

# National Enteric Disease Surveillance: *Salmonella* Annual Report, 2016

The Laboratory-based Enteric Disease Surveillance (LEDS) system contributes to the understanding of human salmonellosis in the United States by collecting reports of infections from state and regional public health laboratories. Reporting to LEDS is voluntary; the number of laboratories submitting reports varies somewhat from year to year, although almost all laboratories report every year. Diagnosing *Salmonella* infections based on results from culture-independent diagnostic tests (CIDTs) has become more common in recent years (1). Cases confirmed only by CIDT provide no serotype information and are listed in the “Unknown serotype” category. Occasionally, more than one isolate is reported from a single episode of infection in a person; this report includes only one isolate of a given *Salmonella* serotype per person within a 30-day period.

An overview of surveillance methods and systems for *Salmonella* infections is available at [http://www.cdc.gov/nationalsurveillance/PDFs/NationalSalmSurveillOverview\\_508.pdf](http://www.cdc.gov/nationalsurveillance/PDFs/NationalSalmSurveillOverview_508.pdf) (2).

Data in this report are current as of February 28, 2018.

## Summary

- In 2016, 53 state and regional public health laboratories reported 46,623 cases of culture-confirmed *Salmonella* infections to LEDS, which is 2.4% fewer than in 2015.
- The incidence of culture-confirmed salmonellosis in 2016 declined to 14.51 cases per 100,000 population from 14.85 in 2015.
- Whereas overall incidence of infection declined in 2016 compared with 2015, infections caused by serotypes Infantis, Muenchen, Montevideo, and Braenderup increased (Figure 1).
- Reports of infection for which the isolate was not serotyped increased by 51% in 2016 compared with 2015 (1.75 vs 1.16 cases per 100,000 respectively).
- As in previous years, infants (children <1 year old) had the highest incidence of infection (110.81 cases per 100,000 population for boys and 108.81 for girls; Table 1b).
- Twenty-six states had incidence above the national average. More than half were in the South (AL, AR, GA, LA, MS, NC, OK, TN and SC) and Midwest (IA, MN, MO, ND, and SD) regions.
- As in previous years, the largest percentage of cases were reported during the summer months.

<sup>1</sup> For reporting year 2016, the LEDS *Salmonella* Annual Report only includes *Salmonella* infections confirmed by culture.

<sup>2</sup> LEDS is currently unable to differentiate reports of culture-confirmed *Salmonella* infection of unknown serotype from reports of *Salmonella* diagnosed only by non-culture methods.

<sup>3</sup> Geographic regions in this report are those defined by the United States Census Bureau ([https://www.census.gov/geo/pdfs/maps-data/maps/reference/us\\_regdiv.pdf](https://www.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf))

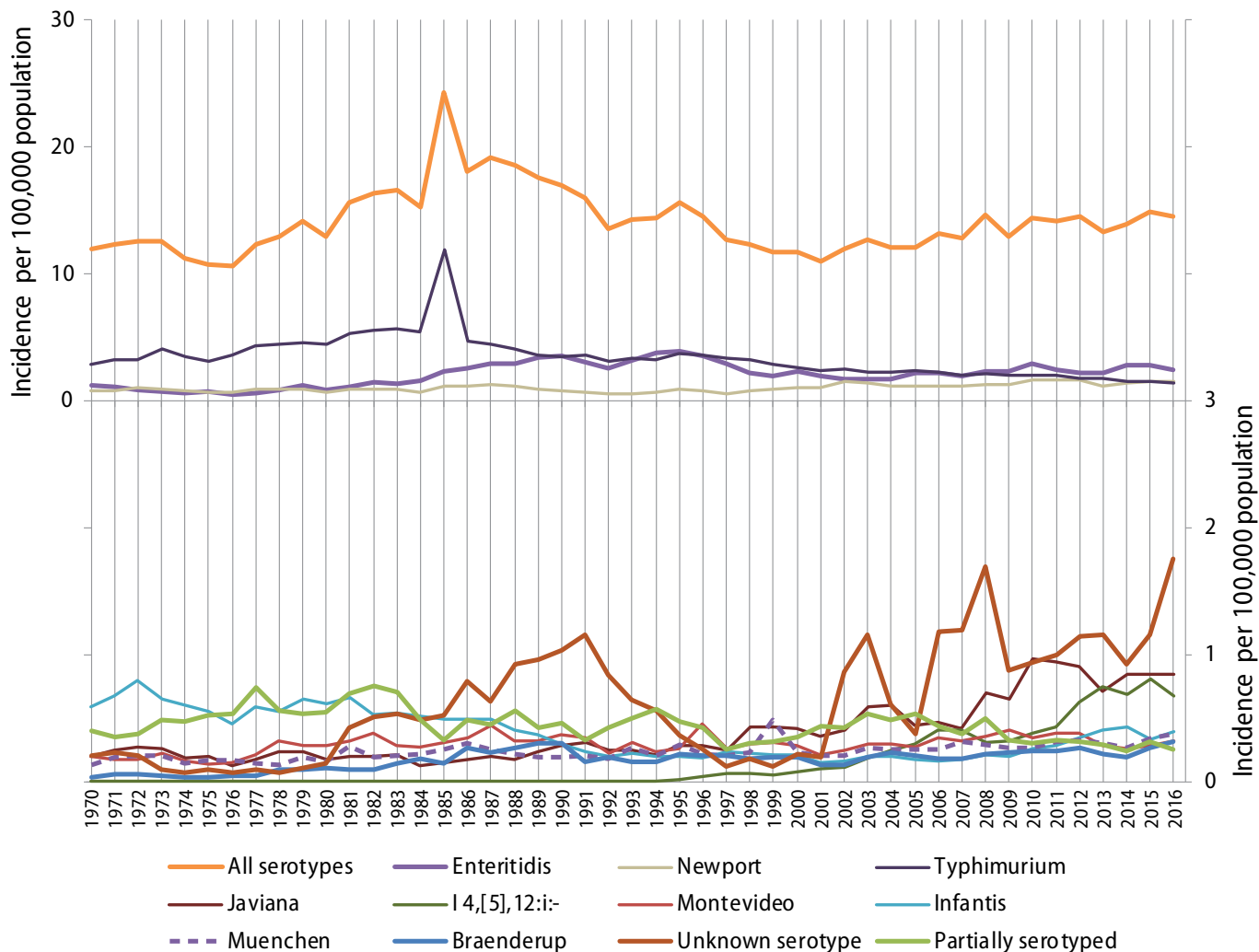
<sup>4</sup> The key to state name abbreviations can be found at [http://www.census.gov/geo/reference/ansi\\_statetables.html](http://www.census.gov/geo/reference/ansi_statetables.html).

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**Figure 1.** Incidence rate of culture-confirmed human *Salmonella* infection reported to LEADS (all serotypes and individual serotypes with  $\geq 1000$  infections reported in 2016), by year, United States, 1970–2016



- The incidence rate of infection with *Salmonella* overall has increased by 33% since a nadir in 2001. Incidence rates of infection have increased the most with serotypes I 4,[5],12:i:- ( $\uparrow 580\%$ ), Infantis ( $\uparrow 167\%$ ), Braenderup ( $\uparrow 138\%$ ), and Javiana ( $\uparrow 136\%$ ) over the same period.
- The large increase in serotype I 4,[5],12:i:- may be due in part to changes in reporting practices and increasing awareness of this serotype.
- “Unknown serotype” indicates cases with no serotype information. This is likely due to serotyping not being performed (1)(2).
- The peak in incidence of serotype Typhimurium infections in 1985 was due to an outbreak associated with pasteurized milk (3).

Note: Data for these charts can be found at <https://www.cdc.gov/nationalsurveillance/data/salm2016/Fig1.xlsx>

**Table 1a.** Culture-confirmed human *Salmonella* infections reported to LEDES, with the 20 most frequently reported serotypes listed individually, United States, 2016

Rank	Serotype	Number reported	Percent	Incidence (per 100,000)
1	Enteritidis	7,830	16.8	2.44
2	Newport	4,728	10.1	1.47
3	Typhimurium	4,581	9.8	1.43
4	Javiana	2,719	5.8	0.85
5	I 4,[5],12:i:-	2,179	4.7	0.68
6	Infantis	1,281	2.7	0.4
7	Muenchen	1,216	2.6	0.38
8	Montevideo	1,018	2.2	0.32
9	Braenderup	1,001	2.1	0.31
10	Thompson	792	1.7	0.25
11	Saintpaul	778	1.7	0.24
12	Heidelberg	754	1.6	0.23
13	Oranienburg	692	1.5	0.22
14	Mississippi	536	1.1	0.17
15	Typhi	423	0.9	0.13
16	Bareilly	412	0.9	0.13
17	Berta	369	0.8	0.11
18	Agona	362	0.8	0.11
19	Paratyphi B var. L(+) tartrate+	343	0.7	0.11
20	Anatum	257	0.6	0.08
	<b>Subtotal</b>	<b>32,271</b>	<b>69.2</b>	
	Other serotyped*	7,709	19.3	2.4
	Unknown serotype	5,625	12.1	1.75
	Partially serotyped	801	1.7	0.25
	Rough, mucoid, and/or nonmotile	217	0.5	0.07
	<b>Subtotal</b>	<b>14,352</b>	<b>30.8</b>	
	<b>Total</b>	<b>46,623</b>	<b>100</b>	<b>14.51</b>

\* Listed individually in Appendix 3

**Table 1b.** Incidence rate of culture-confirmed human *Salmonella* infections reported to LEDES, by age group and sex, United States, 2016 (n = 38,535 with age and sex information reported)

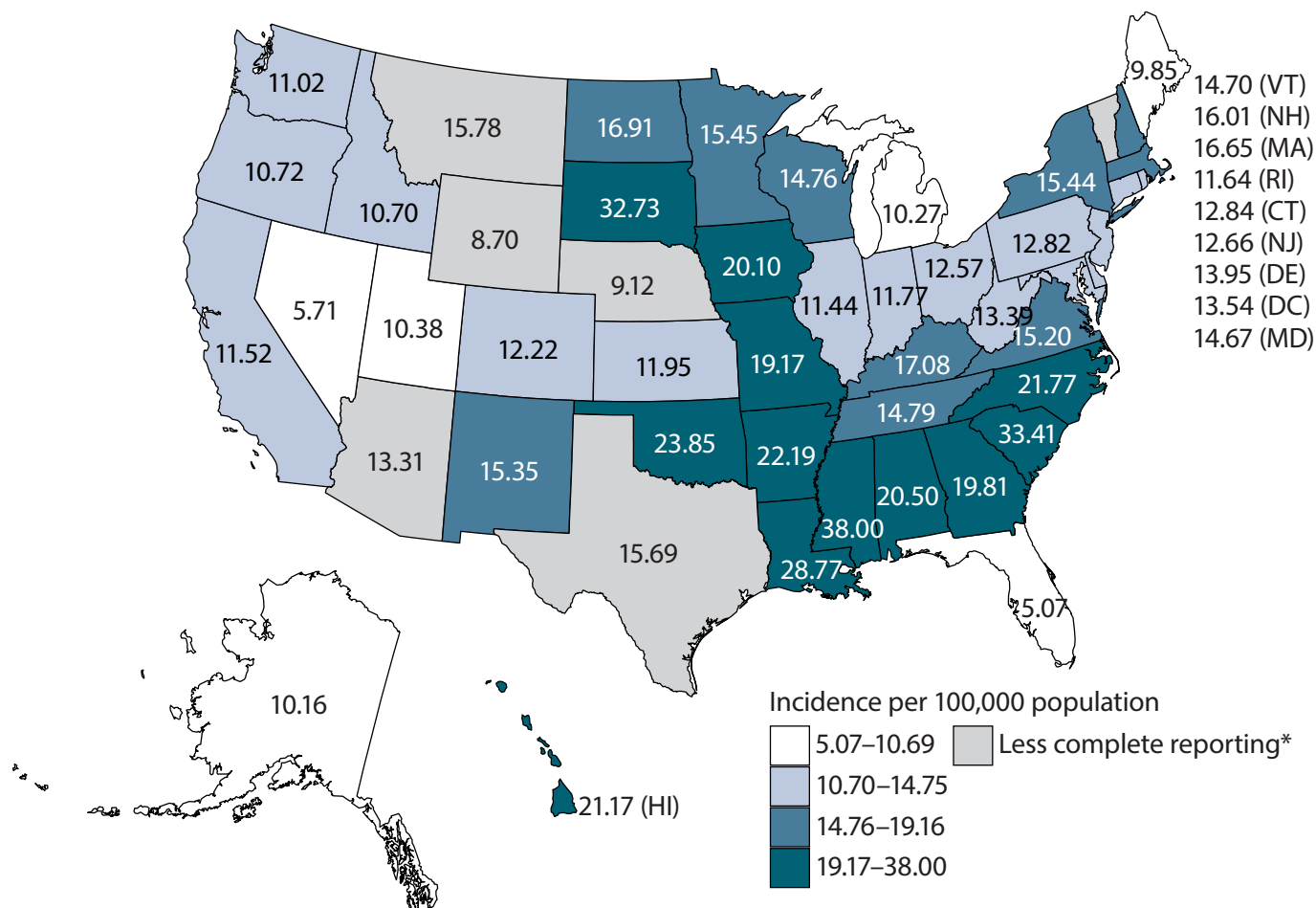
Age group, years	Incidence	
	Female	Male
<1	108.81	110.8
1–4	35.38	36.73
5–9	13.78	14.9
10–19	8.81	9.27
20–29	11.54	9
30–39	10.73	9.26
40–49	11.16	8.59
50–59	13.32	10.41
60–69	14.74	13.01
70–79	16.37	14.92
≥80	16.89	14.58
<b>Overall</b>	<b>14.65</b>	<b>13.25</b>

**Table 2.** Percentage change among the 20 *Salmonella* serotypes most frequently reported to LEDS, comparing 2006, 2011, and 2016

Serotype	Rank			Number Reported			Percentage Change		
	2006	2011	2016	2006	2011	2016	2006 vs 2011	2011 vs 2016	2006 vs 2016
Enteritidis	2	1	1	6,701	7,546	7,830	+ 12.6	+ 3.8	+ 16.8
Newport	3	3	2	3,374	5,185	4,728	+ 53.7	- 8.8	+ 40.1
Typhimurium	1	2	3	6,813	6,120	4,581	- 10.2	- 25.1	- 32.8
Javiana	5	4	4	1,414	2,931	2,719	+ 107.3	- 7.2	+ 92.3
I 4,[5],12:i:-	6	5	5	1,222	1,338	2,179	+ 9.5	+ 62.9	+ 78.3
Infantis	15	9	6	482	901	1,281	+ 86.9	+ 42.2	+ 165.8
Muenchen	8	8	7	757	976	1,216	+ 28.9	+ 24.6	+ 60.6
Montevideo	7	6	8	1,057	1,194	1,018	+ 13	- 14.7	- 3.7
Braenderup	12	10	9	550	733	1,001	+ 33.3	+ 36.6	+ 82
Thompson	16	14	10	442	534	792	+ 20.8	+ 48.3	+ 79.2
Saintpaul	11	12	11	577	703	778	+ 21.8	+ 10.7	+ 34.8
Heidelberg	4	7	12	1,483	1,102	754	- 25.7	- 31.6	- 49.2
Oranienburg	9	11	13	724	718	692	- 0.8	- 3.6	- 4.4
Mississippi	10	13	14	604	546	536	- 9.6	- 1.8	- 11.3
Typhi	17	18	15	411	382	423	- 7.1	+ 10.7	+ 2.9
Bareilly	22	17	16	253	429	412	+ 69.6	- 4.0	+ 62.8
Berta	23	19	17	249	321	369	+ 28.9	+ 15.0	+ 48.2
Agona	13	15	18	530	504	362	- 4.9	- 28.2	- 31.7
Paratyphi B var. L(+) tartrate+	18	16	19	408	431	343	+ 5.6	- 20.4	- 15.9
Anatum	24	21	20	247	293	257	+ 18.6	- 12.3	+ 4.0

- In 2016, serotype Infantis had the largest increase (↑ 165.8%) since 2006.
- Incidence of serotype Typhimurium continues to decline (↓ 32.8% since 2006).

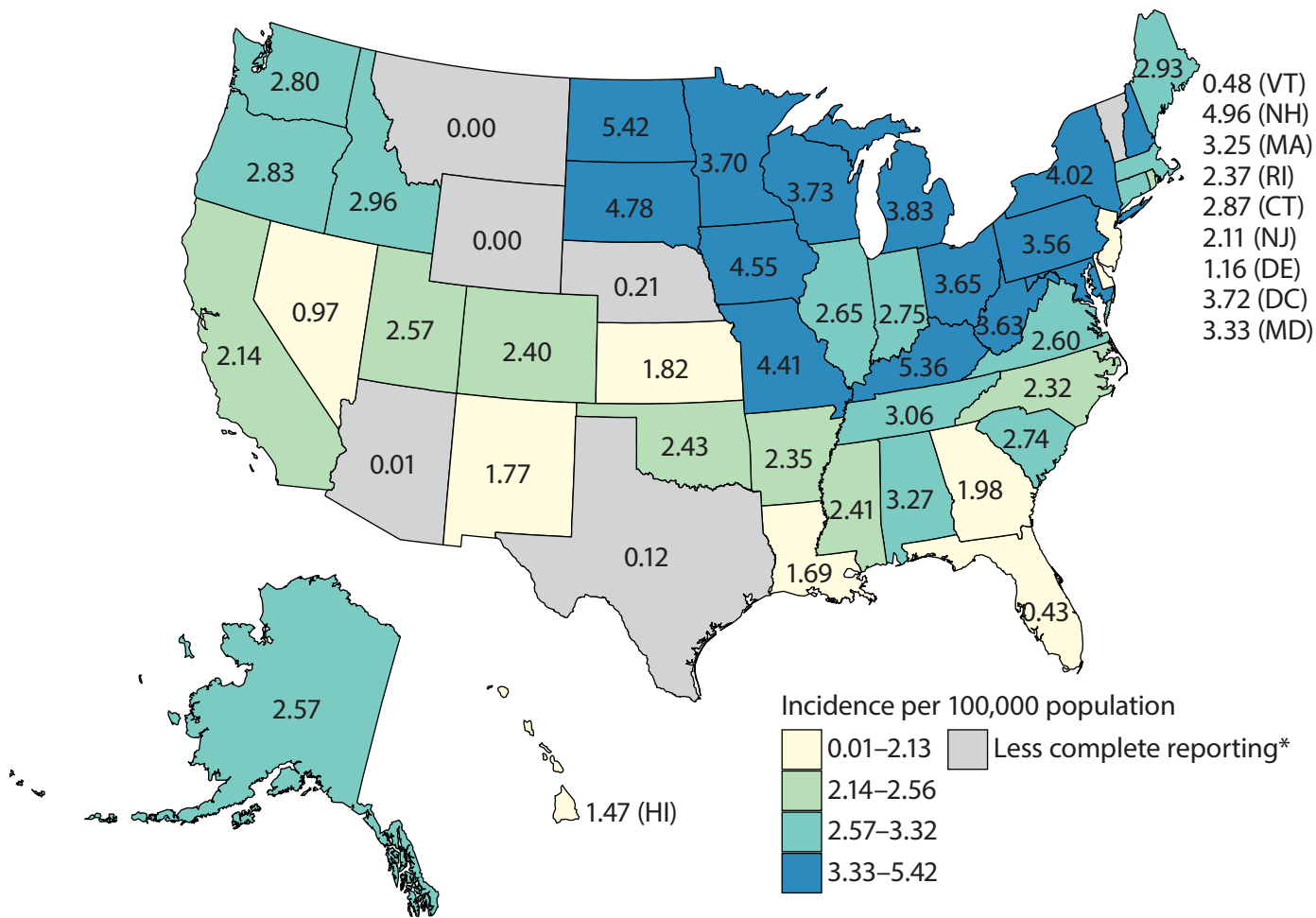
**Figure 2a.** Incidence rate of culture-confirmed human *Salmonella* infections reported to LEDS, by jurisdiction, United States, 2016 (n = 46,623)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_all\\_2a.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_all_2a.csv)

**Figure 2b.** Incidence rate of culture-confirmed human *Salmonella* serotype Enteritidis infection reported to LEDS, by jurisdiction, United States, 2016 (n = 7,830)

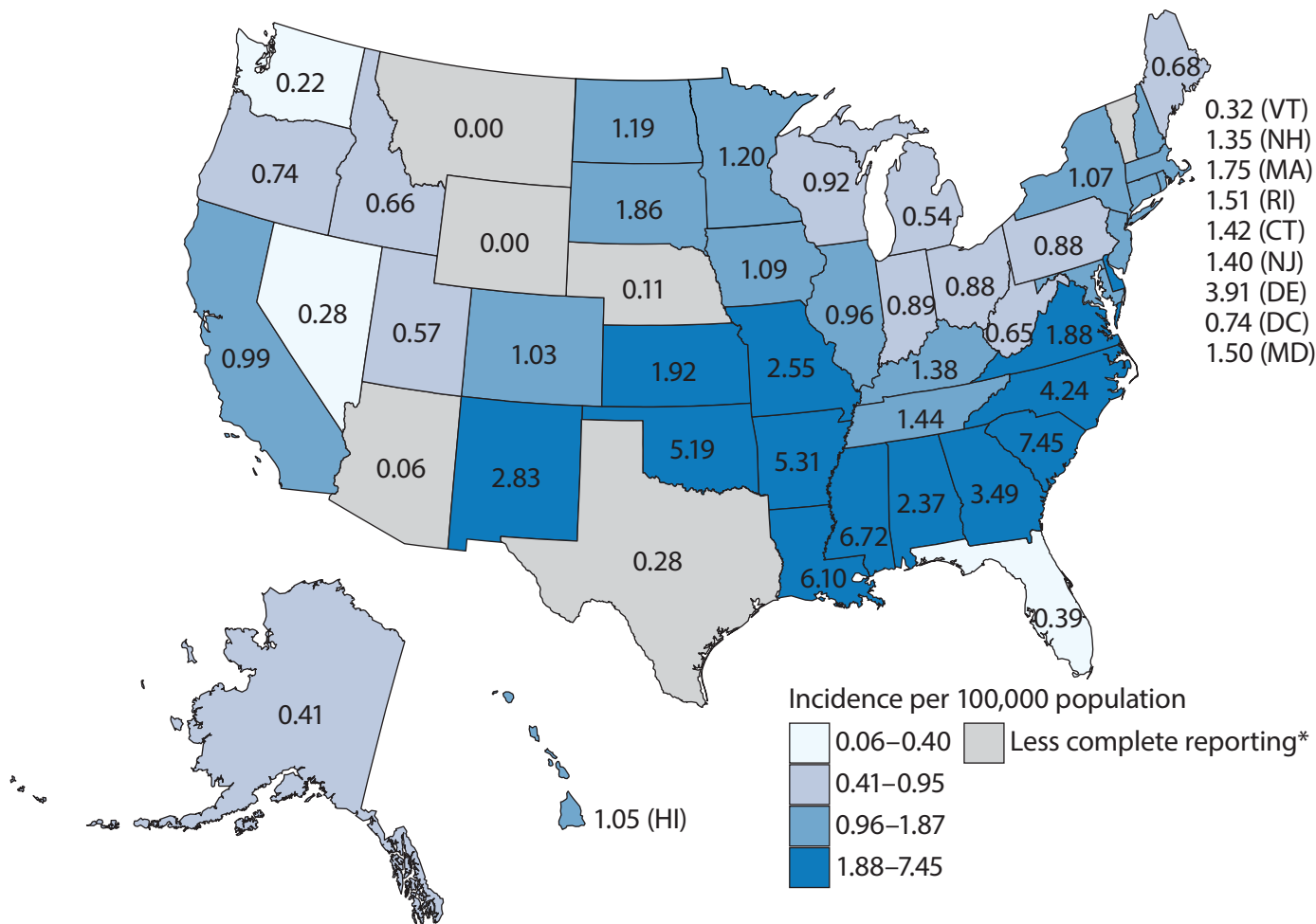


\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_enteritidis\\_2b.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_enteritidis_2b.csv)



