



Listeriosis Investigation Guideline

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Revision History:

Date	Replaced	Comments
06/2019	05/2018	Updated case definition. Recommendation for in-person interviews under Investigator Responsibilities.
05/2018	04/2014	Updated format and web links. Updated Notification sections and Isolation with updated regulations.
04/2014	06/2010	Added notification section; fixed minor typos. Modified laboratory and case investigation sections concerning submission of isolates. Removed references to KS-EDSS in 02/2012.

Listeriosis

Disease Management and Investigative Guidelines

CASE DEFINITION – (CDC 2019)

Clinical Description for Public Health Surveillance:

Invasive listeriosis:

- Systemic illness caused by *L. monocytogenes* manifests most commonly as bacteremia or central nervous system infection. Other manifestations can include pneumonia, peritonitis, endocarditis, and focal infections of joints and bones.
- Pregnancy-associated listeriosis has generally been classified as illness occurring in a pregnant woman or in an infant age ≤ 28 day. Listeriosis may result in pregnancy loss (fetal loss before 20 weeks gestation), intrauterine fetal demise (≥ 20 weeks gestation), pre-term labor, or neonatal infection, while causing minimal or no systemic symptoms in the mother. Pregnancy loss and intrauterine fetal demise are considered to be maternal outcomes.
- Neonatal listeriosis commonly manifests as bacteremia, central nervous system infection, and pneumonia, and is associated with high fatality rates. Transmission of *Listeria* from mother to baby transplacentally or during delivery is almost always the source of early-onset neonatal infections (diagnosed between birth and 6 days), and the most likely source of late-onset neonatal listeriosis (diagnosed between 7–28 days).

Non-invasive Listeria Infections:

- *Listeria* infection manifesting as an isolate from a non-invasive clinical specimen suggestive of a non-invasive infection; includes febrile gastroenteritis, urinary tract infection, and wound infection.

Laboratory Criteria for Case Classification:

Confirmatory laboratory evidence:

- Isolation of *L. monocytogenes* from a specimen collected from a normally sterile site reflective of an invasive infection (e.g., blood or cerebrospinal fluid or, less commonly: pleural, peritoneal, pericardial, hepatobiliary, or vitreous fluid; orthopedic site such as bone, bone marrow, or joint; or other sterile sites including organs such as spleen, liver, and heart, but not sources such as urine, stool, or external wounds);

OR

- For maternal isolates: In the setting of pregnancy, pregnancy loss, intrauterine fetal demise, or birth, isolation of *L. monocytogenes* from products of conception (e.g. chorionic villi, placenta, fetal tissue, umbilical cord blood, amniotic fluid) collected at the time of delivery;

OR

- For neonatal isolates: In the setting of live birth, isolation of *L. monocytogenes* from a non-sterile neonatal specimen (e.g., meconium, tracheal aspirate, but not products of conception) collected within 48 hours of delivery.

Presumptive laboratory evidence:

- Detection of *L. monocytogenes* by culture-independent diagnostic testing (CIDT) in a specimen collected from a normally sterile site (e.g., blood or cerebrospinal fluid or, less commonly: pleural, peritoneal, pericardial,

hepatobiliary, or vitreous fluid; orthopedic site such as bone, bone marrow, or joint; or other sterile sites including organs such as spleen, liver, and heart, but not sources such as urine, stool, or external wounds);

OR

- For maternal isolates: In the setting of pregnancy, pregnancy loss, intrauterine fetal demise, or birth, detection of *L. monocytogenes* by CIDT from products of conception (e.g., chorionic villi, placenta, fetal tissue, umbilical cord blood, amniotic fluid) collected at the time of delivery;

OR

- For neonatal isolates: In the setting of live birth, detection of *L. monocytogenes* by CIDT from a non-sterile neonatal specimen (e.g., meconium, tracheal aspirate, but not products of conception) collected within 48 hours of delivery.

Supportive laboratory evidence:

- Isolation of *L. monocytogenes* from a non-invasive clinical specimen, e.g., stool, urine, wound, other than those specified under maternal and neonatal specimens in the Confirmatory laboratory evidence section.

