

# National Enteric Disease Surveillance: *Listeria* Annual Summary: 2012

## *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 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 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 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.

Reporting jurisdictions (states and District of Columbia) reporting at least one listeriosis case to the *Listeria* Initiative during 2012 are shown in Figure 1.

- Forty-three states and the District of Columbia reported 582 listeriosis cases in 2012.
  - 566 (97%) cases were invasive
    - 492 (87%) were not associated with pregnancy
    - 74 (13%) were pregnancy-associated
  - 9 (1.5%) cases were non-invasive (excluded from further analysis)
  - 7 (1.2%) report forms did not have enough data to categorize the case (excluded from further analysis)
    - 2 invasive cases had unknown pregnancy status
    - 5 cases had insufficient data to be categorized as invasive or non-invasive

**Figure 1.** Forty-four jurisdictions reported at least one case of listeriosis to the *Listeria* Initiative, 2012<sup>\*,†,§</sup>



\*Number of cases reported to the Listeria Initiative in 2012 are indicated on each state that reported.

†Jurisdictions that did not report any cases to the *Listeria* Initiative were Idaho, Louisiana, Nebraska, Nevada, North Dakota, South Dakota, and Wyoming.

§ National Notifiable Disease Surveillance System (NNDSS)

## Invasive listeriosis not associated with pregnancy

Demographic and clinical characteristics of 492 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 (79%) or cerebrospinal fluid (CSF) (17%).
- Ninety-three percent of patients were hospitalized.
- Sixteen percent of patients died.

**Table 1.** Demographic and clinical characteristics of patients with invasive listeriosis not associated with pregnancy reported to the *Listeria* Initiative, 2012 (n=492)

Characteristic (number with information)	n	%
Age in years (n=492)		
Median (range)	70 (2-97)	
Sex (n=491)*		
Male	210	43
Female	281	57
Ethnicity (n=393)*		
Hispanic	45	11
Non-Hispanic	348	89
Race (n=401)*		
White	318	79
African American or Black	46	12
Asian	31	8
Native Hawaiian or Other Pacific Islander	3	<1
Native American	2	<1
Multiracial	1	<1
Source of most invasive isolate (using source hierarchy) (n=492) <sup>†</sup>		
Blood	388	79
CSF	82	17
Other <sup>§</sup>	22	4
Hospitalized (n=481)	445	93
Died (n=394)	62	16

