

# National Enteric Disease Surveillance: *Listeria* Annual Summary, 2011

## *Listeria* Initiative Data

An overview of the *Listeria* Initiative surveillance system is available at [http://www.cdc.gov/nationalsurveillance/listeria\\_surveillance.html](http://www.cdc.gov/nationalsurveillance/listeria_surveillance.html).

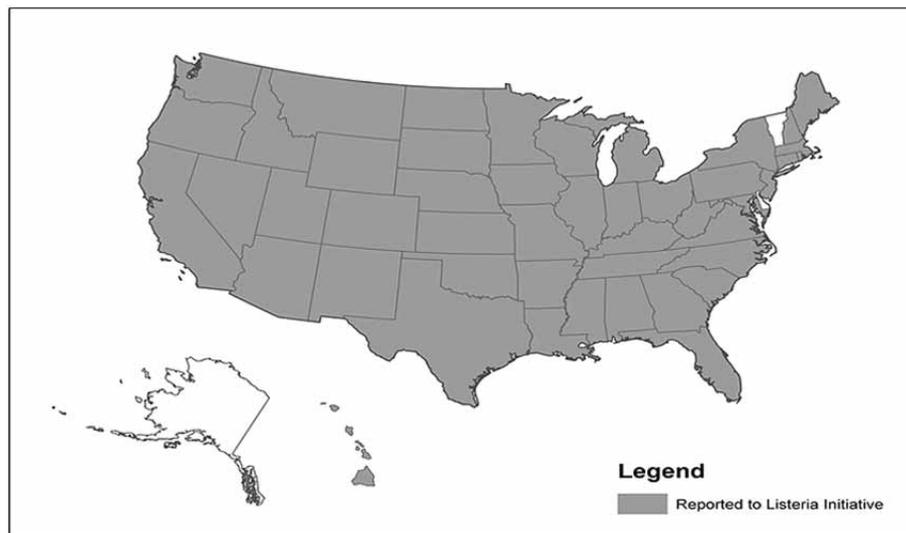
For this report, a case of invasive listeriosis is defined as isolation of *Listeria monocytogenes* from a normally sterile site (e.g., blood or cerebrospinal fluid [CSF]) or from products of conception (e.g., amniotic fluid, placental or fetal tissue). For cases in which *L. monocytogenes* is isolated from multiple anatomical sites, the case is considered to be invasive if any isolate is obtained from a normally sterile site. For cases in which *L. monocytogenes* is 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).

Each mother-infant pair in episodes of pregnancy-associated listeriosis is reported as a single case, even when clinical 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 if not all cases, occurs because the mother ate contaminated food. Cases are classified as pregnancy-associated if illness occurs in a pregnant woman or infant  $\leq 28$  days old; all other cases are considered to not be associated with pregnancy.

States reporting at least one listeriosis case to the *Listeria* Initiative during 2011 are shown in Figure 1.

- Forty-seven states reported 621 listeriosis cases in 2011.
  - » 590 (95%) cases were invasive
    - 533 (90%) were not pregnancy-associated
    - 57 (10%) were pregnancy-associated
  - » 13 (2%) cases were non-invasive
  - » 18 (3%) report forms did not have enough data to categorize the case

**Figure 1.** States reporting at least one case of listeriosis to the *Listeria* Initiative, 2011 (n=47)\*†



\*Reporting states are indicated in gray

†Three states and the District of Columbia reported no cases to the *Listeria* Initiative in 2011.

Non-invasive cases and reports that did not have enough data to categorize the case were excluded from the subsequent analyses.

## Listeriosis not associated with pregnancy

Demographic and clinical characteristics of 533 patients with invasive listeriosis not associated with pregnancy are shown in Table 1.

### Highlights

- The median age of patients with invasive listeriosis not associated with pregnancy was 71 years.
- Most isolates were from blood (83%) or cerebrospinal fluid (CSF) (14%).
- Ninety-four percent of patients with invasive listeriosis not associated with pregnancy were hospitalized.
- Twenty-two percent of patients with invasive listeriosis not associated with pregnancy died.

