



# **LISTERIOSIS**

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## **Disease Plan**

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**Last updated: December 8, 2015, by Wei Hou**

**Questions about this disease plan?**

**Contact the Utah Department of Health Bureau of Epidemiology: 801-538-6191.**

## ✓ WHY IS LISTERIOSIS IMPORTANT TO PUBLIC HEALTH?

Although uncommon, *Listeria monocytogenes* bacteria can cause severe invasive infections.. For the period of 2009-2015, the case-fatality rate was 13% in Utah, and all of those cases were hospitalized.

## ✓ DISEASE AND EPIDEMIOLOGY

### Clinical Description

Symptoms of listeriosis depend on the host. Immunocompromised, neonatal, and elderly persons are typically hospitalized and present with sepsis or meningitis. It may cause meningoencephalitis or bacteremia in newborns and some adults. Meningoencephalitis onset may be sudden with fever, headache, nausea, vomiting, and signs of meningeal irritation. Pregnant women usually experience fever and other non-specific symptoms such as fatigue and aches. It has the potential to lead to miscarriage, stillbirth, premature delivery, or serious infection to the newborn. People other than pregnant women typically have symptoms that are more flu like such as headache, stiff neck, confusion, fever, and muscle aches, but can also cause loss of balance and convulsions.

### Causative Agent

*L. monocytogenes* are non-spore forming, motile, gram-positive rods that cause apparent infections primarily in pregnant women, newborns, elderly and immunocompromised persons. Even though 13 serotypes have been identified, most human cases involve strains of serotypes 1/2a, 1/2b, and 4b.

### Differential Diagnosis

Clinically, it is difficult to separate *Listeria* infection from many other infectious diseases that can lead to fever and constitutional symptoms. Group B streptococci and *E. coli* also cause septicemia and neonatal meningitis.

### Laboratory Identification

Laboratory diagnosis is based on isolation of *L. monocytogenes* from a normally sterile site (i.e. cerebrospinal fluid [CSF], blood, joint, pleural, or pericardial fluid). In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placenta or fetal tissue is acceptable. Serologic testing is not useful in diagnosing acute invasive disease, but can be useful in detecting noninvasive disease in an outbreak. The usefulness of other laboratory methods such as fluorescent antibody testing or polymerase chain reaction to diagnose invasive listeriosis has not been established. Stool samples are of limited use and not recommended.

All clinical *Listeria* isolates in Utah are required to be submitted to the Utah Public Health Laboratory (UPHL) for subtyping.

## Treatment

For severe infections, treatment with intravenous ampicillin and an aminoglycoside (usually gentamicin) is recommended. In immunocompetent patients with mild infections, ampicillin alone can be given.

## Case Fatality

The case fatality rate is approximately 20-30% in newborns and susceptible groups of adults; and it is estimated to be 18% among non-pregnant women with invasive listeriosis.

## Reservoir

*L. monocytogenes* are common in the environment. The organism is easily recovered from soil, water, sewage, vegetation, silage, commercial meat, and dairy products.

## Transmission

Listeriosis is primarily a foodborne infection. Rare nursery outbreaks have been reported and attributed to contaminated equipment or materials. *L. monocytogenes* may be acquired by the fetus in utero or during delivery. Other than mother-to-fetus transmission, person-to-person transmission is not known to occur.

## Susceptibility

Although healthy persons may consume contaminated food without becoming ill, certain persons at high risk for infection may get listeriosis after eating food contaminated with even a few bacteria. Persons at highest risk for apparent infection include:

- Pregnant women – About one third of listeriosis cases happen during pregnancy.
- Newborns – Newborns are very likely to suffer serious effects of infection during their mother's pregnancy. Infants may be stillborn, born with septicemia (bacteria in their blood), or develop meningitis (inflammation of the covering of the brain or spinal cord) very early in life, even if the mother is asymptomatic.
- Persons with weakened immune systems – This would include persons with cancer, diabetes, kidney disease, AIDS, persons who are taking glucocorticoids, and the elderly.

## Incubation Period

The incubation period ranges from 3-70 days, with an estimated median of 21 days.

## Period of Communicability

*L. monocytogenes* may be shed for months in the stool of an infected person. Following delivery, mothers of infected newborns may shed *L. monocytogenes* for 7 to 10 days in vaginal secretions and urine.

## Epidemiology

*L. monocytogenes* bacteria are widely distributed in nature. Most cases of human listeriosis are sporadic, but foodborne and nosocomial outbreaks have been documented. Foods commonly associated with infection include unpasteurized milk and milk products (including soft cheeses), processed meats, and contaminated vegetables. 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. *L. monocytogenes* causes an estimated 2,500 cases of invasive disease and 500 deaths annually in the United States. There are roughly three (3) cases of listeriosis reported in Utah each year.

## ✓ PUBLIC HEALTH CONTROL MEASURES

### Public Health Responsibility

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreak of this disease, and determine the source.
- Identify cases and sources to prevent further transmission.

### Prevention

#### Environmental Measures

Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the enteric epidemiologists at UDOH and UPHL. The general policy of UPHL is to test only food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). If holders of food implicated in single case incidents would like their food tested, they may be referred to a private laboratory that will test food, or store the food in their freezer for a period of time in case additional reports are received. However, in certain circumstances, a single, confirmed case with leftover food that had been consumed within the incubation period may be considered for testing.

#### Personal Preventive Measures/Education

General recommendations for all persons:

- Thoroughly cook all meat, including hot dogs.
- Wash all raw vegetables thoroughly before eating.
- Avoid raw (unpasteurized) milk or foods made from raw milk.
- Avoid contamination of cooked or ready-to-eat foods by raw meats or unwashed vegetables.
- Keep ready-to-eat food cold.
- Wash hands, knives, and cutting boards after handling uncooked foods.

