

Listeriosis

BASIC EPIDEMIOLOGY

Infectious Agent

Listeria monocytogenes, a Gram-positive, rod-shaped bacterium.

Transmission

Transmission primarily occurs through ingestion of contaminated food. Transmission also occurs *in utero* from mother to fetus.

Incubation Period

Typically, 2 or 3 weeks. However, cases have occurred up to 70 days after a single exposure to a contaminated food. Median incubation period is longer among pregnant women.

Communicability

Transplacental infections and nosocomial transmission to newborns are the mostly likely sources of direct human to human transmission. Though infected individuals can shed the bacteria in stools for months, secondary cases among household contacts are rare to nonexistent.

Clinical Illness

Usually consist in a mild illness with fever, malaise, headache, back pain, and gastrointestinal symptoms. Most severe cases occur in immunocompromised, elderly or pregnant individuals. Invasive manifestations are less common and include meningitis and septicemia.

Severity

Illness in pregnant women can cause miscarriage, preterm delivery and/or infection of the fetus/newborn. Case fatality is 20% - 30% in newborns.

DEFINITIONS

Clinical Case Definition

In adults, invasive disease caused by *Listeria monocytogenes* manifests most commonly as meningitis or bacteremia; infection during pregnancy can result in fetal loss through miscarriage or stillbirth, or neonatal meningitis or bacteremia. Other manifestations can also be observed.

Laboratory Confirmation

- Isolation of *L. monocytogenes* from a normally sterile site*, e.g., blood, cerebrospinal fluid (CSF), or less commonly, joint, pleural, or pericardial fluid, **OR**
- Isolation of *L. monocytogenes* from products of conception at time of delivery and non-sterile sites of neonates obtained within 48 hours of delivery, **OR**
- In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue, **OR**
- In the setting of pregnancy or live birth, isolation of *L. monocytogenes* from mother's or neonate's blood or other sterile site, or from placental or amniotic fluid.

*See the Sterile Site and Invasive Disease Determination Flowchart in Appendix A, for confirming a specimen meets the criteria for sterile site.

Note: As required by *TAC*, all *Listeria monocytogenes* isolates must be submitted to the DSHS laboratory.

Case Classifications

- **Confirmed:** A clinically compatible case that is laboratory confirmed

- **Probable:** The mother of a neonate with confirmed or probable listeriosis, even if the laboratory criteria are not met for the mother; a neonate born to a mother with confirmed or probable listeriosis, even if laboratory criteria are not met for the neonate; or a clinically compatible case detected through use of a culture independent laboratory testing method.
- **Suspect:** Isolation of *L. monocytogenes* from a non-invasive clinical specimen, e.g., stool, urine, wound.

Notes:

- Pregnancy loss and intrauterine fetal demise are considered maternal outcomes and would be counted as a single case in the mother.
- Cases in neonates and mothers should be reported separately when each meets the case definition. A case in a neonate is counted if live-born.
- A case should not be counted as a new case if laboratory results were reported within 365 days of a previously reported infection in the same individual, unless additional information is available indicating a separate infection

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation

Local and regional health departments should promptly investigate all reports of listeriosis. Investigations should include an interview of the case or a surrogate to get a detailed exposure history. Please use the *Listeria* Case Form available on the DSHS website: <http://www.dshs.state.tx.us/idcu/investigation/>.