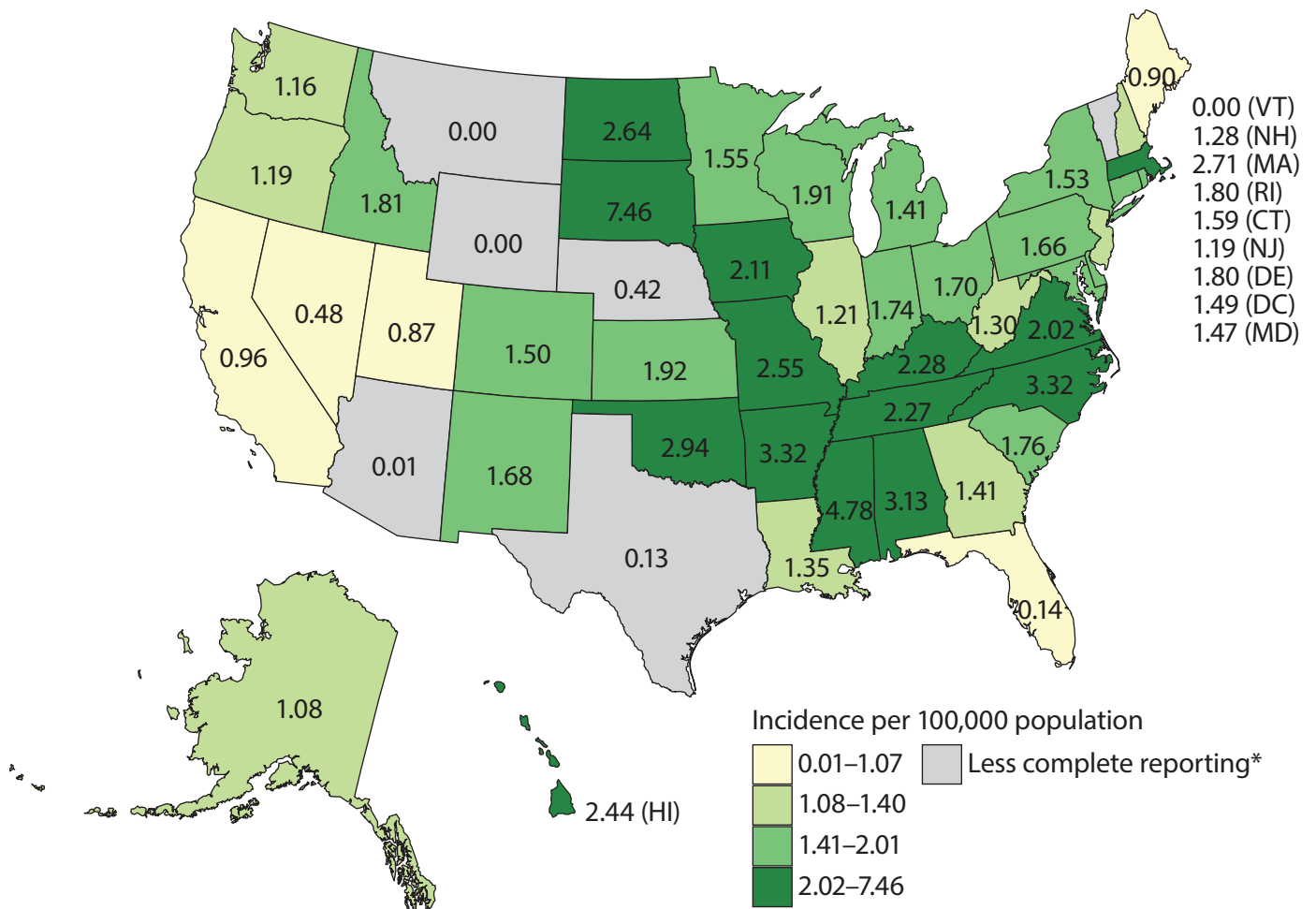
**Figure 2c.** Incidence rate of culture-confirmed human *Salmonella* serotype Newport infection reported to LEDS, by jurisdiction, United States, 2016 (n = 4,728)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the National Notifiable Diseases Surveillance System (NNDSS) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_newport\\_2c.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_newport_2c.csv)

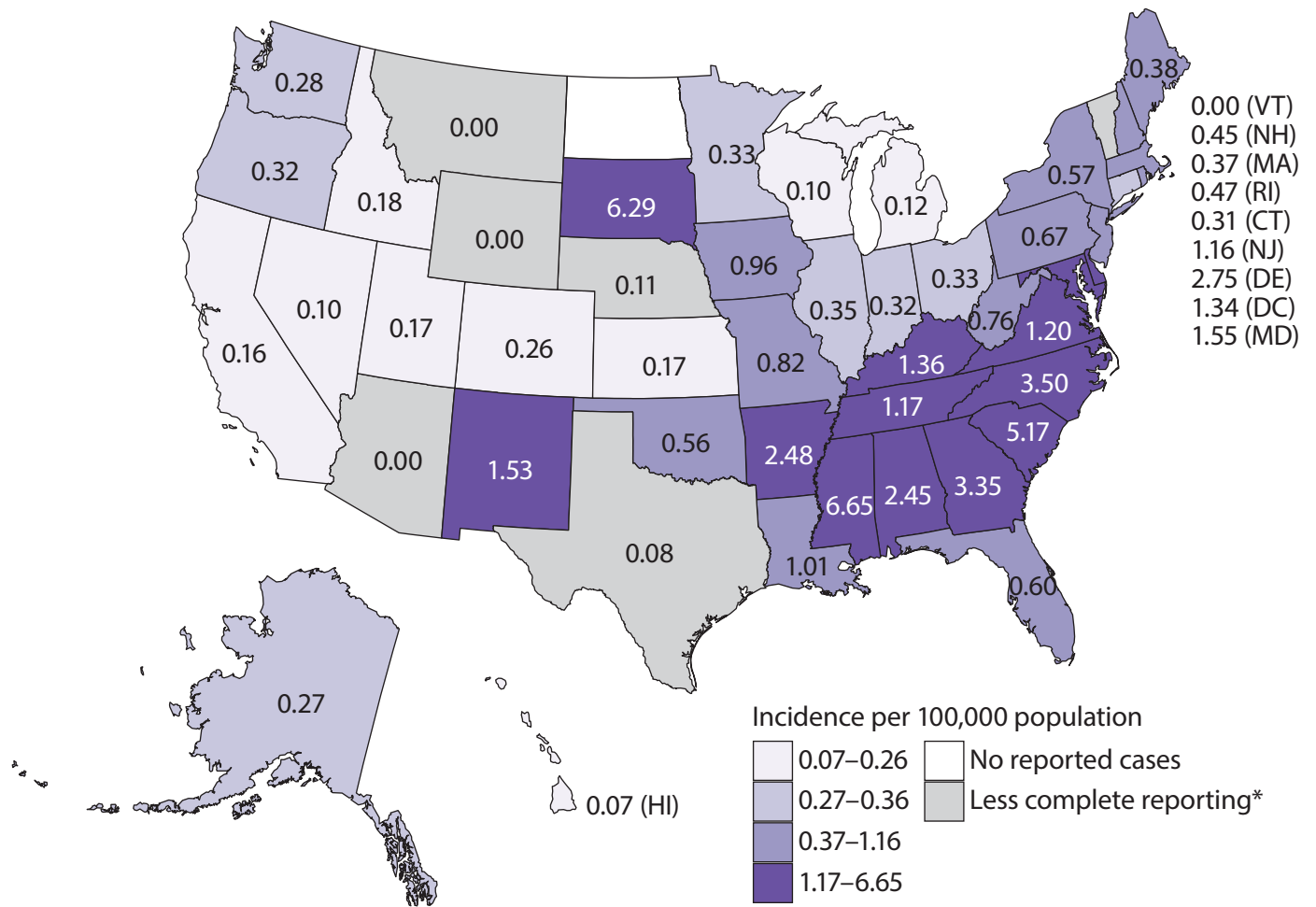
**Figure 2d.** Incidence rate of culture-confirmed human *Salmonella* serotype Typhimurium infection reported to LEDS, by jurisdiction, United States, 2016 (n = 4,581)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_typhi\\_2p.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_typhi_2p.csv)

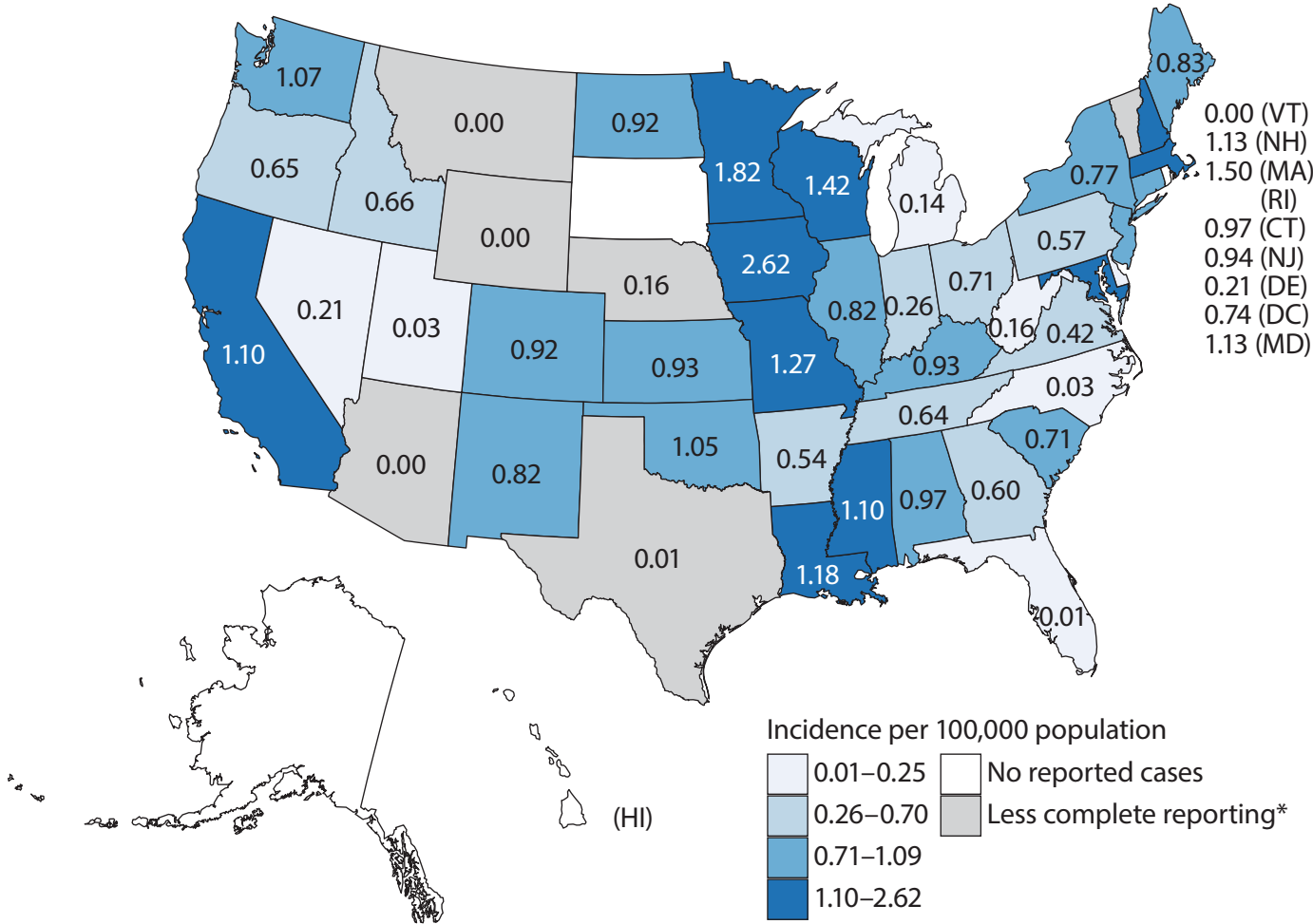
**Figure 2e.** Incidence rate of culture-confirmed human *Salmonella* serotype Javiana infection reported to LEDS, by jurisdiction, United States, 2016 (n = 2,719)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_javiana\\_2e.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_javiana_2e.csv)

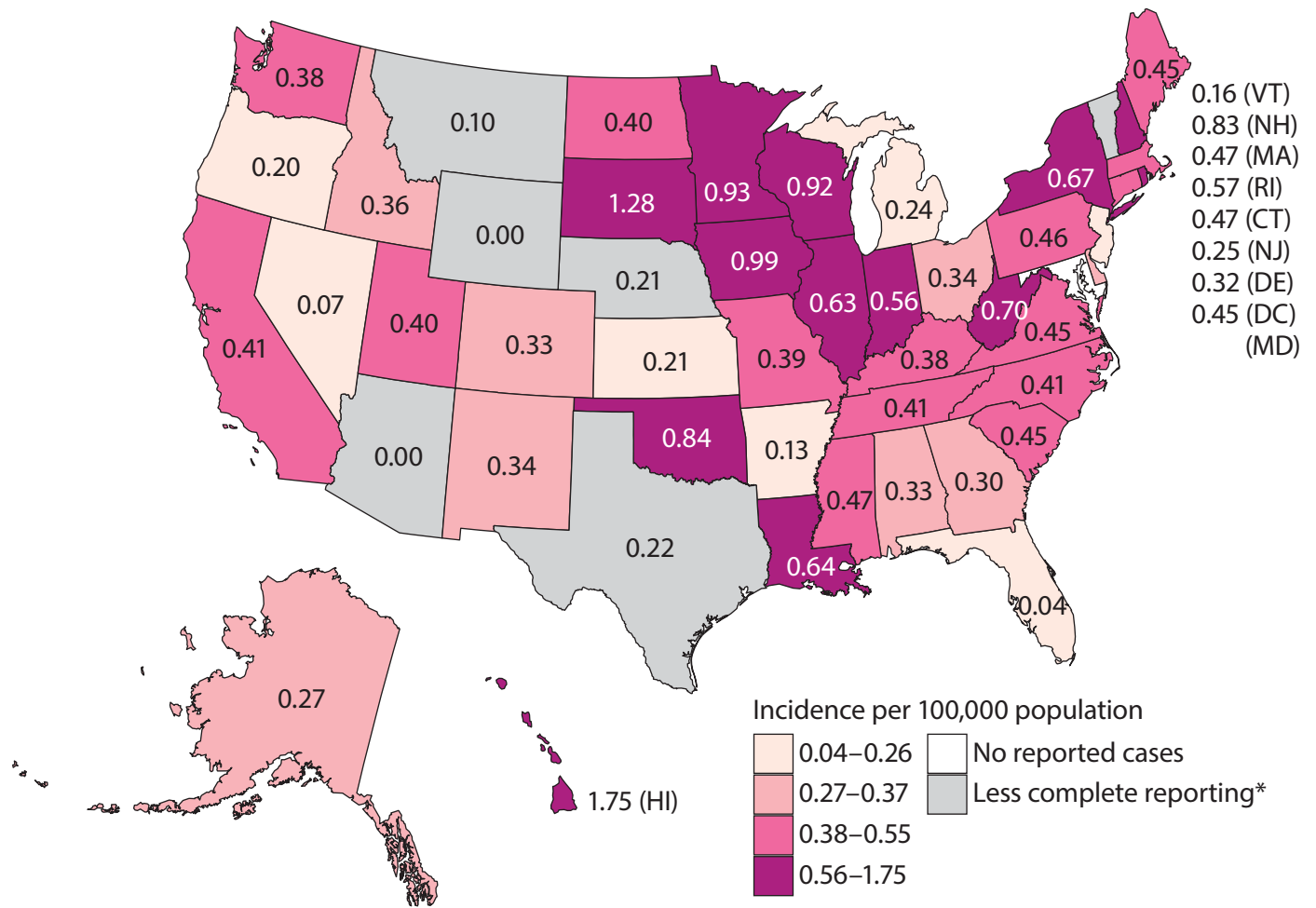
**Figure 2f.** Incidence rate of culture-confirmed human *Salmonella* serotype I 4,[5],12:i:- infection reported to LEDS, by jurisdiction, United States, 2016 (n = 2,179)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the National Notifiable Diseases Surveillance System (NNDSS) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_i4512i\\_2f.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_i4512i_2f.csv)

**Figure 2g.** Incidence rate of culture-confirmed human *Salmonella* serotype Infantis infection reported to LEDS, by jurisdiction, United States, 2016 (n = 1,281)

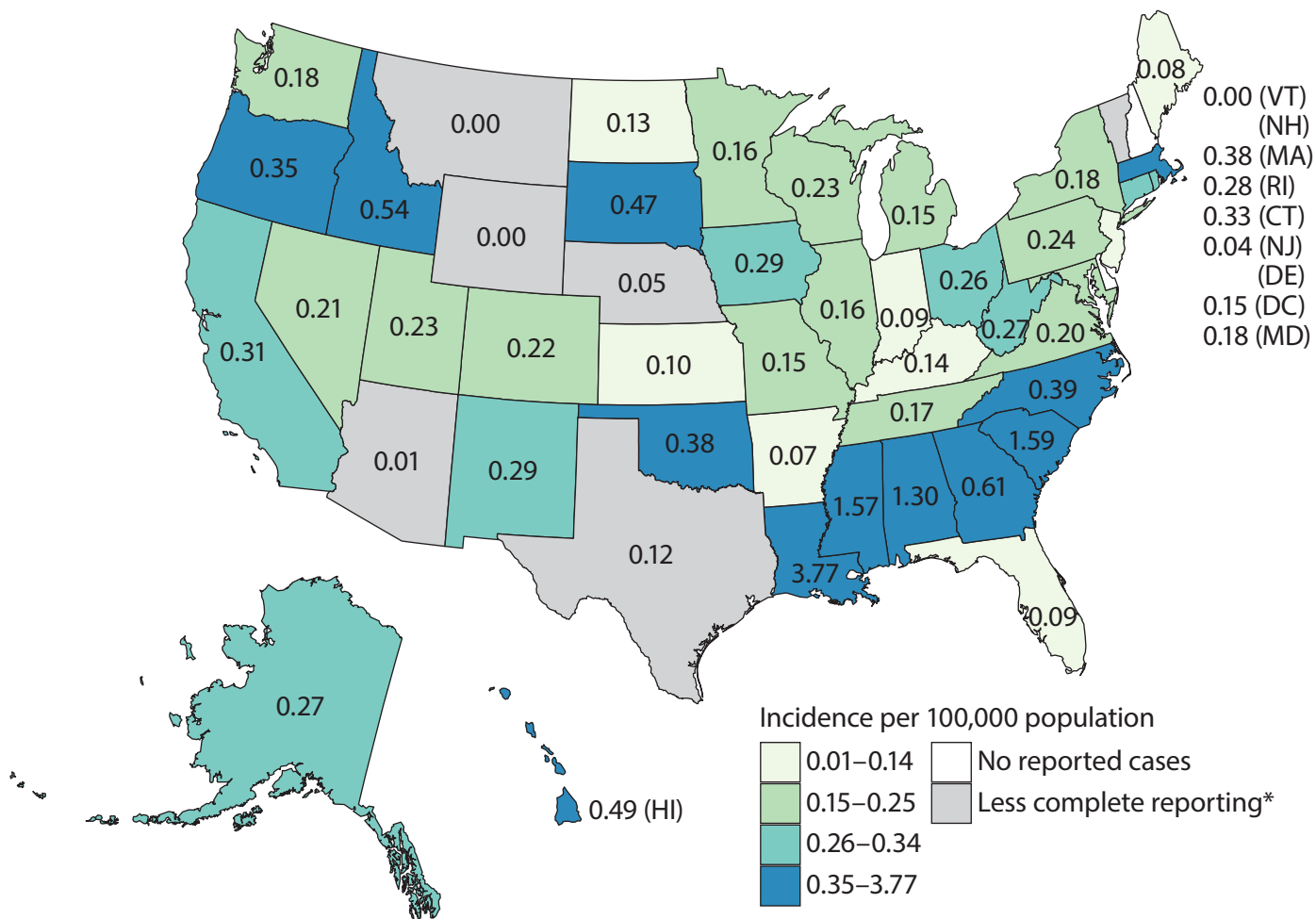


\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_infantis\\_2g.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_infantis_2g.csv)



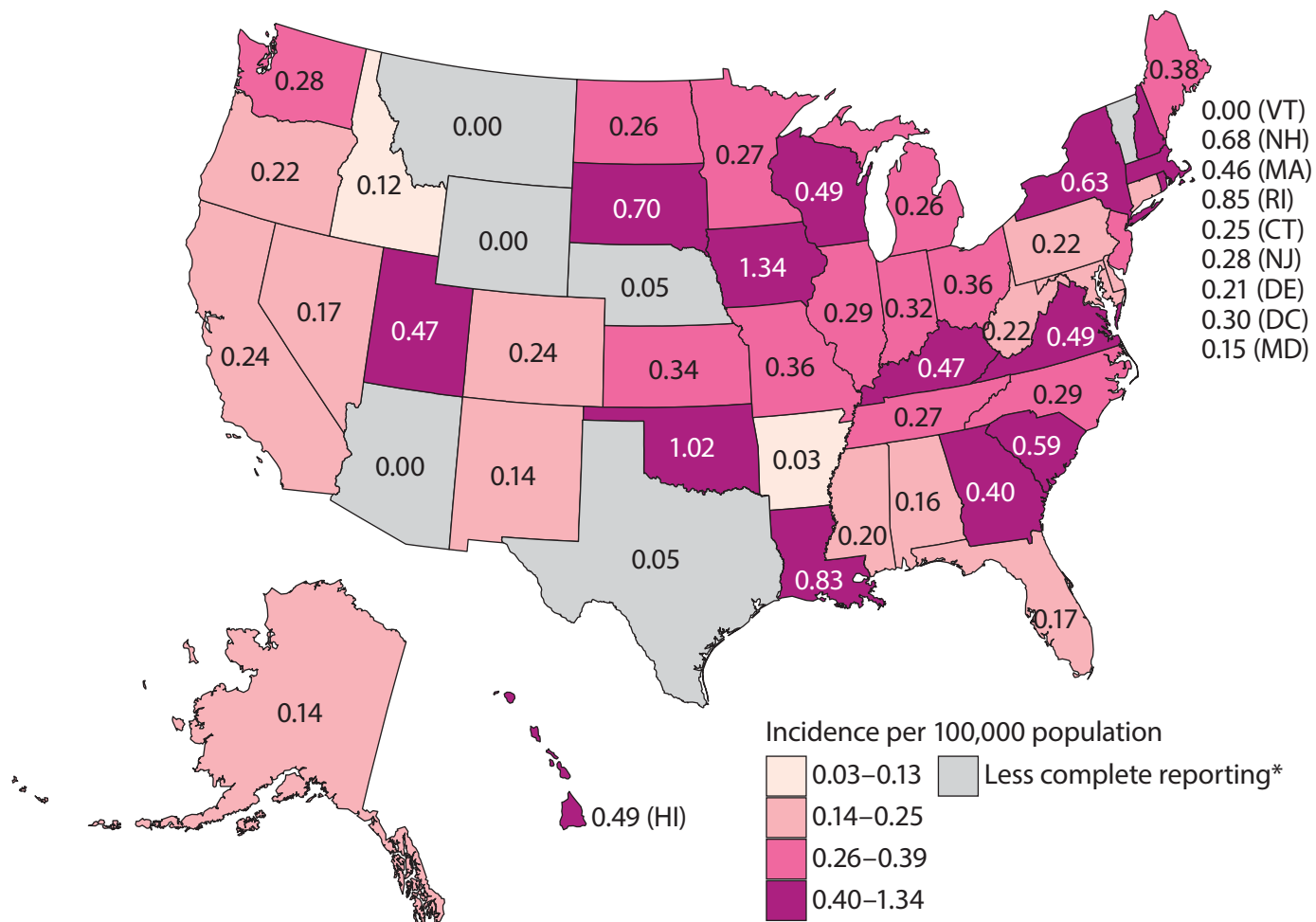
**Figure 2i.** Incidence rate of culture-confirmed human *Salmonella* serotype Montevideo infection reported to LEDS, by jurisdiction, United States, 2016 (n = 1,018)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the National Notifiable Diseases Surveillance System (NNDSS) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_montevideo\\_2i.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_montevideo_2i.csv)

**Figure 2j.** Incidence rate of culture-confirmed human *Salmonella* serotype Braenderup infection reported to LEDS, by jurisdiction, United States, 2016 (n = 1,001)

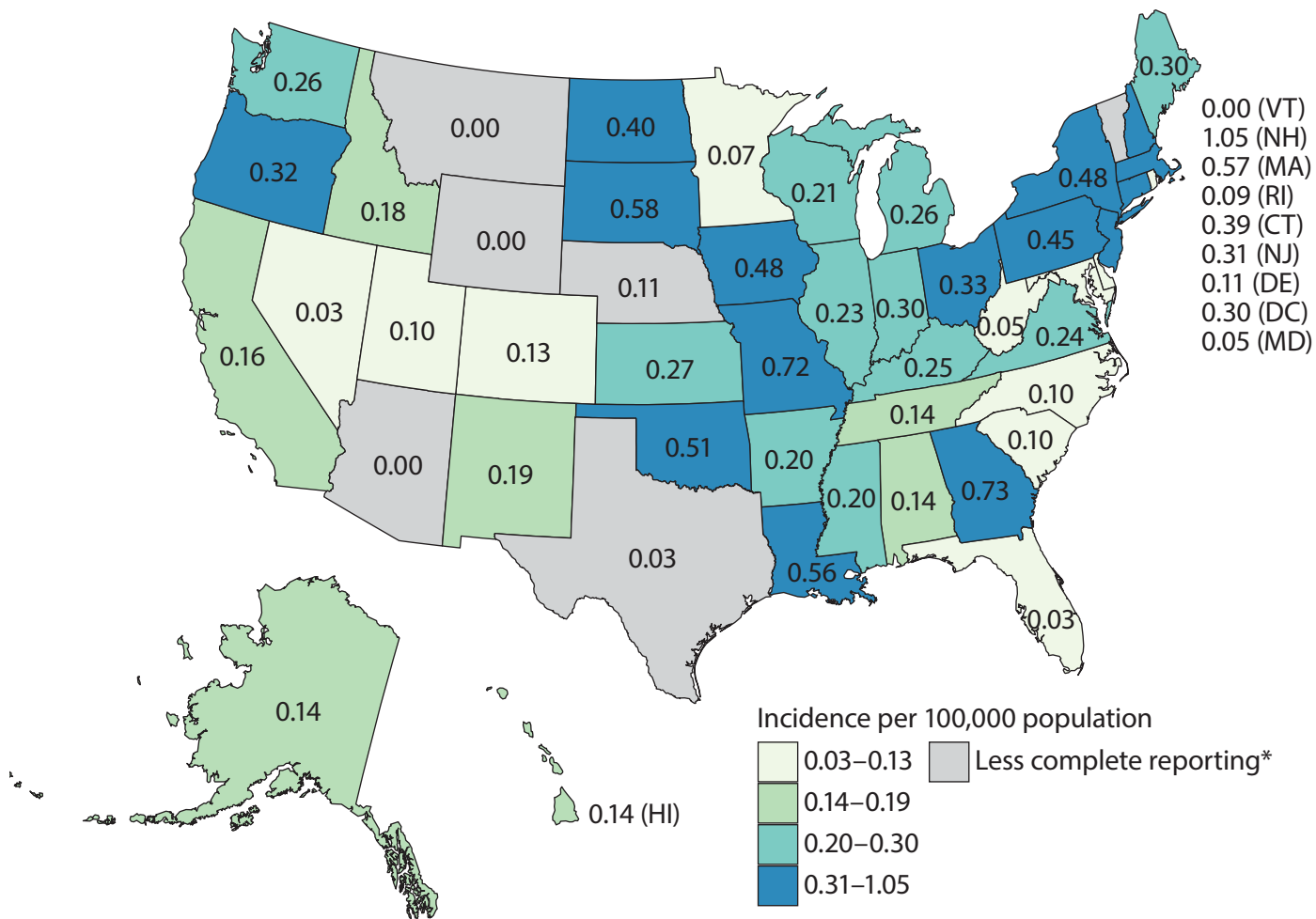


\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_braenderup\\_2j.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_braenderup_2j.csv)



