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Listeriosis

Overview^{1,2,3}

Listeriosis is a serious infection usually caused by eating food contaminated with the bacterium *Listeria monocytogenes*. The disease primarily affects older adults, pregnant women, newborns, and adults with weakened immune systems. However, rarely, persons without these risk factors can also be affected. The risk may be reduced by recommendations for safe food preparation, consumption, and storage.


A person with listeriosis usually has fever and muscle aches, sometimes preceded by diarrhea or other gastrointestinal symptoms. Almost everyone who is diagnosed with listeriosis has "invasive" infection, in which the bacteria have spread beyond the gastrointestinal tract. Listeriosis can present in different ways depending on the type of infection. Manifestations of listeriosis are host-dependent. In pregnant women they may experience a fever and other non-specific symptoms, such as fatigue and aches, followed by fetal loss or bacteremia and meningitis in their newborns. In older adults and people with immunocompromising conditions, septicemia and meningitis are the most common clinical presentations. Immunocompetent people may experience acute febrile gastroenteritis or no symptoms.

- Pregnant women: Pregnant women typically experience fever and other non-specific symptoms, such as fatigue and aches. However, infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or life-threatening infection of the newborn.
- People other than pregnant women: Symptoms, in addition to fever and muscle aches, can include headache, stiff neck, confusion, loss of balance, and convulsions.

The bacterium *Listeria monocytogenes* mainly occurs in soil, forage, water, mud, livestock food, and silage. Many different domestic and wild animals can serve as reservoirs, and humans can carry the organism asymptotically. Incriminated foods associated with listeriosis in people include unpasteurized milk, dairy products, and soft cheeses, including Mexican-style cheese; prepared ready-to-eat deli foods, such as hot dogs, cold cut meats and deli salads, hummus, and pâté; undercooked poultry; precooked seafood and smoked or cured fish; melons and fruit salads; and unwashed raw vegetables. *Listeria* is killed by pasteurization and cooking; however, in some ready-to-eat foods, such as hot dogs and deli meats, contamination may occur after factory cooking but before packaging. Unlike most other foodborne pathogens, *Listeria* tends to multiply in refrigerated foods that are contaminated. The incubation period varies from 3-70 days, with the estimated median incubation period of 21 days.

For a more complete description of listeriosis, refer to the following texts:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 19th ed. 2008.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. 2012.

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2000 Case Definition - Listeriosis⁴ - (1/14)

Clinical Description

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

Laboratory Criteria for Diagnosis

- Isolation of *Listeria monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid).
- In the setting of miscarriage or stillbirth, isolation of *Listeria monocytogenes* from placental or fetal tissue.

Case Classification

Confirmed

A clinically compatible case that is laboratory-confirmed.

COMMENT(S): The usefulness of other laboratory methods such fluorescent antibody testing or polymerase chain reaction to diagnose invasive listeriosis has not been established.

Information Needed for Investigation

Verify the diagnosis. Obtain demographic, clinical and laboratory information on the case from the attending physician, hospital, and/or laboratory. Obtain the other epidemiological information necessary to complete the [Disease Case Report \(CD-1\)](#), [Record of Investigation of Enteric Illness \(CD-2C\)](#) and the [Listeria Case Form](#) (CDC) from the patient or a knowledgeable family member.


Establish the extent of illness. Ask about illnesses among household, childcare, hospital, long-term care, and other close contacts. Determine if the case provided child or patient care, or prepared food for anyone outside the household. Determine whether the case is associated with a food recall.

Identifying the source of infection. Most human infections follow consumption of contaminated food. At least 90% of people who get *Listeria* infections are in highly vulnerable groups; pregnant women, older adults (65 years and older), and people with weakened immune systems. Healthy children and adults occasionally get infected with *Listeria*, but they rarely become seriously ill. The information obtained from the *Listeria* Case Form is used to identify the source. Sometimes the source is not identified.

Provide information about listeriosis to persons at risk for infection and the general public.

