

National Enteric Disease Surveillance: *Listeria* Annual Summary, 2014

Listeria Initiative Data

An overview of the *Listeria* Initiative surveillance system is available at <http://www.cdc.gov/listeria/surveillance.html>.

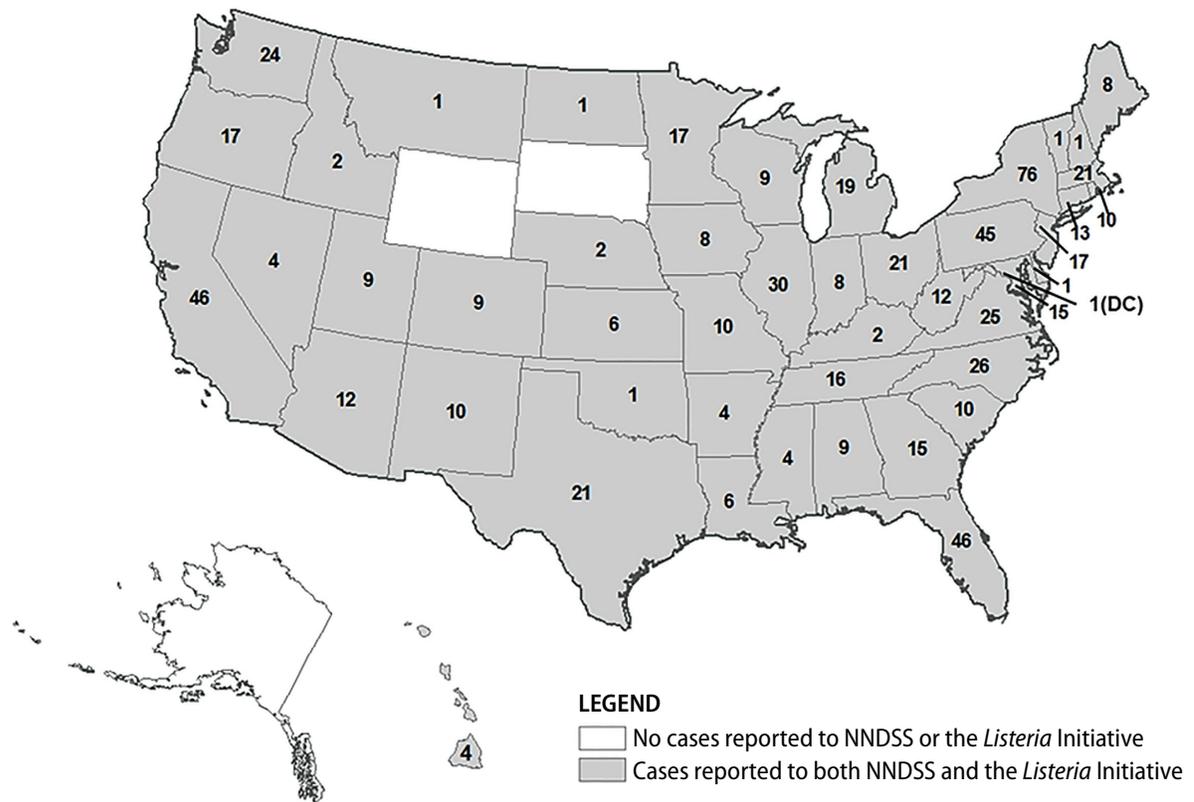
For this report, a case of invasive listeriosis is defined as isolation of *Listeria monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF]) or from products of conception (e.g., amniotic fluid, placental or fetal tissue). For cases in which *L. monocytogenes* is isolated from multiple anatomical sites, the case is considered to be invasive if any isolate was obtained from a normally sterile site. For cases in which *L. monocytogenes* was isolated from multiple normally sterile anatomical sites, the annual summary reports the most invasive site, using a hierarchy (in descending order of invasiveness: CSF, bone or joint fluid, blood, other sterile site, and products of conception).

Each mother-infant pair in episodes of pregnancy-associated listeriosis is reported as a single case, even when isolates are obtained from both the mother and the infant. The rationale is that an episode of pregnancy-associated listeriosis inherently involves both the mother and the infant, because the infant's infection, in most cases, occurs because the mother ate contaminated food. Cases are classified as pregnancy-associated if illness occurs in a pregnant woman or infant ≤ 28 days old; all other cases are considered to not be associated with pregnancy.

