

Listeria

Surveillance Protocol

Provider Responsibilities

Report all cases of listeriosis to the local health department by completing the provider (yellow) section of the WVEDSS form. Attach a copy of the laboratory report to the completed WVEDSS form. Report within the timeframe indicated:

- Sporadic case of listeriosis – Report to the local health department within 72 hours of diagnosis. Because *Listeria* is spread primarily through contaminated foods and can actually multiply at refrigerator temperatures, it is imperative that cases be reported as soon as possible to facilitate investigation.
- Outbreaks of listeriosis – Report to the local health department immediately by phone and follow up with a written report. Outbreaks are defined as two or more cases linked to consumption of the same food item.

Laboratory Responsibilities

1. Report isolation of *Listeria* from:
 - a. any sterile site; or,
 - b. placental or fetal tissue.
2. Report sporadic cases of listeriosis within 72 hours to the local health department by forwarding a completed yellow card or a copy of the laboratory slip.
3. Report outbreaks of *Listeria* (isolation from any site) immediately.
4. Refer isolates of *Listeria* to the Office of Laboratory Services for pulsed field gel electrophoresis.

Public Health Responsibilities

1. Educate providers and laboratories to report cases of Listeriosis within 72 hours to the local health department. Outbreaks should be reported immediately.
2. For sporadic cases, complete the WVEDSS Foodborne Disease reporting form. Use of this form will prompt a complete and appropriate investigation. Use an incubation period of 0-4 weeks from the date of specimen collection. Within the 4 weeks prior to the specimen collection date, ask if the case patient had risk factors that may be associated with *Listeria* infection, including:
 - Consumption of unpasteurized milk or milk products
 - Consumption of ready-to-eat meats
 - Consumption of meats that are not thoroughly cooked
 - Consumption of raw vegetables that have not been thoroughly washed
 - Exposure to potentially infective materials, such as aborted animal fetuses on a farm.

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Collect a ‘usual’ 24 hour food history: “What foods do you usually eat during the day?” and record in the section labeled “Open-ended Food History.”

3. Outbreaks of *Listeria* are very high priority for investigation because of their unusual nature and the high morbidity and mortality that has been associated with outbreaks in the past. Immediately report suspect or confirmed outbreaks of listeriosis to IDEP (800-423-1271), and begin investigating using the national *Listeria* Case Form found at:
<http://www.cdc.gov/foodborneoutbreaks/documents/ListeriaCaseReportFormOMB0920-0004.pdf>
Cases linked to an outbreak must also be reported by WVEDSS.
4. Print a copy of the completed WVEDSS form and store according to local records retention policies. Forward a paper copy of the laboratory slip to IDEP.

Disease Prevention Objectives

Reduce the incidence of listeriosis by educating the public about:

- The risks of consuming unpasteurized milk and milk products, undercooked meats, and unwashed raw vegetables.
- Risks to pregnant women and immunocompromised individuals from consuming ready-to-eat meats and undercooked meats that have not been heated appropriately.
- Handling of potentially infectious animal materials.

Disease Control Objectives

In an outbreak setting, prevent additional cases of listeriosis by prompt and appropriate investigation to identify and remove any continuing source of disease.

Disease Surveillance Objectives

- Determine the incidence of listeriosis in West Virginia.
- Identify the demographic characteristics of persons with listeriosis.
- Identify risk factors associated with listeriosis.
- Rapidly identify outbreaks of listeriosis.

Public Health Significance

Listeria monocytogenes is widely distributed in the environment in soil and water; as well as in the intestines of animals. Vegetables can become contaminated from soil or manure used as fertilizer. The bacterium has been found in uncooked meats, raw vegetables and unpasteurized milk. Cross-contamination occurs readily and some foods (deli cold cuts,

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hot dogs and soft cheeses) may become contaminated after processing and before packaging. Food processing plants can stay contaminated for prolonged periods of time because the organism can survive on the floor, and on or inside equipment or drains. *Listeria* can multiply at refrigeration temperatures and has high salt tolerance, making it very adaptable to a wide variety of refrigerated ready-to-eat food products.

Human exposure to *Listeria* is probably very common: asymptomatic stool carriage rates in healthy adults are 1% to 5%. Pregnant women, neonates, immunocompromised persons and elderly adults are most at risk for symptomatic disease and severe complications.

Listeria is responsible for outbreaks and sporadic cases of disease. Outbreaks are associated with acute febrile gastroenteritis, infections causing spontaneous abortion, still birth, early onset neonatal sepsis syndrome, late onset neonatal meningitis and meningitis, sepsis and focal infections. Food items implicated in outbreaks include turkey deli meat, meat pate, pork tongue in jelly and hot dogs. Cheeses made from unpasteurized milk have also caused outbreaks. Because such items are often widely distributed in the United States, and because the attack rate is so low, outbreak-associated cases of listeriosis may be widely distributed by place and time. Cases occurred over many months in multiple states in outbreaks due to consumption of hot dogs and turkey deli meat.