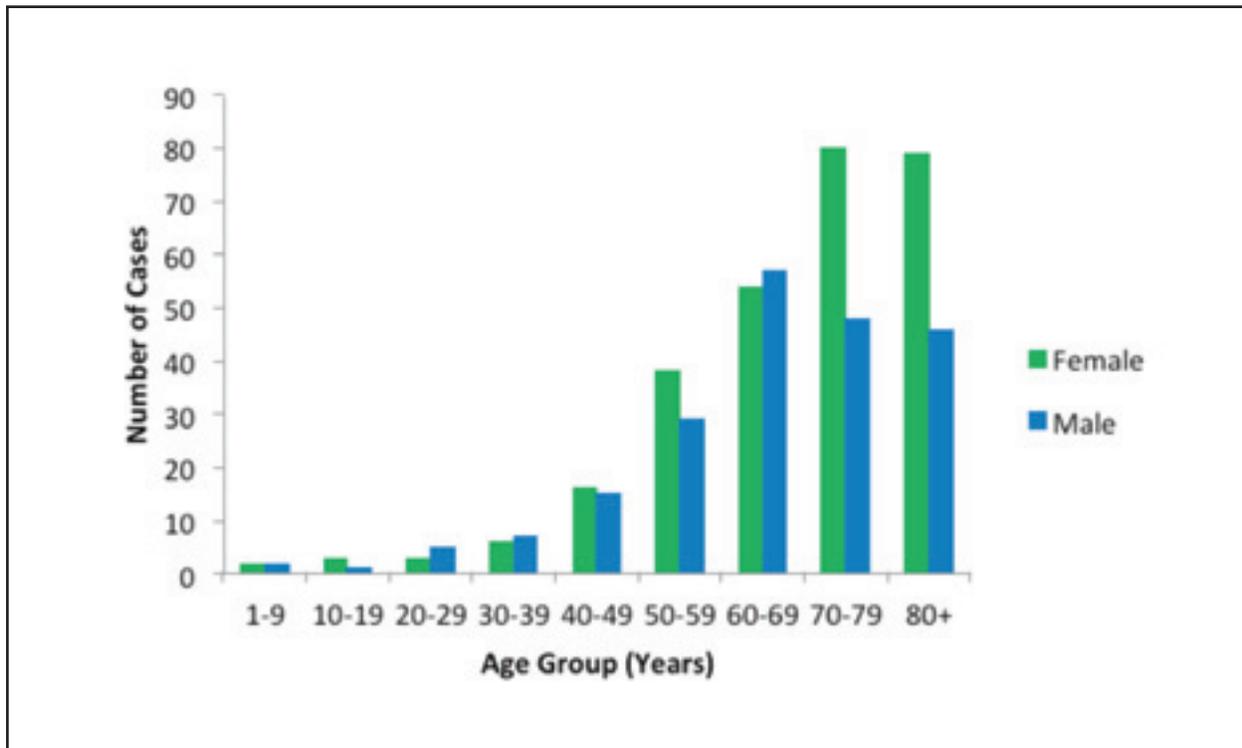
\*Missing and unknown information was excluded from the denominator for each characteristic: sex (n=1), ethnicity (n=99), race (n=91).  
<sup>†</sup>For cases in which *L. monocytogenes* was isolated from multiple normally sterile anatomical sites, the annual summary reports the most invasive site, using a hierarchy (in descending order of invasiveness: CSF, bone or joint fluid, blood, and other sterile site).  
<sup>§</sup>Pleural fluid (5), bone (4), peritoneal fluid (3), ascitic fluid (1), aortic graft (1), aortic sac contents (1), brain (1), brain abscess (1), cardiac muscle (1), peritonitis dialysis effluent (1), thoracentesis/peritoneal fluid (1), tissue around aortic graft (1), vitreous fluid (1).

Patients with invasive listeriosis not associated with pregnancy reported to the *Listeria* Initiative during 2012 are shown by patient age group and sex in Figure 2.

### Highlights

- The number of cases per 10-year age group increased with age among persons 1 to 79 years old; no further increases were observed in persons  $\geq 80$  years old.
- One hundred fifty-nine (32%) cases were among women aged  $\geq 70$  years.

**Figure 2.** Patients with invasive listeriosis not associated with pregnancy, by age group and sex, *Listeria* Initiative, 2012 (n=491)



## Pregnancy-associated listeriosis

Demographic and clinical characteristics of the 74 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 (34%) than in patients with invasive listeriosis not associated with pregnancy (11%).
- Twenty-one percent of episodes of pregnancy-associated listeriosis led to fetal death; in addition, 4% 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, 2011 (n=74)\*

Characteristic (number with information)	n	%
Mother's age in years (n=65) <sup>†</sup>		
Median (range)	28 (21-42)	
Mother's ethnicity (n=61) <sup>†</sup>		
Hispanic	21	34
Non-Hispanic	40	66
Mother's race (n=56) <sup>†</sup>		
White	45	80
African American/Black	6	11
Asian	4	7
Multiracial	1	2
Source of most invasive isolate (using source hierarchy) (n=74) <sup>§</sup>		
CSF from neonate	8	11
CSF from neonate and blood from mother	1	1.5
Blood from both mother and neonate	1	1.5
Blood from neonate	25	34
Blood from mother	32	43
Other products of conception <sup>¶</sup>	7	9
Hospitalization <sup>**</sup>		
Mothers (n=61) <sup>††</sup>	42	69
Live-born infants (n=40) <sup>§§</sup>	35	88
Pregnancy outcome (n=71) <sup>¶¶</sup>		
Live birth, infant survived	27	38
Live birth, infant died	3	4
Live birth, unknown infant outcome	18	25
Fetal death	15	21
Still pregnant at time of case report	8	11

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

<sup>†</sup> Missing and unknown information was excluded from the denominator for each characteristic: age (n=9), ethnicity (n=13), race (n=18).

<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.

<sup>\*\*</sup> Hospitalization related to *Listeria* infection.

<sup>††</sup> Forty (95%) of 42 mothers hospitalized for *Listeria* infection had a positive culture.