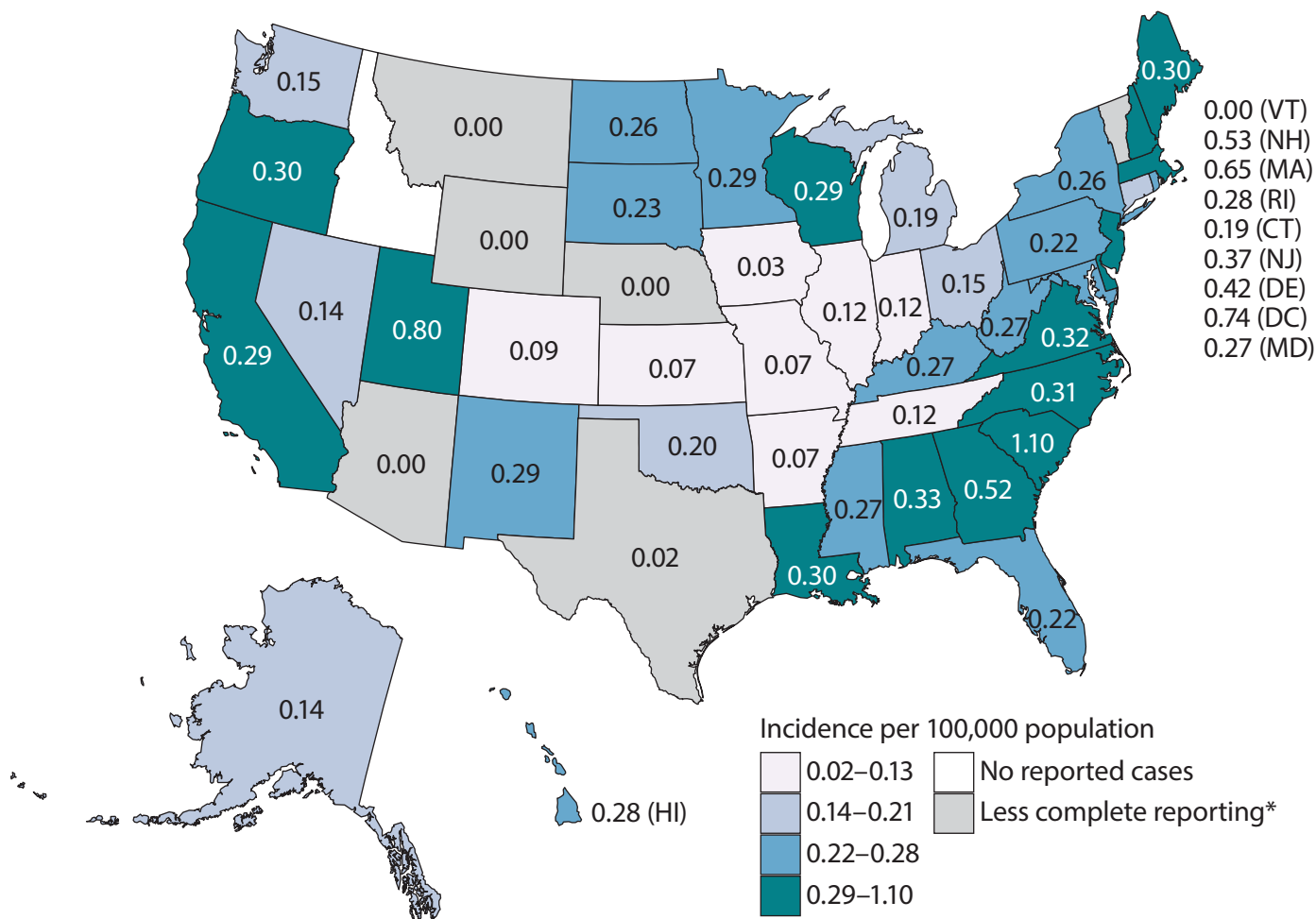
**Figure 2k.** Incidence rate of culture-confirmed human *Salmonella* serotype Thompson infection reported to LEDS, by jurisdiction, United States, 2016 (n = 792)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_thompson\\_2k.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_thompson_2k.csv)

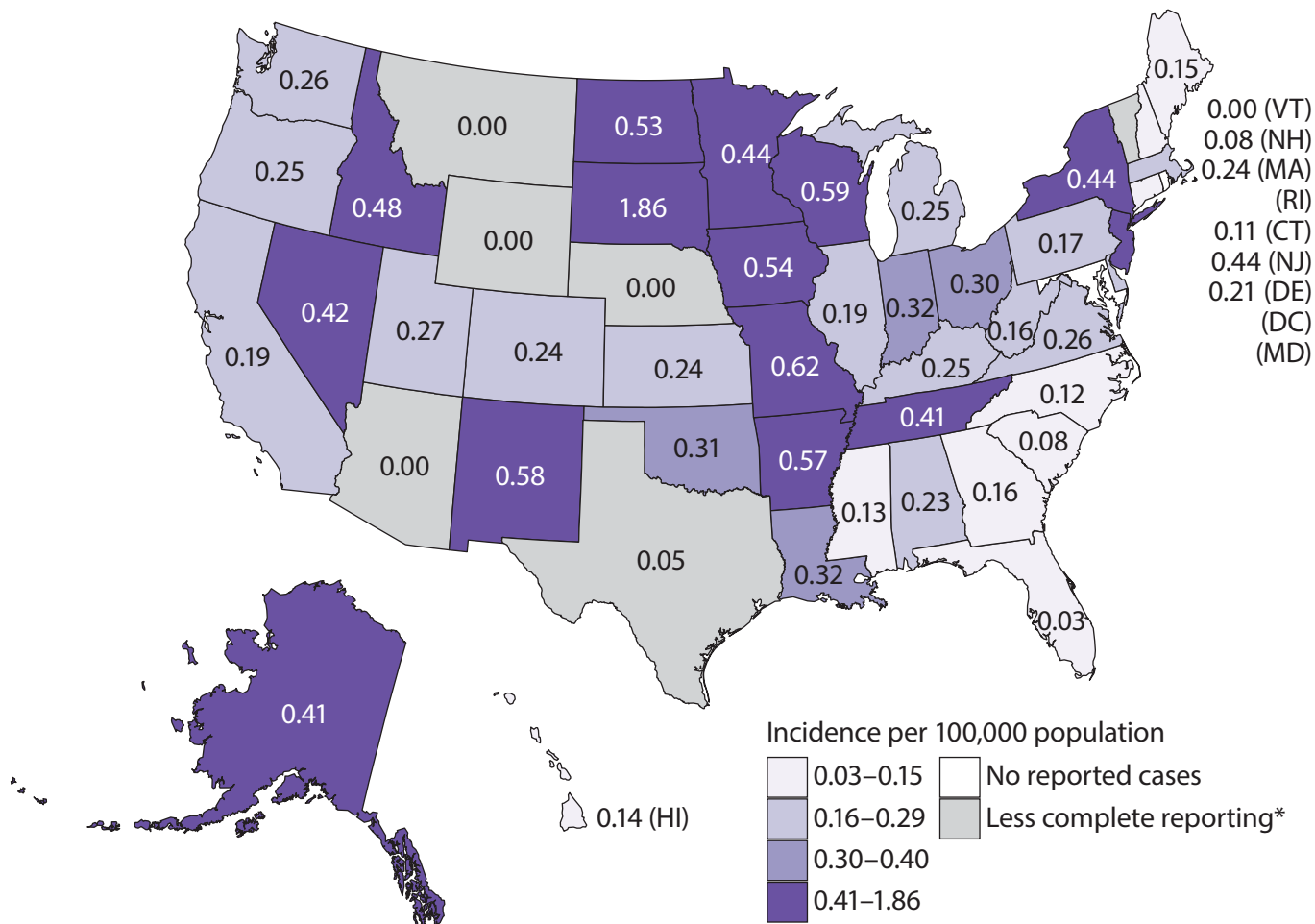
**Figure 2I.** Incidence rate of culture-confirmed human *Salmonella* serotype Saintpaul infection reported to LEDS, by jurisdiction, United States, 2016 (n = 778)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_saintpaul\\_2I.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_saintpaul_2I.csv)

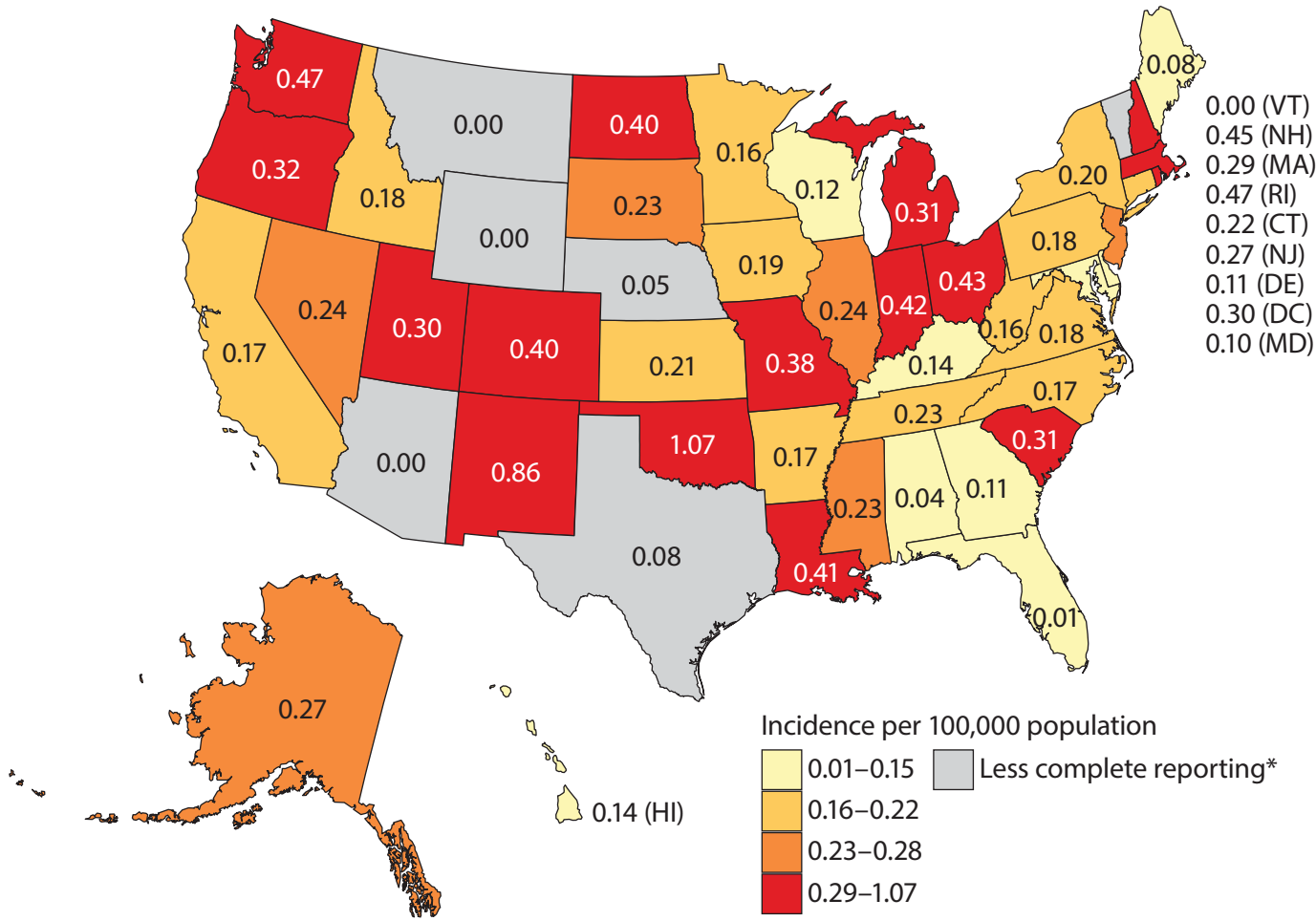
**Figure 2m.** Incidence rate of culture-confirmed human *Salmonella* serotype Heidelberg infection reported to LEDS, by jurisdiction, United States, 2016 (n = 754)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_heidelberg\\_2m.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_heidelberg_2m.csv)

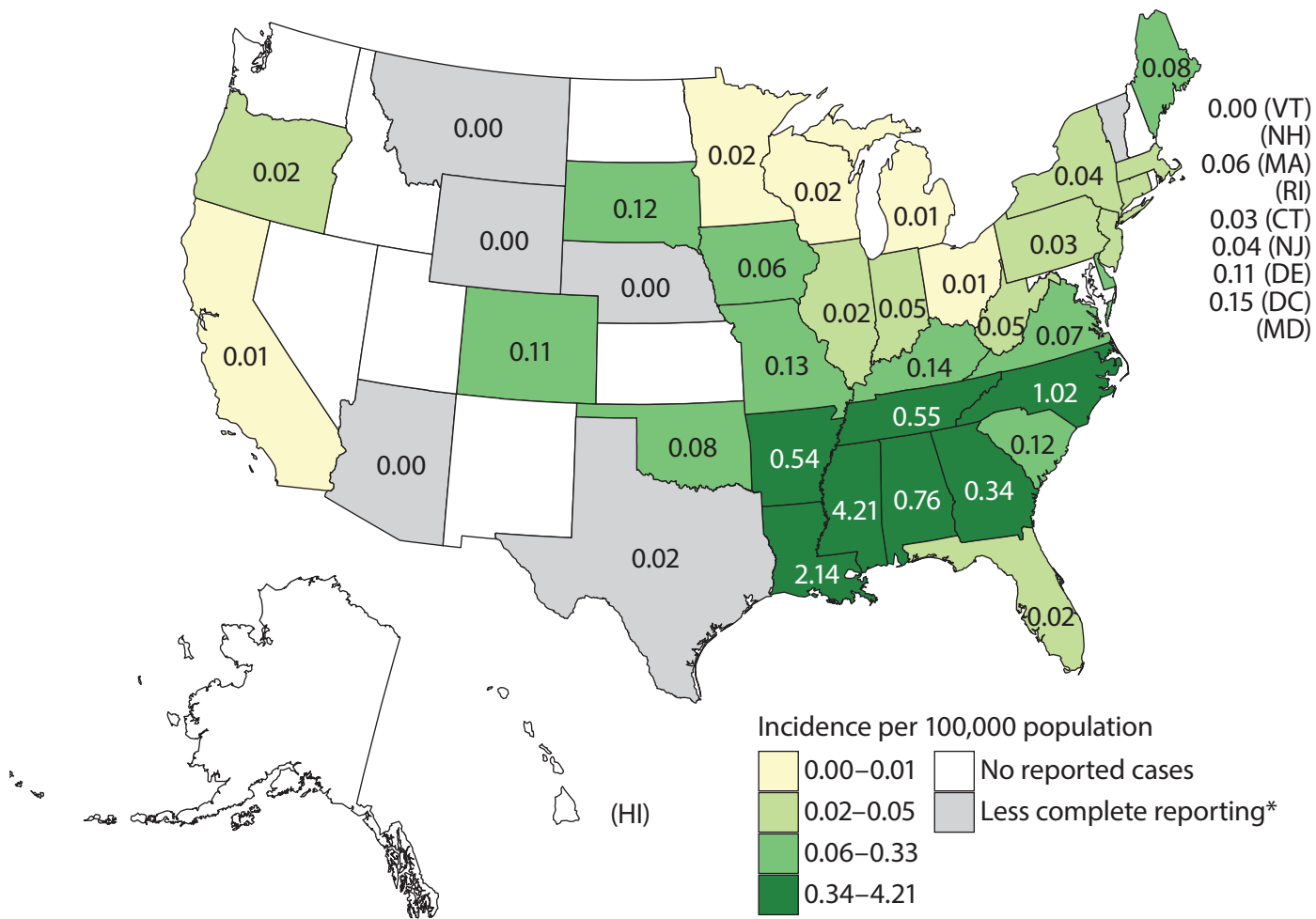
**Figure 2n.** Incidence rate of culture-confirmed human *Salmonella* serotype Oranienburg infection reported to LEDS, by jurisdiction, United States, 2016 (n = 692)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](#) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_oranienburg\\_2n.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_oranienburg_2n.csv)

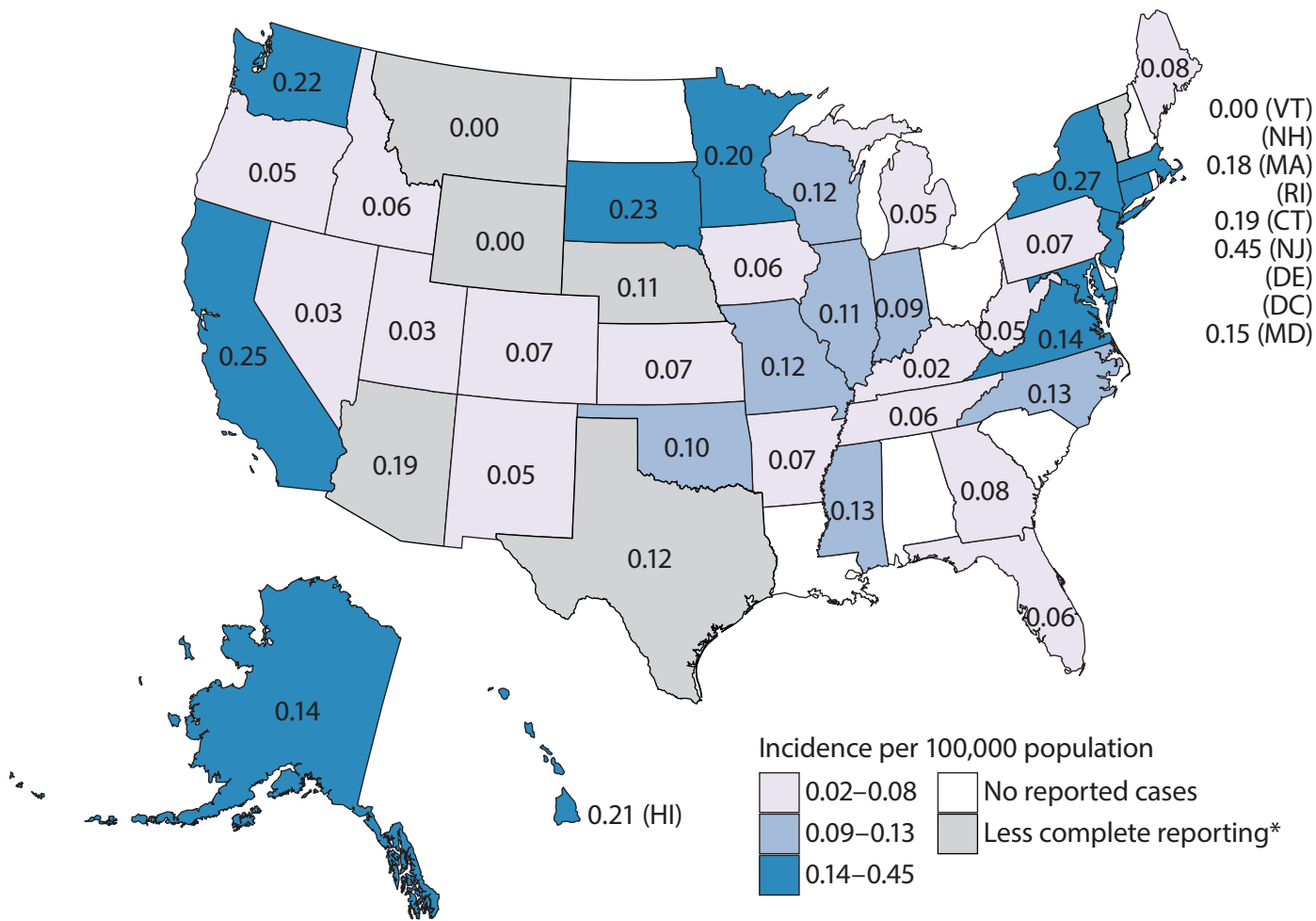
**Figure 2o.** Incidence rate of culture-confirmed human *Salmonella* serotype Mississippi infection reported to LEDS, by jurisdiction, United States, 2016 (n = 536)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_mississippi\\_2o.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_mississippi_2o.csv)

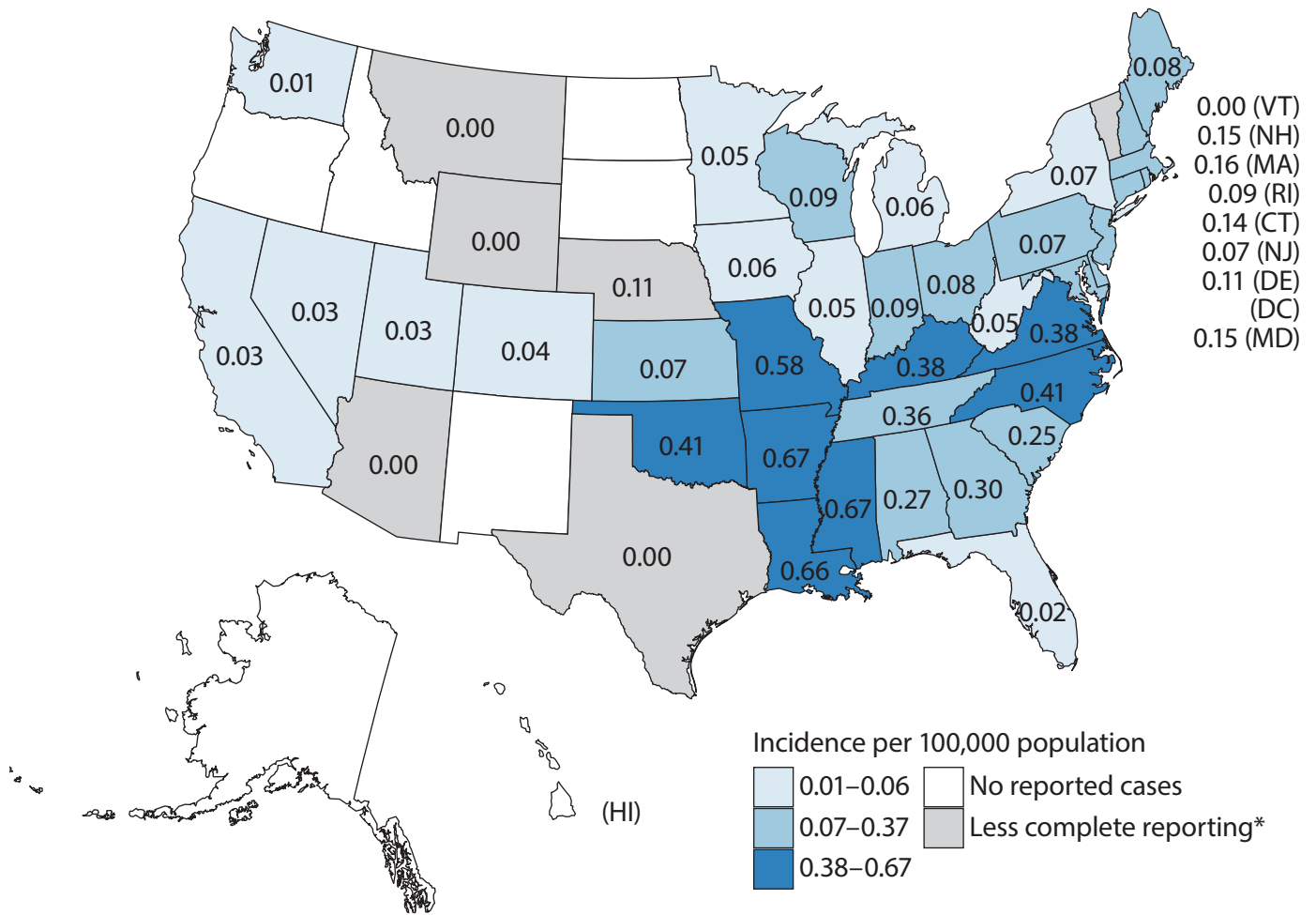
**Figure 2p.** Incidence rate of culture-confirmed human *Salmonella* serotype Typhi infection reported to LEDS, by jurisdiction, United States, 2016 (n = 423)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at: [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_typhi\\_2p.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_typhi_2p.csv)

