transmission most commonly occurs by the respiratory route through contact with respiratory droplets, or by contact with airborne droplets of respiratory secretions, which generally travel 3 feet or less when an infected person talks, cough or sneezes. Indirect spread through contaminated objects occurs rarely.

E. **Incubation Period:**
Legionellosis is transmitted via aerosols inhaled from a contaminated water source or through aspiration. The organism can survive in water between 68-176° F and is resistant to typical levels of chlorination. It is not transmissible person-to-person.

F. **Period of Communicability:**
None.

G. **Susceptibility and Resistance:**
Those most susceptible to disease are of increased age (i.e., >50) and a history of cigarette smoking, chronic lung disease and/or a history of immunosuppressive therapy or disease. There is evidence of lifetime immunity to specific strains.

H. **Treatment:**
Erythromycin is the preferred treatment. If illness progresses, Rifampin may be added. Alternative antimicrobials such as Azithromycin and Levofloxacin may also be used.

---

**NOTIFICATION TO PUBLIC HEALTH AUTHORITIES**

Suspected cases of legionellosis shall be reported within 24 hours, except if the reporting period ends on a weekend or state-approved holiday, the report shall be made by 5:00 p.m. on the next business day after the 24-hour period:

1. Health care providers and hospitals: report to the local public health jurisdiction or KDHE-BEPHI (see below)
2. Local public health jurisdiction: report to KDHE-BEPHI (see below)
3. Laboratories: report to KDHE-BEPHI (see below)

**Kansas Department of Health and Environment (KDHE)**  
**Bureau of Epidemiology and Public Health Informatics (BEPHI)**  
**Phone:** 1-877-427-7317 **Fax:** 1-877-427-7318

**Further responsibilities of state and local health departments to the CDC:**

As a nationally notifiable condition, pertussis cases require a ROUTINELY NOTIFIABLE report to the Center of Disease Control and Prevention (CDC).

1. Local public health jurisdiction will report information as requested in the Kansas electronic surveillance system, as soon as possible, ensuring that the electronic form is completed within 5 days of receiving a notification of a report.
   - **For travel associated cases or nosocomial cases,** the Local public health jurisdiction will notify KDHE-BEPHI by phone at 1-877-427-7317.

2. ROUTINE reporting requires KDHE-BEPHI to file an electronic report for cases within the next reporting cycle to CDC.

3. KDHE-BEPHI will also perform the following notifications:
Travel-associated notifications:
- After receiving a notification that a Kansas lodging facility may be associated to a travel-associated legionellosis case, KDHE-BEPHI will notify the facility management by mail.
- KDHE-BEPHI will also notify the CDC by emailing travellegionella@cdc.gov.

Nosocomial-associated notifications:
- All medical facilities that are associated to a potential nosocomial case of legionellosis will be contacted by the KDHE-BEPHI Healthcare-Associated Infections Program.

INVESTIGATOR RESPONSIBILITIES
1) Report all confirmed, probable and suspected cases to the KDHE-BEPHI.
   - Start the Case Investigation within 3 days of receiving a notification
   - Complete the case investigation within 5 days of receiving notification.
2) Contact medical provider to collect additional information and confirm diagnosis using the current case definition.
   - Collect all information requested in Step 1 of case investigation.
   - Ensure that the patient is aware of his/her diagnosis.
3) Complete the case investigation to identify potential source of infection.
4) Only if a particular source is considered highly likely to be the cause of illness (i.e. additional cases associated with a common source or a single nosocomial case in hospitalized patient), conduct a more detailed contact investigation and investigate possible environmental measures to control and prevent disease.
5) For suspected travel associated cases, contact the KDHE immediately at 1-877-427-7317 to report suspicions.
6) Record data, collected during the investigation, in the KS EpiTrax system under the data’s associated [tab] in the case morbidity report (CMR). Identify whether the source of infection is major public health concern,
7) As appropriate, use notification letter(s) and the disease fact sheet.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation
1) Contact the medical provider who reported or ordered testing of the case.
   - Obtain information from the provider or medical chart about the diagnosis.
     - If patient hospitalized, obtain medical records.
   - Collect case’s demographic data and contact information (birth date, county, sex, race/ethnicity, occupation, address, phone number(s))
   - Note the symptoms and onset date, especially: fever (note maximum temperature); myalgia, cough, or pneumonia
   - Examine the laboratory testing that was done.
   - Record hospitalizations (including those 10 days prior onset): location, dates
   - Record outcomes: survived or date of death
   - Note pre-existing conditions: alcoholism; smoking; diabetes; any chronic disease; immunodeficiency; organ transplant; malignancy
2) Interview the case or proxy to determine source and risk factors:
   • Focus on incubation period 2 weeks prior to illness onset.
   • Record any travel or overnight stay somewhere other than usual residence; note city and lodging information.
   • Record any dental work, note name of dental office.
   • Record any hospital visits; note name of hospital.
   • Record any work in a hospital; note name of hospital.

3) Consider if a case is hospital related (nosocomial):
   • Not nosocomial: no hospital visit (in and out-patient) 10 days prior to onset.
   • Possibly nosocomial: hospitalized 2-9 days before onset of infection.
   • Definitely nosocomial: hospitalized continuously for >10 days before onset.
   • Notify KDHE (877-427-7317) of any suspicion of nosocomial association.

