

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1:

Case Definitions and Disease-Specific Information

Disease: Listeriosis

Effective: May 2022

Listeriosis

Communicable

Virulent

[Health Protection and Promotion Act \(HPPA\)](#)

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)

Provincial Reporting Requirements

Confirmed case

Probable case

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- [O. Reg. 569](#) (Reports) under the HPPA;³
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

Laboratory confirmation of infection, with clinically compatible signs and symptoms, with the:

- Isolation of *Listeria monocytogenes* (*L. monocytogenes*) from a site which is normally sterile (e.g., blood, cerebrospinal fluid (CSF) or, less commonly, joint, pleural, pericardial fluid);

OR

- Isolation of *L. monocytogenes* from miscarried or stillbirth placental or fetal tissue.

Probable Case

Clinically compatible signs and symptoms in a person with an epidemiologic link to a laboratory-confirmed case or to a confirmed source (e.g., contaminated milk, soft cheeses, ready-to-eat meats).

Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (*i.e.*, confirmed and/or probable).

In an outbreak situation, report confirmed cases of the diarrheal form of *Listeria monocytogenes* (isolated in stool).

Clinical Information

Clinical Evidence

Clinically compatible signs and symptoms are characterized by meningitis or bacteremia; infection during pregnancy may result in fetal loss through miscarriage or stillbirth, or neonatal meningitis or septicemia. Pregnant women may experience mild symptoms.

Clinical Presentation

A person with listeriosis usually has fever, diarrhea, and sometimes, nausea and vomiting. In invasive disease, the bacteria may infect the brain and the membrane lining the brain causing meningitis or septicemia. The onset of meningitis may be sudden, with fever, intense headache, nausea, and vomiting. Complications include endocarditis (the bacteria infects the membrane lining of the cavities of the heart), and internal and external abscesses.²

Infected pregnant women may have mild non-specific symptoms – fever, headache, myalgia, and gastrointestinal symptoms. An infected pregnant woman may unknowingly pass on the illness to her unborn child *in utero*. Placental invasion can lead to fetal infection resulting in premature delivery, spontaneous abortion, stillbirth or neonatal infection (presenting septicemia or meningitis).²

Twenty to thirty percent of neonatal infections are fatal. If onset of illness occurs within the first four days of life, the case-fatality rate is 50%.²

Note: individuals may present with mild enteric symptoms but could progress to more severe forms of disease.

Laboratory Evidence

Laboratory Confirmation

Any of the following will constitute a confirmed case of listeriosis:

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

Approved/Validated Tests

Bacteriological ID from the organism. Samples are then sent to the National Microbiology Laboratory (NML) for typing.

Indications and Limitations

No serology testing available through the Public Health Ontario Laboratories.

For further information about human diagnostic testing, contact the [Public Health Ontario Laboratories](#).

Listeriosis cannot be diagnosed clinically, given the many causative agents that may present with similar non-specific symptoms.

Case Management

In addition to the requirements set out in the Requirement #2 of the “Management of Infectious Diseases – Sporadic Cases” and “Investigation and Management of Infectious Diseases Outbreaks” sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection. Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation. Additional disease specific information may include:

- History of out-of-province or international travel including earliest and latest exposure dates;
- Food history for the 4 weeks prior to onset of symptoms;
- Occupation; and
- Residency at an institution and history of multiple institutional admissions.

Exposure investigation:

- Collect samples of suspected food sources for laboratory analysis (obtain product details for trace-back purposes if applicable); and
- Conduct appropriate food premises inspections of potential sources of infection.

Testing is not recommended for asymptomatic individuals exposed to the suspected food source.

Note: Treatment is under the direction of the individual's health care provider.

Contact Management

Listeriosis is rarely spread person-to-person. Persons exposed to the same source should be investigated, particularly if part of the at risk group such as the elderly, immunocompromised and pregnant women.

Outbreak Management

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.

Two or more cases linked by time, common exposure, and/or place are suggestive of an outbreak.

For more information regarding specimen collection and testing, please see the [Public Health Inspector's Guide to the Environmental Microbiology Laboratory Testing](#) (2021, or as current).⁴

Refer to [Ontario's Foodborne Illness Outbreak Response Protocol \(ON-FIORP\) 2020](#) (or as current) for multi-jurisdictional foodborne outbreaks which require the response of more than two Partners (as defined in ON-FIORP) to carry out an investigation.

