



# Listeriosis

## Colorado Communicable Disease Manual

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## The Disease and Its Epidemiology

### A. Etiologic Agent

Listeriosis refers to disease caused by *Listeria monocytogenes*, a gram-positive rod-shaped bacterium.

### B. Clinical Description

Listeriosis is an uncommon infection, and manifestations are host-dependent. Healthy adults and children are occasionally infected, but they rarely become seriously ill. The most common symptoms of listeriosis in healthy individuals are fever, muscle aches, and gastrointestinal symptoms such as nausea or diarrhea. Newborns, persons who take oral steroid medications, immunocompromised persons, organ transplant patients, the elderly, and persons with HIV or AIDS, cancer, diabetes, kidney disease, or liver disease are at greater risk of developing serious illness. Sudden onset of invasive disease such as sepsis, meningitis, and/or encephalitis is the main presentation in these high-risk persons, and death is common. The overall case-fatality rate for non-pregnant adults is approximately 30%.

Pregnant women are about 10 times more likely than other healthy adults to get listeriosis, and the infection can be transmitted to the fetus. Infected pregnant women may experience only a mild, influenza-like illness; however, infections during pregnancy can lead to miscarriage or stillbirth, premature delivery, or infection of the newborn resulting in pneumonia, meningitis, or septicemia. The mother usually recovers fully; however, the case-fatality rate is 20 to 30% in infected newborns and approaches 50% when onset occurs in the newborn in the first four days of life. Spontaneous abortion can occur at any point in pregnancy.

### C. Reservoirs

*Listeria monocytogenes* is found in soil and water. Domestic and wild mammals, birds, and humans (especially in slaughterhouse workers and people who work with the bacteria in a laboratory) can carry the bacteria without showing any symptoms.

### D. Modes of Transmission

The main transmission route for listeriosis is by consuming contaminated food. Vegetables and fruits can become contaminated from the soil or from manure used as fertilizer. Animals can carry the bacteria and contaminate food of animal origin such as meats, poultry, and dairy products. The bacteria have been found in processed foods that become contaminated after processing, such as soft cheeses, Mexican-style cheeses, smoked seafood, hot dogs, pâtés, and cold cuts at the deli counter. Unpasteurized (raw) milk or foods made from unpasteurized milk may contain the bacterium. *Listeria* is killed by pasteurization and cooking. Unlike most other bacterial foodborne pathogens, *Listeria* can multiply in contaminated foods held at refrigeration temperatures (*Listeria* can multiply between 32°F and 113°F). Food contaminated with *Listeria* looks, smells, and tastes normal. Newborns can acquire listeriosis in utero or during passage through the birth canal if their mothers are infected after eating contaminated foods during pregnancy. Those at increased risk for infection can potentially develop infection after eating food contaminated with even a few bacteria.

Rare cases of nosocomial transmission have been reported in hospital nurseries and have been attributed to contaminated equipment or materials.

## E. Incubation Period

The estimated median incubation period is three weeks. Cases have occurred 3 to 70 days following a single exposure to an implicated food item.

## F. Period of Communicability or Infectious Period

While infected individuals can shed the organism in their stools for several months, there is little evidence that listeriosis is spread person-to-person (except when a mother spreads it to her child during pregnancy or childbirth).

## G. Epidemiology

In Colorado, from 2006 through 2013, a median of 10 cases were reported annually (range: eight to 51 reported cases). In 2011, there was a large multi-state outbreak of *Listeria monocytogenes* associated with whole cantaloupe grown in Colorado. On average, less than one case per year is reported in a newborn. Foodborne transmission causes sporadic infections as well as outbreaks.

Colorado statistics are available at the CDPHE website:

<https://www.colorado.gov/pacific/cdphe/colorado-reportable-disease-data>

## Case Definition

### 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 such as endocarditis or abscesses.

### 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.

## Reporting Criteria

### What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local health agency

- Confirmed listeriosis cases.
- Listeriosis cases should be reported within 7 days of diagnosis or a positive laboratory test.
- Cases should be reported using the Colorado Electronic Disease Reporting System (CEDRS), or fax or telephone to CDPHE or the local public health agency. See below for fax or telephone numbers.
- If both a mother and an infant are infected (have positive cultures), each should be entered into CEDRS as a separate case.

### Purpose of Surveillance and Reporting

- To identify cases for investigation and potential outbreaks.
- To monitor trends in disease incidence.

## Important Telephone and Fax Numbers

CDPHE Communicable Disease Epidemiology Branch

- Phone: 303-692-2700 or 800-866-2759
- Fax: 303-782-0338
- After hours: 303-370-9395

CDPHE Microbiology laboratory: 303-692-3480

Communicable Disease (CD) Manual website: <https://www.colorado.gov/pacific/cdphe/communicable-disease-manual>

## State Laboratory Services

### Laboratory Testing Services Available

The services listed below are for public health purposes; clinical laboratories are not charged for these services.