Efforts should be made to promote *Listeria* awareness and provide prevention information to the public to reduce the risk of listeriosis. Information on listeriosis prevention can be found on CDC's website at: <http://www.cdc.gov/listeria/prevention.html>.

Listeria Surveillance. Review WebSurv to determine whether there have been other cases in the same geographic area or institution. When cases are related by person, place, time, or PFGE pattern, efforts should be made to identify a common source. Information obtained through the

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Listeria Case Form is used to identify a possible source of infection and to characterize persons or geographic areas in which additional efforts are needed to raise awareness and reduce disease incidence. When investigating a suspected outbreak of gastrointestinal illness of unknown etiology, see the [Outbreak Investigation](#) section of the CDIRM.

Notification


- Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist](#) for the District, or the Missouri Department of Health and Senior Services (MDHSS) - BCDCP, phone (573) 751-6113, Fax (573) 526-0235, or for afterhours notification contact the MDHSS/ERC at (800) 392-0272 (24/7) immediately if an outbreak* of listeriosis is suspected.
- If a case(s) is associated with a childcare center, BCDCP or the local public health agency (LPHA) will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a foodhandler, BCDCP or the LPHA will contact BEHS, phone (573) 751-6095, Fax (573) 526-7377.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.
- Contact the Department of Natural Resources, Public Drinking Water Branch, at (573) 751-1187, Fax (573) 751-3110 if cases are associated with a public water supply, or BEHS, phone (573) 751-6095, Fax (573) 526-7377, if cases are associated with a private water supply.

*Outbreak is defined as the occurrence in a community or region, illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

Control Measures:^{2, 3, 6}

Antimicrobial therapy for a *Listeria* infection diagnosed during pregnancy may prevent fetal or perinatal infection and its consequences. Listeriosis cases should be reported promptly to the state or local health department to facilitate early recognition and control of common-source outbreaks.²

Except for vertical transmission from mother to fetus and rare instances of cross-contamination in the delivery suite or newborn nursery, human-to-human infection has not been documented.³ However, the Missouri Food Code (2009) should always be enforced for food handlers as described below. Food handlers with diarrhea or vomiting must be restricted from handling food, or be excluded from work until symptoms have resolved for at least 24 hours.⁶ *NOTE: Food handlers should be instructed in proper handwashing before returning to work. Workers in schools, residential programs, daycare, and healthcare facilities who feed, give mouth care, or dispense medications to clients, should follow the same restrictions as food handlers.*

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General guidelines for preventing listeriosis are similar to those for preventing other foodborne illnesses²:

1. Thoroughly cook or reheat foods from animal sources until steaming hot (165°F);
2. Wash raw vegetables;
3. Prevent contamination from fluids of uncooked meats, hot dogs, and packaging onto other foods or food-preparation surfaces by keeping them separate from vegetables, uncooked foods, and ready-to-eat foods;
4. Avoid unpasteurized dairy products; and
5. Wash hands, knives, utensils, and cutting boards after exposure to uncooked foods.

Additional information on listeriosis prevention (to include, general recommendations, recommendations specifically for persons at higher risk for listeriosis, and safety tips for eating melons) can be found on CDC's website at: <http://www.cdc.gov/listeria/prevention.html>.

Laboratory Procedures⁵

Listeria is found in the environment and all people are exposed to it regularly. Therefore, ***there is no clinical value in performing laboratory testing on asymptomatic patients***, even if the person is at high risk for a *Listeria* infection. For symptomatic patients, diagnosis is confirmed only after isolation of *Listeria monocytogenes* from a normally sterile site, such as blood, CSF (in the setting of nervous system involvement), or amniotic fluid/placenta (in the setting of pregnancy). *Stool samples are of limited use and are not recommended.* *Listeria monocytogenes* can be isolated readily on routine media, but care must be taken to distinguish this organism from other Gram-positive rods, particularly diphtheroids. Selective enrichment media improve rates of isolation from contaminated specimens. You can expect that the cultures will take 1-2 days for growth. Importantly, a negative culture does not rule out infection in the presence of strong clinical suspicion. Serological tests are unreliable, and not recommended at the present time.