Prevention and Control Measures

Personal Prevention Measures

Preventive measures:^{1,2}

- High-risk individuals such as pregnant women and immunocompromised persons should avoid high-risk foods such as ready-to-eat meats, smoked fish, soft cheeses and unpasteurized dairy products;
- Cook and reheat food thoroughly to the appropriate temperatures. For proper cooking temperatures, see the Ministry of Health's (ministry) publication "[Food Safety: Cook](#)";

- Avoid consuming raw or unpasteurized milk and dairy products;
- Thoroughly wash raw fruits and vegetables before consuming;
- Prevent cross-contamination between raw foods and ready-to-eat foods during food preparation and storage; and
- Wash hands, clean and sanitize utensils and food preparation surfaces after contact with raw or uncooked foods.

Infection Prevention and Control Strategies

Refer to [PHO's website](#) to search for the most up-to-date information on Infection Prevention and Control (IPAC).

Disease Characteristics

Aetiologic Agent - Listeriosis is an opportunistic infection caused by the agent *Listeria monocytogenes* (*L. monocytogenes*), a facultative anaerobic, nonspore-forming, motile, gram-positive bacillus that produces a narrow zone of hemolysis on a blood agar medium.¹ Human infections are usually caused by serovars 1/2a, 1/2b, and 4b.²

Modes of Transmission - The main route of transmission is foodborne, through ingestion of contaminated food such as ready-to-eat meats (e.g., deli meats), unpasteurized milk and soft cheeses, and raw vegetables and cantaloupe melons. *Listeria* biofilms in food production systems can be transferred to food products. Vegetables can become contaminated from the soil or from manure used as fertilizer.^{1,2}

In utero or perinatal transmission can occur.^{1,2}

Incubation Period – The incubation period for self-limiting, febrile gastroenteritis following ingestion of a large inoculum is 24 hours, illness typically lasts 2 to 3 days.¹ For invasive disease incubation period is typically 2 to 3 weeks; however, cases have occurred up to 70 days following a single exposure to a contaminated product.^{1,2} The incubation period for pregnancy-associated cases is longer than for nonpregnancy-associated cases.¹

Period of Communicability - Infected persons can shed the bacteria in stool for several months.² Mothers of infected newborns may shed the infectious agent in vaginal discharges or urine for 7 to 10 days after delivery.

Reservoir - *Listeria* is found in soil, water, animals, and humans. Animal reservoirs include domestic and wild mammals and fowl. Asymptomatic fecal carriage is common in humans. Bacteria can thrive and multiply at refrigeration temperatures.²

Host Susceptibility and Resistance - Those at highest risk for severe disease are fetuses and neonates, the elderly, immunocompromised persons, and pregnant women. Disease is frequently superimposed on other conditions such as cancer, organ transplantation, diabetes and HIV/AIDS. There is no evidence of acquired immunity.²

Please refer to [PHO's Reportable Disease Trends in Ontario reporting tool](#) for the most up-to-date information on infectious disease trends in Ontario.

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

References

1. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: *Listeria monocytogenes* Infections. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. Red Book: 2018 Report of the Committee on Infectious Diseases. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018.
2. Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.
3. Health Protection and Promotion Act, R.R.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>

4. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Public Health Inspector's Guide to Environmental Microbiology Laboratory Testing. Evergreen ed. Toronto, ON: Queen's Printer for Ontario; 2021. Available from: https://www.publichealthontario.ca/-/media/Documents/Lab/phi-guide.pdf?sc_lang=en

Case Definition Sources

Acha P, Szyfres B. Zoonoses and Communicable Diseases Common to Man and Animals. Vol. 1. 3 ed. Washington, DC: Pan American Health Organization; 2001.

Centers for Disease Control and Prevention. National Notifiable Disease Surveillance System: Listeriosis (*Listeria monocytogenes*) - 2000 Case Definition [Internet]. Atlanta, GA: U.S. Department of Health & Human Services; 2000 [cited June 15, 2018]. Available from: [National Listeria Surveillance | National Surveillance | CDC](#)

Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.

Public Health Agency of Canada. Invasive Listeriosis. In: Case Definitions for Communicable Diseases under National Surveillance. Canada Communicable Disease Report. 2009;35S2.

Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.