Case Investigation Checklist

- Confirm laboratory results meet the case definition.
- Verify that the laboratory has forwarded the isolate to the DSHS laboratory, as required. If an isolate has not been sent, please request a specimen be submitted.
- Review medical records or speak to an infection preventionist or healthcare provider to verify case definition, identify possible risk factors and describe course of illness.
 - Use information from medical records to complete the Supplemental Medical History Form of the *Listeria* Case Form.
- Interview the case to get detailed food history and risk factor information.
 - Use the **Listeria Case Form** to record information from the interview.
 - If the case is not available or is a child, conduct the interview with a surrogate who would have the most reliable information on the case, such as a parent or guardian.
 - Provide education to the case or his/her surrogate about effective hand washing and food safety practices. See Prevention and Control Measures.
- Fax completed forms to DSHS EAIDU at 512-776-7616 or email securely to FOODBORNETEXAS@dshs.texas.gov.
 - An EAIDU foodborne epidemiologist will fax or email the form (deidentified) to the CDC.
 - Please note that the CDC measures the proportion of interviews reported to CDC within 7 days of interview date, so please send the form as soon as possible.
 - For lost to follow-up (LTF) cases, please complete as much information, obtained from medical/laboratory records (e.g., demographics, symptomology, onset date, etc.), on investigation form and fax/email securely to DSHS EAIDU noting case is LTF.
- Hospitalized cases should be followed until discharge and patient's outcome recorded on the *Listeria* Case Form
 - Initial reports can be sent to DSHS prior to discharge.
- In the event of a death, copies of the hospital discharge or death summary should also be faxed to DSHS EAIDU.
- If case is part of an outbreak or cluster, see Managing Special Situations section.
- All confirmed case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

Prevention and Control Measures

- Avoid consuming raw milk and other unpasteurized dairy products.

- Rinse raw produce, such as fruits and vegetables, thoroughly under running tap water before eating, cutting, or cooking.
- Scrub the surface of melons, such as cantaloupes, with a clean produce brush under running water and dry them with a clean cloth or paper towel before cutting.
- Follow food safety principles in the kitchen, especially:
 - Cook or reheat meat thoroughly. Reheated meats should be steaming hot (165°F).
 - Prevent cross-contamination in food preparation areas by thoroughly washing hands, counters, cutting boards, and utensils after they touch raw meat.
 - Separate uncooked meats, hot dogs and other meat packaging from vegetables, uncooked food and ready to eat foods.
 - Keep the refrigerator at 40°F or lower and the freezer at 0°F or lower.
 - Clean up all spills in your refrigerator right away—especially juices from hot dog and lunch meat packages, raw meat, and raw poultry.
- Pregnant women and immunocompromised individuals should avoid high risk food items, such as:
 - Smoked fish
 - Soft cheeses such as feta, queso blanco, queso fresco, brie, Camembert, blue-veined, or panela
 - Refrigerated pâté or meat spreads
 - Ready to eat meat, hot dogs, luncheon meats, cold cuts, deli meats, fermented/dry sausage, or leftover food unless heated until steaming hot.
- Routine hand washing with soap and warm water, especially:
 - Before preparing, handling or eating any food.
 - After going to the bathroom.
 - After changing a diaper.
 - After caring for someone with diarrhea.
 - After any contact with animals or their living areas.

Exclusions

School/child-care: No exclusions are specified for listeriosis but the standard exclusion for diarrhea or fever applies:

- Children with diarrhea should be excluded from school/child-care until they are free from diarrhea for 24 hours without the use of diarrhea suppressing medications.
- Children with a fever from any infection should be excluded from school/child-care for at least 24 hours after fever has subsided without the use of fever suppressing medications.

Food Employee: No exclusions are specified for listeriosis but the standard exclusion for vomiting or diarrhea applies:

- Food employees are to be excluded if symptomatic with vomiting or diarrhea until:
 - Asymptomatic for at least 24 hours without the use of diarrhea suppressing medications OR
 - Medical documentation is provided stating that symptoms are from a noninfectious condition.

Please see Guide to Excluding and Restricting Food Employees in Appendix A.

MANAGING SPECIAL SITUATIONS

Outbreaks

If an outbreak is suspected, notify the appropriate regional DSHS office or DSHS EAIDU at **(512) 776-7676**.

