Listeriosis

Listeria monocytogenes

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of listeriosis to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at http://localhealth.nj.gov/.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to (609) 826-5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to (609) 392-2020 during all other days and hours.

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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent and Background

Listeriosis is caused by the bacterium *Listeria monocytogenes*.

Invasive listeriosis has a mortality rate of about 20%, making it the third leading cause of death from foodborne illness in the U.S. Listeriosis disproportionately affects immunosuppressed patients and persons in the extremes of age; the most common clinical manifestations are bacteremia and central nervous system infections. Approximately 15% of listeriosis is pregnancy-associated. Previously healthy persons may develop non-invasive disease such as febrile gastroenteritis after ingesting food heavily contaminated by *L. monocytogenes*.

B. Clinical Description

1. Signs and Symptoms

Signs and symptoms of *Listeria* infection vary depending on the person infected and the part of the body affected.

The bacteria are most likely to sicken people who are pregnant and their newborns, adults aged 65 or older, and people with weakened immune systems. Other people can be infected with *Listeria*, but they rarely become seriously ill.

2. Invasive Illness

Invasive illness occurs when *Listeria* spreads beyond the intestines. Symptoms of invasive illness usually begin within 2 weeks of eating food contaminated with *Listeria*.

In people who are pregnant, symptoms typically include fever and flu-like symptoms (such as muscle aches and fatigue). Symptoms are usually mild, and some pregnant people never have symptoms; however, infection during pregnancy usually leads to miscarriage, stillbirth, premature delivery, or life-threatening infection of the newborn.

In people who are not pregnant, symptoms typically include fever, flu-like symptoms (such as muscle aches and fatigue), headache, stiff neck, confusion, loss of balance, and seizures. Symptoms in non-pregnant people can be severe, and almost 1 in 6 non-pregnant people with invasive listeriosis die.

3. Intestinal Illness

Listeria can also cause intestinal illness but may be rarely diagnosed because laboratories do not regularly test patient stool samples for *Listeria*. Symptoms of

intestinal illness usually start within 24 hours after eating food contaminated with *Listeria* and last about 1-3 days.

Symptoms typically include diarrhea and vomiting and are usually mild; however, some people with intestinal illness develop invasive illness.

4. Clinical Features

The clinical features of listeriosis depend on the patient. In older adults and people with immunocompromising conditions, the most common clinical presentations are invasive infections, such as sepsis, meningitis, and meningoencephalitis. People can also experience focal infections, including septic arthritis, osteomyelitis, prosthetic graft infections, and infections of sites inside the chest and abdomen or of the skin and eye. Less commonly, otherwise healthy young people may also develop invasive listeriosis.

Some neonates with listeriosis develop granulomatosis infantiseptica, a severe disorder involving the internal organs and skin. Neonatal listeriosis is classified as early (within 6 days of birth) or late onset (7-28 days after birth). Early-onset neonatal listeriosis is usually acquired through transplacental transmission. The sources of late-onset listeriosis are less clear; they may involve exposure during delivery or healthcare-associated exposures.

People with normal immune systems rarely develop invasive infection. However, they may experience a self-limited acute febrile gastroenteritis following exposure.

C. Reservoirs

Reservoirs for *L. monocytogenes* are soil, water, mud, silage, mammals, and fowl.

D. Modes of Transmission

L. monocytogenes may be acquired by the fetus in utero or during delivery. *Listeria* can also be transmitted through ingestion of contaminated food or through contact with infected animals or birds. Person-to-person transmission has also been reported in healthcare-associated outbreaks of listeriosis. *Listeria* is a hardy germ that can be difficult to fully remove from food processing facilities. If a facility has *Listeria*, the bacteria can spread to food that touches contaminated equipment or surfaces. It can even grow on foods kept in the refrigerator.

E. Incubation Period

A range of 3-70 days has been reported, with a median incubation period of about 21 days.