Reporting jurisdictions (states and the District of Columbia) reporting at least one listeriosis case to the *Listeria* Initiative during 2014 are shown in Figure 1.

- Forty-seven states and the District of Columbia reported 675 listeriosis cases in 2014.
 - » 660 (98%) cases were invasive
 - 564 (85%) were not associated with pregnancy
 - 96 (15%) were pregnancy-associated
- 13 (2%) cases were non-invasive (excluded from further analysis)
- 2 (<1%) report forms did not have enough data to categorize the case (excluded from further analysis)
 - » 1 invasive case had unknown pregnancy status
 - » 1 case had insufficient data to be categorized as invasive or non-invasive

Figure 1. Jurisdictions reporting cases of listeriosis to the *Listeria* Initiative and National Notifiable Disease Surveillance System (NNDSS), 2014*[†]



* Number of cases reported to the *Listeria* Initiative in 2014 are indicated on each jurisdiction that reported.

[†] Jurisdictions that did not report any cases to the *Listeria* Initiative were Alaska, South Dakota, and Wyoming.

Invasive listeriosis not associated with pregnancy

Demographic and clinical characteristics of 564 patients with invasive listeriosis not associated with pregnancy are shown in Table 1.

Highlights

- The median age of patients was 70 years.
- Most isolates were from blood (81%) or cerebrospinal fluid (CSF) (13%).
- Eighty-nine percent of patients were hospitalized.
- Twenty-three percent of patients died.

Table 1. Demographic and clinical characteristics of patients with invasive listeriosis not associated with pregnancy reported to the *Listeria* Initiative, 2014 (n=564).

Characteristic (number with information)	n	%
Age in years (n=562)		
Median (range)	70 (0–95)	
Sex (n=562)*		
Male	293	52
Female	269	48
Ethnicity (n=456)*		
Hispanic	58	13
Non-Hispanic	398	87
Race (n=441)*		
White	344	78
African American or Black	51	12
Asian	34	8
Native American	5	1
Native Hawaiian or Other Pacific Islander	4	1
Multiracial	3	<1
Source of most invasive isolate (n=564) [†]		
Blood	459	81
CSF	72	13
Other [§]	33	6
Hospitalized (n=543)		
	485	89
Died (n=462)		
	107	23

* Missing and unknown information was excluded from the denominator for each characteristic: age (n=2), sex (n=2), ethnicity (n=108), race (n=123).

[†] For cases in which *L. monocytogenes* was isolated from multiple normally sterile anatomical sites, the annual summary reports the most invasive site, using a hierarchy (in descending order of invasiveness: CSF, bone or joint fluid, blood, and other sterile site).