The local/regional health department should:

- Interview all cases suspected as being part of the outbreak or cluster.
- Request medical records for any case in your jurisdiction that died, was too ill to be interviewed, or for whom there are no appropriate surrogates to interview.
- Prepare a line list of cases in your jurisdiction. Minimal information needed for the line list might include patient name or other identifier, DSHS or laboratory specimen identification number,

specimen source, date of specimen collection, date of birth, county of residence, date of onset (if known), symptoms, underlying conditions, treatments and outcome of case, and risky foods eaten, foods eaten leading up to illness, or other risky exposures, such as animal contact and travel, reported by the case or surrogate.

Line list example:

ID	Name	Age	Sex	Ethnicity	Onset	Symptoms	Food	Animal	Notes
1	NT	34	F	W/N	2/4/16	Bl. D, F	Chicken, eggs	Dog	Dog food
2	PR	2	M	U/U	1/30/16	V,D,F	Chicken, spinach	None	Brother ill

- If the outbreak was reported in association with an apparent common local event (e.g., party, conference, rodeo), a restaurant/caterer/home, or other possible local exposure (e.g., pet store, camp), contact hospitals in your jurisdiction to alert them to the possibility of additional listeriosis cases.
- If isolates have not already been submitted to the DSHS laboratory for confirmation and whole genome sequencing (WGS), request hospital/clinical labs submit isolates for confirmation and WGS testing. See Laboratory Procedures.
- Work with any implicated facilities to ensure staff, students, residents, and volunteers receive hand hygiene education, and review hygiene and sanitary practices currently in place including:
 - Policies on and adherence to hand hygiene.
 - Storage and preparation of food.
 - Procedures for changing diapers and toilet training.
 - Procedures for environmental cleaning.
- Recommend that anyone displaying symptoms seeks medical attention from a healthcare provider.
- Restrict individuals from handling food, engaging in child-care, healthcare work, or attending child-care, if they are symptomatic. See Exclusions in Case Investigation section.
- Enter outbreak into NORS at the conclusion of the outbreak investigation. See Reporting and Data Entry Requirements section.

Whole Genome Sequencing clusters:

- For clusters of cases with indistinguishable WGS patterns detected by CDC/PulseNet and/or the DSHS laboratory, a member of the DSHS EAIDU foodborne team will notify appropriate DSHS regional epidemiologists, usually by email, who will then notify appropriate local health departments of cases within their jurisdiction.
- Local/regional health departments with cases in their jurisdiction should:
 - Interview the case patient, even if they have already been interviewed as part of a routine disease investigation, using the cluster specific questionnaire attached in the email notification.
 - Fax the completed questionnaire promptly within timeframe designated in cluster notification to DSHS EAIDU at **512-776-7616** or email securely to FOODBORNETEXAS@dshs.texas.gov.
 - If the health department having jurisdiction of a case is unable to reach a case-patient after 3 attempts during normal working hours, and they are not able to call after hours, please call the DSHS regional office or DSHS EAIDU to discuss further.
 - If an interview is unattainable or the case is lost to follow-up, fax/email securely medical records and any case information to DSHS EAIDU.
 - Please complete as much information obtained from medical/laboratory records (e.g., demographics, symptomology, onset date, etc.) on investigation form and fax/email securely to DSHS EAIDU noting case is LTF.
- Local/regional health department with cases will be notified by the EAIDU foodborne team of any

CDC or DSHS conference calls and may participate, if able.

Note:

- If a food item or food establishment is implicated, the lead epidemiologist for foodborne diseases will notify the DSHS Division of Regulatory Services about the outbreak and the possibility of a common contaminated food source for the cases.
- Decisions about testing implicated food items can be made after consultation with an EAIDU foodborne epidemiologist and the DSHS Laboratory. The general policy is to test only food samples implicated in suspected outbreaks, not in single cases.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School, Child-Care Facility, and General Public Reporting Requirements

Confirmed and clinically suspected cases are required to be reported **within 1 week** to the local or regional health department or DSHS EAIDU at **(512) 776-7676**.