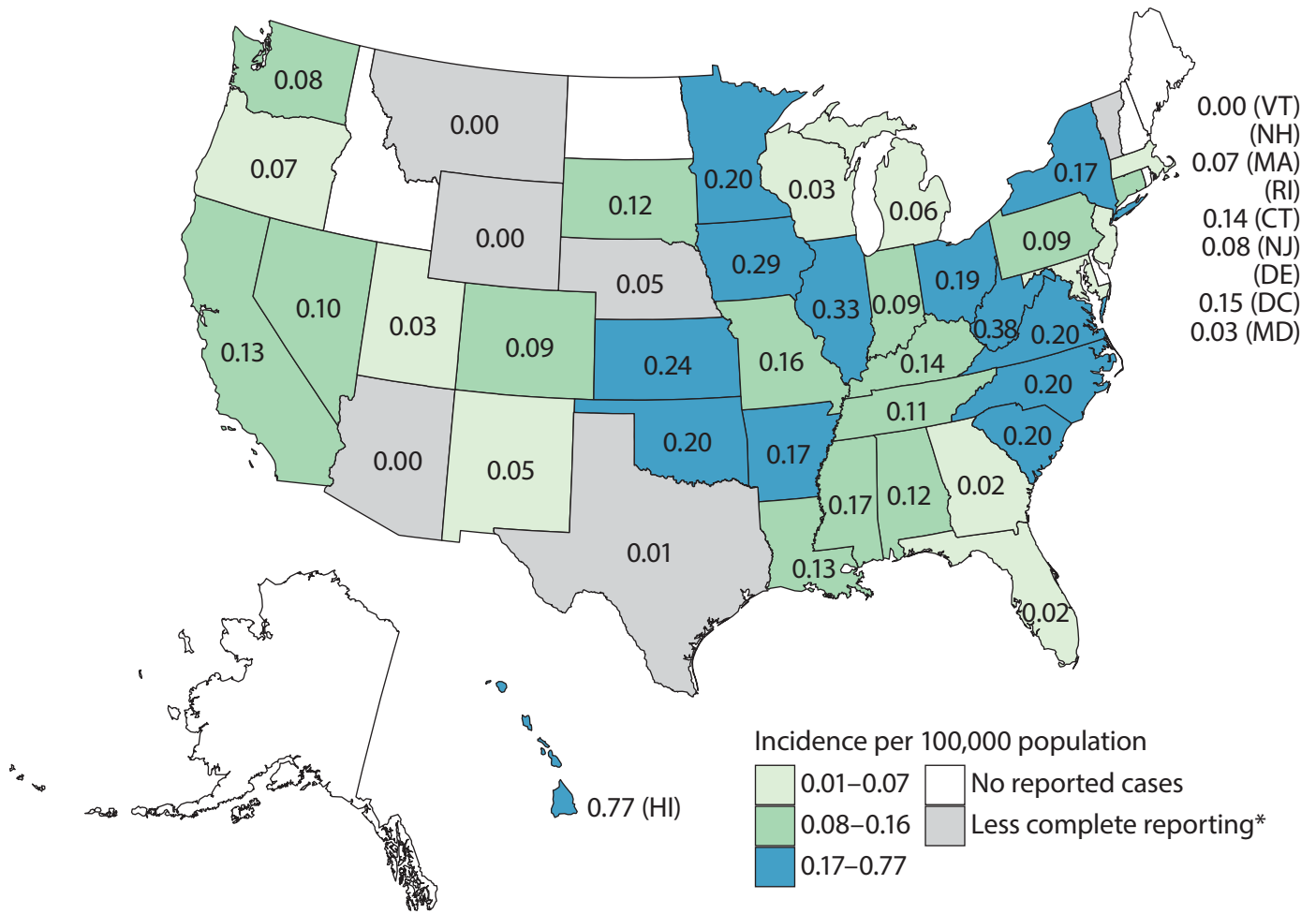
**Figure 2q.** Incidence rate of culture-confirmed human *Salmonella* serotype Bareilly infection reported to LEDS, by jurisdiction, United States, 2016 (n = 412)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at [https://wwwdev.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_bareilly\\_2q.csv](https://wwwdev.cdc.gov/nationalsurveillance/data/salm2016/salmonella_bareilly_2q.csv)

**Figure 2r.** Incidence rate of culture-confirmed human *Salmonella* serotype Berta infection reported to LEDS, by jurisdiction, United States, 2016 (n = 369)

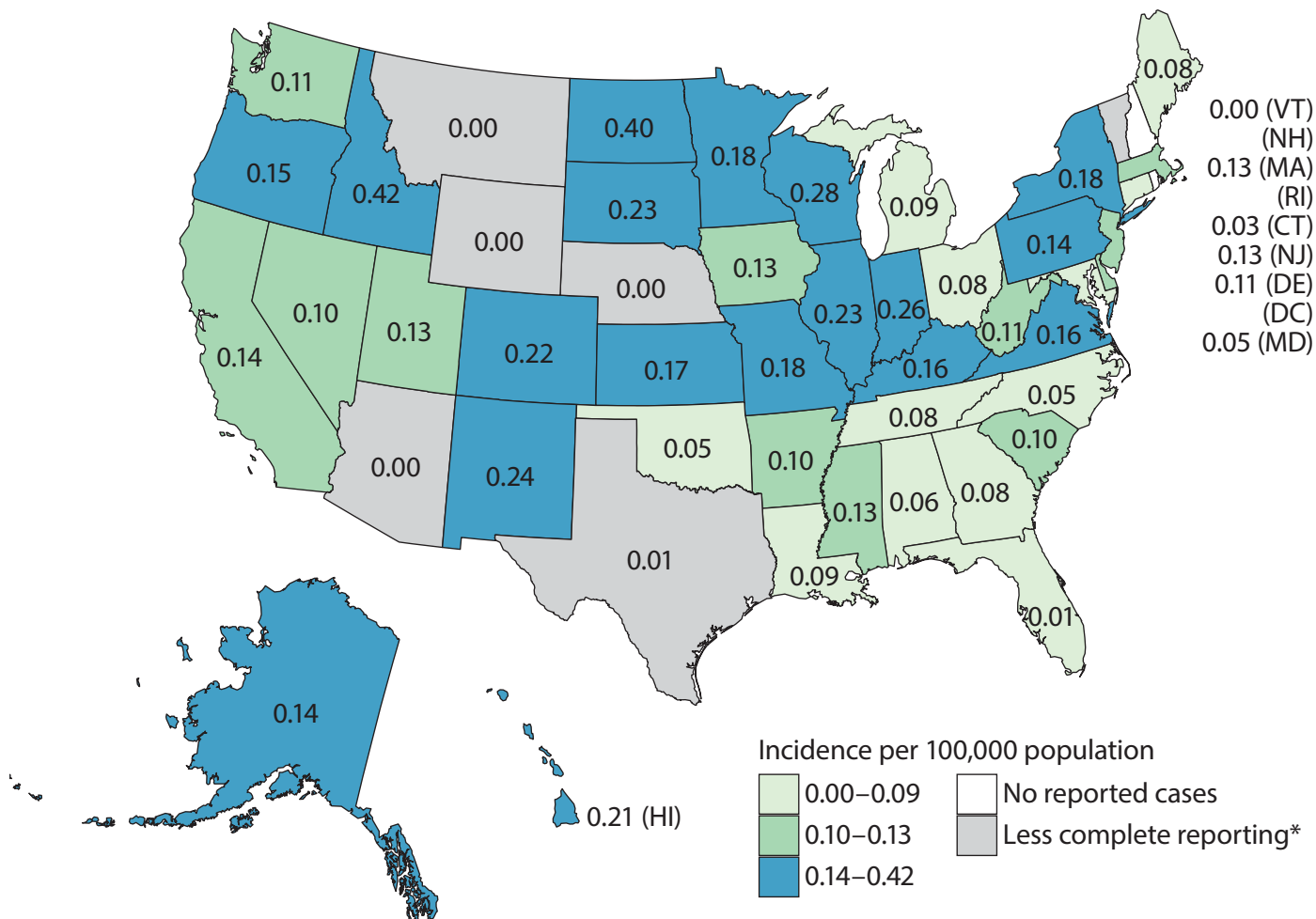


\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_berta\\_2r.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_berta_2r.csv)



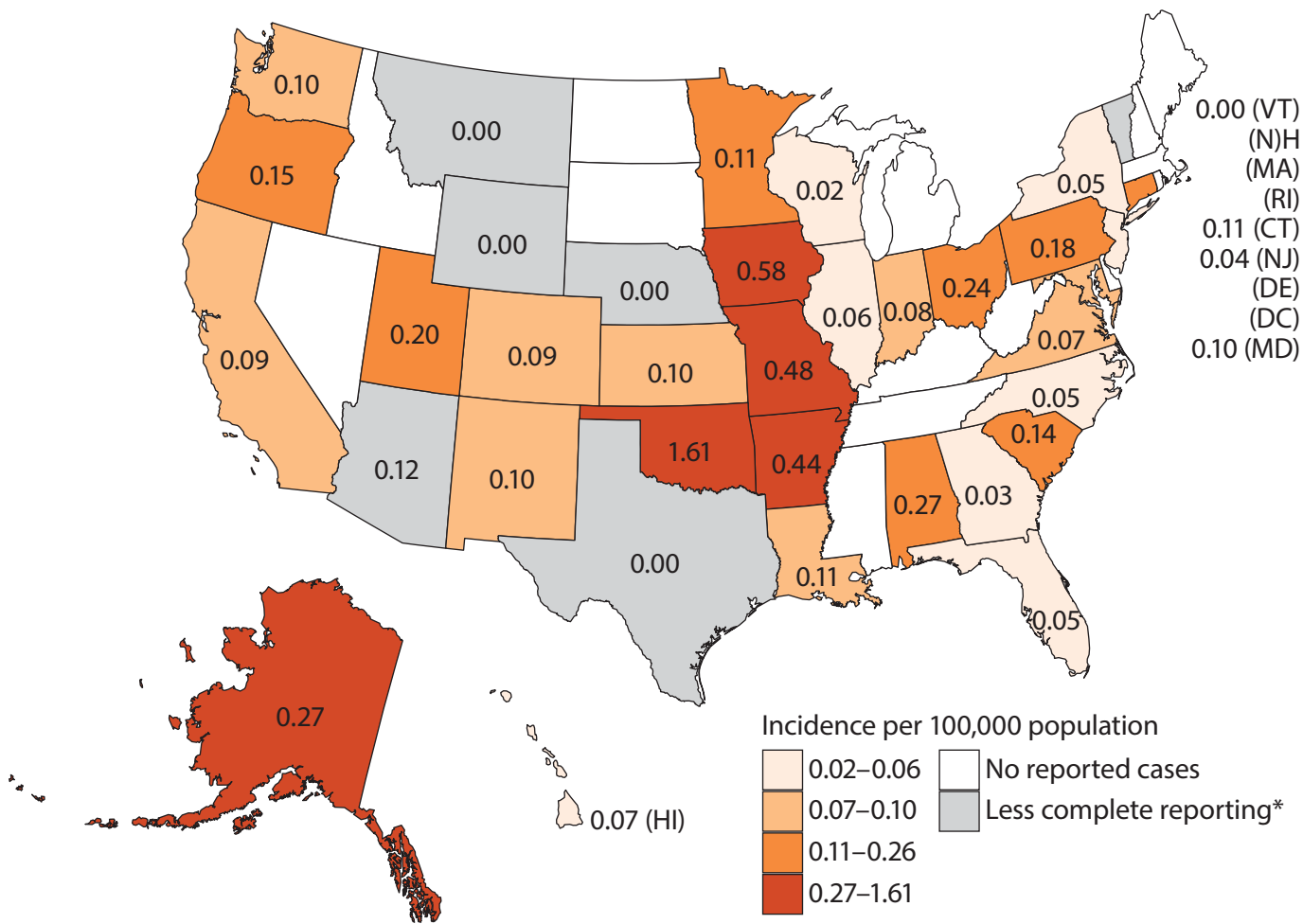
**Figure 2s.** Incidence rate of culture-confirmed human *Salmonella* serotype Agona infection reported to LEDS, by jurisdiction, United States, 2016 (n = 362)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the National Notifiable Diseases Surveillance System (NNDSS) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_agona\\_2s.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_agona_2s.csv)

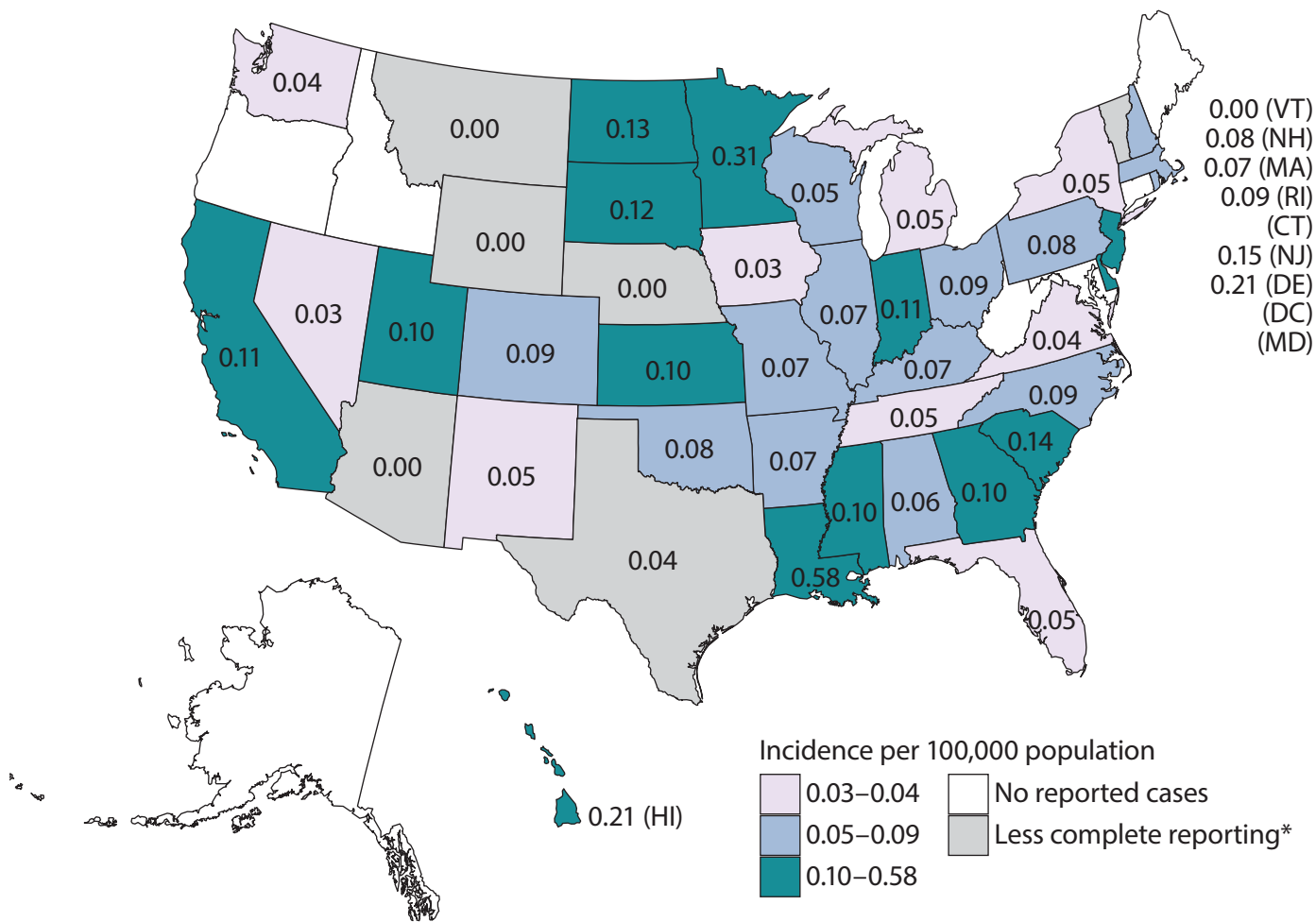
**Figure 2t.** Incidence rate of culture-confirmed human *Salmonella* serotype Paratyphi B var. L(+) tartrate+ infection reported to LEDS, by jurisdiction, United States, 2016 (n = 343)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data table for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_paratyphibvarltartrate\\_2t.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_paratyphibvarltartrate_2t.csv)

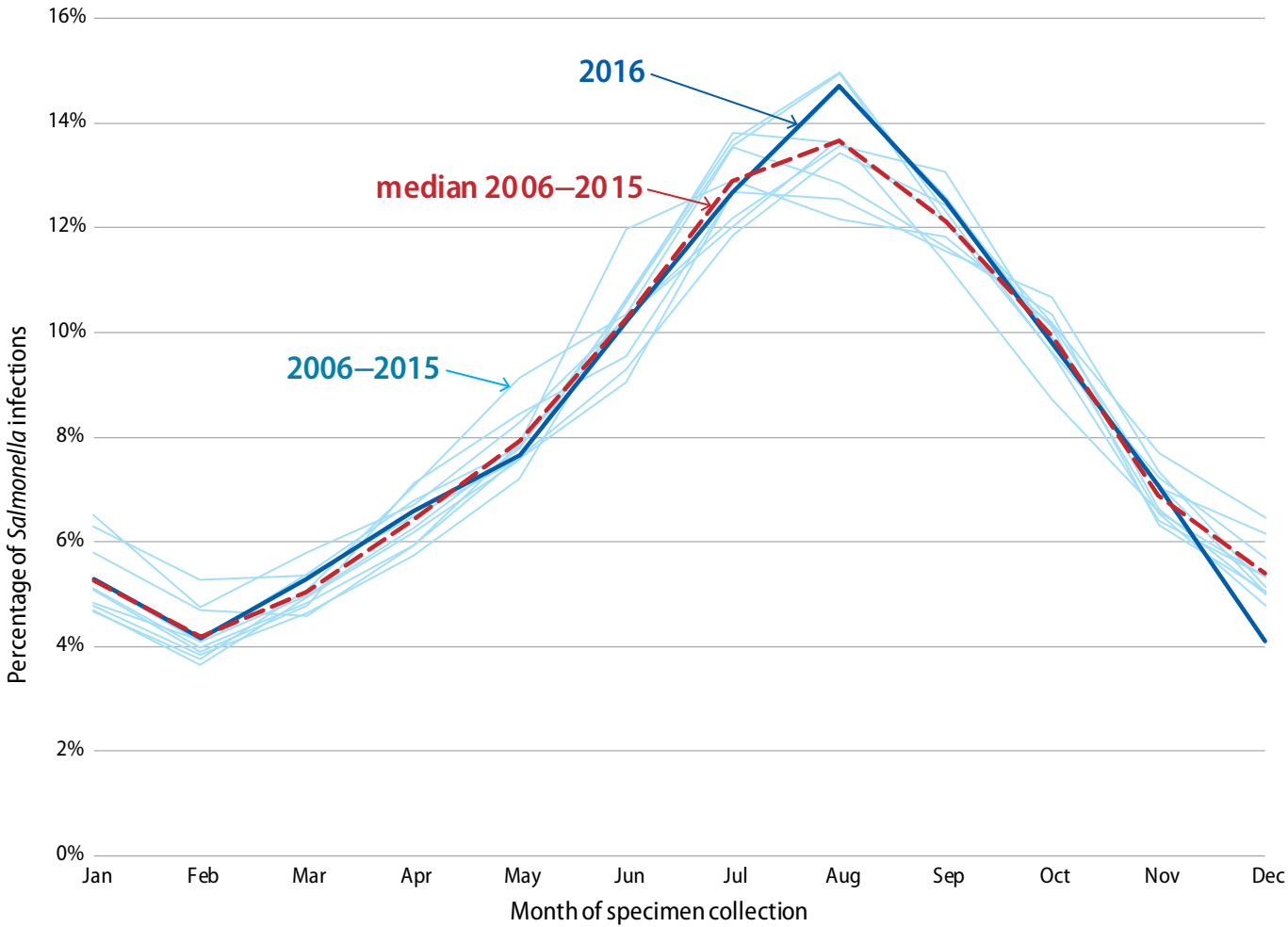
**Figure 2u.** Incidence rate of culture-confirmed human *Salmonella* serotype Anatum infection reported to LEDS, by jurisdiction, United States, 2016 (n = 257)



\*States are shaded gray if a) the number of culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of salmonellosis cases reported to the [National Notifiable Diseases Surveillance System \(NNDSS\)](https://www.cdc.gov/nndss/) or b) the number of fully serotyped culture-confirmed human *Salmonella* isolates reported to LEDS was less than 80% of all *Salmonella* isolates reported to LEDS.

Note: Data tables for all states at [https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella\\_anatum\\_2u.csv](https://www.cdc.gov/nationalsurveillance/data/salm2016/salmonella_anatum_2u.csv)

**Figure 3.** Percentage of culture-confirmed *Salmonella* infections reported to LEADS, by month of specimen collection, United States, 2016 and median percentage during 2006 to 2015



Note: Data for this graph at <https://www.cdc.gov/nationalsurveillance/data/salm2016/Figure4.xlsx>

## Other Sources of National *Salmonella* Surveillance Data

### Human Case Surveillance Data: National Notifiable Diseases Surveillance System (NNDSS)

The National Notifiable Disease Surveillance System (NNDSS) collects and compiles reports of nationally notifiable infectious diseases, including salmonellosis. Salmonellosis cases are not currently reported by serotype to NNDSS.

Annual reports: [http://www.cdc.gov/mmwr/mmwr\\_nd/index.html](http://www.cdc.gov/mmwr/mmwr_nd/index.html)

Data: <https://data.cdc.gov/browse?category=NNDSS>

### Human Antimicrobial Resistance Data: National Antimicrobial Resistance Monitoring System (NARMS)

The National Antimicrobial Resistance Monitoring System (NARMS) monitors antimicrobial resistance among enteric bacteria (including *Salmonella*) isolated from humans.

Annual reports: <https://www.cdc.gov/narms/reports/index.html>

Data: <https://wwwn.cdc.gov/narmsnow/>

### Foodborne Diseases Active Surveillance Network (FoodNet)

The Foodborne Diseases Active Surveillance Network (FoodNet) conducts surveillance for enteric diseases (including salmonellosis) diagnosed by laboratory testing of samples from patients. The catchment area comprises Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, Tennessee and selected counties in California, Colorado, and New York.

Annual reports: <https://www.cdc.gov/foodnet/reports/index.html>

Data: <https://wwwn.cdc.gov/foodnetfast/>

### Human Outbreak Data: National Outbreak Reporting System (NORS)

The National Outbreak Reporting System (NORS) is a web-based platform used by local, state, and territorial health departments in the United States to report waterborne and foodborne disease outbreaks and enteric disease outbreaks transmitted by contact with environmental sources, infected persons or animals, or unknown modes of transmission to CDC.

Annual reports—Foodborne: <https://www.cdc.gov/foodsafety/fdoss/data/annual-summaries/index.html>

Data—Foodborne: <https://wwwn.cdc.gov/foodborneoutbreaks/>

### Non-human Surveillance Data: Food Safety and Inspection Service (FSIS)

The Food Safety and Inspection Service (FSIS) conducts nontyphoidal *Salmonella* serotype testing on isolates recovered from raw meat and poultry products subject to sampling under the Pathogen Reduction Hazard Analysis and Critical Control Point (PR/HACCP) verification testing program.

Annual report: <https://www.fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/microbiology/annual-serotyping-reports>

Data: <https://www.fsis.usda.gov/wps/portal/fsis/topics/data-collection-and-reports/data>

## References

1. Marder EP, Cieslak PR, Cronquist AB, et al. Incidence and trends of infections with pathogens transmitted commonly through food and the effect of increasing use of culture-independent diagnostic tests on surveillance — Foodborne Diseases Active Surveillance Network, 10 U.S. Sites, 2013–2016. *MMWR Morb Mortal Wkly Rep.* 2017;66:397–403. [DOI PubMed](#)
2. Centers for Disease Control and Prevention (CDC). National *Salmonella* Surveillance Overview. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2012.
3. Ryan CA, Nickels MK, Hargrett-Bean NT, et al. Massive outbreak of antimicrobial-resistant salmonellosis traced to pasteurized milk. *JAMA.* 1987 Dec 11;258(22):3269-74. [DOI PubMed](#)

## Recommended Citation:

Centers for Disease Control and Prevention (CDC). National *Salmonella* Surveillance Annual Report, 2016. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2018.

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# National Enteric Disease Surveillance: *Salmonella* Annual Report Appendices, 2016<sup>5</sup>

## Recommended Citation

Centers for Disease Control and Prevention (CDC). National *Salmonella* Surveillance Annual Report, 2016. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2018.

## Appendices

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<sup>5</sup> In mid-2012, the USDA Food Safety and Inspection Service (USDA-FSIS) began molecular serotyping, which resulted in few *Salmonella* isolates being sent to the National Veterinary Services Laboratories (NVSL) of USDA's Animal and Plant Health Inspection Service (APHIS) for traditional serotyping; those results are therefore no longer included as Appendices to this report. USDA-FSIS publishes serotypes of *Salmonella* isolated from carcasses and meat and poultry products on its website (<http://www.fsis.usda.gov/wps/portal/food/foodsafety/foodinspection/microbiology/annual-serotyping-reports>).

