

*epi*TRENDS

A Monthly Bulletin on Epidemiology and Public Health Practice in Washington

July 2022 Volume 27, Number 7

Listeriosis

Named after Joseph Lister, who introduced sterilization of surgical equipment, *Listeria* cause a bacterial infection that is of concern due to the potential severity of cases and the necessity for prompt public health intervention.

Background

Listeria monocytogenes was first described in 1911 but was at the time included in the genus *Bacterium* and did not receive its current name until 1940. Sporadic human and human infections were identified, and the agent was found to be a cause of neonatal sepsis and meningitis, but it was not until the 1980s that outbreaks due to listeriosis were recognized. Although cases are rarer than for most other foodborne notifiable conditions, listeriosis has a higher hospitalization and mortality rate than more common bacterial agents.



Listeriosis

Asymptomatic carriage occurs in domestic and wild mammals, birds, and humans. Ubiquitous in the environment. *L. monocytogenes* occur in soil, water, sewage, vegetation, and agricultural silage. The organism is frequently found in refrigerated commercial meat, such as processed meats and hotdogs, well as in dairy products (particularly soft cheeses), smoked fish, ready-to-eat deli foods, and packaged salads. After exposure, the incubation period is estimated to be typically around three weeks but can range from a few days to a month or longer.

Immunocompetent people may have minimal to moderate symptoms of gastroenteritis. Women who are pregnant may have a mild illness involving fever, backache, and muscle aches but a preterm delivery or miscarriage can result if there is also fetal infection. Illness can be severe in immunocompromised, neonatal, or elderly persons, resulting in sepsis or meningitis. Such



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invasive infections carry a high risk of death, up to 50% in prenatally infected infants and 60% in adults aged 60 and older.

Most cases of listeriosis are not diagnosed because those with relatively mild illness do not seek care, and because routine stool cultures do not detect *Listeria*; most current culture-independent stool tests will not detect it, although that may change in the near future as more tests are added. Cultures of normally sterile sites will identify the organism. Such cultures are important for genomic analysis, which can identify outbreaks from a few widely dispersed cases. Patients who are linked by whole genome sequencing (WGS) have the same strain of *Listeria*. This indicates that the illnesses may have been caused by the same source, including contaminated foods. Successful investigations depend on a combination of laboratory and epidemiologic data sources. Epidemiologic data, including information about what foods people ate before they got sick, are critical for outbreak detection, investigation, and prevention. All *Listeria* isolates from cases should be submitted to the Department of Health; as of January 2023, specimens associated with positive tests should also be submitted.

Due to testing constraints, the national case definition includes only persons with isolation of *L. monocytogenes* from normally sterile sites (with the exception of testing in perinatal infections). Consult the case definition for classifying a woman or neonate with possible listeriosis.

Outbreaks

In July 2022, the Centers for Disease Control and Prevention announced a listeriosis outbreak associated with a commercial brand of ice cream. To date, there have been 23 illnesses in ten states, with 22 hospitalizations and one death. Listeriosis has been connected to dairy products, including ice cream but more typically raw milk or soft cheeses that are not aged.

In 2021, four national listeriosis outbreaks were linked to commercial products. Two involved packaged salads, one was due to fully cooked chicken, and one was attributed to queso fresco.

Vehicle (all commercial products)	States	Illnesses	Hospitalized	Deaths
Packaged salads	13	28	16	3 (23%)
Packaged salads	8	10	10	1 (10%)
Fully cooked chicken	3	3	3	1 (33%)
Queso fresco	13	4	12	1 (8%)

In prior years, national listeriosis outbreaks were linked to deli meats, mushrooms, raw milk, and other items. An unusual outbreak in 2014 involved commercially produced prepackaged caramel apples with 35 cases, 24 hospitalizations, and 7 deaths. There was also a pregnancy loss. The product had a shelf life of several weeks and was stored unrefrigerated, potentially allowing bacterial growth from contamination introduced by the skewer into the apple’s interior.

Of note in the listeriosis outbreaks is the apparent seriousness of the illnesses. The case data are skewed because of the lower detection of the organism and the inclusion in the case definition of only severe cases. However, listeriosis has an inherent severity as compared to other foodborne bacterial agents, which only rarely cause meningitis or bacteremia. For this reason, it is imperative to detect and stop listeriosis outbreaks rapidly. Genomic analysis has been able to identify outbreaks from only a few cases, such as the outbreak in 2021 with three cases in three states that were linked to a single commercial source.

Each *Listeria* isolate is critical for identifying clusters through genomic analysis and each interview for a case of listeriosis is an important source of exposure information. Completing interviews with cases or a surrogate, as well as confirming submission of isolates or specimens, supports the recognition of national outbreaks with the result that further exposures are prevented.

Resources

Case definition: <https://ndc.services.cdc.gov/case-definitions/listeriosis-2019/>

FDA – Get the Facts about Listeria:

<https://www.fda.gov/animal-veterinary/animal-health-literacy/get-facts-about-listeria#:~:text=After%20going%20through%20several%20name,In%201929%2C%20A.>

CDC – US listeriosis outbreaks: <https://www.cdc.gov/listeria/outbreaks/>

CDC – investigation timeline: [timeline-linking-listeria-case-to-outbreak-508.pdf](https://www.cdc.gov/listeria/outbreaks/timeline-linking-listeria-case-to-outbreak-508.pdf) (cdc.gov)

Caramel apple outbreak: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6542465/>

Who has a higher risk of getting *Listeria* food poisoning?

Lessons from *Listeria* outbreaks: Food poisoning can happen to anyone. Each year, about 48 million people in the US (1 in 6) get sick from eating contaminated food. It can be especially dangerous for pregnant women and their newborns; older adults; and people with immune systems weakened by cancer, cancer treatments, or other serious conditions (like diabetes, kidney failure, liver disease, and HIV/AIDS). *Listeria* is a prime example of how germs that contaminate food can cause sickness and death in these groups.

Pregnant women, fetuses, and newborn infants

Listeria can pass from pregnant women to their fetuses and newborns. It can cause miscarriages, stillbirths, and newborn deaths.

Chancy cheese
LISTERIA OUTBREAK: Queso fresco (a type of soft cheese) sickened 142 people, killed 10 newborns and 18 adults, and caused 20 miscarriages.

People with weakened immune systems

Listeria can spread through the bloodstream to cause meningitis, and often kills. The weaker your immune system, the greater the risk.

Contaminated celery
LISTERIA OUTBREAK: Pre-cut celery in chicken salad served at hospitals sickened 10 people who had other serious health problems. Five of them died as a result.

Adults 65 or older

Listeria can spread through the bloodstream to cause meningitis, and often kills. The older you are, the greater the risk.

Tainted cantaloupes
LISTERIA OUTBREAK: Contaminated whole cantaloupes sickened 147 people in 28 states and caused one of the deadliest foodborne outbreaks in the US. There were 33 deaths, mostly in adults over 65, reported during the outbreak.

SOURCE: CDC, 2013

What foods are risky?

When it comes to *Listeria*, some foods are more risky than others. Meet some of the other foods where *Listeria* is known to hide.

- Raw Sprouts
- Soft Cheeses
- Raw Milk (unpasteurized)
- Smoked Seafood
- Deli Meats and Hot Dogs (cold, not heated)