Local and Regional Reporting and Follow-up Responsibilities

Local and regional health departments should:

- Enter the case into NBS and submit an NBS notification on all **confirmed** cases.
 - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
 - A case should not be counted as a new case if laboratory results were reported within 365 days of a previously reported infection in the same individual, unless additional information is available indicating a separate infection. A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completing the investigation.
- Fax completed *Listeria* case forms to DSHS EAIDU at **512-776-7616** or email securely to FOODBORNETEXAS@dshs.texas.gov.
 - An EAIDU foodborne epidemiologist will fax the form (de-identified) to the CDC.
 - Please note that the CDC measures the proportion of interviews reported to CDC within 7 days of interview date, so please send the form as soon as possible.
 - For lost to follow-up (LTF) cases, please complete as much information, obtained from medical/laboratory records (e.g., demographics, symptomology, onset date, etc.), on investigation form and fax/email securely to DSHS EAIDU noting case is LTF.

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDU at **512-776-7676**
- Enter outbreak information into the **National Outbreak Reporting System (NORS)** at the conclusion of the outbreak investigation.
 - For NORS reporting, the definition of an outbreak is two or more cases of similar illness associated with a common exposure.
 - The following should be reported to NORS:
 - Foodborne disease, waterborne disease, and enteric illness outbreaks with person-to-person, animal contact, environmental contact, or an indeterminate route of transmission.
 - Enter outbreaks into NORS online reporting system at <https://www.cdc.gov/nors/login.aspx>
 - Forms, training materials, and other resources are available at <http://www.cdc.gov/nors/>
- To request a NORS account, please email FoodborneTexas@dshs.texas.gov.
 - Please put in Subject Line: NORS User Account Request
 - Information needed from requestor: name, email address, and agency name
 - After an account has been created a reply email will be sent with a username, password, and instructions for logging in.

LABORATORY PROCEDURES

All *Listeria monocytogenes* isolates must be submitted to the DSHS laboratory.

CLINICAL SPECIMENS:

Specimen Collection

- Submit pure culture on an agar slant.
- If a pure culture is not available, you may submit:
 - Blood, CSF, amniotic fluid, placental tissue or fetal tissue, shipped on wet ice within 48 hours of collection.
 - Blood should be collected in tiger or red top vacutainer.

Submission Form

- Use DSHS Laboratory G-2B form for specimen submission.
- Make sure the patient's name, date of birth and/or other identifier match exactly what is written on the transport tubes and on the G-2B form.
- Fill in the date of collection and select the appropriate test.
- If submitting as part of an outbreak investigation, check “Outbreak association” and write in name of outbreak.
- Payor source:
 - Check IDEAS” to avoid bill for submitter

Specimen Shipping

- Transport temperature: Submit pure cultures on an agar slant at ambient temperature. Blood should be kept at 2° - 25° C (refrigerated or at room temperature); tissue must be kept refrigerated at 2°-8° C.
- Ship specimens via overnight delivery on cold packs or wet ice (double bagged). Pure isolates and blood may be shipped without ice or cold packs.
- Do NOT mail on a Friday, or state holiday, unless special arrangements have been pre-arranged with an EAIDU foodborne epidemiologist or DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

Causes for Rejection:

- Incorrect source of specimen.
- Specimen not in correct transport medium.
- Missing or discrepant information on form/specimen.

FOOD SAMPLES AND ENVIRONMENTAL SWABS:

Testing of food and environmental swabs for *Listeria monocytogenes* is available at the DSHS laboratory. Decisions about testing implicated food items can be made after consultation with an EAIDU foodborne epidemiologist and the DSHS Laboratory.

General policy

- The DSHS lab will only test food samples or environmental swabs from facilities implicated in a suspected outbreak (not associated with single cases).
- In outbreaks, the DSHS lab will not test food samples or environmental swabs unless a pathogen has been identified in a clinical specimen.

- Food samples or environmental swabs must be **collected by a registered sanitarian**

For further questions, please contact an EAIDU foodborne epidemiologist to discuss further.

REVISION HISTORY

- March 2021
Updated Laboratory Confirmation and Case Classifications statements under Definition section.