**Appendix 1.** Culture-confirmed *Salmonella* infections reported to LEDS by age group and sex, 2016

Age Group (years)	Sex			Total
	Female	Male	Unknown	
<1	2,114	2,255	172	4,541
1–4	2,755	2,991	163	5,909
5–9	1,382	1,558	90	3,030
10–19	1,799	1,977	153	3,929
20–29	2,552	2,077	153	4,782
30–39	2,251	1,950	132	4,333
40–49	2,311	1,749	133	4,193
50–59	3,008	2,244	194	5,446
60–69	2,716	2,174	177	5,067
70–79	1,752	1,329	120	3,201
≥80	1,267	669	76	2,012
Unknown	56	53	71	180
<b>All age groups</b>	<b>23,963</b>	<b>21,026</b>	<b>1,634</b>	<b>46,623</b>



**Appendix 2a.** Culture-confirmed *Salmonella* infections reported to LEDS by serotype and reporting jurisdiction, (Alaska to Kansas)

Cells with no numbers indicate no reported cases of that serotype for 2016. The key to state name abbreviations can be found at [http://www.census.gov/geo/reference/ansi\\_statetables.html](http://www.census.gov/geo/reference/ansi_statetables.html).

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I	Aba																	
I	Abaetetuba				1												1	
I	Aberdeen										1		1					
I	Abony					1	2											
I	Adelaide		1		1	37	2	1			2	1	3	1	1	3	2	
I	Afula					1												
I	Agbeni		1		1	3					5	1		4		18	23	
I	Ago					1										1		
I	Agona	1	3	3		53	12	1		1	1	8	3	4	7	30	18	5
I	Agoueve																	
I	Alabama		1	1														
I	Alachua											1				1		
I	Albany					5										1		
I	Albert																	
I	Albuquerque						1											
I	Altona			1		3	2					1		2		1		
I	Amager				1	2	1											
I	Amsterdam																	1
I	Anatum		3	2		42	5			2	10	10	3	1		9	7	2
I	Anecho						1											
I	Angoda																	
I	Apapa				1	2												
I	Apeyeme																	
I	Aqua											1						
I	Arechavaleta											1	1			2	1	
I	Bahrenfeld																	
I	Baildon		1	1		1	1				19	1				2	5	
I	Bareilly		15	20		11	2	4		1	4	28		2		7	6	2
I	Barranquilla			1								2		1				
I	Benin																	
I	Benue											1						
I	Bergen					1												
I	Berkeley																	
I	Berta		6	5		51	5	5	1		4	2	11	9		39	6	6
I	Birkenhead					2							2					
I	Blockley					5	1	1				1	1			7		
I	Bonariensis													1				
I	Bovismorbificans		1			24	2	2	1		2	2		1		5	5	
I	Braenderup	1	9	1		95	12	9	2	2	35	40	8	42	2	39	20	8
I	Brandenburg					33	2	1					2			5	2	1

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS	
I	Brazil											2							
I	Bredeney		1			6		1	2							1		1	
I	Brunei	1																	
I	Buzu																		
I	Cannstatt					2										2			
I	Caracas																		
I	Carmel															1			
I	Carrau						3				2	4						1	
I	Cerro		1			7		2					1	1		1	3	2	
I	Chailey					9										5			
I	Charity																		
I	Chester					4				1	1	1		1		2			
I	Choleraesuis																		
I	Choleraesuis var. Decatur																		
I	Choleraesuis var. Kunzendorf					2										1			
I	Clackamas																		
I	Coeln															1			
I	Colindale																		
I	Colorado						1												
I	Concord																		
I	Corvallis					2					3	1	1	1				1	
I	Cotham		1	1		5	1	1			2	1		1		1	3		
I	Cubana					1				1								1	3
I	Curacao																		
I	Dahra																	1	
I	Dakota																		
I	Daytona		1									3							
I	Denver					3	1												
I	Derby		1			16		2				4	1	3		8	4		
I	Dublin		3		1	41	8	3		1	4	4	1	1	2	9	6	3	
I	Duisburg					2													
I	Durban		1			3	3						3	1				2	
I	Durham																	3	
I	Ealing			1	3	3	1												
I	Eastbourne					1					1	1			1				
I	Ebrie																		
I	Ekpoui																		
I	Elisabethville																		
I	Emek					6		1											
I	Enteritidis	19	160	70	1	836	131	101	22	11	85	201	23	143	48	334	181	39	
I	Essen																	1	

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I Florida											4	2						
I Fluntern						1										1		
I Freetown																		
I Fresno							1											
I Frintrop																		
I Gaminara			7	1	4	2					18	5			1	1	1	
I Gatuni												1						
I Give		1	6			6	1		1		2		7	1		2	1	
I Glostrup		1	1			1					4	1						
I Goelzau								1										
I Goettingen														1				
I Goldcoast						11							1				1	
I Grumpensis							1					1		1				
I Guinea																	1	
I Hadar		1	2	4		20	3	3			1	5	2	6		6	2	3
I Haduna																		
I Haifa																		
I Hartford			3	1		8	2				10	13		13		13	21	2
I Hato																		
I Havana						6				1			1		2			
I Heidelberg		3	11	17		74	13	4		2	7	16	2	17	8	25	22	6
I Heron																		
I Herston														1				
I Hindmarsh																		
I Holcomb																		
I Horsham		1										1						
I Hvittingfoss						2	1	1			4		1			1	1	
I Idikan						1										1		
I Indiana		1	8	2		6	1			1		10			2	3		
I Infantis		2	16	4		162	18	16	3	2	9	30	25	35	5	81	37	4
I Inverness			5								5	5						
I Irumu						4												
I Isangi						3		1										
I Israel																		
I Ituri												1						
I Jalisco																	1	
I Jangwani																		
I Javiana		2	120	73		59	14	11	9	26	123	337	1	31	2	41	22	3
I Johannesburg						11	2							1		4	1	
I Kaduna																		
I Kampala																		
I Kedougou																1		
I Kentucky			2			8	3					1		3		2	3	

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I Kenya																		
I Kiambu			1	1			1		1			3			2	1		
I Kingston																		
I Kintambo																		
I Kisarawe												1						
I Koenigstuhl												1						
I Kokomlele																		
I Kottbus						8	1			1								
I Kua																		
I Landwasser																		
I Langensalza														1				
I Lattenkamp							1											
I Lexington																		
I Lika																		
I Lingwala																		
I Litchfield			3	1		15	2	3			6	1		8	1	2	4	
I Liverpool					1	7												
I Livingstone						1										1		
I Lomalinda					1	54	2									1	2	
I Lome							1											1
I London		1				3	1	1		1						4	5	
I Luciana			1			3						2						
I Madelia				1														
I Manchester																		
I Manhattan						63	2	1				1			1	6	1	1
I Mapo												1						
I Maracaibo			1					1										
I Matadi						2												
I Mbandaka			10	2	1	16	4	1		1	5	2		5	1	6	7	5
I Meleagridis			2			2					1	1		1				
I Miami			4				2	1			20	15		1		1	1	
I Michigan						2	1							1				
I Mikawasima																		1
I Minnesota					2						5	1		1	1	1		
I Mississippi			36	16	1	1	6	1	1	1	4	33		3		2	3	
I Missouri				1														
I Molade						1												
I Monschau						3					1			2		5		1
I Montevideo		2	64	2	1	123	12	9	1		18	60	7	9	9	21	6	2
I Muenchen			76	13		170	9	12	1	1	39	100	49	11	4	31	15	7
I Muenster			2	1		11	2	2							3	3	7	2
I Nagoya						1												
I Napoli								2										

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I Ndolo																1		
I Newmexico																		
I Newport		3	111	156	2	385	56	49	5	37	78	355	17	35	12	114	65	51
I Newrochelle												1						
I Nima						14					1						1	
I Norwich			8	25			16	3	3	3		9				3	6	5
I Nottingham						1					2							
I Offa																		
I Ohio			3	1	1	10	15	1			1	1		3	1	11	3	
I Okatie															2			
I Oranienburg		2	2	7		68	22	8	2	1		11	2	6	3	30	29	5
I Orion						2												
I Oslo						9		2			1		5	1		2		
I Othmarschen																		
I Panama				1	1	23	2	6	2	2	4	1	3	1		4		
I Paratyphi A					1	38	2	3		2	3	2	1	3		5	1	
I Paratyphi B						1	1	1	1					1		1		
I Paratyphi B var. L(+) tartrate+		2	13	10	8	35	5	3			10	3	1	18		5	3	3
I Paratyphi C																		
I Parkroyal																		
I Pensacola												1						1
I Perth																		
I Pomona						9	2									1	2	
I Poona		4	2		61	36	8	3	1		13	4		1	1	4	3	1
I Portland																		
I Potsdam						1	2	3										
I Praha																		
I Putten														1				
I Quiniela																		
I Reading		3	3			20	18	1		1	2	2	2	6		8	7	6
I Richmond						6					2					1		
I Ried																		
I Rissen			1			13	1						3	1		4		
I Roodepoort														1				
I Rubislaw			8	13	2	3				1	50	27	1			2		
I Ruiru						1												
I Saarbruecken																		
I Saintpaul		1	16	2		116	3	7	5	4	44	53	5	2		16	8	2
I Sandiego		1		1		15	5	3		2	45	11	1	2	1	1	1	2
I Sangalkam				1													1	
I Saphra					1													
I Schwarzengrund			11			17	5	2			3	9		2	1	3	7	1

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I Senftenberg			1	1	9	35					1		1	2		3		
I Seremban																		
I Shubra																1	1	
I Singapore						2										1	1	
I Soerenga																		
I Stanley			2	1		33	5	2	2		3	1	4	1	1	5	3	
I Stanleyville						1											1	
I Suelldorf																	1	
I Sundsvall																		
I Takoradi																		
I Tallahassee			2								1							
I Tamberma						1												
I Teko								1										
I Teitelkebir				4		4										1		
I Tennessee		2	1			8	1	1								1		1
I Thompson		1	7	6		61	7	14	2	1	5	73	2	15	3	31	20	6
I Toucra																		
I Tshiongwe																		
I Tucson																		
I Typhi		1		2	13	98	4	7			12	8	3	2	1	15	5	2
I Typhimurium		8	149	104		377	82	57	9	16	29	137	37	68	27	139	118	51
I Uganda			1		2	24	2				3	2		1		7	2	1
I Ughelli																		
I Uppsala																		
I Urbana					2	6					17	3		1		1	2	
I Vanier																1		
I Victoria				1														
I Virchow			1			22	6	1	2				1	2		4		
I Vitkin																		
I Wandsworth																		
I Wangata						2												
I Waycross							1					1						
I Welikade																1		
I Weltevreden						28	1	1			5	1	40	1	1	3	2	
I Westhampton						2												
I Widemarsh																		
I Woodinville					1													
I Worthington				2		3	2	1			1	2				3	1	
I Yaba						2												
I Zega							1											
I 11:k:-																		
I 11:r:-																		
I 13,22:-:1,6																		

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
I	13,22:z:-											1						
I	13,23:-:1,5											2						
I	13,23:b:-			1								105						1
I	13,23:y:e,n,z15							1										
I	13,23:z:-											1						
I	16:a:-															1		
I	16:b:-															1		
I	16:d:-																	
I	28:i:-															1		
I	3,10:-:l,w					21												
I	3,10:l,v:-											1						
I	4,[5],12:-:1,2					1	2	1				1						3
I	4,[5],12:b:-		1	3	1	16	1	2				14			2	21		
I	4,[5],12:d:-																	
I	4,[5],12:e,h:-											1						
I	4,[5],12:i:-		47	15		431	50	35	5	2		58		84	11	98	19	20
I	4,[5],12:r:-															1		
I	47:z4,z23:-					1												
I	6,14:d:-																	
I	6,7:-:1,2																	
I	6,7:-:1,5					2		1				12				3		
I	6,7:-:1,6															1		
I	6,7:-:e,n,z15																	
I	6,7:c:-																	
I	6,7:d:-																	1
I	6,7:e,h:-																	
I	6,7:k:-					5		2								1		
I	6,7:r:-					1		1										
I	6,7:y:-											1						
I	6,7:z10:-																	
I	6,8:-:1,2					2						1				2		
I	6,8:-:1,5																	
I	6,8:d:-					1		1				2						2
I	6,8:e,h:-							1								2		1
I	6,8:r:-							1										
I	9,12:-:1,5		1			4						1				1		
I	9,12:a:-																	
I	9,12:g,z51:-																	
I	9,12:l,z28:-					2						2				6		
II	13,22:z29:1,5																	
II	17:b:e,n,x,z15					1												
II	21:z10:[z6]				2													
II	30:l,z28:z6																	

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
II	42:z29:-					1												
II	43:z4,z23:-																	
II	50:b:z6											1						
II	58:c:z6																	
II	58:l,z13,z28:z6					1												
II	6,7:-:1,6							1										
II	6,7:z39:1,5,7					1												
II	9,12:l,z28:1,5																	
IIIa	11:g,z51:-																	
IIIa	13,23:g,z51:-											1						
IIIa	13,23:z4,z23,[z32]:-																	
IIIa	18:z4,z23:-					9												
IIIa	21:g,z51:-					1												
IIIa	21:z4,z23:-					2												
IIIa	35:z29:-																	
IIIa	35:z4,z23:-					1												
IIIa	40:z36:-			1														
IIIa	41:z4,z23:-		1			2	2					1						
IIIa	44:z4,z23,z32:-					1												
IIIa	44:z4,z24:-						1					1						
IIIa	47:g,z51:-																	
IIIa	48:g,z51:-		2		1							5						
IIIa	48:z29:-			1													1	1
IIIa	48:z4,z23,z32:-					1												
IIIa	48:z4,z23:-		2															
IIIa	48:z4,z24:-		1			3												
IIIa	50:z4,z23:-					1												
IIIa	51:z4,z23:-						3											
IIIa	53:z4,z23:-					2												
IIIa	56:z4,z23:-					1	1											
IIIb	16:z10:e,n,x,z15																	
IIIb	17:k:z																	
IIIb	35:k:e,n,x,z15					1												
IIIb	35:l,v:z35											2						
IIIb	38:(k):-												1					
IIIb	38:(k):z35					1												
IIIb	42:l,v:1,5,7												1					
IIIb	47:k:-						1											
IIIb	47:k:z35																	
IIIb	47:z10:z35																	
IIIb	48:c:z																1	
IIIb	48:i:z		1			1	1											
IIIb	48:i:z35																	



Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
IIIb	48:k:z53					1												
IIIb	48:z4,z24:-						1											
IIIb	48:z52:z																1	
IIIb	50:k:z						1										1	
IIIb	50:k:z35					1												
IIIb	50:r:-																	
IIIb	50:r:z					4	2									3		
IIIb	50:z:z52						1											
IIIb	50:z52:z35																1	
IIIb	53:k:e,n,x,z15																	
IIIb	53:z10:z															1		
IIIb	53:z10:z35																	
IIIb	53:z52:z53					2												
IIIb	60:r:e,n,x,z15					2												
IIIb	60:r:z						2											
IIIb	60:z52:z					1												
IIIb	61:c:-																	
IIIb	61:c:z35					1												
IIIb	61:i:-					1												
IIIb	61:i:z53					3												
IIIb	61:k:1,5,[7]					5												
IIIb	61:l,v:1,5,7					3										1		
IIIb	61:z52:z																	1
IIIb	61:z52:z53					1	1	1										
IIIb	65:(k):z					1												
IIIb	65:l,v:z					1												
IIIb	65:z10:e,n,x,z15					1												
IV	11:z4,z23:-					1		1										
IV	16:z4,z32:-			1														1
IV	40:z4,z32:-																	
IV	43:z4,z23:-		1			1								1				
IV	44:z36,[z38]:-																	
IV	44:z4,z23:-					3												
IV	44:z4,z24:-																	
IV	44:z4,z32:-																	
IV	45:g,z51:-					1												
IV	48:g,z51:-		1			4		1				1						
IV	48:z4,z32:-																	
IV	50:g,z51:-				1	3						1		1				
IV	50:z4,z23:-							1	1			1		1				
S. bongori	48:z35:-																	
S. bongori	48:z81:-															1		

Subspecies	Serotype	AK	AL	AR	AZ	CA	CO	CT	DC	DE	FL	GA	HI	IA	ID	IL	IN	KS
	<b>Partially serotyped</b>	14	1		257	2	6					7	3	1	2	8	4	
	<b>Partially serotyped</b>	6	3			19	5					6	1	5		12	2	5
	<b>Rough, mucoid, and/or nonmotile isolates</b>	2			1	46	1	2				13			1	11	1	
	<b>Unknown</b>		1	55	801	156		7	2		204	59	26	1			7	1
	<b>Total</b>	73	995	662	932	4,505	658	446	87	129	1,007	1,987	319	643	171	1,405	795	286

**Appendix 2b.** Culture-confirmed *Salmonella* infections reported to LEDS by serotype and reporting jurisdiction, 2016 (Kentucky to Nevada)

Cells with no numbers indicate no reported cases of that serotype for 2016. The key to state name abbreviations can be found at [http://www.census.gov/geo/reference/ansi\\_statetables.html](http://www.census.gov/geo/reference/ansi_statetables.html).

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I	Aba				1			1										
I	Abaetetuba											1				1		
I	Aberdeen																	
I	Abony					1	2											
I	Adelaide	1	1	1		1	1	1	2			6				5		
I	Afula																	
I	Agbeni	2		1	1		2	2	1	1		1				4		1
I	Ago																	
I	Agona	6	4	11	3	1	9	10	11	4		5	3			8	5	3
I	Agoueve							1										
I	Alabama								1			1						
I	Alachua			1								2						
I	Albany		1	1														
I	Albert						1											
I	Albuquerque																	
I	Altona			1					2								1	
I	Amager											1					1	
I	Amsterdam			2					1									
I	Anatum	3	26	6			5	17	6	3		9	1		1	11	1	1
I	Anecho																	
I	Angoda								1							1		
I	Apapa	1																
I	Apeyeme															1		
I	Aqua											3						
I	Arechavaleta			4														
I	Bahrenfeld											1						
I	Baildon	1	2					1				1				1		
I	Bareilly	18	31	12	9	1	6	3	36	20		39		1	2	6		1
I	Barranquilla								2							1		
I	Benin						1											
I	Benue																	
I	Bergen																	
I	Berkeley							1										
I	Berta	6	6	4	2		6	11	13	5		20		1	1	7	1	2
I	Birkenhead																	
I	Blockley			13	3											14	1	1
I	Bonariensis				1								1					
I	Bovismorbificans	3	4				1	3		2		2				1		
I	Braenderup	21	39	31	9	5	25	15	24	7		28	2	1	9	21	3	5
I	Brandenburg			1					1			3				2		

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I	Brazil									1								
I	Bredeney			4					1			1						
I	Brunei			1			1											
I	Buzu																	
I	Cannstatt																	
I	Caracas																	
I	Carmel																	
I	Carrau						1					6						
I	Cerro			1	1		2	2	1			1				1		
I	Chailey	2	1					3	1			2		1				
I	Charity															1		
I	Chester			5			3	2	1									2
I	Choleraesuis						1											
I	Choleraesuis var. Decatur											1						
I	Choleraesuis var. Kunzendorf																	
I	Clackamas																	
I	Coeln																	
I	Colindale																	
I	Colorado																	
I	Concord																	
I	Corvallis			2												3		
I	Cotham	2					1	1	2						3			
I	Cubana								1									2
I	Curacao																	
I	Dahra																	
I	Dakota																	
I	Daytona											3						
I	Denver																	
I	Derby		3	2	3	2	3	3	2	1		2		1	1			1
I	Dublin	2	1	4	1	3	6	1	2	2		1	1		5	2	1	2
I	Duisburg																	
I	Durban			1			1		1	2					1	1		
I	Durham								1									
I	Ealing	1	3						1	1								
I	Eastbourne	1		1												1		
I	Ebrie																	
I	Ekpoui																	
I	Elisabethville							1										
I	Emek						1									1		
I	Enteritidis	231	79	229	197	36	373	201	289	72		233	41	3	65	188	37	26
I	Essen				1													

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I Florida												2						
I Fluntern									2									
I Freetown																		
I Fresno																		
I Frintrop							2											
I Gaminara			33					1	1	12		8					1	
I Gatuni																		
I Give			52	4			3	1	1	19		9				1	1	2
I Glostrup								1										
I Goelzau																		
I Goettingen																		
I Goldcoast				1					1			1				1		
I Grumpensis																		
I Guinea		2							1			3						
I Hadar		2		6	1	2		12	1	4		13	8		1	6		6
I Haduna																1		
I Haifa																		2
I Hartford		4	3	5			9	7	10	4		8				6		
I Hato																		
I Havana				2				1	2			1					2	
I Heidelberg		12	15	16		2	24	24	38	4		14	4		1	37	12	12
I Heron																		
I Herston																		
I Hindmarsh																		
I Holcomb																		
I Horsham																		
I Hvittingfoss			23				2		1			1				2		
I Idikan						1		1										
I Indiana							1	3	2	10		18	3		1			1
I Infantis		17	30	32		6	22	50	27	15		39	3	3	11	21	7	2
I Inverness			10		1					3		14					1	
I Irumu									1									
I Isangi				2			3									1		
I Israel																1		
I Ituri																		
I Jalisco																		
I Jangwani																		
I Javiana		61	47	26	91	5	12	18	60	207		348		2	5	97	32	2
I Johannesburg							2	2	1			1				2		
I Kaduna																		
I Kampala																		
I Kedougou							1											
I Kentucky			1	5			3	2				2			1	4	1	1

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I Kenya																		
I Kiambu			1					1								1	1	
I Kingston																		
I Kintambo									2									
I Kisarawe																		
I Koenigstuhl																		
I Kokomlemlé																		
I Kottbus				1				1										
I Kua																		
I Landwasser								1										
I Langensalza																		
I Lattenkamp																		
I Lexington																		
I Lika				2														
I Lingwala															1			
I Litchfield		2	6	11			3	6	6	10		7		1		3		1
I Liverpool								1	1								1	
I Livingstone			1		1													
I Lomalinda							3		6							1	4	
I Lome																		
I London		2		1								1				1		2
I Luciana			3							2								
I Madelia																		
I Manchester																1		
I Manhattan		2	6		2		1	1	4			13				1		
I Mapo																		
I Maracaibo																		
I Matadi																		
I Mbandaka		5	2	10	1	1	8	7	6	2		10	2			4		1
I Meleagridis				1				1	1							2		
I Miami		2	1	1	2	2	2		1	5		15				5		
I Michigan																	1	
I Mikawasima							1											
I Minnesota							4		2	2					1	2		
I Mississippi		5	99	4		1	1	1	8	128		106				4		
I Missouri																		
I Molade																		
I Monschau		1					3		3			2					1	
I Montevideo		5	176	28	10	1	15	9	10	49		39	1	1		3	6	6
I Muenchen		14	66	17	4	2	14	4	29	56		79	2		8	22	7	5
I Muenster		2	1	2			11	1	2			6	1		1	2		2
I Nagoya																		
I Napoli				1					1			1						

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I Ndolo															1			
I Newmexico									1									
I Newport		53	283	122	90	9	53	64	175	207		421	9	2	19	121	59	8
I Newrochelle																		
I Nima																2		
I Norwich		2	6	2	8			1	28	32		3			2	4	4	
I Nottingham						1												
I Offa																		
I Ohio		1		1			1	2	4			3				1	1	1
I Okatie								2								1		
I Oranienburg		6	19	21	6	1	29	9	24	8		17	3	1	6	24	18	7
I Orion		1				1							1					
I Oslo		2		3			7	5	1	1		2				3		1
I Othmarschen				1														
I Panama		2	1	11		2	4	3	4			5	1		2	21	1	
I Paratyphi A			1	4	3		1		1			2			1	11		2
I Paratyphi B		1			1		21	1		1								
I Paratyphi B var. L(+) tartrate+			5		6			6	36			5				4	2	
I Paratyphi C																		
I Parkroyal																		
I Pensacola					1		1	1		2		2						
I Perth																		
I Pomona				1				1	7	1						2	1	
I Poona		6	2		6		1	3	3	1		6				6	7	4
I Portland																		
I Potsdam			1	1												1		
I Praha				1														
I Putten												1						
I Quiniela			1															
I Reading		1	1	1	7	2	10	7	7	1		3	3			23	2	
I Richmond				3												2		
I Ried																		
I Rissen												1	1			2		
I Roodepoort				1														
I Rubislaw		1	26				1	1	5	32		10				4	1	
I Ruiru																		
I Saarbruecken																		
I Saintpaul		13	14	44	15	4	19	16	4	8		31	2		7	33	6	4
I Sandiego		1		1	2	1	6	7	3	3		4				8	2	4
I Sangalkam																		
I Saphra			1									1						
I Schwarzengrund		2	2	18	5	1	6	2	4	2		7	1		1	10	1	3