4) For cases that have any travel or overnight stay 10 days before illness onset:
   • Notify KDHE (877-427-7317) of any travel association within 7 days of initial report of local health department receiving a report of Legionellosis.
   • KDHE will notify the CDC within 7 days after receiving a notification.
   • When epi-linked cases are identified, the CDC and state will assist the local investigator in investigating the cases and locations.

5) Investigate epi-links among cases (clusters, household, co-workers, etc).
   • Highly suspected sources should be investigated.
   • For suspected outbreaks refer to Managing Special Situations section.

Contact Investigation
Contacts are only at risk if they are exposed to the same source.

A detailed contact and environmental investigation will only be completed if a particular source is considered highly likely to be the cause of illness among groups of people or in hospital settings.

The CDC and its web resources will be used to guide the investigation. Refer to www.cdc.gov/legionella/index.html for more information.

Isolation, Work and Daycare Restrictions
None.

Case Management
None.

Contact Management
None; unless required as part of an active investigation with state and/or CDC.
Environmental

It should be noted that routine surveillance of environmental sources is not recommended because of the high prevalence of the organism in the environment, the number of potential sources and the frequency of environmental bacteria in the absence of clinical disease.

The following measures are recommended:

- Water management programs should be considered to reduce *Legionella* growth and spread in buildings. Toolkits are available to assist: [https://www.cdc.gov/legionella/maintenance/wmp-toolkit.html](https://www.cdc.gov/legionella/maintenance/wmp-toolkit.html)
- Cooling towers should undergo regular maintenance and should be drained when not in use. Appropriate biocides should be used to limit the growth of slime-forming organisms.
- If it is necessary to attempt to eliminate *L. pneumophila* from a cooling tower or potable water system the most effective methods are heating to 140° F, and/or hyperchlorination.
- Tap water should not be used for respiratory therapy devices.
- Where clinical cases are linked to a likely environmental source, sampling may be considered. Consult with KDHE at 1-877-427-7317.

Refer to [www.cdc.gov/legionella/index.html](https://www.cdc.gov/legionella/index.html) for more information.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- Outbreak definition:
  - A single documented nosocomial case in a hospital or other care facility should be investigated as a potential outbreak until a source has been identified and decontaminated or until additional cases have been ruled out.
  - In outbreaks, cases are clustered in time and place among groups that share a common air space. Most cases are sporadic and a complete environmental investigation is not necessary.
- Notify KDHE immediately, 877-427-7317.
- Active case finding will be an important part of any investigation.
- Recommendations will be made based on the CDC guidance.
  - Refer to [www.cdc.gov/legionella/index.html](https://www.cdc.gov/legionella/index.html) for more information.
DATA MANAGEMENT AND REPORTING TO THE KDHE

A. Accept the case assigned to the LHD and record the date the LHD investigation was started on the [Administrative] tab.

B. Organize and collect data.
   - The Legionellosis Report Form can assist with data collection.
   - Investigators can collect and enter all required information directly into EpiTrax [Investigation], [Clinical], [Demographics], [Epidemiological], [Contact] tabs without using the paper forms.
   - During outbreak investigations, refer to guidance from a KDHE epidemiologist for appropriate collection tools.

C. Report data collected during the investigation via EpiTrax.
   - Verify that all data requested in Step 1) has been recorded on an appropriate EpiTrax [tab], or that actions are completed for a case lost to follow-up as outlined below.
   - Some data that cannot be reported on an EpiTrax [tab] may need to be recorded in [Notes] or scanned and attached to the record.
   - Paper report forms do not need to be sent to KDHE after the information is recorded in EpiTrax. The forms should be handled as directed by local administrative practices.

D. If a case is lost to follow-up, after the appropriate attempts:
   - Indicate ‘lost to follow-up’ on the [Administration] tab with the number of attempts to contact the case recorded.
   - Record at least the information that was collected from the medical records.
   - Record a reason for ‘lost to follow-up’ in [Notes].

E. After the requirements listed under Case Investigation have been completed, record the “Date LHD investigation completed” field located on the [Administrative] tab.
   - Record the date even if the local investigator’s Case or Contact Management for the contact is not “Complete”.

F. Once the entire investigation is completed, the LHD investigator will click the “Complete” button on the [Administrative] tab. This will trigger an alert to the LHD Administrator, so they can review the case before sending to the state.
   - The LHD Administrator will then “Approve” or “Reject” the CMR.
   - Once a case is “Approved” by the LHD Administrator, BEPHI staff will review the case to ensure completion before closing the case.

ADDITIONAL INFORMATION / REFERENCES


C. Case Definitions: CDC Division of Public Health Surveillance and Informatics, Available at: www.cdc.gov/nndss/

D. Additional Information (CDC): www.cdc.gov/health/default.htm
   • Legionellosis Resource Site: www.cdc.gov/legionella/index.html

ATTACHMENTS

To view attachments in the electronic version:
   1. Go to <View>; <Navigation Pane>; <Attachments> – OR – Click on the “Paper Clip” icon at the left.
   2. Double click on the document to open.