F. Period of Communicability or Infectious Period

Although *L. monocytogenes* may be shed for months in the stool of infected persons, person-to-person transmission is rare. Following delivery, mothers of infected newborns may shed *L. monocytogenes* for 7-10 days in vaginal secretions or urine.

G. Epidemiology

Listeria is widely distributed in nature. Most cases of human listeriosis are believed to occur sporadically, but foodborne and healthcare-associated outbreaks have been documented. Foods associated with infection include unpasteurized milk, soft cheeses, processed meats, and contaminated vegetables. Unlike most other foodborne pathogens, *Listeria* tends to multiply in refrigerated foods that are contaminated. Newborns, the elderly, immunocompromised persons, and pregnant women are at greater risk of infection. About 30% of diagnosed cases occur within the first three weeks of life. In the United States, approximately 1,600 cases per year are reported and an estimated 260 deaths per year are related to listeriosis. In New Jersey approximately 44 cases are reported every year.

2 NJDOH CASE DEFINITION

A. Clinical Description

1. Invasive listeriosis:

- Systemic illness caused by *L. monocytogenes* manifests most commonly as bacteremia or central nervous system infection. Other manifestations can include pneumonia, peritonitis, endocarditis, and focal infections of joints and bones.
- Pregnancy-associated listeriosis has generally been classified as illness occurring in a pregnant woman or in an infant age ≤ 28 days. Listeriosis may result in pregnancy loss (fetal loss before 20 weeks gestation), intrauterine fetal demise (≥20 weeks gestation), pre-term labor, or neonatal infection, while causing minimal or no systemic symptoms in the mother. Pregnancy loss and intrauterine fetal demise are considered to be maternal outcomes.
- Neonatal listeriosis commonly manifests as bacteremia, central nervous system infection, and pneumonia, and is associated with high fatality rates. Transmission of *Listeria* from mother to baby transplacentally or during delivery is almost always the source of early-onset neonatal infections (diagnosed between birth and 6 days), and the most likely source of late-onset neonatal listeriosis (diagnosed between 7-28 days).

2. Non-invasive *Listeria* Infections:

- *Listeria* infection manifesting as an isolate from a non-invasive clinical specimen suggestive of a non-invasive infection; includes febrile gastroenteritis, urinary tract infection, and wound infection.

B. Laboratory Criteria for Diagnosis

1. Confirmatory laboratory evidence:

- Isolation of *L. monocytogenes* from a specimen collected from a normally sterile site reflective of an invasive infection (e.g., blood or cerebrospinal fluid or, less commonly: pleural, peritoneal, pericardial, hepatobiliary, or vitreous fluid; orthopedic site such as bone, bone marrow, or joint; or other sterile sites including organs such as spleen, liver, and heart, but not sources such as urine, stool, or external wounds);

OR

- For maternal isolates: In the setting of pregnancy, pregnancy loss, intrauterine fetal demise, or birth, isolation of *L. monocytogenes* from products of conception (e.g. chorionic villi, placenta, fetal tissue, umbilical cord blood, amniotic fluid) collected at the time of delivery;

OR

- For neonatal isolates: In the setting of live birth, isolation of *L. monocytogenes* from a non-sterile neonatal specimen (e.g., meconium, tracheal aspirate, but not products of conception) collected within 48 hours of delivery.

2. Presumptive laboratory evidence:

- Detection of *L. monocytogenes* by culture-independent diagnostic testing (CIDT) in a specimen collected from a normally sterile site (e.g., blood or cerebrospinal fluid or, less commonly: pleural, peritoneal, pericardial, hepatobiliary, or vitreous fluid; orthopedic site such as bone, bone marrow, or joint; or other sterile sites including organs such as spleen, liver, and heart, but not sources such as urine, stool, or external wounds);

OR

- For maternal isolates: In the setting of pregnancy, pregnancy loss, intrauterine fetal demise, or birth, detection of *L. monocytogenes* by CIDT from products of conception (e.g., chorionic villi, placenta, fetal tissue, umbilical cord blood, amniotic fluid) collected at the time of delivery;

OR

- For neonatal isolates: In the setting of live birth, detection of *L. monocytogenes* by CIDT from a non-sterile neonatal specimen (e.g., meconium, tracheal aspirate, but not products of conception) collected within 48 hours of delivery.