Epidemiologic Linkage

For probable maternal cases:

- A mother who does not meet the confirmed case criteria, BUT
- Who gave birth to a neonate who meets confirmatory or presumptive laboratory evidence for diagnosis, AND
- Neonatal specimen was collected up to 28 days of birth.

OR

For probable neonatal cases:

- Neonate(s) who do not meet the confirmed case criteria, AND
 - Whose mother meets confirmatory or presumptive laboratory evidence for diagnosis from products of conception, OR
 - A clinically compatible neonate whose mother meets confirmatory or presumptive laboratory evidence for diagnosis from a normally sterile site.

Case Classification:

Suspected:

- A person with supportive laboratory evidence.

Probable:

- A person who meets the presumptive laboratory evidence;
- OR**
- A mother or neonate who meets the epidemiologic linkage but who does not have confirmatory laboratory evidence.

Confirmed:

- A person who meets confirmatory laboratory evidence.

LABORATORY ANALYSIS:

Kansas participates in the CDC [Listeria Initiative](#). All *L. monocytogenes* isolates are to be forwarded to Kansas Health and Environmental Laboratories (KHEL) for subtyping through the National Molecular Subtyping Network (PulseNet).

- Shipping of isolates: Use a KHEL Miscellaneous Infectious Disease mailer
- For additional information: call (785) 296-1620.

EPIDEMIOLOGY

L. monocytogenes bacteria are widely distributed in nature, especially in the food chain. Most cases occur sporadically but foodborne and nosocomial outbreaks have been documented. Foods associated with infection include: unpasteurized milk, soft cheeses, processed meats, and contaminated vegetables. Newborns, the elderly, immunocompromised persons, and pregnant women are at greater risk of infection. About 30% of all cases occur to newborns within the first 3 weeks of life.

DISEASE OVERVIEW

A. Agent:

L. Monocytogenes is an aerobic gram-positive rod-shaped bacterium.

B. Clinical Description:

Infections in healthy persons may appear as mild flu-like illness. Seen as meningoencephalitis or bacteremia in newborns and some adults, it may cause fever and abortion in pregnant women. Meningoencephalitis onset may be sudden with fever, headache, nausea, vomiting, and signs of meningeal irritation. Endocarditis, granulomatous lesions in the liver and other organs, localized internal or external abscesses, and pustular or papular cutaneous lesions may also occur. ~30% case-fatality rate seen in infected newborns.

C. Reservoirs:

Reservoirs for *L. monocytogenes* are soil, water, silage, mammals and fowl.

D. Mode(s) of Transmission:

L. monocytogenes may be acquired by the fetus in utero or during delivery. Listeria can also be transmitted through ingestion of contaminated foods or through contact with infected animals or birds. Person-to-person transmission has also been reported in nosocomial outbreaks.

E. Incubation Period:

Range 3-70 days; average 21 days.

F. Period of Communicability:

L. monocytogenes may be shed for months in the stool of infected persons, but person-to-person transmission is rare. Following delivery, the infected newborn's mother may shed *L. monocytogenes* for 7-10 days in vaginal secretions or urine.

G. Susceptibility and Resistance:

Fetuses and newborns are highly susceptible. Children and young adults are usually resistant; adults, especially the immunocompromised and the elderly, are less resistant after age 40. Disease is often superimposed on other illness such as cancer, organ transplant, diabetes and AIDS. There is no evidence of immunity after infection.

H. Treatment:

Penicillin or ampicillin alone or together with aminoglycosides. If case is allergic to penicillin, TMP-SMX or erythromycin is preferred. Cephalosporins are not effective. Tetracycline resistance has been observed.

NOTIFICATION TO PUBLIC HEALTH AUTHORITIES

Suspected cases of Listeriosis 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, *confirmed* and *probable* Listeriosis cases are **ROUTINELY NOTIFIABLE** to the Center of Disease Control and Prevention (CDC).

- **Local public health jurisdiction** will report information requested on the disease reporting forms as soon as possible, completing the forms within 5 days of receiving a notification of a report.
- KDHE-BEPHI will file an electronic case report the next regularly scheduled electronic transmission.
(KDHE-BEPHI files electronic reports weekly with CDC.)