**Table 1.** Demographic and clinical characteristics of patients with invasive listeriosis not associated with pregnancy reported to the *Listeria* Initiative, 2011 (n=533)

Characteristic (number with information)	n	%
Age in years (n=531)		
Median (range)	71 (0*-97)	
Sex (n=533)		
Male	254	48
Female	279	52
Ethnicity (n=430) <sup>†</sup>	59	14
Hispanic	59	14
Non-Hispanic	371	86
Race (n=471) <sup>†</sup>		
White	393	83
African American/Black	49	10
Asian	18	4
Native Hawaiian or Other Pacific Islander	8	2
Multiracial	3	<1
Source of most invasive isolate (using source hierarchy) (n=533) <sup>§</sup>		
Blood	440	83
CSF	74	14
Other <sup>¶</sup>	19	4
Hospitalized (n=515)	486	94
Died (n=469)	105	22

\* Two infants under one year old were not considered to be pregnancy-associated cases because the infants were >28 days old at illness onset (36 and 37 days old, respectively.)

<sup>†</sup> Does not include reports with missing or unknown ethnicity (n=103) or race (n=62).

<sup>§</sup> 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).

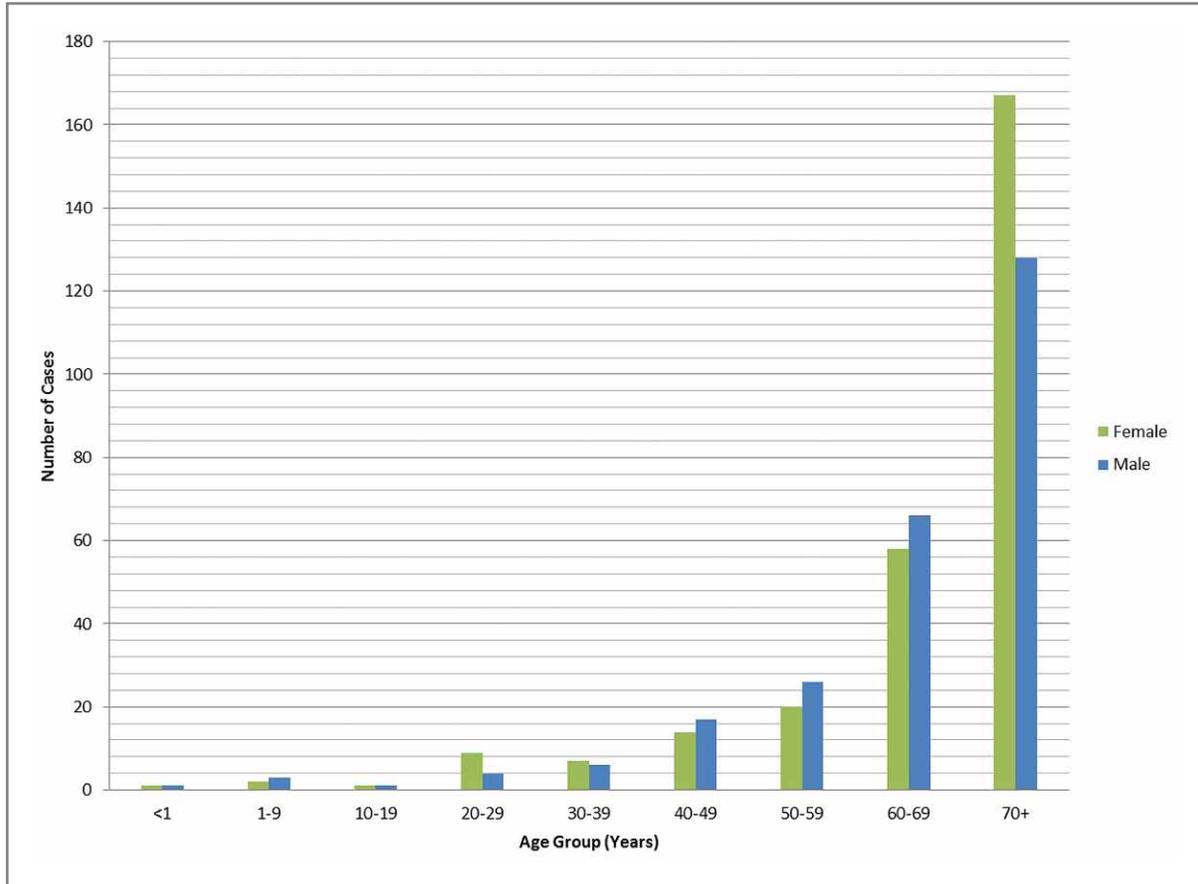
<sup>¶</sup> Pleural fluid (8), ascitic fluid (2), joint/bone (2), aortic tissue (1), brain mass (1), vitreous and anterior eye chamber (1), liver (1), lung (1), pericardial fluid (1), and peritoneal fluid (1).