3. Supportive laboratory evidence:

- Isolation of *L. monocytogenes* from a non-invasive clinical specimen, e.g., stool, urine, wound, other than those specified under maternal and neonatal specimens in the “Confirmatory laboratory evidence” section.

C. Epidemiologic Linkage

1. For probable maternal cases:

- A mother who does not meet the confirmed case criteria, **BUT**
- Who gave birth to a neonate who meets confirmatory or presumptive laboratory evidence for diagnosis, **AND**
- Neonatal specimen was collected up to 28 days of birth.

2. For probable neonatal cases:

- Neonate(s) who do not meet the confirmed case criteria, **AND**
  - Whose mother meets confirmatory or presumptive laboratory evidence for diagnosis from products of conception, **OR**
  - A clinically compatible neonate whose mother meets confirmatory or presumptive laboratory evidence for diagnosis from a normally sterile site.

D. Case Classification

1. Confirmed

- A person who meets confirmatory laboratory evidence.

2. Probable

- A person who meets the presumptive laboratory evidence;

OR

- A mother or neonate who meets the epidemiologic linkage but who does not have confirmatory laboratory evidence.

3. Possible

- A person with supportive laboratory evidence

Case Classification 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**.**

E. Criteria for Distinguishing a New Case from an Existing Case

There is currently insufficient data available to support a routine recommendation for criteria to distinguish a new case of listeriosis from prior reports or notifications. Duplicate or recurring reports of listeriosis in an individual should be evaluated on a case-by-case basis.

F. Differences from CDC Case Definition

There are no substantive differences between the NJDOH and CDC case definitions; "suspected" cases will be classified as "possible" in CDRSS.

3 LABORATORY TESTING

The NJDOH Public Health and Environmental Laboratories (PHEL) will confirm the identification of *L. monocytogenes* in blood and cerebrospinal fluid. PHEL requests laboratories to submit all *Listeria* isolates within three days to aid in public health surveillance (N.J.A.C. 8:57).

The Foodborne and Waterborne Disease Unit (FWD Unit) within the Communicable Disease Service (CDS) will determine if testing of food items implicated in clusters or outbreaks is warranted. NJDOH can help coordinate pickup of food samples and testing at PHEL.

4 PURPOSE OF SURVEILLANCE AND REPORTING REQUIREMENTS

- To identify transmission sources of major public health concern (e.g., a restaurant or commercially distributed food product) and to stop transmission.
- To provide education about reducing the risk of infection.

5 CASE INVESTIGATION

A. Forms

It is the health officer's responsibility to investigate the case by interviewing the patient and others who may be able to provide pertinent information about the case patient's illness. Some of the required information can be obtained from the patient's healthcare provider or the medical record. Much of the information on exposure and food history must be obtained from the patient as it is not likely to be found in the medical record. The *Listeria* Case Report Form (CRF) should be used to complete the case investigation. After completing the case investigation using the CRF, update CDRSS and email the CRF to cds.fwd.epi@doh.nj.gov or fax to (609) 292-5811 or (609) 292-5821.

B. Update CDRSS

Please refer to the disease prioritization guidance that provides LHDs with timeframes for public health response and enter critical details in CDRSS: demographics, signs/symptoms, clinical status, laboratory information, patient location, industry/occupation, and sources of infections and risk factors for listeriosis. Listeriosis is

a Priority Level 3 disease and critical details should be entered into CDRSS within 5 days. If critical details cannot be obtained, local health departments (LHDs) should document the reason for the delay and the anticipated time when these details will be available.