The CDPHE Laboratory requests all *Listeria* isolates or clinical material from clinical laboratories be submitted for confirmation, serotyping, and Pulsed Field Gel Electrophoresis (PFGE) testing (i.e., molecular typing).

The CDPHE Laboratory can test blood, CSF, or other sterile site specimens for the presence of *Listeria*. This is usually not necessary as most cases of listeriosis are hospitalized and initial testing occurs at the hospital laboratory.

Note: Authorization by the CDPHE Communicable Disease Branch is required before submitting specimens or implicated food items to the CDPHE Laboratory.

For more information on *Listeria* testing, contact the CDPHE Microbiology Laboratory. See Disease Control Measures, section E (Environmental Measures), for more information about food testing.

## Case Investigation

Interview all listeriosis cases to determine the potential source of infection, and implement control measures as appropriate.

Listeria case investigations will be conducted by CDPHE for LPHAs participating in centralized Listeria case interviews. CDPHE has primary responsibility for interviews of sporadic and outbreak-associated cases of Listeria in Colorado with the exception of cases residing in a jurisdiction not participating in centralized Listeria case interviews. However, in the event of a large Listeria outbreak, CDPHE may request assistance in completing case interviews from LPHAs.

### A. Case Investigation / Forms

Jurisdictions participating in centralized Listeria case interviews

A designated CDPHE interviewer will conduct the interview according to the FoodCORE centralized Listeria Interview Protocol below.

Jurisdictions not participating in centralized Listeria case interviews

Interview all cases using the CDC [Listeria Case Form](#) that can be found on the CD manual website. After the patient is interviewed, update the CEDRS record with any new information and send a copy of the form to the CDPHE Communicable Disease Branch when complete.

## B. FoodCORE Centralized Listeria Interview Protocol

CDPHE Interviewer: Nereida Corral (303-692-6274, nereida.corral@state.co.us)

The goal of centralizing Listeria case interviews at the state level is to conduct more standardized, timely case interviews at a central location to improve Listeria cluster and outbreak detection in Colorado. When one interviewer conducts the majority of interviews, it is possible for that interviewer to note food items or patterns of eating among cases that multiple interviewers could miss. This protocol is not intended to centralize follow-up of routine or outbreak-related Listeria questions from residents and other partners within local jurisdiction. This may include questions about testing, treatment and/or food recalls.

### Case assignment

- LPHAs will continue to have access to all Listeria case reports in CEDRS for cases residing in their agency's jurisdiction.
- The new CEDRS system will automatically assign an agency for case investigation based on the ['Guidance for Public Health Follow-up of Single Cases of Reportable Communicable Diseases'](#) document. Newly reported Listeria cases will be assigned to CDPHE. CDPHE will maintain communication with the case's relevant regional epidemiologist and LPHA according to the notification procedures outlined in this protocol.
- Notification to provider
  - ▶ When a case is reported and before performing case follow-up, CDPHE will attempt to contact the health care provider to notify him/her that public health will be contacting the patient and to find out if the provider has informed the patient/family of the positive test result. If the health care provider is not available, CDPHE will leave a message with office staff stating that public health staff will be contacting the patient.
- Confirm isolate/clinical material is sent to CDPHE laboratory
  - ▶ CDPHE will follow-up with laboratory staff and/or the IP to confirm that the isolate/clinical material will be sent to CDPHE, unless otherwise preferred by LPHA.

### LPHA notification procedures

LPHA's participating in centralized Listeria case interviews will receive case-specific information from CDPHE by email notification. Notifications will include:

- An initial email reminding the LPHA that the investigation will be initiated by CDPHE and that CDPHE will notify the health care provider as described below.
- Upon completion of the case interview, a second email will be sent to the LPHA with epidemiologic information including whether the case is part of a known cluster, travel history, underlying medical conditions, and other relevant exposure information.
- All data collected during the case interview will be entered in available fields in CEDRS. Additionally, the interviewer will include case notes with any relevant epidemiologic information including whether the case is part of a known cluster, travel history, underlying medical conditions, and other relevant exposure information.

### Multi-state/Multi-jurisdiction Outbreak/Cluster investigations

- As with most multi-state/multi-jurisdiction cluster and outbreak investigations, CDPHE will likely take the lead on one involving Listeria cases. However, CDPHE will notify all appropriate LPHA's if a case in their jurisdiction is associated with the cluster/outbreak and provide updates as they are available. If necessary, CDPHE will coordinate routine conference calls to discuss the situation and provide updates.
- If case re-interview is necessary due to an outbreak/cluster investigation, CDPHE will conduct the interview.
- If a food item is available for testing, CDPHE will work through LPHA's to facilitate food collection and submission to the CDPHE laboratory.

### Local-source investigations

In the very rare event that a Listeria cluster/outbreak is thought to be associated with a locally-produced product, CDPHE and relevant LPHAs will discuss roles in the investigation. CDPHE will follow

standard outbreak procedures and notify all LPHA's with associated cases and/or producers. If necessary, CDPHE will coordinate routine conference calls with all agencies involved to discuss the situation and provide updates.