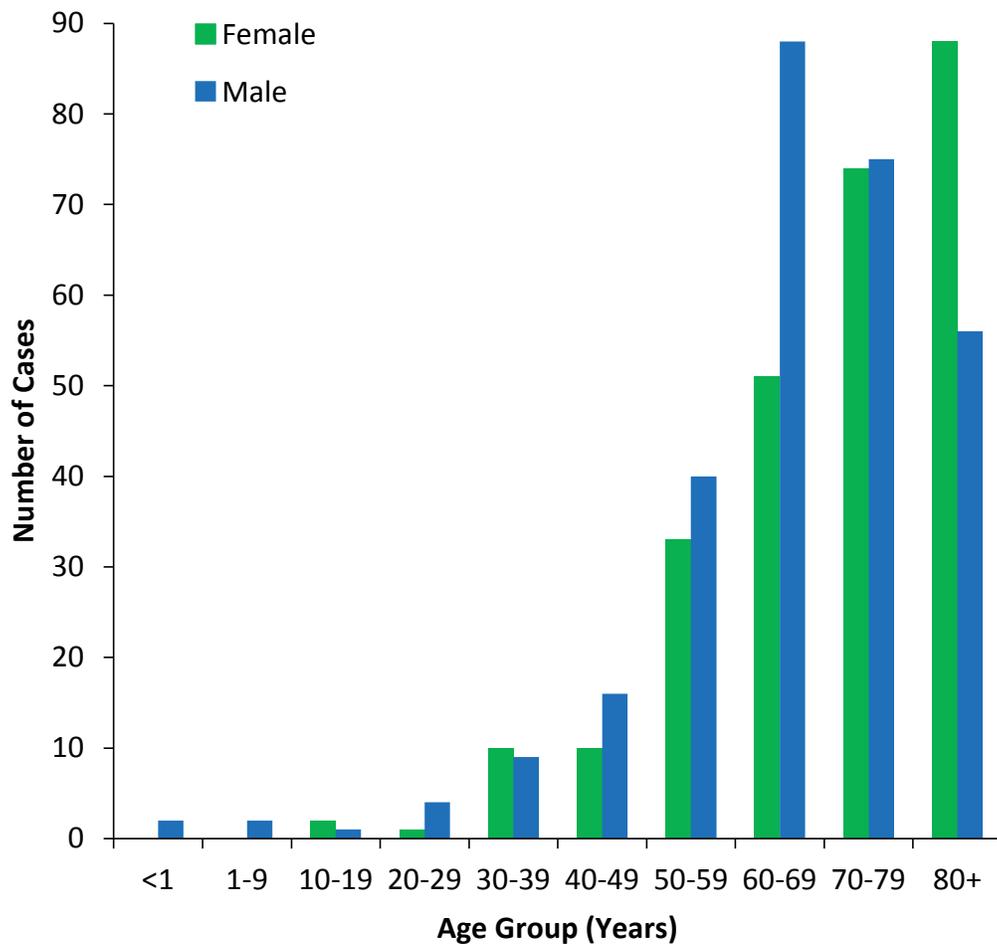
[§] Pleural fluid (9), peritoneal fluid (9), joint fluid (8), brain (3), bone (1), eye (1), hemodialysis catheter (1), spinal tissue (1).

Patients with invasive listeriosis not associated with pregnancy reported to the *Listeria* Initiative during 2014 are shown by patient age group and sex in Figure 2.

Highlights

- The number of cases in each 10-year age group increased with age among persons 1 to 79 years.

Figure 2. Patients with invasive listeriosis not associated with pregnancy, by age group and sex, *Listeria* Initiative, 2014 (n=562).



Pregnancy-associated listeriosis

Demographic and clinical characteristics of the 96 episodes of pregnancy-associated listeriosis are shown in Table 2.

Highlights

- Hispanic ethnicity was more common in the mothers in episodes of pregnancy-associated listeriosis (47%) than in patients with invasive listeriosis not associated with pregnancy (13%).
- Twenty-four percent of episodes of pregnancy-associated listeriosis led to fetal death; in addition, 6% were reported to have led to death of live-born infants (outcome not reported for all live births).

Table 2. Demographic and clinical characteristics of episodes of pregnancy-associated listeriosis cases reported to the *Listeria* Initiative, 2014 (n=96)*

Characteristic (number with information)	n	%
Mother's age in years (n=68) [†]		
Median (range)	30 (17–49)	
Mother's ethnicity (n=85) [†]		
Hispanic	40	47
Non-Hispanic	45	53
Mother's race (n=71) [†]		
White	51	72
African American/Black	10	14
Asian	7	10
Native Hawaiian or Other Pacific Islander	2	3
Native American	1	1
Source of most invasive isolate (n=96) [§]		
CSF from neonate	13	13
CSF from mother	1	1
Blood from neonate	37	39
Blood from mother	29	30
Other products of conception [¶]	16	17
Hospitalization ^{**}		
Mothers (n=82) ^{††}	43	52
Live born infants (n=54) ^{§§}	44	81
Pregnancy outcome (n=75) ^{¶¶}		
Live birth, infant survived	41	55
Live birth, infant died	5	6
Live birth, unknown infant outcome	2	3
Fetal death	18	24
Still pregnant at time of case report	9	12

*Cases involving mother-infant pairs are counted as a single case.

[†] Missing and unknown information was excluded from the denominator for each characteristic: age (n=28), ethnicity (n=11), race (n=25).

[§] For cases in which *L. monocytogenes* was isolated from multiple normally sterile anatomical sites, the annual summary reports the most invasive site, using a hierarchy (in descending order of invasiveness: CSF, bone or joint fluid, blood, other sterile site, and other products of conception).

