

Listeriosis

1) 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.

Pregnant women are about 20 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 fully recovers; however, the case-fatality rate is 30% in 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 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

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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 3-70 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 1998 through 2004, an average of 12 cases were reported annually (range: 7 to 21 reported cases). On average, one of these cases per year is reported in a newborn. Foodborne transmission causes sporadic infections as well as outbreaks. Recent outbreaks have involved commercially prepared foods distributed in multiple states. Colorado Statistics are available at the CDPHE website:

<http://www.cdphe.state.co.us/dc/CODiseaseStatistics/index.html>

2) 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.

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3) REPORTING CRITERIA

What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local public 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 Numbers and Web Resources

- CDPHE Communicable Disease Epidemiology Program
 - 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:
http://www.cdphe.state.co.us/dc/Epidemiology/dc_manual.html

4) 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 from clinical laboratories be submitted for confirmation, serotyping, and Pulsed Field Gel Electrophoresis (PFGE) testing (i.e., molecular typing).
- The CDPHE Laboratory will 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.
- For more information on *Listeria* testing, contact the CDPHE Microbiology Laboratory.
- **Note:** Authorization by the CDPHE Communicable Disease Program is required before submitting specimens or implicated food items to the CDPHE Laboratory.
- See Section 6 (E)--Environmental Measures, for more information about food testing.

5) CASE INVESTIGATION

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

Organized local health departments have primary responsibility for interviews of sporadic cases in their jurisdictions. In other jurisdictions, public health nursing services should consult with regional epidemiologists to establish primary responsibility for interviews of sporadic cases.

A. Case Investigation / Forms

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 **mail or fax a copy of the form to the CDPHE Communicable Disease Epidemiology Program** when complete.

B. Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases of listeriosis in your jurisdiction is higher than usual, or if an outbreak is suspected, consult with a CDPHE Communicable Disease Epidemiologist. *Listeria* clusters often cross county and state boundaries. CDPHE staff can coordinate activities between local public health agencies, other states, and CDC.

6) DISEASE CONTROL MEASURES

A [Listeriosis Fact Sheet](#) is available on the CD manual 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.

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- 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

1. 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.

2. Patients in Health Care Facilities (Hospitals and Long Term Care Facilities)

If nosocomial transmission is suspected, please contact CDPHE immediately.

3. 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.

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- If a commercial product is suspected, the CDPHE Communicable Disease Program will coordinate follow-up with the CDPHE Consumer Protection Division and relevant outside agencies.
- A decision about testing suspect/implicated food items must be made in consultation with CDPHE Communicable Disease Program.
- The general policy of the CDPHE Laboratory and the Communicable Disease Program 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 CDPHE [Food and Stool Specimen Collection Instructions](#) can be found on the CD manual website.

REFERENCES

American Academy of Pediatrics. *2003 Red Book: Report of the Committee on Infectious Diseases, 26th Edition*. Illinois, Academy of Pediatrics, 2003.

Case Definitions for Infectious Conditions Under Public Health Surveillance.
www.cdc.gov/epo/dphsi/casedef/

CDC Website: www.cdc.gov → click on “Diseases and Conditions”.

Heymann, DL, ed. *Control of Communicable Diseases Manual, 18th Edition*. Washington, DC, American Public Health Association, 2004.