Human Specimens:

Initial clinical specimen testing is NOT provided by the Missouri State Public Health Laboratory (MSPHL). However, private laboratories that obtain positive test results are required by the state reporting rule to send positive isolates of the cultured organism to the MSPHL for confirmation and epidemiological testing. The MSPHL performs this testing at no charge to the submitting laboratory.

Note: Information on the collection or shipment of specimens for Listeria testing by the MSPHL may be viewed at: <http://health.mo.gov/lab/specialbacteriology.php>.

Food Samples:

Food samples can be sent to MSPHL to be tested for *Listeria* as part of an outbreak investigation. Samples should be collected in their **final intact package** for testing. If an intact sample of a product is too large to submit to the lab, submit a sterile sample container with at least four ounces of the product to be tested. Please contact the District Environmental Public Health Specialist prior to submitting samples. The Environmental Bacteriology Unit at the MSPHL should also be notified. For

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additional information concerning food sample collection or food sample transport, you may call the (MSPHL) Environmental Bacteriology Unit at (573) 751-3334.

Reporting Requirements


Listeriosis is a Category 3 disease and shall be reported to the [local health authority](#) or to the Missouri Department of Health and Senior Services within three (3) calendar days of first knowledge or suspicion.

As a Nationally Notifiable Condition, **confirmed** and **probable** listeriosis cases are a **STANDARD** report to the Centers of Disease Control and Prevention (CDC). **STANDARD** reporting requires the Missouri Department of Health and Senior Services (MDHSS) to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.

1. For all reported cases, complete a [Disease Case Report \(CD-1\)](#), a [Record of Investigation of Enteric Illness \(CD-2C\)](#) and CDC's [Listeria Case Form](#) which is also available in [Spanish](#).
2. Entry of the completed CD-1 and the Record of Investigation of Enteric Illness form into WebSurv negates the need for the paper CD-1 and CD-2C to be forwarded to the District Health Office.
3. MDHSS will report to CDC following the above reporting criteria (see box).
4. Send the completed *Listeria* Case Form to the District Health Office.
5. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the [Missouri Outbreak Surveillance Report \(CD-51\)](#).
6. If an outbreak is associated with food, a CDC 52.13 form ([National Outbreak Reporting System – Foodborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
7. If an outbreak is associated with the consumption or use of water for drinking, or with ingestion, contact, or inhalation of recreational water, a CDC 52.12 form ([National Outbreak Reporting System - Waterborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
8. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References

1. American Public Health Association. *Listeriosis*. In: Heymann D Ed. *Control of Communicable Diseases Manual*. 19th ed. Washington, D.C. American Public Health Association, 2008: 357-361.
2. American Academy of Pediatrics. *Listeria monocytogenes Infections (Listeriosis)*. In: Pickering LK, Baker CJ, Kimberlin DW, Long SS, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. Elk Grove Village, IL. American Academy of Pediatrics; 2012: 471-474.
3. Lorber, Bennett. *Listeria monocytogenes*. In: Gerald L. Mandell, John E. Bennett, & Raphael Dolin, Eds. *Principles and Practice of Infectious Diseases*, 7th ed., Pennsylvania: Churchill Livingstone Elsevier, 2010: 2707-2714.

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4. CDC's National Notifiable Diseases Surveillance System (NNDSS) and Case Definitions. <http://wwwn.cdc.gov/nndss/> (1/14).
5. Centers for Disease Control and Prevention. Listeriosis questions and answers (also available in Spanish). <http://www.cdc.gov/listeria/index.html> (1/14).
6. United States Department of Health and Human Services, Public Health Service, Food and Drug Administration. 2009 Food Code. <http://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/UCM2019396.htm> (1/14).

Other Sources of Information

1. eMedicine Journal. "*Listeria monocytogenes*." Weinstein, KB February 25, 2013. <http://emedicine.medscape.com/article/220684-overview> (1/14).