INVESTIGATOR RESPONSIBILITIES

- 1) Use current [case definition](#) to confirm diagnosis with the medical provider.
 - Collect all information requested in [Step 1](#) of case investigation.
 - Ensure that case/proxy is aware of the diagnosis
- 2) Continue the [case investigation](#) to identify potential source of infection.
 - KDHE recommends performing an in-person interview with the case when possible. The KDHE epidemiologist in charge of Listeria surveillance will lead or assist with the interview after consultation with the local health department.
 - The [Listeria Case Form](#) will assist with data collection.
 - Start the [case investigation](#) within 3 days of receiving a notification
 - Complete the [case investigation](#) within 5 days of receiving notification.
- 3) Identify whether the source of infection is major public health concern.
 - Example: commercially available food.
- 4) Conduct [contact investigation](#) only if a specific food has been incriminated.
- 5) Initiate control and prevention measures to prevent spread of disease.

- 6) Complete and report all information requested in the Kansas electronic surveillance system.
- 7) As appropriate, use notification letter(s) and the disease [fact sheet](#) to notify the case, contacts and other individuals or groups.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Case Investigation

- 1) Contact the medical provider who ordered testing of the case and obtain the following information.
 - Collect patient's demographics (address, birth date, gender, race/ethnicity, primary language, and phone number(s)). [Demographic]
 - Record patient's occupation. [Epidemiologic]
 - Examine the laboratory testing that was done: [Laboratory]
 - Note type of specimen, specimen collection date and submitting lab.
 - If *Listeria* was isolated; ensure the isolate is sent to KHEL.
(Examine the *Isolate Submission* field on the [Laboratory] Tab and the *Notes* tab to verify or report submission of the isolate.)
 - Record onset date of symptoms. [Clinical]
 - Symptoms include: fever; chills; headache; muscle aches; stiff neck; altered mental status, diarrhea; vomiting; preterm labor; or other.
 - Record diagnose date. [Clinical]
 - Record current treatment. [Clinical]
 - Record hospitalizations: including those hospitalizations that occurred four weeks before illness/delivery date, note location and duration of stay. [Clinical]
 - Record outcomes: survived or date of death. [Clinical]
 - For females, pregnancy status [Clinical]. For pregnancy associated illness, see specific instructions under [Managing Special Situations](#).
- 2) Interview the case, mother of neonatal infant, or other proxy to determine source and risk factors; focus on four weeks prior to illness onset.
 - Examine hospitalizations or residency in nursing homes, note date of admission or discharge.
 - Travel history:
 - Travel outside of KS; list states visited; dates visited.
 - Travel outside of U.S.; list country; date of departure and return to U.S.
 - Food purchase history. (Note locations and dining dates, as needed.)
 - Food consumption history; especially cold cuts, deli or luncheon meat, cheeses and other dairy, ready-to-eat salads, seafood, and fruits.
 - Collect information from case for the [Contact Investigation](#). (See below.)
- 3) Examining the epidemiological information:
 - Record where the infection was most likely imported from. (Indigenous or out-of-county, state, or U.S.) [Epidemiologic].
 - Highly suspected sources should be investigated.
 - A detailed trace-back investigation may need to occur. The agency involved in traceback and inspections will depend on the source.
 - For suspected [Outbreaks](#) refer to [Managing Special Situations](#) section.

Contact Investigation

Contacts are any person exposed to a specific food identified as a likely source of contamination. Until a specific food has been incriminated, anyone sharing food with case can be considered a potential contact of the unknown source.

Isolation, Work and Daycare Restrictions

No isolation or restrictions in employment or school attendance required.

Case Management

None.

Contact Management

Antimicrobial therapy of infection diagnosed during pregnancy may prevent fetal or perinatal infections and its consequences.

Environmental Measures

- 1) Implicated food items must be removed from the food supply chain.
- 2) A decision about testing implicated food items can be made in consultation with the state epidemiologist.
- 3) If a commercial product is suspected, the state health department will coordinate follow-up with relevant outside agencies.