[¶] Other products of conception include placenta (n=14), amniotic fluid (n=1), and tracheal aspirate sputum (1).

^{**} Hospitalization related to *Listeria* infection.

^{††} Thirty-nine (91%) of 43 mothers hospitalized for *Listeria* infection had a culture yielding *L. monocytogenes*.

^{§§} Forty-two (95%) of 44 infants who were hospitalized for *Listeria* infection had a culture yielding *L. monocytogenes*.

^{¶¶} Outcomes were unknown for 21 cases.

Investigations

The *Listeria* Initiative was designed to expedite investigation of and response to clusters and outbreaks. (By cluster, we mean 2 or more people whose isolates are very similar and whose illnesses may or may not have been linked to a common source; clusters of ill persons that were linked to a common source are called outbreaks.) By participating in the *Listeria* Initiative, including use of the standard questionnaire, state and local health departments contribute data on food exposures that can be pooled for rapid investigation of clusters and other epidemiological analyses.

During 2014, state and local health officials, regulatory agencies, and CDC investigated 18 clusters of listeriosis. Eight outbreaks were identified; four outbreaks included patients who resided in more than one state (Table 3). Highlights of these investigations are below. More information on *Listeria* outbreaks can be found at CDC's Foodborne Outbreak Online Database (FOOD) (wwwn.cdc.gov/foodborneoutbreaks).

Table 3. Outbreaks of listeriosis investigated during 2014 (n=8)

Implicated food/source	State(s)	Number of cases	Number of deaths	Number of fetal losses	Highlights
Cross-contamination at retail	Maine	2	0	0	
Cross-contamination at restaurant	Rhode Island	4	2	0	
Milkshake made from pasteurized milk	Washington	2	0	0	First reported link between human listeriosis and ice cream; made from pasteurized milk
Mexican-style cheese (1)	Multistate	9	1	2	Made from pasteurized milk
Sprouts (2)	Multistate	5	2	0	
Mexican-style cheese	Washington	3	1	0	Made from pasteurized milk
Caramel apples (3)	Multistate	35	7	1	First reported link between human listeriosis and caramel apples
Stone fruit (4)	Multistate	2	1	0	First reported link between human listeriosis and stone fruit

Listeria serotypes

The CDC *Listeria* Reference Laboratory serotyped 527 isolates from cases reported to the *Listeria* Initiative in 2014 (Table 3).

Highlights

- Serotype 4b was the most commonly identified serotype, accounting for 57% of isolates.

Table 3. Serotypes of *Listeria monocytogenes* isolated from invasive cases reported to the *Listeria* Initiative, 2014 (n=527)

Serotype	n	%
4b	299	57
1/2a	139	26
1/2b	66	13
Other serotypes	16	3
Untypeable	7	1

Reporting Statistics

Prompt interviewing of all patients with listeriosis, timely submission of *Listeria* Initiative standardized questionnaires to CDC, rapid pulsed-field gel electrophoresis (PFGE) subtyping, and uploading of PFGE results to PulseNet allow for rapid detection and investigation of listeriosis clusters. To help meet these objectives, reporting statistics and goals for the *Listeria* Initiative (below) were proposed at the 2012 Council of State and Territorial Epidemiologists (CSTE) Annual Meeting (5).

CDC sends state-specific summaries to state epidemiologists. Health department personnel may also request their state's reporting statistics by emailing edebresponse@cdc.gov.

Table 4. National listeriosis surveillance metrics by year, *Listeria* Initiative, 2010–2014

	2010	2011	2012	2013	2014
Number of jurisdictions reporting to LI ¹	42	47	44	44	48
Number of case reports received	577	621	582	646	675
Proportion of NNDSS cases reported to LI ²	71%	67%	78%	85%	85%
Proportion of human PulseNet isolates reported to LI ³	65%	69%	82%	86%	87%
Reporting Timeliness					
Proportion of interviews reported to CDC within 7 days of interview date ⁴	15%	19%	21%	31%	38%
Proportion of clinical isolates uploaded to PulseNet within 14 days of specimen collection date ⁵	45%	57%	53%	56%	52%
Reporting Completeness					
Proportion of reports using the standard LI questionnaire ⁶	77%	83%	78%	82%	86%
Proportion of reports with "complete" food history ⁷	49%	57%	53%	58%	62%