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I Senftenberg				2			3		2			1		1		1	3	
I Seremban																		
I Shubra																		
I Singapore																		
I Soerenga								1									1	
I Stanley		5	1	7		2	7	4	6	2		9	1		1	3		
I Stanleyville				2														
I Suelldorf																		
I Sundsvall																		
I Takoradi							1											
I Tallahassee				1														
I Tamberma																1		
I Teko																		
I Teitelkebir				3		1	1		2			2				2		1
I Tennessee		1		1					3			1						
I Thompson		10	26	39	3	4	26	4	47	6		9	3	2	14	27	4	1
I Toucra									1			1						
I Tshiongwé																1		
I Tucson								1										
I Typhi		1		12	9	1	6	11	7	4		12		2		37	1	1
I Typhimurium		102	63	189	88	12	135	83	168	150		334	20	7	16	109	35	14
I Uganda		1	2	2			1	5	1			1				1	2	
I Ughelli																		
I Uppsala				2														
I Urbana			11				2			1						2		
I Vanier																		
I Victoria																		
I Virchow		3		7			7	3				2			1		1	2
I Vitkin																		
I Wandsworth																	1	
I Wangata																		
I Waycross																		
I Welikade																		
I Weltevreden		1	2	2			1	3	1	2		3				1		1
I Westhampton								1										
I Widemarsh																4		
I Woodinville																		
I Worthington			1					1	1							1		
I Yaba																		
I Zega																		
I 11:k:-					1													
I 11:r:-			2															
I 13,22:-:1,6								4										



Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
I	13,22:z:-																	
I	13,23:-:1,5																	
I	13,23:b:-		1		1											2		
I	13,23:y:e,n,z15																	
I	13,23:z:-																	
I	16:a:-																	
I	16:b:-																	
I	16:d:-							1										
I	28:i:-							1										
I	3,10:-:l,w																	
I	3,10:l,v:-																	
I	4,[5],12:-:1,2				3				1							1		
I	4,[5],12:b:-	18	3	2	1		16	5		3						2	1	
I	4,[5],12:d:-				1													
I	4,[5],12:e,h:-	1																
I	4,[5],12:i:-	42	55	103	67	11	14	100	91	34		2	7	1	15	79	17	6
I	4,[5],12:r:-							1										
I	47:z4,z23:-																	
I	6,14:d:-																	
I	6,7:-:1,2				1													
I	6,7:-:1,5				15			7								3		
I	6,7:-:1,6																	
I	6,7:-:e,n,z15				1													
I	6,7:c:-															1		
I	6,7:d:-																	
I	6,7:e,h:-							1	1								1	
I	6,7:k:-				1			6	2							1		
I	6,7:r:-																	
I	6,7:y:-				2													
I	6,7:z10:-				1													
I	6,8:-:1,2				2													
I	6,8:-:1,5				2													
I	6,8:d:-																1	
I	6,8:e,h:-				7													
I	6,8:r:-																	
I	9,12:-:1,5				10			1		1						2		
I	9,12:a:-				1													
I	9,12:g,z51:-																1	
I	9,12:l,z28:-		3					2	5	11								
II	13,22:z29:1,5																	
II	17:b:e,n,x,z15																	
II	21:z10:[z6]																	
II	30:l,z28:z6																	

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
II	42:z29:-																	
II	43:z4,z23:-																	
II	50:b:z6					1												
II	58:c:z6																	
II	58:l,z13,z28:z6																	
II	6,7:-:1,6				1													
II	6,7:z39:1,5,7																	
II	9,12:l,z28:1,5																	
IIIa	11:g,z51:-																1	
IIIa	13,23:g,z51:-																	
IIIa	13,23:z4,z23,[z32]-																	
IIIa	18:z4,z23:-																	
IIIa	21:g,z51:-																	
IIIa	21:z4,z23:-																	
IIIa	35:z29:-																	
IIIa	35:z4,z23:-																	
IIIa	40:z36:-																	
IIIa	41:z4,z23:-			1								1						
IIIa	44:z4,z23,z32:-																	
IIIa	44:z4,z24:-																	
IIIa	47:g,z51:-																	
IIIa	48:g,z51:-						1					2						
IIIa	48:z29:-																	
IIIa	48:z4,z23,z32:-																	
IIIa	48:z4,z23:-																	1
IIIa	48:z4,z24:-																	1
IIIa	50:z4,z23:-																	
IIIa	51:z4,z23:-																	
IIIa	53:z4,z23:-																	
IIIa	56:z4,z23:-																	
IIIb	16:z10:e,n,x,z15																	
IIIb	17:k:z																	
IIIb	35:k:e,n,x,z15						1									1		
IIIb	35:l,v:z35																	
IIIb	38:(k):-																	
IIIb	38:(k):z35																	
IIIb	42:l,v:1,5,7																	
IIIb	47:k:-						1											
IIIb	47:k:z35								1									
IIIb	47:z10:z35								1									
IIIb	48:c:z																	1
IIIb	48:i:z		1													1		
IIIb	48:i:z35																	1

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
IIIb	48:k:z53																	
IIIb	48:z4,z24:-																	
IIIb	48:z52:z																	
IIIb	50:k:z						2											
IIIb	50:k:z35																	
IIIb	50:r:-																	
IIIb	50:r:z																1	
IIIb	50:z:z52																	
IIIb	50:z52:z35																	
IIIb	53:k:e,n,x,z15																	
IIIb	53:z10:z																	
IIIb	53:z10:z35															1		
IIIb	53:z52:z53																	
IIIb	60:r:e,n,x,z15								1				2					
IIIb	60:r:z															1		
IIIb	60:z52:z																	
IIIb	61:c:-																	
IIIb	61:c:z35																	
IIIb	61:i:-																	
IIIb	61:i:z53																	
IIIb	61:k:1,5,[7]	2					1		1									
IIIb	61:l,v:1,5,7						1											
IIIb	61:z52:z																	
IIIb	61:z52:z53																	
IIIb	65:(k):z																	
IIIb	65:l,v:z																	
IIIb	65:z10:e,n,x,z15																	
IV	11:z4,z23:-																	
IV	16:z4,z32:-																	
IV	40:z4,z32:-																	
IV	43:z4,z23:-								1			1						
IV	44:z36,[z38]:-																	
IV	44:z4,z23:-								2									
IV	44:z4,z24:-							1										
IV	44:z4,z32:-																	
IV	45:g,z51:-								1									
IV	48:g,z51:-						1		1									
IV	48:z4,z32:-															1		
IV	50:g,z51:-						1					1						
IV	50:z4,z23:-		9												1			
S. bongori	48:z35:-																	

Subspecies	Serotype	KY	LA	MA	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH	NJ	NM	NV
S. bongori	48:z81:-	1																
	<b>Partially serotyped</b>	1	1		10			15	2		159	9		30	1	4	1	
	<b>Rough, mucoid, and/or nonmotile isolates</b>		4		60		2	6	6							7	3	3
	<b>Unknown</b>		14	32	87	1	3		2	13	10	120	1	106	3		12	
	<b>Total</b>	720	1,339	1,160	870	128	996	836	1,300	1,179	169	2,169	128	167	210	1,095	320	159

**Appendix 2c. Culture-confirmed *Salmonella* infections reported to LEDS by serotype and reporting jurisdiction, 2016 (New York to Wyoming)**

Cells with no numbers indicate no reported cases of that serotype for 2016. The key to state name abbreviations can be found at [http://www.census.gov/geo/reference/ansi\\_statetables.html](http://www.census.gov/geo/reference/ansi_statetables.html).

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I	Aba																	
I	Abaetetuba					1												
I	Aberdeen	1				1							1					
I	Abony					1												
I	Adelaide	15				2					2	1			4	3		
I	Afula																	
I	Agbeni	25	15	2		11	1	1		1	1		5		1	1	3	
I	Ago														1			
I	Agona	36	9	2	6	20		5	2	5	1	4	13		7	17	2	
I	Agoueve	1			2													
I	Alabama																	
I	Alachua	4				1			2			1						
I	Albany	3				3									1			
I	Albert																	
I	Albuquerque																	
I	Altona	1								1								
I	Amager																	
I	Amsterdam																	
I	Anatum	12	11	3		9	1	7	1	3	12	4	3		2	3		
I	Anecho																	
I	Angoda																	
I	Apapa														1			
I	Apeyeme																	
I	Aqua							2										
I	Arechavaleta	3		5	1					1								
I	Bahrenfeld																	
I	Baildon	4	3		1	8		1					3			1		
I	Bareilly	13	7	16		9	1	12		24		1	34		1	5	2	
I	Barranquilla	3				1												
I	Benin	1																
I	Benue																	
I	Bergen														1			
I	Berkeley																	
I	Berta	35	21	8	3	12		10	1	7	2	1	17		6	3	8	
I	Birkenhead														1			
I	Blockley	45				4	1					1				1		
I	Bonariensis		1			1							1			1		
I	Bovismorbificans	6	9		2	2		7		5		1			1	2	2	
I	Braenderup	128	41	40	9	30	9	29	6	17	13	14	41		20	27	7	

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I	Brandenburg	5	2	2	1			1		1	1		2		11	7		
I	Brazil																	
I	Bredeney		1										1		1			
I	Brunei																	
I	Buzu		1															
I	Cannstatt														1			
I	Caracas								1									
I	Carmel																	
I	Carrau	2				2		15					1				1	
I	Cerro	1				4		1					1			4		
I	Chailey	2								1		1				1		
I	Charity																	
I	Chester	7	1	1									1		2		2	
I	Choleraesuis										4							
I	Choleraesuis var. Decatur																	
I	Choleraesuis var. Kunzendorf	1											1					
I	Clackamas				3										2			
I	Coeln																	
I	Colindale	1																
I	Colorado																	
I	Concord															1		
I	Corvallis	10	2			6	1					1			1	1		
I	Cotham	17	2		2	1			2			3			4	6	1	
I	Cubana					5							1					
I	Curacao							1										
I	Dahra																	
I	Dakota											2						
I	Daytona							1		1					4			
I	Denver																	
I	Derby	5	4			3			1			1						
I	Dublin	19	12	1	4	3	1	1	3	4	1	1			4	6	3	
I	Duisburg																	
I	Durban	4	1		1	2		1		1	1	1						
I	Durham																	
I	Ealing	1		4		3		1				1	1		1		1	
I	Eastbourne	1	4			2	1											
I	Ebrie			1														
I	Ekpoui															1		
I	Elisabethville																	
I	Emek														1			
I	Enteritidis	796	434	95	111	461	25	135	43	194	31	82	219	1	201	225	72	

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I Essen																		
I Florida								4										
I Fluntern		2						2					2					
I Freetown											1							
I Fresno													1					
I Frintrop																		
I Gaminara		6	3			2		15		1	2		1		1	1	1	
I Gatuni																	2	
I Give		4	2					16			9	1			3	3	2	
I Glostrup			1									1						
I Goelzau																		
I Goettingen																		
I Goldcoast		6				1				2		1						
I Grumpensis		2																
I Guinea			1										2		2			
I Hadar		18	2	4	3	11	2	9	6	3		5	10		2	2	8	
I Haduna																		
I Haifa		1	2							1			2		1			
I Hartford		21	36			3		18		6	1		19			9	2	
I Hato			2															
I Havana		6	1		2	3	1	2				1			1	1		
I Heidelberg		88	34	12	10	23		3	16	26	13	10	22		18	34	3	
I Heron		1																
I Herston																		
I Hindmarsh				2														
I Holcomb		11	1			2											2	
I Horsham																		
I Hvittingfoss		3	2	4	1	1						1			2	4		
I Idikan		1								1								
I Indiana		3	1		3	1		4	6	1			10		2		14	
I Infantis		132	44	33	8	61	6	23	12	25	55	13	40	1	27	54	13	
I Inverness		4						32					1					
I Irumu													1					
I Isangi		1																
I Israel																		
I Ituri																		
I Jalisco																		
I Jangwani																	1	
I Javiana		118	38	23	13	92	5	253	54	74	18	6	102		18	6	12	
I Johannesburg		2	1			2	1									1		
I Kaduna		2																
I Kampala					1													
I Kedougou																		

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I Kentucky		5		1	1	2			1		1	1	5		3		1	
I Kenya															1			
I Kiambu		8	1	6		2			1	2			1		1			
I Kingston																1		
I Kintambo		1										1				1		
I Kisarawe						1			2									
I Koenigstuhl																		
I Kokomlele		1																
I Kottbus		2				1												
I Kua		1																
I Landwasser																		
I Langensalza																		
I Lattenkamp																		
I Lexington																1		
I Lika																		
I Lingwala																		
I Litchfield		14	5	26	1	29			3	4	1	1	8		8	3		
I Liverpool		1				1							2			1	1	
I Livingstone													1					
I Lomalinda			1		1							5	1					
I Lome			1										1					
I London		4	3					2		1			1		2			
I Luciana								2	2									
I Madelia																		
I Manchester																		
I Manhattan		7	1	1		2		3		1	1	2	1		1	2		
I Mapo																		
I Maracaibo																		
I Matadi			1															
I Mbandaka		7	14	4	1	6	1	5	4	2		3	5		5		2	
I Meleagridis					1					1					2			
I Miami		6	1		2	1		12		2		1	3			1	3	
I Michigan												1						
I Mikawasima																		
I Minnesota		1				2	1	1										
I Mississippi		8	2	3	1	4		2	1	36	5		7			2		
I Missouri																		
I Molade																		
I Monschau		8				6			2			1			2			
I Montevideo		40	30	15	14	31	3	78	4	11	31	6	18		13	13	6	
I Muenchen		50	27	12	13	43	1	120		11	8	7	25		23	7	2	
I Muenster		11	10		1	5				6		1	3		2	4		
I Nagoya																		



Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I Napoli			3			1									2			
I Ndolo																	1	
I Newmexico																		
I Newport		217	104	203	29	118	16	369	16	95	72	17	163	1	15	53	14	
I Newrochelle																		
I Nima		2																
I Norwich		5	3	16		4		1	1	26			3		1		1	
I Nottingham															1			
I Offa						1							1					
I Ohio		5	1			2		7	2	2					1	2		
I Okatie			1															
I Oranienburg		40	51	42	13	25	4	15	2	15	20	9	15		34	7	3	
I Orion																		
I Oslo		2	2	1	1	1				1		4	1		2	2		
I Othmarschen																1		
I Panama		17	1		4	8				1	1	4	14		4	12		
I Paratyphi A		17	1		2	7					3	1	9		8	2		
I Paratyphi B							1		1	1	1	1						
I Paratyphi B var. L(+) tartrate+		12	29	63	6	22		7				7	6		7	1		
I Paratyphi C											2							
I Parkroyal								1										
I Pensacola		1				2		5					4			1		
I Perth						1												
I Pomona		5		1		3				2			1		1	1		
I Poona		8	7	5	3	5		3		4	3	2	4		5	2		
I Portland															1			
I Potsdam		3																
I Praha																		
I Putten					1													
I Quiniela																		
I Reading		29	2		1	24		2	1	1	1	1	3		1	7	1	
I Richmond						1												
I Ried		1																
I Rissen		1			1	1			1				1		3	4	1	
I Roodepoort							1		1									
I Rubislaw		6	1	3		1		23		2	3	1	1			1		
I Ruiru					1													
I Saarbruecken						1	1											
I Saintpaul		53	17	8	12	28	3	53	2	7	4	24	28		11	18	6	
I Sandiego		20	3	1	4	5	1	1		4	1	2	3		3	4		
I Sangalkam																		
I Saphra											1							

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I	Schwarzengrund	38	12			8	1	3		3	1	1	8		2	3	2	
I	Senftenberg	18	1	2	7	4	1		1	1	2	1			2	2		
I	Seremban	1																
I	Shubra																	
I	Singapore		1			6		2										
I	Soerenga												1					
I	Stanley	22	6	1	7	3	1		1	4		6	5		11	6		
I	Stanleyville				1	1									1			
I	Suelldorf																	
I	Sundsvall				3					1			1		3			
I	Takoradi											1				1		
I	Tallahassee																	
I	Tamberma																	
I	Teko																	
I	Telekebir	1	3			1			1		2		3		7	1		
I	Tennessee	7	7	2		7							2		1	1		
I	Thompson	96	39	20	13	60	1	6	5	9	8	3	22		19	12		
I	Toucra		1															
I	Tshiongwe																	
I	Tucson								1									
I	Typhi	53		4	2	12			2	4	32	1	12		16	7	1	
I	Typhimurium	296	203	113	46	216	19	86	65	144	34	29	173		83	117	24	
I	Uganda	7	3	13	1	3		1		1	2		1		2	4	1	
I	Ughelli														1			
I	Uppsala																	
I	Urbana	2	1			1						2			1	1		
I	Vanier											1						
I	Victoria																	
I	Virchow	14	6	2	3	2	1	1	1	2		4	4		4	3	1	
I	Vitkin			1														
I	Wandsworth											1						
I	Wangata																	
I	Waycross																	
I	Welikade			1														
I	Weltevreden	12	2	3	1	4					1	2	2		3	1		
I	Westhampton															1		
I	Widemarsh	5				2												
I	Woodinville					1												
I	Worthington	2		4		3		2		1	1		1		1			
I	Yaba																	
I	Zega																	
I	11:k:-																	
I	11:r:-																	

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
I	13,22:-:1,6																	
I	13,22:z:-																	
I	13,23:-:1,5																	
I	13,23:b:-	4				12		119								1		
I	13,23:y:e,n,z15																	
I	13,23:z:-																	
I	16:a:-																	
I	16:b:-																	
I	16:d:-	1						1										
I	28:i:-															1		
I	3,10:-:l,w																	
I	3,10:l,v:-																	
I	4,[5],12:-:1,2	1																
I	4,[5],12:b:-	12	16	3	7	5		2		11	4		7		8	15	1	
I	4,[5],12:d:-												1					
I	4,[5],12:e,h:-																	
I	4,[5],12:i:-	157	82	41	25	73		36		42	3		36		77	85	3	
I	4,[5],12:r:-							1										
I	47:z4,z23:-																	
I	6,14:d:-							1										
I	6,7:-:1,2																	
I	6,7:-:1,5					4										2		
I	6,7:-:1,6																	
I	6,7:-:e,n,z15																	
I	6,7:c:-	2																
I	6,7:d:-																	
I	6,7:e,h:-																	
I	6,7:k:-												1					
I	6,7:r:-	1						1		1						1		
I	6,7:y:-							1										
I	6,7:z10:-																	
I	6,8:-:1,2																	
I	6,8:-:1,5																	
I	6,8:d:-																	
I	6,8:e,h:-															1		
I	6,8:r:-																	
I	9,12:-:1,5	6																
I	9,12:a:-																	
I	9,12:g,z51:-																	
I	9,12:l,z28:-			1				13										
II	13,22:z29:1,5														1			
II	17:b:e,n,x,z15																	
II	21:z10:[z6]																	

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
II	30:l,z28:z6	1																
II	42:z29:-																	
II	43:z4,z23:-															1		
II	50:b:z6				1													
II	58:c:z6											1						
II	58:l,z13,z28:z6												2					
II	6,7:-:1,6																	
II	6,7:z39:1,5,7																	
II	9,12:l,z28:1,5									1								
IIIa	11:g,z51:-																	
IIIa	13,23:g,z51:-					1		2										
IIIa	13,23:z4,z23,[z32]:-		1															
IIIa	18:z4,z23:-																	
IIIa	21:g,z51:-																	
IIIa	21:z4,z23:-																	
IIIa	35:z29:-														1			
IIIa	35:z4,z23:-									1								
IIIa	40:z36:-																	
IIIa	41:z4,z23:-				1										1			
IIIa	44:z4,z23,z32:-																	
IIIa	44:z4,z24:-																	
IIIa	47:g,z51:-									1								
IIIa	48:g,z51:-												2					
IIIa	48:z29:-																	
IIIa	48:z4,z23,z32:-																	
IIIa	48:z4,z23:-									1								
IIIa	48:z4,z24:-					1		3								1		
IIIa	50:z4,z23:-																	
IIIa	51:z4,z23:-							2		2								
IIIa	53:z4,z23:-																	
IIIa	56:z4,z23:-												1					
IIIb	16:z10:e,n,x,z15	1						1					1					
IIIb	17:k:z					1												
IIIb	35:k:e,n,x,z15																	
IIIb	35:l,v:z35												1					
IIIb	38:(k):-																	
IIIb	38:(k):z35																	
IIIb	42:l,v:1,5,7																	
IIIb	47:k:-																	
IIIb	47:k:z35					1												
IIIb	47:z10:z35																	
IIIb	48:c:z																	
IIIb	48:i:z							1					1		1			

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
IIIb	48:i:z35																	
IIIb	48:k:z53																	
IIIb	48:z4,z24:-																	
IIIb	48:z52:z				1											1		
IIIb	50:k:z	2																
IIIb	50:k:z35											1						
IIIb	50:r:-									1								
IIIb	50:r:z																	
IIIb	50:z:z52																	
IIIb	50:z52:z35																	
IIIb	53:k:e,n,x,z15															1		
IIIb	53:z10:z														1			
IIIb	53:z10:z35				1													
IIIb	53:z52:z53																	
IIIb	60:r:e,n,x,z15									1								
IIIb	60:r:z					1												
IIIb	60:z52:z																	
IIIb	61:c:-							1										
IIIb	61:c:z35																	
IIIb	61:i:-																	
IIIb	61:i:z53											1						
IIIb	61:k:1,5,[7]																	
IIIb	61:l,v:1,5,7					2							1					
IIIb	61:z52:z																	
IIIb	61:z52:z53															1		
IIIb	65:(k):z																	
IIIb	65:l,v:z																	
IIIb	65:z10:e,n,x,z15					1												
IV	11:z4,z23:-																	
IV	16:z4,z32:-																	
IV	40:z4,z32:-									1								
IV	43:z4,z23:-												1		2	1		
IV	44:z36,[z38]:-									1								
IV	44:z4,z23:-	2	1										1					
IV	44:z4,z24:-											2						
IV	44:z4,z32:-														1			
IV	45:g,z51:-		2			1												
IV	48:g,z51:-					2				1								
IV	48:z4,z32:-	2											1					
IV	50:g,z51:-	2			1	1										2		
IV	50:z4,z23:-	2																
S. bongori	48:z35:-					1												

Subspecies	Serotype	NY	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VA	VT	WA	WI	WV	WY
S. bongori	48:z81:-																	
	<b>Partially serotyped</b>		1	41	1	25	7	7	2	5	255	3	18	92		10		37
	<b>Rough, mucoid, and/or nonmotile isolates</b>	1	5			4		24	1				2			14		
	<b>Unknown</b>	58	35	5	1		2		1	67	3,605		92		1	3	17	15
	<b>Total</b>	3,088	1,503	926	424	1,677	122	1,641	284	951	4,277	323	1,302	95	771	886	256	52

### Appendix 3a. Culture-confirmed *Salmonella* infections reported to LEDS by serotype and year, 2006-2016

Cells with no numbers indicate no reported cases of that serotype for the column year.