Education

Inform people at higher risk of methods to avoid listeriosis; this includes instructing pregnant women and persons with weakened immune systems to:

- Avoid soft cheeses such as Brie, Camembert, and Mexican style cheeses.
- Avoid deli meats.
- Cook leftover foods or hot dogs until steaming hot.
- Thoroughly cook food from animal sources such as beef, pork, or poultry and consume only pasteurized dairy products.
- Avoid contact with potentially infective materials, such as aborted animal fetuses on farms.
- Thoroughly wash raw fruits and vegetables before eating.
- Wash hands, knives, and cutting boards after handling uncooked foods.
- Avoid the use of untreated manure on food crops.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

- 1) Outbreaks have been reported with the ingestion of contaminated food and as nosocomial infections in neonatal nurseries.
- 2) A foodborne disease outbreak is defined in the following ways:
 - Two or more individuals (from different households) who experience a similar illness after eating a common food or food from a common place.
 - An unexplained, unexpected increase of a similar illness and food is a likely source.
- 3) Notify KDHE immediately, 1-877-427-7317.
- 4) Active case finding will be an important part of any investigation.
- 5) References that will assist with investigations include:
 - USDA Fact sheets: www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets
 - CDC Foodborne Outbreak Surveillance Kit: www.cdc.gov/foodsafety/outbreaks/surveillance-reporting/investigation-toolkit.html

B. For Pregnancy Associated Cases:

- 1) Examine the laboratory testing; note type of specimen that grew *Listeria*; whether from the mother or neonate; collection date and submitting lab.
- 2) Record outcome of pregnancy:
 - Still pregnant, fetal death, induced abortion, delivery, or other.
 - Note week of gestation and date for the event.
- 3) Record any type of illness in the mother: bacteremia/sepsis, meningitis, febrile gastroenteritis, amnionitis, non-specific “flu-like” illness, or other type of illness.
- 4) Record any type of illness in neonate: bacteremia/sepsis, meningitis, pneumonia, granulomatosis infantisepticum, or other.
- 5) Note if mother and/or neonate were hospitalized for listeriosis:
 - Include admit and discharge dates.
 - Record outcomes for mother and/or neonate: survived or date of death.
- 6) Collect case’s demographic data and contact information (birth date, county, sex, race/ethnicity, occupation, address, phone number(s)).
- 7) Collect information on the following:
 - Examine hospitalizations or residency in nursing homes, note date of admission or discharge.
 - Travel history:
 - Travel outside of KS; list states visited; dates of visit.
 - Travel outside of U.S.; list country; date of departure and return.
 - Record any symptoms and onset date: fever, chills, headache, muscle aches, stiff neck, diarrhea, vomiting, preterm labor, other, or none.
- 8) Food consumption and purchase history for 4 weeks prior to mother’s onset date or delivery date with no symptom onset.

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, using appropriate data collection tools including:
- The [Listeria Case Form](#) can be used to collect information.
 - Investigators can also enter all required information directly into EpiTrax [\[Investigation\]](#), [\[Clinical\]](#), [\[Demographics\]](#), and [\[Epidemiological\]](#) tabs.
- C.** Report data collected during the investigation via EpiTrax.
- Verify that all data requested 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 and/or attached in EpiTrax. The forms should be handled as directed by local administrative practices.
- D.** After the appropriate attempts to contact the case have been made with no success, a case is lost to follow-up:
- Indicate 'lost to follow-up' on the [\[Administrative\]](#) tab with the number of attempts to contact the case recorded.
 - Record the information that was collected from the initial reporter or medical provider 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 and close the case after ensuring it is complete and that the case is assigned to the correct event, based on the reported symptoms reported.

(Review the [EpiTrax User Guide, Case Routing](#) for further guidance.)

ADDITIONAL INFORMATION / REFERENCES

- A. Treatment / Differential Diagnosis:** Red Book: 2015 Report of the Committee on Infectious Diseases. 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2015.
- B. Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual (CCDM), 20th Edition. Washington, DC, American Public Health Association, 2015.
- C. Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: www.cdc.gov/nndss/
- D. Additional Information:** <https://www.cdc.gov/listeria/>