Patients with invasive listeriosis not associated with pregnancy reported to the Listeria Initiative during 2011 are shown by patient age group and sex in Figure 2.

### Highlights

- As in previous years, the number of cases per 10-year age group increased with age.

**Figure 2.** Patients with invasive listeriosis not associated with pregnancy, by patient age group and sex, Listeria Initiative, 2011 (n=531)



## Pregnancy-associated listeriosis

Demographic and clinical characteristics of the 57 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 (37%) than in patients with invasive listeriosis not associated with pregnancy (14%).
- Twenty-six percent of episodes of pregnancy-associated listeriosis led to fetal death, and 4% of live-born infants with listeriosis died.
- *L. monocytogenes* was isolated from both mother and infant in only one episode of pregnancy-associated listeriosis.

**Table 2.** Demographic and clinical characteristics of episodes of pregnancy-associated listeriosis reported to the Listeria Initiative, 2011 (n=57)\*

Characteristic (number with information)	n	%
Mother's age in years (n=47)		
Median (range)	29 (17–41)	
Mother's ethnicity (n=49) <sup>†</sup>		
Hispanic	18	37
Non-Hispanic	31	63
Mother's Race (n=45) <sup>†</sup>		
White	33	73
African American/Black	8	18
Asian	3	7
Native Hawaiian Other Pacific Islander	1	2
Source of most invasive isolate (using source hierarchy) (n=57) <sup>§</sup>		
CSF from neonate	4	7
CSF from mother	2	4
Blood from both mother and neonate	1	2
Blood from neonate	17	30
Blood from mother	23	40
Other products of conception <sup>¶</sup>	10	18
Hospitalization**		
Mothers (n=53)	39	74
Live born infants (n=30)	26	87
Pregnancy outcome (n=57) <sup>††</sup>		
Live birth, infant survived	25	44
Live birth, infant died	1	4
Live birth, unknown infant outcome	8	14
Fetal death	15	26
Still pregnant at time of case report	8	14

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

<sup>†</sup>Does not include reports with missing or unknown ethnicity (n=8) or race (n=12).

<sup>§</sup> 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).

<sup>¶</sup>Other products of conception include placenta, amniotic fluid, and fetal tissue.

\*\*Hospitalization related to *Listeria* infection.

<sup>††</sup> Two cases of multiple gestations were reported; the outcome of each infant/fetus is reported. In one case, twin live births were reported; both infants survived. In the other, twin fetal deaths were reported.

## Investigations

The *Listeria* Initiative was designed to expedite investigation of and response to clusters and outbreaks. By participating in the *Listeria* Initiative, including use of the standardized questionnaire, state/local health departments contribute data on food exposures that can be pooled for rapid outbreak investigation and other epidemiological analyses.

During 2011, CDC investigated 11 clusters of listeriosis. The *Listeria* Initiative assisted in implicating foods in two investigations in 2011:

- The Michigan Department of Community Health and the Wayne County Public Health Department investigated a small outbreak linked to locally-produced All Natural Ackawi Cheese and All Natural Chives cheeses made with pasteurized milk.
- State partners and CDC investigated a large outbreak of 147 cases of listeriosis. Using the *Listeria* Initiative database for case-case epidemiologic analysis as part of a comprehensive investigation, investigators rapidly implicated whole cantaloupe grown on a single farm (1). Recall of the implicated cantaloupe and other public health interventions were estimated to have prevented 36 illnesses and 7 deaths (2).

## Listeria serotypes

The CDC *Listeria* Reference Laboratory serotypes *L. monocytogenes* isolates from invasive cases. Serotypes of isolates from cases reported to the *Listeria* Initiative in 2011 are shown in Table 3.

### Highlights

- Serotype 1/2a was the most commonly identified serotype, accounting for 43% of isolates.
- Historically, serotype 4b has been the most common serotype. However, serotype 1/2a was one of two serotypes (1/2a and 1/2b) involved in the large 2011 listeriosis outbreak associated with cantaloupe, which may explain the observed increase from previous years.

**Table 3.** Serotypes of *Listeria monocytogenes* isolated from invasive cases reported to the *Listeria* Initiative, 2011 (n=271)\*

Serotype <sup>†</sup>	n	%
4b	90	33
1/2a	117	43
1/2b	50	18
Other serotypes	13	5
Untypeable	1	<1

\*43 isolates pending serotype results  
<sup>†</sup>Excludes isolates reported as serogroup 1/2 (42) or serogroup 4 (18)

## Performance measures

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 (3).