C. Other Reporting/Investigation Issues

Once LHD completes its investigation and assigns a report status of "LHD CLOSED," the FWD Unit will review the case and approve the case by changing the report status to "DHSS APPROVED." At this time, the case will be submitted to CDC and locked for editing. If additional information is received after a case has been placed in "DHSS APPROVED," you will need to contact the FWD Unit at NJDOH to reopen the case. This should be done only if relevant exposure becomes available or the additional information changes the case status of the report.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57)

None.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Cases that have been linked to multistate clusters or outbreaks may require additional follow-up from LHDs. Specific investigation details will be provided by the FWD Unit on a case-by-case basis.

7 OUTBREAK SITUATIONS

If the number of reported cases of listeriosis in a facility or region is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (such as food) should be sought, and applicable preventive or control measures should be instituted. NJDOH staff will help determine a course of action to prevent further cases and perform surveillance for cases across jurisdictions that may be difficult to identify at a local level. In a case of an outbreak, immediately notify NJDOH by telephone at (609) 826-5964 during business hours and (609) 392-2020 after business hours and on weekends and holidays.

8 PREVENTIVE MEASURES

A. Environmental Measures

Implicated food items may be recalled by federal partners and recall notices will be shared by the Public Health Food Protection Program (PHFPP). If a commercial product is suspected, PHFPP will coordinate follow-up and provide technical assistance with traceback and environmental investigation (such as interpreting the New Jersey Food Code, conducting a hazard analysis and critical control point risk assessment, initiating enforcement actions, and collecting food samples).

B. Personal Preventive Measures/Education

Listeria is especially harmful for older adults (65+), people with weakened immune systems, pregnant people, and newborns. Listed below are safer food choices:

Do not eat	Choose these instead
• Any unheated queso fresco-type cheeses, when made with pasteurized or unpasteurized (raw) milk, such as queso fresco, or similar fresh, soft cheeses such as queso blanco and requesón • Any type of cheese when made with (raw) unpasteurized milk	• Hard cheeses, when made with pasteurized milk, such as Asiago, Cheddar, Parmesan, or Swiss/Gruyere/Emmental • Cottage cheese, cream cheese, string cheese, feta, and mozzarella, when made with pasteurized milk • Queso fresco-type cheeses or unpasteurized (raw) milk cheeses when heated to 165°F or until steaming hot
• Unheated deli meat, cold cuts, hot dogs, and fermented or dry sausages	• Deli meat, cold cuts, hot dogs, and fermented or dry sausages reheated to 165°F or until steaming hot
• Premade deli salads, such as coleslaw and potato, tuna, or chicken salad	• Homemade deli salads
• Refrigerated pâté or meat spreads	• Pâté or meat spreads in sealed, airtight containers that don't need to be kept refrigerated before opening
• Refrigerated smoked fish	• Smoked fish in sealed, airtight packages or containers that don't need to be kept refrigerated before opening • Smoked fish cooked in a casserole or other cooked dishes
• Raw or lightly cooked sprouts	• Sprouts cooked until steaming hot
• Cut melon left out for more than 2 hours (1 hour if it's exposed to temperatures hotter than 90°F, such as a picnic or hot car) • Cut melon in refrigerator for more than a week	• Melon that has just been cut
• Raw (unpasteurized) milk, yogurt, and ice cream	• Pasteurized milk, yogurt, and ice cream

References

1. [NJDOH] NJ Administrative Code: https://www.nj.gov/health/cd/reporting/acode/
2. [CDC] Listeria (*Listeriosis*) Webpage: https://www.cdc.gov/listeria/index.html
3. [CSTE] 18-ID-06 Revisions to the Surveillance Case Definition, Case Classification, Public Health Reporting, and National Notification for Listeriosis: https://cdn.ymaws.com/www.cste.org/resource/resmgr/ps/2018ps/18-ID-06_FINAL.pdf
4. Control of Communicable Diseases Manual (Heymann), Listeriosis