## Disease Control Measures

A [Listeriosis Fact Sheet](#) is available on the CDC website.

### A. Treatment

Treatment with antibiotics is recommended for severe infections. When infection occurs during pregnancy, antibiotics given promptly to the pregnant woman can often prevent infection of the fetus or newborn. Even with prompt treatment, some infections result in death.

### B. Prophylaxis

No prophylactic treatment of close contacts is recommended.

### C. Education

Persons at high-risk for infection can limit exposure by avoiding certain foods:

- Avoid eating hot dogs, luncheon meats, deli meats, or leftover foods unless they are reheated until steaming hot.
- Avoid eating soft cheeses such as feta, Brie, and Camembert, blue-veined cheeses, or Mexican-style cheeses such as queso blanco, queso fresco, and panela, unless they have labels that clearly state they are made from pasteurized milk. Hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt may be eaten.
- Avoid eating refrigerated pâtés or meat spreads. Canned or shelf-stable pâtés and meat spreads may be eaten.
- Avoid eating refrigerated smoked seafood, unless it is contained in a cooked dish, such as a casserole. Refrigerated smoked seafood, such as salmon, trout, whitefish, cod, tuna, or mackerel is most often labeled as "nova-style", "lox", "kippered", "smoked" or "jerky". The fish is found in the refrigerated section or sold at deli counters of grocery stores and delicatessens. Canned or shelf-stable smoked seafood may be eaten.
- Avoid getting fluid from hot dog packages on other foods, utensils, and food preparation surfaces.

Everyone, including high-risk individuals, should handle food properly and practice good hygiene:

- Thoroughly cook raw food from animal sources, such as beef, pork, or poultry. Cooking will kill *Listeria* bacteria.
- Wash raw fruit and vegetables thoroughly before eating.
- Keep uncooked meats separate from vegetables, fruits, cooked foods, and ready-to-eat foods.
- Consume perishable foods and ready-to-eat foods as soon as possible.
- Avoid unpasteurized (raw) milk, including unpasteurized goat's milk, unpasteurized milk products, and foods made from unpasteurized milk.
- Wash knives and cutting boards after preparing uncooked foods.
- Always wash hands thoroughly with soap and water before eating or preparing food, after handling hot dogs and deli meats, after using the toilet, after handling animals, and after changing diapers.

Educate case and household contacts on proper hand washing techniques.

### D. Managing Special Situations

#### Food Recalls

In recent years, outbreaks of listeriosis have resulted in large food recalls due to *Listeria* contamination. The risk of an individual person developing listeriosis after consuming a contaminated food is very small. If a person has eaten a contaminated food and does not have any symptoms, testing and treatment are not recommended, even if he/she is in a high-risk group. However, if a high-risk individual has eaten the

contaminated product and within two months becomes ill with fever or signs of serious illness, he/she should contact a physician and inform him or her about the exposure.

#### Patients in Health Care Facilities (Hospitals and Long Term Care Facilities)

If nosocomial transmission is suspected CDPHE will coordinate with the Health Facilities Division.

#### Food Handlers / Child Care / Preschool / School / Community Residential Programs

Because listeriosis is not spread through person-to-person transmission, there are no special actions to be taken if a case is a food handler, attends a child care center/preschool/school, or is a resident in a community residential program.

### E. Environmental Measures

- Implicated or recalled food items must be removed from the environment.
- If a commercial product is suspected, the CDPHE Communicable Disease Branch will coordinate follow-up with the CDPHE Division of Environmental Health and Sustainability and relevant outside agencies.
- A decision about testing suspect/implicated food items must be made in consultation with CDPHE Communicable Disease Branch.
- The general policy of the CDPHE Laboratory and the Communicable Disease Branch is only to test food samples associated with outbreaks, not in single cases.
- For single cases, CDPHE or local health agencies may suggest that concerned persons locate a private laboratory to test food, or ask them to store the food in their freezer for a period of time in case additional reports are received.
- The CDPHE laboratory can test food samples associated with isolated cases of illness on a fee for service basis. For more information, contact the CDPHE Microbiology Laboratory.
- The Instructions for Enteric and Food Specimen Packaging and Shipping are available on the [Specimen Collection Guidelines](#) webpage.

### References

American Academy of Pediatrics. *2009 Red Book: Report of the Committee on Infectious Diseases, 28<sup>th</sup> Edition*. Illinois, Academy of Pediatrics, 2009.

Case Definitions for Infectious Conditions Under Public Health Surveillance.

[www.cdc.gov/osels/ph\\_surveillance/nndss/casedef/case\\_definitions.htm](http://www.cdc.gov/osels/ph_surveillance/nndss/casedef/case_definitions.htm)

CDC Website: [www.cdc.gov](http://www.cdc.gov) (click on "Diseases and Conditions")

Heymann DL, ed. *Control of Communicable Diseases Manual, 19<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2008.