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Aarhus	6	6	5	4	2							23
I	Aba	1		1			1					2	5
I	Abaetetuba	3	3	1	5	3		3	2	1	1	5	27
I	Aberdeen	10	13	6	13	7	6	6	7	4	6	5	83
I	Abony	8	3	2	3	6	4	4	8	12	5	7	62
I	Abortusequi					1	2	1			1		5
I	Adelaide	66	58	63	43	79	95	64	132	176	124	101	1,001
I	Adeoyo									1			1
I	Adjame								1				1
I	Afula											1	1
I	Agama	4	2		7	2	2	1	2	2			22
I	Agbeni	14	15	16	15	23	39	58	62	59	82	139	522
I	Ago	1	4	4	14	7	3	5	5	1	1	3	48
I	Agona	530	505	601	380	508	504	339	360	307	289	362	4,685
I	Agoueve	3	2	1	3	4	7	4	3	3	3	4	37
I	Ahoutoue		1										1
I	Ahuza				1								1
I	Ajiobo	1				1							2
I	Alabama	5				2	4	3	9	3	1	4	31
I	Alachua	17	19	13	24	18	14	16	11	11	23	13	179
I	Alagbon			1									1
I	Albany	36	38	23	30	29	30	21	27	21	27	15	297
I	Albert				3	1	3	5	5	2	3	1	23
I	Albuquerque						1	1	1			1	4
I	Allandale				2			1			1		4
I	Altona	4	6	6	10	14	77	15	10	14	8	16	180
I	Amager	4	4	9	5	8	2	5	3	1	5	6	52
I	Amherstiana	1											1
I	Amounderness			1									1
I	Amoutive	1	2	2	2	1					1		9
I	Amsterdam	4	2	2	7	4	7	3	1	1	1	4	36
I	Amunigun							1					1
I	Anatum	247	204	219	227	227	293	402	253	282	261	257	2,872
I	Anecho	3	9	9		2		4	4	5	1	1	38
I	Anfo	1	2	2	1	1	2	2	1	2			14
I	Angoda											2	2
I	Apapa	6	13	8	5	5	3	4	6	7	7	5	69
I	Apeyeme				2	1			3	1	1	1	9
I	Aqua	3	1	1	4	3	7	7	8		1	6	41
I	Arapahoe							1		1			2
I	Arechavaleta	2	12	9	14	12	8	8	4	5	13	19	106
I	Assen			1			2	1					4

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Assinie	4											4
I	Atento							1					1
I	Augustenborg			1	1		1	1					4
I	Avignon	1											1
I	Avonmouth						1						1
I	Ayinde					1							1
I	Azteca			1									1
I	Babelsberg						1						1
I	Bahrenfeld	1				1		2	1	1		1	7
I	Baildon	14	15	9	11	88	26	25	35	70	72	58	423
I	Ball		1			3	1						5
I	Banana	1					2	1					4
I	Bareilly	253	237	222	282	339	429	890	347	381	418	412	4,210
I	Barranquilla	5	5	26	2	4	11	13	3	1	8	11	89
I	Bassadji							1		5			6
I	Beaudesert	3	2	3	3	5	1	1	1		3		22
I	Belem					1		3	2				6
I	Benin	5		1		1	4	3	1	1	3	2	21
I	Benue											1	1
I	Bere	7	6	11	3	2	1	1	1				32
I	Bergen	1					1					2	4
I	Berkeley							1				1	2
I	Berta	249	188	186	182	263	321	299	257	318	406	369	3,038
I	Bietri			1							1		2
I	Birkenhead		1	3	4	3		1	2	1	2	5	22
I	Bispebjerg									2	1		3
I	Blegdam			1	1	2	1				4		9
I	Blijdorp								1	1			2
I	Blockley	66	70	54	56	37	28	49	40	100	95	100	695
I	Blukwa										1		1
I	Bochum									1			1
I	Bolombo						1						1
I	Bonariensis	2	4	5	2	1	6	12	5	5	8	7	57
I	Bonn	1			1					1			3
I	Bournemouth	1	2	1	1	1				1	2		9
I	Bouso	1				2				1			4
I	Bovismorbificans	68	47	73	61	67	110	96	57	70	70	98	817
I	Brackenridge										1		1
I	Bradford	1	1		1	1							4
I	Braenderup	550	551	655	715	728	733	829	681	610	825	1,001	7,878
I	Brancaaster							1			2		3
I	Brandenburg	92	70	78	87	63	67	74	87	72	106	86	882
I	Brazil	3	2	4	1	1	1		1	1	2	3	19
I	Brazos					1					2		3



Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Brazzaville	3	1	1	1		1						7
I	Bredeney	26	22	28	24	37	29	67	30	42	25	21	351
I	Breukelen		1										1
I	Brezany			1									1
I	Brijbhumi							1					1
I	Brive										3		3
I	Bron	1		1									2
I	Bronx		1					1					2
I	Bruck				1	1							2
I	Brunei			1		1	2	1		1	2	3	11
I	Bsilla			1									1
I	Budapest		1										1
I	Bukavu		1	1			1	3		2			8
I	Bullbay										1		1
I	Burgas		1										1
I	Burundi			1									1
I	Butantan				1								1
I	Buzu	2	2			1		5	2	2		1	15
I	California	2		1	1			1					5
I	Canada							1	2	2	3		8
I	Cannstatt	1		2	9	3	6	1	2	2	3	5	34
I	Caracas	1		1			2		3			1	8
I	Carmel	1	4	2	2	4	1	5	4	6	2	1	32
I	Carrau	10	1	7	64	31	20	33	18	17	22	38	261
I	Cerro	35	31	48	26	29	18	43	37	26	23	38	354
I	Chailey			2	3	11	7	9	30	17	39	29	147
I	Chandans	1		1	1	1	1		1				6
I	Charity				1	1		1			1	1	5
I	Chester	26	30	26	41	85	63	50	25	48	43	37	474
I	Chicago	1	2			1					1		5
I	Chichiri					4		4	2				10
I	Chile			1									1
I	Chincol	1				2	1	1					5
I	Chingola		1										1
I	Chiredzi									1			1
I	Choleraesuis	11	14	18	22	8	13	12	7	3	5	5	118
I	Choleraesuis var. Decatur				2				1			1	4
I	Choleraesuis var. Kunzendorf	10	10	4	9	4	3	5	5	2	2	5	59
I	Clackamas	1	2	5		5	6	2	1	7	2	5	36
I	Claibornei	1											1
I	Cleveland				1						1		2
I	Coeln	4	4	6		4	2	5	2	7	3	1	38

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Colindale	12	5	6	7	4	5	5	3	1	1	1	50
I	Colorado									1		1	2
I	Concord	17	20	31	36	17	7	8	4	2	3	1	146
I	Connecticut										1		1
I	Corvallis	23	22	30	13	23	19	27	12	21	35	36	261
I	Cotham	12	14	21	20	23	25	45	68	65	72	64	429
I	Croft	1											1
I	Cubana	16	24	9	18	33	15	30	9	11	6	15	186
I	Cuckmere	1							1				2
I	Cullingworth			1						1			2
I	Curacao					1				2		1	4
I	Cyprus						1						1
I	Daarle			1									1
I	Dahlem	1											1
I	Dahra	2	1		1	1	1		2		1	1	10
I	Dakar		1										1
I	Dakota											2	2
I	Daytona	5	1	3	2	7	10	7	6	6	4	13	64
I	Denver	1	2	6	3	3	5		5	3	3	4	35
I	Derby	139	143	140	131	132	113	110	81	104	79	77	1,249
I	Dessau										1		1
I	Detmold								1				1
I	Diguel										1		1
I	Djakarta	1						1		1			3
I	Djugu	2	2	2				1					7
I	Doorn	1											1
I	Dublin	81	104	106	100	124	100	113	137	169	170	184	1,388
I	Duisburg	1	2	5	3	3	4	1	7	2	5	2	35
I	Durban	11	12	7	17	6	5	9	12	13	32	32	156
I	Durham	4	1	3	4	4	3	5	1	2	3	4	34
I	Duval	1			1								2
I	Ealing	12	28	25	33	26	24	17	20	23	15	27	250
I	Eastbourne	16	16	27	15	13	19	25	15	12	24	15	197
I	Eberswalde										2		2
I	Eboko				1								1
I	Ebrie			1	1			2		1		1	6
I	Edinburg	17	6	7	10	3	1			1			45
I	Eko										1		1
I	Ekotedo							1					1
I	Ekpoui				1							1	2
I	Elisabethville		1				1			1	1	1	5
I	Elomrane		1										1
I	Emek	3	7		3					1	3	10	27
I	Emmastad				1								1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Entebbe	3	6										9
I	Enteritidis	6,701	6,056	7,197	7,122	8,896	7,546	7,095	6,815	8,895	9,150	7,830	83,303
I	Enugu			1	1								2
I	Eppendorf	2	1	5			1		1	2			12
I	Erfurt								1				1
I	Escanaba		1										1
I	Eschberg						1						1
I	Essen	1	5	1		2		1		2	2	2	16
I	Falkensee		1		1	1			1				4
I	Fann								1				1
I	Farmsen								1	1	1		3
I	Farsta	1											1
I	Fayed	1											1
I	Fillmore			1									1
I	Fischerkietz	1											1
I	Fischerstrasse		3	1	3			1					8
I	Florida	3	6	1	7	5	3	3	3	7	3	12	53
I	Fluntern	3	5	6	7	8	8	4	8	11	7	10	77
I	Fomeco										2		2
I	Frankfurt				1		1						2
I	Freefalls				1								1
I	Freetown			1	2		1		1	1	1	1	8
I	Fresno		1	4	4		1	1	4	1	1	2	19
I	Friedenau	1						1			1		3
I	Friedrichsfelde	1	1	1		1		1					5
I	Frintrop	1					1					2	4
I	Fulica						1						1
I	Fyris	2											2
I	Galiema				1		1		2	1			5
I	Gambia							1					1
I	Gaminara	76	74	84	60	62	100	95	72	101	128	129	981
I	Garba						1	1					2
I	Garoli	1											1
I	Gatow		2		2	1							5
I	Gatuni	2	3	3	2	2	4		1	3	1	3	24
I	Georgia	6	5	2		1	1	1		2	1		19
I	Gera								2				2
I	Give	122	106	117	109	103	120	150	102	101	118	161	1,309
I	Giza							1					1
I	Glasgow		2					1					3
I	Glidji								1				1
I	Glostrup	5	5	5	3	2	5	4		2	6	11	48
I	Gnesta		2	2									4
I	Godesberg								1				1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Goelzau											1	1
I	Goettingen		3	3	1	2	2	2	1	2		1	17
I	Goldcoast		1			4	1	1		2	2	27	38
I	Gombe			1									1
I	Good									1			1
I	Gouloumbo				1								1
I	Goverdhan		1					1					2
I	Grandhaven	1											1
I	Grumpensis	8	2	1	3	1	2			3	1	5	26
I	Guildford		1		2			1					4
I	Guinea	1	3	2	1		2	2	5	7	9	12	44
I	Gwale	1											1
I	Hadar	281	286	310	271	224	204	242	177	180	221	205	2,601
I	Haduna					1		1				1	3
I	Haelsingborg									1	1		2
I	Haifa	5	5	5	6	4	7	6		3	5	9	55
I	Hannover							2			2		4
I	Harburg	1											1
I	Harcourt	1											1
I	Hartford	195	192	209	184	250	241	252	155	151	207	257	2,293
I	Hatfield					1			1				2
I	Hato	4	2	4	1	1	1		1	2	3	2	21
I	Havana	36	33	54	58	41	29	28	26	45	36	36	422
I	Heidelberg	1,483	1,576	1,278	1,409	1,092	1,102	976	1,397	1,430	1,130	754	13,627
I	Heron											1	1
I	Herston	2	1	2	3	3	2	4	4	2	1	1	25
I	Herzliya							1					1
I	Hidalgo				1	1							2
I	Hiduddify	1					1						2
I	Hillegersberg	1		1									2
I	Hillingdon					2				1			3
I	Hindmarsh	4		2	3					1	3	2	15
I	Hofit	2		1	1								4
I	Hoghton	1											1
I	Holcomb	2	4	5	3	3	3	3	8	19	10	16	76
I	Homosassa			1							1		2
I	Horsham	1						1	1	1	3	2	9
I	Huettwilen							1					1
I	Hull	3	5	8	1		1	2	1	2	1		24
I	Hvittingfoss	45	54	46	51	119	72	63	59	55	64	58	686
I	Ibadan	3	2	3		4		1			3		16
I	Idikan		2	3			3	2		5	8	6	29
I	Ikeja					1							1
I	Ilala			1	1								2

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Indiana	27	10	15	3	6	8	3	5	23	84	118	302
I	Infantis	482	517	633	626	807	901	1,106	1,310	1,357	1,057	1,281	10,077
I	Inganda	1	2		2	2			1				8
I	Inverness	48	56	47	55	50	63	88	53	41	38	81	620
I	Irumu	9	5	10	8	3	2	7	1	3	16	6	70
I	Isangi	1	4	5	1	1	1	3	5	9	41	11	82
I	Israel	1	4			1						1	7
I	Itami	1	1		1		1	1					5
I	Ituri	1	1	2	1	5			1	2		1	14
I	Jaffna		1										1
I	Jalisco											1	1
I	Jamaica							3					3
I	Jangwani		8	2	5		2		3	1	2	1	24
I	Javiana	1,414	1,259	2,131	1,992	3,007	2,931	2,855	2,247	2,704	2,696	2,719	25,955
I	Jerusalem	1											1
I	Joal		1										1
I	Jodhpur			1						1	1		3
I	Johannesburg	22	38	29	49	40	67	50	44	35	26	34	434
I	Jubilee	1											1
I	Jukestown	1						2	1				4
I	Kaapstad					1		1		2			4
I	Kaduna								3			2	5
I	Kalamu	1			2						1		4
I	Kallo	1											1
I	Kalumburu										1		1
I	Kampala				1				1			1	3
I	Kanifing				1								1
I	Kapemba	1											1
I	Kedougou	4	1	2	2			2	8	1	4	2	26
I	Kentucky	122	95	93	73	94	101	113	92	93	87	63	1,026
I	Kenya											1	1
I	Kiambu	64	34	81	89	69	90	39	59	49	46	36	656
I	Kibi						2						2
I	Kimberley									1			1
I	Kimuenza		1										1
I	Kingabwa	4	7	6	6	4		6	5	1	5		44
I	Kingston		2	4	1	2	1		1	2	2	1	16
I	Kintambo	15	8	13	10	5	10	11	11	3	7	5	98
I	Kirkee	2											2
I	Kisangani	1		1	1	1	2	1		4	1		12
I	Kisarawe		3	1	2	2	3	2	1	3	6	4	27
I	Kisii		1							1			2
I	Kitenge									1			1
I	Kivu	1					2						3

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Koenigstuhl											1	1
I	Koketime			3					1	1			5
I	Kokomleme	2	3	2	2	4	6			3	4	1	27
I	Korlebu	1											1
I	Kortrijk	1											1
I	Kottbus	15	12	18	5	9	13	5	7	8	8	15	115
I	Kouka										2		2
I	Krefeld			2	2			1		1	1		7
I	Kua		1	3	1	1	1	2	2	1		1	13
I	Kumasi			2		1							3
I	Kunduchi			1									1
I	Kuntair									1	1		2
I	Kuru					1							1
I	Labadi			1									1
I	Lagos	1	3	1	1	3	4	2		3	1		19
I	Landau										1		1
I	Landwasser			2						1		1	4
I	Langensalza											1	1
I	Lansing		1		3								4
I	Larochelle	2	3	4	2	2	1	2	5	3			24
I	Lattenkamp		1	3	3	1	3	1	2	1	1	1	17
I	Lawndale							1					1
I	Lawra					1			2				3
I	Leiden								1				1
I	Lerum							1					1
I	Lexington	2	4	1	2	6	3	1		1		1	21
I	Lika											2	2
I	Lille		1					3	2		3		9
I	Limete	1		3						2	2		8
I	Lindenburg	3	2	3	1	1	2	1					13
I	Lindern										1		1
I	Lingwala											1	1
I	Litchfield	205	237	341	263	199	230	212	200	175	232	205	2,499
I	Liverpool	2	3	5	14	12	8	8	12	14	12	17	107
I	Livingstone	8	9	7	18	20	15	12	21	7	5	5	127
I	Loanda	2	3		1								6
I	Lockleaze	1	1			1					1		4
I	Lomalinda	20	11	15	17	31	21	30	40	40	38	82	345
I	Lome			1	1	1		3	3	2	1	4	16
I	Lomita		1	4	1	1	1			1			9
I	London	34	175	25	20	31	27	34	25	40	32	36	479
I	Loubomo						1						1
I	Louisiana								1				1
I	Luciana	3	8	5	5	3	4	7	4	2	5	15	61

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Luke						1	1	1				3
I	Maastricht									2			2
I	Macallen		1										1
I	Macclesfield							1					1
I	Madelia	11	10	9	20					3	2	1	56
I	Madison			1									1
I	Madras								1				1
I	Magwa							1					1
I	Manchester			1								1	2
I	Mango							1					1
I	Manhattan	76	53	106	78	92	82	83	68	78	119	128	963
I	Mapo											1	1
I	Maracaibo											2	2
I	Maricopa			3		1				1			5
I	Maritzburg										1		1
I	Marshall									1			1
I	Matadi		2	2		2	1	1	1	2	1	3	15
I	Matopeni	3	1	1		1		3	1	3	1		14
I	Maumee		1		4					1			6
I	Mbandaka	238	228	225	214	249	187	176	226	202	155	184	2,284
I	Meleagridis	20	27	9	16	13	16	20	13	10	5	16	165
I	Memphis	1						1	1				3
I	Menden	1				1							2
I	Mendoza										1		1
I	Menston	1	1	1			2	2		2			9
I	Mgulani	2	1		1		2	1			1		8
I	Miami	62	94	89	109	152	105	89	128	142	120	113	1,203
I	Michigan	4	7	3	6	5	2	2	4	5	11	6	55
I	Mikawasima	6	2	1	1	1	1	4	1	1	2	2	22
I	Minnesota	57	31	21	26	18	22	25	18	28	28	27	301
I	Mississippi	604	449	432	443	471	546	648	479	532	571	536	5,711
I	Missouri											1	1
I	Mocamedes										1		1
I	Molade	3	2	2	2	2	1	1	2	1	1	1	18
I	Mons			1									1
I	Monschau	10	11	13	21	23	15	15	45	31	42	41	267
I	Montaigu						1						1
I	Montevideo	1,057	957	1,087	1,259	1,062	1,194	1,200	889	841	931	1,018	11,495
I	Montreal						1						1
I	Morehead			2									2
I	Mornington	1											1
I	Moscow	1											1
I	Mountpleasant		1	1					1	1			4
I	Mpouto				1								1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Muenchen	757	952	878	818	829	976	1,036	938	873	1,106	1,216	10,379
I	Muenster	95	71	71	48	44	49	52	85	34	101	107	757
I	Nagoya	2										1	3
I	Napoli	3	1	1	2	2	6	5	4	9	10	11	54
I	Narashino						1						1
I	Natal										1		1
I	Nchanga	1	1					23	1				26
I	Ndolo											3	3
I	Nessziona	3	1				1						5
I	Neudorf	1	1										2
I	Neukoelln							1		1			2
I	Newholland					1		1					2
I	Newmexico	2	1	8	5	4		3	3	4	5	1	36
I	Newport	3,374	3,554	3,828	3,815	5,046	5,185	5,077	3,706	4,437	4,731	4,728	47,481
I	Newrochelle							1				1	2
I	Newyork		1						2				3
I	Nigeria		1	1	3				1				6
I	Nima	15	8	10	5	4	7	9	12	5	9	20	104
I	Nitra		1		1		1						3
I	Norwich	117	113	135	119	154	195	183	133	158	394	234	1,935
I	Nottingham	2	4	3	2	2	2	1	4	1	5	5	31
I	Nyanza		1		1	1				1	1		5
I	Oakland		1		1	2		1		2			7
I	Obogu					3	1						4
I	Offa	1	2	2	4	3			2		2	2	18
I	Ohio	68	49	38	56	61	64	45	62	57	43	88	631
I	Okatie	2						4	1	2	3	6	18
I	Oldenburg		1										1
I	Onderstepoort	1								1	3		5
I	Onireke				2	1	1						4
I	Ontario						1						1
I	Oranienburg	724	676	654	893	661	718	736	677	728	853	692	8,012
I	Orientalis			3	1				1		2		7
I	Orion	5	7	3		2	4	7	2		3	5	38
I	Oritamerin	1					2						3
I	Os	1											1
I	Oskarshamn		1										1
I	Oslo	23	19	36	32	31	24	31	29	51	41	62	379
I	Othmarschen	9	16	15	12	3	8	3	4	8	6	2	86
I	Ouakam	4					3	2		1	1		11
I	Overschie	3	2	2	1		1		5	2			16
I	Oxford	1											1
I	Panama	196	174	173	158	194	181	172	161	198	200	173	1,980
I	Papua			3			1	1					5



Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Paratyphi A	180	184	138	176	187	182	150	138	131	113	137	1,716
I	Paratyphi B	135	146	83	46	91	82	54	43	61	73	36	850
I	Paratyphi B var. L(+) tartrate+	408	398	469	431	447	431	513	317	335	394	343	4,486
I	Paratyphi C	1	1				2			1	4	2	11
I	Parkroyal										1	1	2
I	Penarth	1											1
I	Pensacola	12	11	13	9	15	25	23	13	23	14	22	180
I	Perth											1	1
I	Pharr				1			2					3
I	Ploufragan						1						1
I	Plymouth	2	1	1	1						2		7
I	Poano	5	2		3	4	6	1	2	1			24
I	Pomona	89	65	86	80	49	73	72	54	48	56	41	713
I	Poona	200	248	495	235	268	275	276	297	322	990	238	3,844
I	Portland	2		1				1	2	2		1	9
I	Potengi			1									1
I	Potsdam	18	16	23	31	16	21	26	18	45	12	12	238
I	Praha	1	1	1	1	3		1	1	2		1	12
I	Pramiso								1				1
I	Preston			1		1							2
I	Putten	2	5	9	25	5	12	4	6	23	18	3	112
I	Quiniela					1				1	1	1	4
I	Reading	50	57	46	53	33	42	58	55	104	139	221	858
I	Redlands	1						1		1			3
I	Remo	2	1		1								4
I	Rhone		1										1
I	Richmond	9	11	2	8	14	5	11	9	6	4	15	94
I	Ridge		1					2					3
I	Ried											1	1
I	Riggil								1				1
I	Rissen	17	11	29	127	16	24	30	35	39	24	40	392
I	Riverside			1					2	2	2		7
I	Romanby	1	1	1	2	1							6
I	Roodepoort	9	1		2	1	1	1	4	3	2	4	28
I	Rovaniemi	1											1
I	Rubislaw	94	119	120	88	144	179	140	178	225	240	230	1,757
I	Ruiru										5	2	7
I	Saarbruecken	3		1		3		1		1	3	2	14
I	Saintemarie		1										1
I	Saintpaul	577	499	1,814	850	881	703	764	1,006	980	947	778	9,799
I	Salford	1		1									2
I	Sandiego	214	195	132	141	155	142	195	191	197	235	185	1,982
I	Sangalkam											2	2

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Sangera				1		5						6
I	Sanjuan	1	1								1		3
I	Sanktgeorg	2											2
I	Sao								2				2
I	Sapele							1					1
I	Saphra	1	1	7	1	3	2	7	4		4	4	34
I	Saugus								3				3
I	Schwarzengrund	163	300	326	346	393	262	290	250	219	177	208	2,934
I	Senegal						2		1				3
I	Senftenberg	112	167	202	152	127	132	144	227	162	145	108	1,678
I	Seremban					1						1	2
I	Serrekunda								1				1
I	Shipley	1	1								1		3
I	Shubra	2	2	12	5	3		5		2	1	2	34
I	Simi	2	1										3
I	Singapore	7	8	13	9	7	9	10	7	11	8	13	102
I	Sinstorf	1		1			1		1				4
I	Skansen								1	1			2
I	Soahanina									1			1
I	Soerenga	3	7	5	5	4	4	5	4	9	9	3	58
I	Solt							1	1				2
I	Somone	1								1	1		3
I	Southbank			1									1
I	Splott					1					2		3
I	Stachus		1										1
I	Stanley	306	256	217	165	230	209	212	181	206	204	184	2,370
I	Stanleyville	5	6	10	9	4	5	7	3	7	5	7	68
I	Stellingen							1					1
I	Sternschanze		1										1
I	Stockholm		1										1
I	Stoneferry				1								1
I	Stormont						1						1
I	Strathcona									1	1		2
I	Stuttgart							1					1
I	Suberu	1											1
I	Suelldorf	1	2	1	3		1	2	5	3	1	1	20
I	Sundsvall	3	3	5	3	2	5	3	3	2	10	8	47
I	Szentes									1			1
I	Tabligbo		1										1
I	Takoradi	4	1	5	6	2	4	3	1	2	3	3	34
I	Taksony									4			4
I	Tallahassee	12	7	4	5	6	2	4	10	8	15	4	77
I	Tamberma	1					1			1	1	2	6
I	Tanzania	1											1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Tarshyne					1			2	1			4
I	Teddington						2				1		3
I	Tees					2							2
I	Teko								1		1	1	3
I	Teelkebir	52	68	28	26	28	16	23	24	19	15	40	339
I	Telhashomer										3		3
I	Teltow									1	2		3
I	Tennessee	310	602	124	63	32	29	30	37	19	32	48	1,326
I	Tennyson						1						1
I	Texas					2	1						3
I	Thompson	442	406	411	473	480	534	818	627	626	723	792	6,332
I	Tilene	1			1	1	1		2	1			7
I	Tokoin					2							2
I	Tornow					2				1			3
I	Toucra	1				1		1	1	1	3	3	11
I	Trachau										1		1
I	Travis				1					1			2
I	Treguier	1											1
I	Troy					1							1
I	Tschangu				1								1
I	Tsevie							3					3
I	Tshiongwe	3				2						1	6
I	Tucson		4	2	4	2	2	1	2		1	2	20
I	Tudu										1		1
I	Typhi	411	442	477	427	477	382	364	365	527	493	423	4,788
I	Typhimurium	6,813	6,152	6,485	6,087	6,104	6,120	5,702	5,745	5,041	4,943	4,581	63,773
I	Tyresoe	1		1									2
I	Uccle				1		1	2	1				5
I	Uganda	59	73	67	51	73	84	102	153	147	87	100	996
I	Ughelli											1	1
I	Umbilo	1					1		3		1		6
I	Umhlatazana							1					1
I	Uppsala	1	4				4					2	11
I	Urbana	35	59	53	40	38	67	60	40	25	38	56	511
I	Utah			1		1		1					3
I	Uzaramo	2		4	3					2	2		13
I	Vancouver		2	1		1			1				5
I	Vanier							1				2	3
I	Vejle				1	1					1		3
I	Veneziana									1			1
I	Victoria			1		1		1				1	4
I	Vinohradý	1				1							2
I	Virchow	72	74	106	81	98	75	133	67	66	95	113	980
I	Vitkin		1						1			1	3