State-specific summaries were sent to state epidemiologists in January 2013. Health department personnel may request their state's reporting statistics by emailing [edebresponse@cdc.gov](mailto:edebresponse@cdc.gov).

**Table 4.** National listeriosis reporting statistics by year, *Listeria* Initiative, 2004–2011

	2004	2005	2006	2007	2008	2009	2010	2011
Number of jurisdictions reporting to LI <sup>1</sup>	10	14	20	22	27	40	42	47
Number of case reports received	114	156	187	311	349	525	577	621
Proportion of NNDSS cases reported to LI <sup>2</sup>	15%	17%	20%	37%	47%	66%	71%	67%
Proportion of human PulseNet isolates reported to LI <sup>3</sup>	21%	28%	27%	40%	52%	53%	65%	69%
<b>Reporting Timeliness</b>								
Proportion of interviews reported to CDC within 7 days of interview date <sup>4</sup>					20%	21%	15%	19%
Proportion of clinical isolates uploaded to PulseNet within 14 days of specimen isolation date <sup>5</sup>	13%	23%	31%	32%	39%	44%	45%	57%
<b>Reporting Completeness</b>								
Proportion of reports using the standard LI questionnaire <sup>6</sup>	100%	100%	98%	74%	75%	76%	77%	81%
Proportion of reports with “complete” food history <sup>7</sup>	75%	57%	73%	55%	50%	50%	49%	57%
<sup>1</sup> Includes District of Columbia <sup>2</sup> Is not calculable in instances where no cases are reported to NNDSS <sup>3</sup> Is not calculable in instances where no human isolates are reported to PulseNet <sup>4</sup> 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 <sup>5</sup> 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 <sup>6</sup> Is not calculable in instances where no LI reports are received <sup>7</sup> 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, Coleslaw, Smoked Fish, Yogurt								

**Table 5.** Proposed 2- and 4-year national listeriosis reporting goals, the *Listeria* Initiative

	Proposed national goals			
	Current (2011)	2-year (2014)	4-year (2016)	Status (2011)
Number of jurisdictions reporting to LI <sup>1</sup>	47	All	All	Needs improvement
Proportion of NNDSS cases reported to LI <sup>2</sup>	67%	≥90%	≥100%	Needs improvement
Proportion of human PulseNet isolates reported to LI <sup>3</sup>	69%	≥90%	≥100%	Needs improvement
<b>Reporting Timeliness</b>				
Proportion of interviews reported to CDC within 7 days of interview date <sup>4</sup>	19%	70%	90%	Needs improvement
Proportion of clinical isolates uploaded to PulseNet within 14 days of specimen isolation date <sup>5</sup>	57%	70%	90%	Needs improvement
<b>Reporting Completeness</b>				
Proportion of reports using the standard LI questionnaire <sup>6</sup>	81%	95%	100%	Needs improvement
Proportion of reports with “complete” food history <sup>7</sup>	57%	80%	90%	Needs improvement
<sup>1</sup> Includes District of Columbia <sup>2</sup> Is not calculable in instances where no cases are reported to NNDSS <sup>3</sup> Is not calculable in instances where no human isolates are reported to PulseNet <sup>4</sup> 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 <sup>5</sup> 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 <sup>6</sup> Is not calculable in instances where no LI reports are received <sup>7</sup> 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, Coleslaw, Smoked Fish, Yogurt				

## 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](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/outbreaknet/surveillance\\_data.html](http://www.cdc.gov/outbreaknet/surveillance_data.html).

## References

1. Centers for Disease Control and Prevention (CDC). Multistate Outbreak of Listeriosis Associated with Jensen Farms Cantaloupe — United States, August — September 2011. *MMWR* 2011; 60(39):1357–1358.
2. CDC Memo. Estimates of illnesses, hospitalizations, and deaths prevented by the response to the 2011 multistate outbreak of listeriosis infections associated with cantaloupes grown on a single farm. 25 May 2012.
3. Jackson KA, Stroika S, Silk BJ, Fullerton KA. Trends in the timeliness and completeness of reporting to the Listeria Initiative, 2004–2010. 2012 Council of State and Territorial Epidemiologists Annual Conference, Omaha, NE; June 3–7, 2012.

### Reference Citation:

**Centers for Disease Control and Prevention (CDC). National *Listeria* Surveillance Annual Summary, 2011. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2013.**

### NCEZID Atlanta:

**For more information please contact Centers for Disease Control and Prevention**

**1600 Clifton Road NE, Atlanta, GA 30333 MS C-09**

**Telephone: 1-404-639-2206**

**Email: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov)**