Recommendations for persons with increased risk of developing listeriosis (e.g., pregnant women or immunocompromised persons, including individuals taking steroids):

- Avoid processed meats (e.g., hot dogs, luncheon meats, deli meats, or leftover foods) unless they are reheated to 165°F.
- Avoid soft cheeses (hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt need not be avoided).
- Cook hot dogs and other ready-to-eat meats (such as sliced deli meat and prepackaged cold cuts) before eating.

## Chemoprophylaxis

None.

## Vaccine

None.

## Isolation and Quarantine Requirements

**Isolation:** None.

**Hospital:** Standard precautions.

**Quarantine:** None.

## ✓ CASE INVESTIGATION

### Reporting

**Table 1. Criterion for reporting**

Criterion	Reporting
<i>Clinical Evidence</i>	
Healthcare record contains a diagnosis of foodborne disease	S
Death certificate lists foodborne disease as a cause of death or a significant condition contributing to death	S
<i>Epidemiological Evidence</i>	
Two or more people with illness with similar symptoms after exposure to a shared meal, eating at the same restaurant (or venue) or eating the same food item.	O
Any outbreak of infectious disease, chemical poisoning or toxin-mediated illness where food is implicated as the source by an epidemiological investigation.	O

Notes:

S = This criterion alone is sufficient to report a case

O = At least one of these "O" criteria in each category in the same column (e.g., clinical presentation and laboratory findings) is required to report a case.

## Case Definition

### Clinical description

In adults, invasive disease caused by *L. 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 may also be observed.

### Laboratory criteria

- Isolation of *L. monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF] or, less commonly, joint, pleural, or pericardial fluid), OR

- In the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue.

**Case classification**

*Confirmed:* a clinically compatible case that is laboratory-confirmed.

**Table 2. Criteria for defining listeriosis cases**

Criterion	Case Definition	
	Confirmed	
<i>Clinical Evidence</i>		
Meningitis	O	
Bacteremia	O	
Brain Abscess	O	
Endocarditis	O	
Neonatal sepsis		O
Spontaneous abortion		O
Stillbirth		O
<i>Laboratory Evidence</i>		
<i>L. monocytogenes</i> isolated from a clinical specimen**	O	
<i>L. monocytogenes</i> isolated from placenta or fetal tissue		N
<i>Epidemiological Evidence</i>		
Pregnancy		N

Notes: N = All —N criteria in the same column are Necessary to classify a case. O = At least one of these —O (Optional) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all —N criteria in the same column—is required to classify a case.

\*\* Isolation of *L. monocytogenes* from a normally sterile site, or from placental or fetal tissue in the setting of miscarriages or stillbirth.

**Case Investigation Process**

- Identify the source of infection.
- Assure isolate submission to UPHL.

**Outbreaks**

CDC defines a foodborne outbreak as, “an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food”. In order to confirm an outbreak of listeriosis, the same *Listeria* serotype must be isolated from at least two (2) ill persons exposed to food that has been epidemiologically implicated, or from which the same *Listeria* serotype has been isolated. The source of the infection should be identified and measures to identify additional ill persons and/or to remove the source from consumers should be taken.

## Case Contact Identification and Management

### Neonatal infection/ Maternal Infant Transmission

When neonate is less than one month of age, please use the following data entry procedure.

#### UTNEDSS Data Entry

- The mother is the case-patient, or “parent” CMR
  - Enter mother’s medical record number in parent CMR
  - Enter mother’s symptoms in the parent CMR
  - Enter mother’s exposure history in parent CMR
  - Add attachments and lab report(s) for mother on parent CMR
- Neonate is entered as a contact of the mother
  - Enter neonate medical record number as a contact of the mother
  - Enter neonate symptoms as a contact of the mother
  - Enter neonate exposure as a contact of the mother
  - Add attachments and lab report(s) for neonate as a contact of the mother
- Neonate may be promoted to own CMR as appropriate
- When searching UTNEDSS for name of mother or neonate, both CMRs should come up in search results

## ✓ REFERENCES

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*Listeria* Case Surveillance. Council of State and Territorial Epidemiologists Position Statement. website: <http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/03-ID-01revised.pdf>. Updated 2003. Accessed 11, 2015

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## ✓ VERSION CONTROL

V.11.15: Added “Why is Listeriosis Important to Public Health” section. Updated “Disease and Epidemiology” section. Updated “Public Health Control Measures” section. Updated “Case Investigation” section. Added “Version Control” section. Added “UT-NEDSS Minimum/Required Fields by Tab” section.

## ✓ UT-NEDSS Minimum/Required Fields by Tab

Every field on the Listeria Initiative form (can be found here: [http://health.utah.gov/epi/diseases/listeriosis/listeria\\_form.pdf](http://health.utah.gov/epi/diseases/listeriosis/listeria_form.pdf)) is required as per CDC.

### Demographic

- Patient's name
- Patients street address
- City
- State
- Zip
- Phone number
- Sex
- Date of birth
- Ethnicity
- Race
- Muscle Aches
- Stiff neck
- Diarrhea
- Vomiting
- Preterm Labor

### Laboratory

- Specimen source
- Collection date
- Laboratory name
- UPHL Accession Number

### Clinical

- Is case associated with pregnancy?
- Hospitalized?
- Died?
- Symptoms?
  - Bacteremia
  - Sepsis
  - Meningitis
  - Febrile gastroenteritis
  - Fever
  - Chills
  - Headache

### Epidemiological

- Place Exposures

### Investigation

- All questions in the investigation tab are to be completed

### Reporting

- Date first reported to public health

### Administrative

- State case status