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	Vleuten			1									1
I	Vuadens			1									1
I	Wa		1										1
I	Wagenia				1				1	1	1		4
I	Wandsworth	7	68	6	4	6	5	3	6	5	2	2	114
I	Wangata		2	3			1		1	7	2	2	18
I	Waral					1							1
I	Warmesen		1										1
I	Waycross	2		3	6	1	3		4		5	2	26
I	Wedding						1						1
I	Welikade				1				2			2	5
I	Weltevreden	92	83	90	73	79	56	75	61	69	80	131	889
I	Wernigerode								1		1		2
I	Weslaco		1				3						4
I	Westhampton	3	7	1			1		6	9	2	4	33
I	Widemarsh	2	2	6	4	3	3	32	13	6	2	11	84
I	Wien	3	2		2		2		2	1	1		13
I	Wimborne							1					1
I	Windermere							1					1
I	Winston					2	1			1			4
I	Woodinville			1		1	1		1			2	6
I	Worthington	33	17	38	29	31	27	56	30	29	39	34	363
I	Wyldegreen							1		1			2
I	Yaba										1	2	3
I	Yoruba	1						3					4
I	Zaiman		1	1									2
I	Zanzibar			3									3
I	Zaria						1						1
I	Zega								1			1	2
I	Zwickau	1							1				2
I	11:::e,n,x						2			1			3
I	11:i:-									1			1
I	11:k:-											1	1
I	11:r:-				1	1	2	1	3	2		2	12
I	11:z10:-	1						1		1			3
I	13,22:-:1,6		1					2			1	4	8
I	13,22:b:-						2			1			3
I	13,22:z:-	1			2	2	4		1			1	11
I	13,23:-:1,5		2	1	2	5	8	3	4	2	1	2	30
I	13,23:b:-	4	51	131	113	234	218	252	217	248	206	247	1,921
I	13,23:y:e,n,z15											1	1
I	13,23:z:-						1	2			4	1	8
I	16:::e,n,x					1							1
I	16:a:-					1					1	1	3

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	16:b:-					1	2	2		1		1	7
I	16:d:-			1	1	1		3	1		2	3	12
I	16:e,h:-				2			1					3
I	16:l,v:-		2				2	1			1		6
I	17:-:e,n,x						1						1
I	28:i:-	1				1		3		1	1	3	10
I	3,10:-:1,2							1					1
I	3,10:-:1,5						6	11	7	3	2		29
I	3,10:-:1,6		1	1				3					5
I	3,10:-:1,7										5		5
I	3,10:-:l,w						1			2	1	21	25
I	3,10:e,h:-	2				1		5	1	8	4		21
I	3,10:i:-					1							1
I	3,10:l,v:-	2	2		1	4	1	2	3	4	1	1	21
I	3,10:l,z13:-					1		1	1		1		4
I	3,10:r:-	3								2			5
I	30:b:-							2	1				3
I	38:k:-			2	1	4	2	1	2	1	1		14
I	4,[5],12:-:1,2	15	2	10	9	12	12	44	16	28	23	14	185
I	4,[5],12:-:1,5					1	2			1	9		13
I	4,[5],12:-:1,7		1			1		1	1	1	2		7
I	4,[5],12:-:e,n,z15						1			3			4
I	4,[5],12:b:-	105	180	200	215	266	245	265	220	203	173	203	2,275
I	4,[5],12:d:-	3	4	12	5	10	5	8	10	16	19	2	94
I	4,[5],12:e,h:-	4	5	4	2	1	11	18	10	19	21	2	97
I	4,[5],12:i:-	1,222	1,225	940	991	1,181	1,338	1,954	2,364	2,189	2,606	2,179	18,189
I	4,[5],12:l,v:-								2	3	3		8
I	4,[5],12:r:-	1		18	17	21	8	7	11	10	12	3	108
I	4,12,27:d:-					1							1
I	4,12,27:l,v:-					1							1
I	40:-:e,n,x							1		2	1		4
I	43:k:-	3											3
I	47:b:-				1						1		2
I	47:d:-						1	1					2
I	47:z4,z23:-	13	2	3	3	8	3	2				1	35
I	6,14:-:l,z13,z28	1											1
I	6,14:b:-	1	1	1									3
I	6,14:d:-					1						1	2
I	6,14:y:-						1						1
I	6,7:-:1,2				2				4	4	3	1	14
I	6,7:-:1,5	15	23	27	26	35	43	68	59	71	57	49	473
I	6,7:-:1,6				1	1	3	5			1	1	12
I	6,7:-:1,7					1		1			2		4
I	6,7:-:e,n,x				1	2	3	1		1			8

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	6,7:-:e,n,z15				2	2	3	2	3		1	1	14
I	6,7:a-									2			2
I	6,7:b-					2			1	4	1		8
I	6,7:c-	1	2	1	1		1	4	6	2	1	3	22
I	6,7:d-					3		2	2	3		1	11
I	6,7:e,h-	1	1	2	4	13	11	30	14	6	14	3	99
I	6,7:i-	1							1				2
I	6,7:k-	17	6	7	18	19	25	20	19	34	35	19	219
I	6,7:l,w-	1		3	1	2	5	1	1	4			18
I	6,7:r-	2	1	7	2	9	13	27	11	23	14	6	115
I	6,7:y-			3		4	2	11	3	11	7	4	45
I	6,7:z10:-						3	2	1	1		1	8
I	6,7:z4,z23:-										1		1
I	6,8:-:1,2	1	2	4	3	3	8	21	9	7	8	7	73
I	6,8:-:1,5		2			2		2	4	2	5	2	19
I	6,8:-:e,n,x						1		1	1			3
I	6,8:-:e,n,z15				1				1				2
I	6,8:b-					1	1	1			2		5
I	6,8:d-	1	8	5	8	9	8	14	15	7	12	7	94
I	6,8:e,h-	1	3	6	7	9	15	13	14	41	22	12	143
I	6,8:i-			1					2	3	6		12
I	6,8:l,v-			1		1	1	1	2				6
I	6,8:r-					1	1		1		1	1	5
I	6,8:y-								1				1
I	6,8:z10:-			2			1	1	3	2	8		17
I	8,20:-:z6							1					1
I	8,20:i-		1			1	1	1	2		1		7
I	9,12:-:1,2				1			1					2
I	9,12:-:1,5	3	4	6	9	12	13	20	19	44	39	27	196
I	9,12:-:1,6							1					1
I	9,12:-:e,n,x					1				1	1		3
I	9,12:a-			3		1	3		6	6		1	20
I	9,12:e,h-					1		5	3	3	2		14
I	9,12:g,z51:-	1				3		4	3	1		1	13
I	9,12:i-									4			4
I	9,12:l,v-	2	1	6		1	4	2	2	3	4		25
I	9,12:l,z13:-										1		1
I	9,12:l,z28:-	9	13	17	33	29	21	57	37	47	38	45	346
II	1,9,12,46,27:l,z13,z28:z39							1					1
II	13,22:g,m,t:[1,5]							1					1
II	13,22:z:-								1				1
II	13,22:z29:1,5					1						1	2
II	13,23:a:z42							1					1
II	13,23:b:[1,5]:z42					15	21	14					50

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
II	13,23:d:e,n,x			1									1
II	13,23:g,t:e,n,x					1							1
II	13,23:z:1,5							1					1
II	16:g,[m],[s],t:[1,5]						1		1				2
II	16:m,t:-					2	2		1		1		6
II	16:z4,z23:-		1										1
II	17:b:-						1						1
II	17:b:e,n,x,z15											1	1
II	17:g,t:[e,n,x,z15]			1					1				2
II	18:z4,z23:-										1		1
II	21:g,[m],[s],t:-		1	1			1			1	1		5
II	21:z10:[z6]	1	2	1	4	1		2	1	2	1	2	17
II	3,10:l,z28:1,5								1				1
II	30:b:z6					1							1
II	30:l,z28:z6	1		1	1			1	1	1		1	7
II	35:l,z28:-	1											1
II	4,12,[27]:b:[e,n,x]										1		1
II	40:b:-								1				1
II	40:c:e,n,x,z15				1		1	1					3
II	40:z39:1,7	1											1
II	40:z4,z24:z39							1					1
II	41:z10:z6		1	1									2
II	42:z:e,n,x,z15				1								1
II	42:z29:-											1	1
II	43:z4,z23:-									1		1	2
II	47:a:1,5										1		1
II	47:b:1,5	2	4	4	1		1		3				15
II	47:b:e,n,x,z15	1	2		2	3	2	1	1		1		13
II	47:b:z6		1										1
II	47:d:1,5						1						1
II	48:a:z39				1		1	1					3
II	48:a:z6	1	1	1			1	2	1	1			8
II	48:d:z6	2			2	1	1	1		1	2		10
II	50:b:z6	2	2	2	1	2	1		1	3		3	17
II	55:k:z39			1									1
II	58:c:z6	2	1					1	2	1	1	1	9
II	58:d:z6					1							1
II	58:l,z13,z28:1,5				1								1
II	58:l,z13,z28:z6	2	8	7	5	4		2	9	1	2	3	43
II	6,7:-:1,6						1			1	2	2	6
II	6,7:z:1,5	1											1
II	6,7:z:e,n,x									1			1
II	6,7:z39:1,5,7											1	1
II	60:g,m,t:z6			1			1						2

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
II	9,12:a:1,5							1			1		2
II	9,12:g,m,s,t:e,n,x							1					1
II	9,12:g,s,t:e,n,x						1						1
II	9,12:l,w:e,n,x					1	1	1	1				4
II	9,12:l,z28:1,5											1	1
II	9,12:z29:1,5						1	2		1			4
II	9,12:z39:1,7		1					1		2	1		5
IIIa	11:g,z51:-											1	1
IIIa	13,22:z4,z23:-	1	1				1	2	1	2	2		10
IIIa	13,23:g,z51:-	1		1		2	2	3	1	3	1	4	18
IIIa	13,23:z4,z23,[z32]:-			2		1						1	4
IIIa	13,23:z4,z24:-			1	6	1							8
IIIa	17:z29:-			1		1							2
IIIa	17:z36:-									1			1
IIIa	18:g,z51:-						1				1		2
IIIa	18:z36:-	1											1
IIIa	18:z4,z23:-	19	7	29	33	39	35	27	4	4	6	9	212
IIIa	18:z4,z32:-	1		2									3
IIIa	21:g,z51:-	2		2		2	1	1	1	2	6	1	18
IIIa	21:z29:-			2				1					3
IIIa	21:z36:-	1											1
IIIa	21:z4,z23:-				1			1			1	2	5
IIIa	21:z4,z32:-					1							1
IIIa	35:g,z51:-								1				1
IIIa	35:z29:-			1				1	1	1	1	1	6
IIIa	35:z4,z23:-	1	1	2	1	1		2				2	10
IIIa	35:z4,z32:-		2										2
IIIa	40:g,z51:-			2	1	2	3		1		4		13
IIIa	40:z36:-			1	1		1	1	1			1	6
IIIa	40:z4,z23:-	2		1	2	2			2	2			11
IIIa	40:z4,z24:-	1			1	1							3
IIIa	41:g,z51:-										2		2
IIIa	41:z4,z23,z32:-			1	1	1	1						4
IIIa	41:z4,z23:-	11	13	17	9	13	19	14	8	17	15	10	146
IIIa	41:z4,z24:-				2	1							3
IIIa	41:z4,z32:-				2	1	1	1	3				8
IIIa	42:g,z51:-		1						2	1			4
IIIa	42:z4,z23:-	1	1			2			1				5
IIIa	42:z4,z24:-			1		1		2					4
IIIa	43:g,z51:-					1							1
IIIa	43:z29:-			1		2							3
IIIa	43:z4,z23:-				2		3	3					8
IIIa	44:z4,z23,z32:-		1				1	1		1		1	5
IIIa	44:z4,z23:-			1			1			1	1		4



Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
IIIa	44:z4,z24:-	2		2	1	1			1		1	2	10
IIIa	44:z4,z32:-			1	1	1	1						4
IIIa	45:z4,z23:-					1							1
IIIa	47:g,z51:-							2		1		1	4
IIIa	47:z4,z23:-	3		1		4	1	2					11
IIIa	48:g,z51:-	6	8	16	15	6	18	16	14	21	17	13	150
IIIa	48:z29:-	1	1								1	3	6
IIIa	48:z36:-	1			1		1						3
IIIa	48:z4,z23,z32:-				1							1	2
IIIa	48:z4,z23:-								1	1	1	4	7
IIIa	48:z4,z24:-	4	3	6	4	3	14	13	2	5	14	10	78
IIIa	48:z4,z32:-										1		1
IIIa	50:g,z51:-						2		2		2		6
IIIa	50:z29:-				1								1
IIIa	50:z36:-			1					1		1		3
IIIa	50:z4,z23,z32:-								1				1
IIIa	50:z4,z23:-		3	1	2		1	1	1	1	1	1	12
IIIa	50:z4,z32:-	1											1
IIIa	51:g,z51:-		1	1				1	2				5
IIIa	51:z4,z23:-	1		1	1		1	2	3	6		7	22
IIIa	51:z4,z24:-			1									1
IIIa	51:z4,z32:-								1				1
IIIa	53:z4,z23,z32:-				1	1	1				1		4
IIIa	53:z4,z23:-	5		4	3	1	4	9	4	1	1	2	34
IIIa	53:z4,z24:-							1	1		1		3
IIIa	56:z4,z23:-	1	5	3	2	2	5	3	4	4	12	3	44
IIIa	59:z4,z23:-									2			2
IIIa	63:z4,z23:-	2				1							3
IIIb	(6),14:l,v:z						1						1
IIIb	(6),14:z10:z				1								1
IIIb	11:k:z53								1				1
IIIb	11:l,v:z53	1									1		2
IIIb	13,23:z:1,5			2									2
IIIb	16:z10:e,n,x,z15		4	1	1		1	4	3	1	3	3	21
IIIb	17:i:z35							1					1
IIIb	17:k:z											1	1
IIIb	17:z10:e,n,x,z15			1				1					2
IIIb	18:l,v:z				1								1
IIIb	21:k:z										1		1
IIIb	21:l,v:z							1					1
IIIb	35:i:e,n,x,z15						1						1
IIIb	35:i:z	1											1
IIIb	35:k:e,n,x,z15	1			2					1	1	3	8
IIIb	35:k:z53			1									1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
IIIb	35:l,v:z35			1	4		3	1		2		3	14
IIIb	35:r:e,n,x,z15	1		1	1					1			4
IIIb	38:(k):-	1							1			1	3
IIIb	38:(k):1,5,7							2	2				4
IIIb	38:(k):z35	1	1	1		1		1	3			1	9
IIIb	38:i:z							1					1
IIIb	38:l,v:z53			2	1			1	2				6
IIIb	42:(k):z35	1					2	1	1	3			8
IIIb	42:l,v:1,5,7											1	1
IIIb	47:k:-				1	1		1		3		2	8
IIIb	47:k:z35	1	3	3		7	4	4	3	2	1	2	30
IIIb	47:k:z53			1		1				1			3
IIIb	47:r:z				1						1		2
IIIb	47:r:z53				1	1	1	3	1	1	2		10
IIIb	47:z10:z35		1			1						1	3
IIIb	48:-:z							1					1
IIIb	48:c:z			1				2		2		2	7
IIIb	48:i:z	9	7	5	3	1	7	7	7	8	7	8	69
IIIb	48:i:z35	1									1	1	3
IIIb	48:k:z53					1		1	1			1	4
IIIb	48:l,v:z						1						1
IIIb	48:r:e,n,x,z15		1										1
IIIb	48:r:z			1				2	3				6
IIIb	48:z4,z24:-							1		1	2	1	5
IIIb	48:z52:z		1	1				1			2	3	8
IIIb	50:k:-							1		2			3
IIIb	50:k:z	1	1	3	8	7	15	9	11	8	7	6	76
IIIb	50:k:z35				1				1			2	4
IIIb	50:k:z53	2	1			1	1	1					6
IIIb	50:l,v:z			1	1		1						3
IIIb	50:l,v:z35			1		1	2				1		5
IIIb	50:r:-						1	1	1			1	4
IIIb	50:r:1,5,(7)			2									2
IIIb	50:r:z	10	3	7	3	7	4	7	7	10	7	10	75
IIIb	50:r:z35		1										1
IIIb	50:z:z52				2		1	1	3		1	1	9
IIIb	50:z52:z35	1	1	1		5	1	2			2	1	14
IIIb	53:-:z53							1					1
IIIb	53:k:e,n,x,z15	1										1	2
IIIb	53:k:z							1					1
IIIb	53:z10:z		1	2							1	2	6
IIIb	53:z10:z35	1	1	2	4	2	3	1	1	5	1	2	23
IIIb	53:z52:z53		1	1			3					2	7
IIIb	58:l,v:z35								1				1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
IIIb	59:l,v:z53										1		1
IIIb	60:i:e,n,x,z15									1			1
IIIb	60:k:z35									2			2
IIIb	60:r:-					1							1
IIIb	60:r:e,n,x,z15	4	2	3	10	5	5	1	4	3	4	6	47
IIIb	60:r:z			1		3	1	3		6		4	18
IIIb	60:z52:z				1						2	1	4
IIIb	60:z52:z35			1									1
IIIb	60:z52:z53	2	1		1	1	2	1	1		1		10
IIIb	61:-:1,5,[7]		6	1	3	21	11	1		1	2		46
IIIb	61:(k):z53					1							1
IIIb	61:c:1,5,[7]			1	1								2
IIIb	61:c:-											1	1
IIIb	61:c:z35	1	2	2	4	2	7	2	5	5		1	31
IIIb	61:i:-											1	1
IIIb	61:i:z		2	1	1			2		1	1		8
IIIb	61:i:z35			1									1
IIIb	61:i:z53	1			1	1		1	3			4	11
IIIb	61:k:1,5,[7]	2	1		1	13	7			1	1	9	35
IIIb	61:l,v:-									1	1		2
IIIb	61:l,v:1,5,7	11	13	8	23	16	17	17	16	14	10	8	153
IIIb	61:l,v:z35				1	1	2	1	2	4	2		13
IIIb	61:r:z					1			3				4
IIIb	61:r:z53		1										1
IIIb	61:z52:z											1	1
IIIb	61:z52:z53	4	2	5		4	5	4		1		4	29
IIIb	65:(k):z			2	1	2		1	1	1	2	1	11
IIIb	65:(k):z35		1	1	1		1						4
IIIb	65:(k):z53		1		1	1	1	1					5
IIIb	65:c:z53								1				1
IIIb	65:l,v:z						1					1	2
IIIb	65:z10:e,n,x,z15	2		1				1		2		2	8
IV	11:g,z51:-			1			1						2
IV	11:z4,z23:-	3	1	1	1				3	1		2	12
IV	16:z4,z24:-							1					1
IV	16:z4,z32:-	7	5	4	9	3	2		2	4	2	2	40
IV	17:z29:-									1			1
IV	18:z36,z38:-							1					1
IV	21:z4,z23:-							1					1
IV	21:z4,z32:-					1							1
IV	40:z4,z23:-			1					1	3			5
IV	40:z4,z24:-	1	2	1	1	2	2	1	3	2	1		16
IV	40:z4,z32:-	1	1		1				4	2	1	1	11
IV	41:z4,z23:-							1					1

Subspecies	Serotype	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
IV	43:z4,z23:-	4	1	2	3	5	2	5	3	1	3	9	38
IV	43:z4,z32:-				1			1					2
IV	44:z36,[z38]:-		1	1	1	6	6		3	6	4	1	29
IV	44:z4,z23:-	10	8	11	7	13	10	4	11	18	16	9	117
IV	44:z4,z24:-				4	2	3	1	4	5	6	3	28
IV	44:z4,z32:-	7		4	5		4	4	5	3	1	1	34
IV	45:g,z51:-	7	13	10	10	2	1	5	7	2	5	5	67
IV	48:g,z51:-	11	30	11	20	16	11	14	10	13	12	12	160
IV	48:z4,z24:-		1										1
IV	48:z4,z32:-	3	12	2	1	2		2	3		1	4	30
IV	50:g,z51:-	16	8	9	11	13	12	14	29	32	24	14	182
IV	50:z4,z23:-	56	83	42	22	9	9	15	10	10	12	16	284
IV	50:z4,z24:-								1				1
IV	50:z4,z32:-	2	1		3								6
IV	51:z4,z23:-					1							1
IV	53:z4,z23:-						1						1
IV	6,7:z4,z23:-									1			1
IV	6,7:z4,z24:-	1			5	1	5		1	4			17
S. bongori	48:a:-					1							1
S. bongori	48:z35:-			3					2	1		1	7
S. bongori	48:z81:-			3		1		1		2		2	9
	<b>Partially serotyped</b>	<b>1,322</b>	<b>1,130</b>	<b>1,520</b>	<b>1,021</b>	<b>942</b>	<b>1,039</b>	<b>1,006</b>	<b>912</b>	<b>771</b>	<b>991</b>	<b>801</b>	<b>11,455</b>
	<b>Rough, mucoid, and/or nonmotile isolates</b>	<b>109</b>	<b>97</b>	<b>126</b>	<b>129</b>	<b>228</b>	<b>219</b>	<b>319</b>	<b>210</b>	<b>187</b>	<b>237</b>	<b>220</b>	<b>2,081</b>
	<b>Unknown</b>	<b>3,543</b>	<b>3,577</b>	<b>5,136</b>	<b>2,699</b>	<b>2,910</b>	<b>3,117</b>	<b>3,600</b>	<b>3,652</b>	<b>2,954</b>	<b>3,743</b>	<b>5,626</b>	<b>40,557</b>
	<b>Total</b>	<b>39,644</b>	<b>38,667</b>	<b>44,408</b>	<b>39,711</b>	<b>44,570</b>	<b>44,065</b>	<b>45,783</b>	<b>42,212</b>	<b>44,444</b>	<b>47,734</b>	<b>46,623</b>	<b>477,861</b>

**Appendix 3b.** Partially serotyped culture-confirmed *Salmonella* infections reported to LEDS by serogroup and year, 2006-2016

The Pasteur Institute publishes the official list of known *Salmonella* serotypes and their respective serogroups. The document can be found at <http://www.pasteur.fr/jip/portal/action/WebdriveActionEvent/oid/015-000036-089>. Cells with no numbers indicate no reported cases of that serotype for the column year.

Subspecies	Serogroup	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
I	O:1,3,19	7	2	2	1	2	1			1		1	17
I	O:11	1									4		5
I	O:13											5	5
I	O:2	5	7	4	7	9	2	2	2			2	40
I	O:28											1	1
I	O:3											1	1
I	O:3,10	14	14	16	10	7	18	4	9	14	9	12	127
I	O:30									1			1
I	O:38	1											1
I	O:39											1	1
I	O:4	498	350	525	356	237	290	223	316	317	249	186	3,547
I	O:40	1								1			2
I	O:47	1											1
I	O:50											1	1
I	O:51	1											1
I	O:7	192	184	293	135	126	125	185	169	112	144	115	1,780
I	O:8	95	81	110	73	93	106	117	71	52	41	44	883
I	O:9	168	101	93	68	118	97	145	114	101	107	117	1,229
I	O:9,46										1		1
I	Unspecified	96	229	337	270	266	303	250	139	92	114	114	2,210
II	O:13											2	2
II	O:4											3	3
II	O:48									1			1
II	O:50										1		1
II	O:58											1	1
II	Unspecified	2	18	18	12	9	18	12	21	4	2	6	122
III	Unspecified	50	53	46	34	41	35	26	23	22	20	32	382
IIIa	O:13	1											1
IIIa	O:21											1	1
IIIa	O:40	1				1							2
IIIa	O:41				1					1			2
IIIa	O:48	1								1	2	1	5
IIIa	O:50					1				1			2
IIIa	O:51			2									2
IIIa	O:53							1					1
IIIa	Unspecified	20	8	15	15	8	10	13	14	11	9	15	138
IIIb	O:35	1	1				4		1	6	12		25
IIIb	O:38										1		1
IIIb	O:47	16				1		1			5	1	24

Subspecies	Serogroup	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
IIIb	0:48							1					1
IIIb	0:50	1						1		2	1	1	6
IIIb	0:53			1						1		1	3
IIIb	0:60	1			1			1					3
IIIb	0:61	1	2	1		1		1			1	6	13
IIIb	0:65		1	1								3	5
IV	0:11										1		1
IV	0:40					1							1
IV	0:43	1									1		2
IV	0:50	2									1	1	4
IV	Unspecified	33	57	35	22	8	14	5	7	10	13	6	210
Unspecified	0:11	18	3					1	4				26
Unspecified	0:13	19	10	13	10	6	8	12	14	12	232		336
Unspecified	0:16	9		1	1		2		1		3		17
Unspecified	0:17	3			2					2	4		11
Unspecified	0:18	1						2		1			4
Unspecified	0:21	2									1		3
Unspecified	0:28	2				1						1	4
Unspecified	0:3,10											1	1
Unspecified	0:30	2	1	1					2		1	1	8
Unspecified	0:35											8	8
Unspecified	0:38	4		1	1								6
Unspecified	0:39	2				1	3	2					8
Unspecified	0:4											65	65
Unspecified	0:40	4					1						5
Unspecified	0:41											1	1
Unspecified	0:42			1							1		2
Unspecified	0:43								2				2
Unspecified	0:44					1			1	1		1	4
Unspecified	0:45	1	1							1	2	1	6
Unspecified	0:47	2	1					1					4
Unspecified	0:48	2	1	2	1		1				1	2	10
Unspecified	0:50	38	1		1	1	1		2	2	4	1	51
Unspecified	0:51									1			1
Unspecified	0:58					1							1
Unspecified	0:6,14			1		1					2		4
Unspecified	0:65			1									1
Unspecified	0:7											11	11
Unspecified	0:8											27	27
S. bongori	Unspecified										1	1	2
VI	Unspecified	2	4			1							7
	<b>Total</b>	<b>1,322</b>	<b>1,130</b>	<b>1,520</b>	<b>1,021</b>	<b>942</b>	<b>1,039</b>	<b>1,006</b>	<b>912</b>	<b>771</b>	<b>991</b>	<b>801</b>	<b>11,455</b>

**NCEZID Atlanta:**

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