The incidence of listeriosis has been estimated as 0.4 cases per 100,000 in the general population, and 52.8 per 100,000 among neonates. Rates have been declining in recent years, presumably with improved food safety and education. Listeriosis has a high case fatality rate (20-30% among neonates), and is responsible for an estimated 500 deaths annually in the US. Over 700 cases of listeriosis were reported in the US in 2004.

Clinical Presentation

Infection during pregnancy is usually mild and self-limited, manifested by myalgias, arthralgias, headache and gastrointestinal symptoms. By contrast, fetal and neonatal illness is severe, frequently fatal and includes preterm labor, amnionitis, spontaneous abortion, stillbirth and early onset sepsis. Severe disseminated disease with widespread microabscesses and granulomas is known as granulomatous infantisepsis. Late onset disease is likely the result of infection at or near birth and presents as meningitis at 1 to several weeks of age.

More recently, outbreaks of fever and diarrhea have also been described in association with foodborne transmission.

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Recovery is the norm from febrile gastroenteritis; however mortality from invasive listeriosis is about 30%.

Causative organism

Listeria monocytogenes is an aerobic, non-spore-forming, motile, gram-positive bacillus that produces a narrow zone of hemolysis on blood agar medium.

Incubation period

Variable, ranging 3-70 days; median incubation period is 3 weeks. Use an incubation period of 0-4 weeks for investigation purposes.

Infectious Period

Mothers of infected newborns can shed the infectious agent in vaginal discharges and urine for 7-10 days after delivery, rarely longer. Infected individuals can shed the organism in their stools for several months.

Reservoir

Listeria is distributed widely in the environment, in soil, forage, water, mud and silage. Animal reservoirs include wild and domestic animals, fowl and people. Asymptomatic intestinal carriage in humans is common. Unlike most other foodborne pathogens, *Listeria* can multiply readily in contaminated refrigerated foods.

Modes of Transmission

Most cases of listeriosis arise from ingestion of contaminated foods, namely, raw or contaminated milk, soft cheeses, vegetables, and ready-to-eat meats. Papular lesions may develop on the hands and arms from direct contact with infectious material.

In neonatal infections, the organism can be transmitted from mother to fetus *in utero* or during passage through the infected birth canal. Rarely, outbreaks have occurred in nurseries due to contaminated equipment and materials.

Outbreak recognition

Foodborne outbreaks of listeriosis are generally recognized as increased incidence over the background rate of cases which is generally very low. Occurrence of as few as two or

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more cases clustered in time should alert county-level investigators to consider the possibility of an outbreak. Increased occurrence of a strain with a particular pulsed field gel electrophoresis patterns is sometimes first recognized by public health laboratory personnel, who then alert the epidemiology staff.

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.

Laboratory Criteria for diagnosis:

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

Comment: The usefulness of other laboratory methods such fluorescent antibody testing or polymerase chain reaction to diagnose invasive listeriosis has not been established.

Laboratory Diagnosis

Laboratory diagnosis of listeriosis is established by the isolation of *Listeria monocytogenes* from any clinical specimen.

All isolates of *Listeria monocytogenes* should be referred to the Office of Laboratory Services for pulsed field gel electrophoresis. For instructions on submission, please call (304)-558-3530 or see: <http://www.wvdhhr.org/labservices/index.cfm>

Preventive Interventions

General:

- Thoroughly cook raw food from animal sources.
- Wash raw vegetables thoroughly before eating

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- Keep uncooked meats separate from vegetables and from cooked and ready-to-eat foods.
- Avoid unpasteurized (raw) milk or foods made from unpasteurized milk.
- Wash hands, knives and cutting boards after handling uncooked foods.

Persons at high risk, such as pregnant women and persons with a weakened immune system, in addition to general recommendations:

- No hot dogs, luncheon meats or deli meats, unless they are reheated until steaming hot.
- Avoid cross-contaminating other foods, utensils and food preparation surfaces with fluid from hot dog packages; wash hands after handling hotdogs, luncheon meats and deli meats.
- No soft cheeses such as feta, Brie, Camembert, blue-veined and Mexican-style such as 'Queso blanco fresco.' Cheeses allowed include hard cheeses, semisoft cheeses such as mozzarella, pasteurized processed cheese slices and spreads, cream cheese, and cottage cheese.
- No refrigerated pates or meat spreads. Canned or shelf-stable pates and meat spreads may be eaten.
- No refrigerated smoked seafood, unless it is contained in a cooked dish, such as a casserole. Refrigerated smoked seafood (salmon, trout, whitefish, cod, tuna or mackerel) is most often labeled 'nova-style,' 'lox,' 'kippered,' 'smoked,' or 'jerky' and is found in the refrigerator section or sold at deli counters. Canned or shelf-stable smoked seafood may be eaten.

Surveillance Indicators

1. Proportion of cases with complete demographic information
2. Proportion of cases with complete risk factor investigation.
3. Proportion of cases investigations with complete information on high risk occupations (handling animals, carcasses, etc.)

References

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Websites

www.cdc.gov

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