<sup>§§</sup> Thirty (85%) of 35 infants who were hospitalized for *Listeria* infection had a positive culture

<sup>¶¶</sup> Two cases of multiple gestations were reported; in both cases the mothers were still pregnant at time of report. Outcomes were unknown for 3 cases.

## 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 2012, CDC investigated 12 clusters of listeriosis. The *Listeria* Initiative assisted in implicating foods in one investigation:

- An outbreak caused 22 cases of listeriosis. Using the *Listeria* Initiative database for case-case epidemiologic analysis, soft cheese was identified as a risk factor. Investigators implicated ricotta salata cheese imported from Italy using
  - 1) a supplemental questionnaire to obtain additional information from patients on specific cheeses consumed,
  - 2) retail product inventory data from points of purchase, and
  - 3) cheese testing.

## Listeria serotypes

The CDC *Listeria* Reference Laboratory serotyped 382 isolates from cases reported to the *Listeria* Initiative in 2012 (Table 3).

### Highlights

- Serotype 4b was the most commonly identified serotype, accounting for 54% of isolates.

**Table 3.** Serotypes of *Listeria monocytogenes* isolated from invasive cases reported to the *Listeria* Initiative, 2012 (n=382)

Serotype	n	%
4b	205	54
1/2a	105	28
1/2b	61	16
Other serotypes	8	2
Untypable	3	<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 (3).

CDC sends state-specific summaries state epidemiologists. Health department personnel may also request their state's reporting statistics by emailing [edebresponse@cdc.gov](mailto:edebresponse@cdc.gov).

**Table 4.** National listeriosis surveillance metrics by year, *Listeria* Initiative, (LI) 2004-2012

	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of jurisdictions reporting to LI <sup>1</sup>	10	14	20	22	27	40	42	47	44
Number of case reports received	114	156	187	311	349	525	577	621	582
Proportion of NNDSS cases reported to LI <sup>2</sup>	15%	17%	20%	37%	47%	66%	71%	67%	78%
Proportion of human PulseNet isolates reported to LI <sup>3</sup>	21%	28%	27%	40%	52%	53%	65%	69%	82%
<b>Reporting Timeliness</b>									
Proportion of interviews reported to CDC within 7 days of interview date <sup>4</sup>					20%	21%	15%	19%	21%
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%	53%
<b>Reporting Completeness</b>									
Proportion of reports using the standard LI questionnaire <sup>6</sup>	100%	100%	98%	74%	75%	76%	77%	83%	78%
Proportion of reports with "complete" food history <sup>7</sup>	75%	57%	73%	55%	50%	50%	49%	57%	53%
<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 (LI)

	Proposed national goals			
	Current (2011)	2-year (2014)	4-year (2016)	Status (2011)
Number of jurisdictions reporting to LI <sup>1</sup>	44	All	All	
Proportion of NNDSS cases reported to LI <sup>2</sup>	78%	≥90%	100%	Needs improvement
Proportion of human PulseNet isolates reported to LI <sup>3</sup>	82%	≥90%	100%	Needs improvement
<b>Reporting Timeliness</b>				
Proportion of interviews reported to CDC within 7 days of interview date <sup>4</sup>	21%	70%	90%	Needs improvement
Proportion of clinical isolates uploaded to PulseNet within 14 days of specimen isolation date <sup>5</sup>	53%	70%	90%	Needs improvement
<b>Reporting Completeness</b>				
Proportion of reports using the standard LI questionnaire <sup>6</sup>	78%	95%	100%	Needs improvement
Proportion of reports with “complete” food history <sup>7</sup>	53%	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				

In 2013, CDC began in new process of working with states to assure that *Listeria* Initiative reports are linked to isolates with patterns in PulseNet. This process is important for cluster investigations. As a result of this process, the number of *Listeria* Initiative reports linked to information about the patient’s isolate in PulseNet increased from 74% to 79% in 2012.

## 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 Linked to Imported Frescolina Marte Brand Ricotta Salata Cheese (Final Update). Atlanta, Georgia: US Department of Health and Human Services, CDC, 2012. Retrieved from [http://www.cdc.gov/listeria/outbreaks/cheese-09-12/index.html?s\\_cid=fb1807](http://www.cdc.gov/listeria/outbreaks/cheese-09-12/index.html?s_cid=fb1807)

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