¹ Includes District of Columbia

² Is not calculable in instances where no cases are reported to NNDSS

³ Is not calculable in instances where no human isolates are reported to PulseNet

⁴ Is not calculable in instances where no LI reports are received or when interview date was not completed; CDC did not begin tracking received date until 2008

⁵ Is not calculable in instances where no human isolates are reported to PulseNet or when specimen collection date and/or PulseNet upload date are not completed

⁶ Is not calculable in instances where no LI reports are received

⁷ Is not calculable in instances where no LI reports are received; for purposes of this report, complete food history is defined as information on consumption history for all of the following items: turkey breast, blue cheese, cole slaw, smoked fish, yogurt

Table 5. Proposed national listeriosis reporting goals, the Listeria Initiative (LI), 2014

	Proposed National Goals			Status (2014)
	Current (2014)	2014 Goal	2016 Goal	
Number of jurisdictions reporting to LI ¹	48	All	All	Achieved ⁸
Proportion of NNDSS cases reported to LI ²	85%	≥90%	≥100%	Needs improvement
Proportion of human PulseNet isolates reported to LI ³	87%	≥90%	≥100%	Needs improvement
Reporting Timeliness				
Proportion of interviews reported to CDC within 7 days of interview date ⁴	45%	70%	90%	Needs improvement
Proportion of clinical isolates uploaded to PulseNet within 14 days of specimen collection date ⁵	52%	70%	90%	Needs improvement
Reporting Completeness				
Proportion of reports using the standard LI questionnaire ⁶	86%	95%	100%	Needs improvement
Proportion of reports with "complete" food history ⁷	62%	80%	90%	Needs improvement

1 Includes District of Columbia

2 Is not calculable in instances where no cases are reported to NNDSS; can be greater than 100% if more cases are reported to LI than to NNDSS

3 Is not calculable in instances where no human isolates are reported to PulseNet; can be greater than 100% if more cases are reported to LI than to PulseNet

4 Is not calculable in instances where no LI reports are received or when interview date was not completed; CDC did not begin tracking received date until 2008

5 Is not calculable in instances where no human isolates are reported to PulseNet or when specimen collection date and/or PulseNet upload date are not completed

6 Is not calculable in instances where no LI reports are received

7 Is not calculable in instances where no LI reports are received; for purposes of this report, complete food history is defined as information on consumption history for all of the following items: turkey breast, blue cheese, cole slaw, smoked fish, yogurt

8 The three jurisdictions that did not report to LI had no cases of listeriosis

Other Sources of Surveillance Data

NNDSS Data

The National Notifiable Disease Surveillance System (NNDSS) collects and compiles reports of nationally notifiable infectious diseases, including listeriosis. Reports can be found at http://www.cdc.gov/mmwr/mmwr_nd/index.html.

Outbreak Data

The Foodborne Disease Outbreak Surveillance System (FDOSS) collects reports of foodborne disease outbreaks from local, state, tribal, and territorial public health agencies. Reports can be found at <http://www.cdc.gov/foodsafety/fdoss/data/annual-summaries/index.html>.

References

- Centers for Disease Control and Prevention. Oasis Brands, Inc. Cheese Recalls and Investigation of Human Listeriosis Cases (Final Update). December 4, 2014 [cited 2015 December 3]. <http://www.cdc.gov/listeria/outbreaks/cheese-10-14/index.html>
- Centers for Disease Control and Prevention. Whole Soy Products, Inc. Sprouts and Investigation of Human Listeriosis Cases (Final Update). January 27, 2015 [cited 2015 December 3]. <http://www.cdc.gov/listeria/outbreaks/bean-sprouts-11-14/index.html>
- Centers for Disease Control and Prevention. Multistate Outbreak of Listeriosis Linked to Commercially Produced, Prepackaged Caramel Apples Made from Bidart Bros. Apples (Final Update). February 12, 2015 [cited 2015 December 3]. <http://www.cdc.gov/listeria/outbreaks/caramel-apples-12-14/index.html>
- Jackson, BR, M Salter, C Tarr, et al. Notes from the field: Listeriosis associated with Stone Fruit—United States, 2014. MMWR Morb Mortal Wkly Rep. 2015 Mar 20;64(10):282–283. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6410a6.htm>

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