

National Enteric Disease Surveillance: Shiga toxin-producing *Escherichia coli* (STEC) Annual Report, 2012

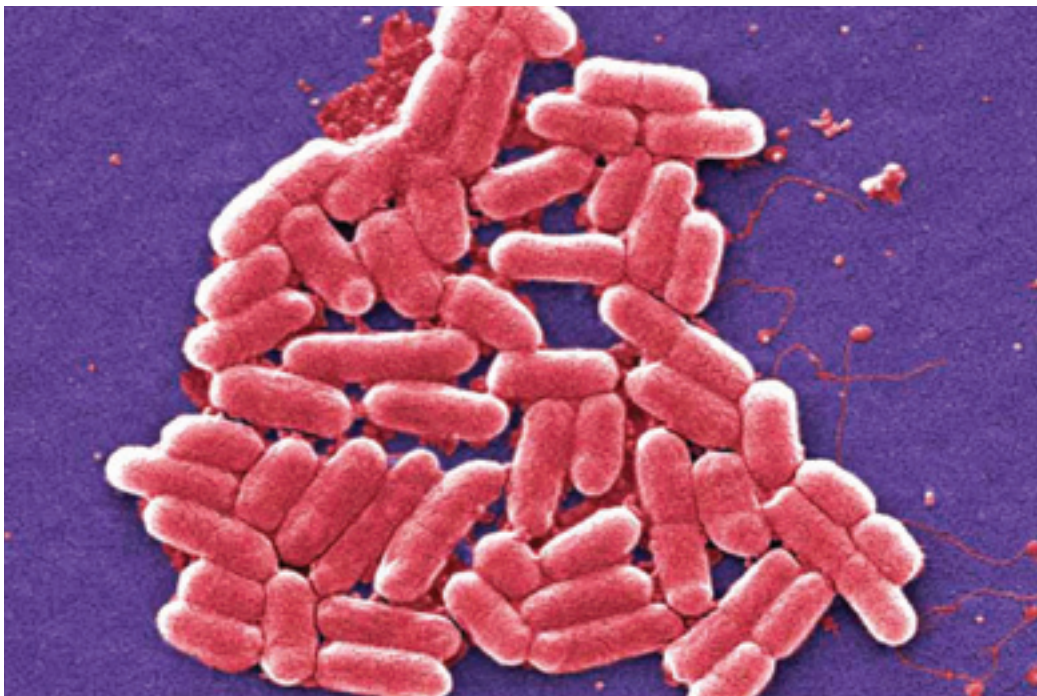
An overview of surveillance methods and systems for Shiga toxin-producing *Escherichia coli* (STEC) infections is available at <http://www.cdc.gov/ncezid/dfwed/PDFs/national-stec-surveillance-overview-508c.pdf> (1).

Human Surveillance Data: Laboratory-based Enteric Disease Surveillance (LEDS)

The Laboratory-based Enteric Disease Surveillance (LEDS) system collects reports of isolates from laboratory-confirmed human STEC infections from state public health laboratories. Reporting to LEDS is voluntary, and the number of states submitting reports varies somewhat from year to year, although almost all states report every year. 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 STEC serotype per person within a 30-day period.

In this report, we summarize the number of infections reported, and also report incidence rates (cases per 100,000 population), which are calculated as the number of STEC infections reported for a given year divided by the state population for that year. Data were received from all 51 reporting jurisdictions (50 states plus the District of Columbia) in 2012.

Data in this report current as of 7/25/2014.



Colorized scanning electron micrograph (SEM) of Gram-negative *Escherichia coli* O157:H7.

Table 1. Laboratory-confirmed STEC infections reported to CDC, with the 20 most frequently reported serogroups listed individually, United States, 2012

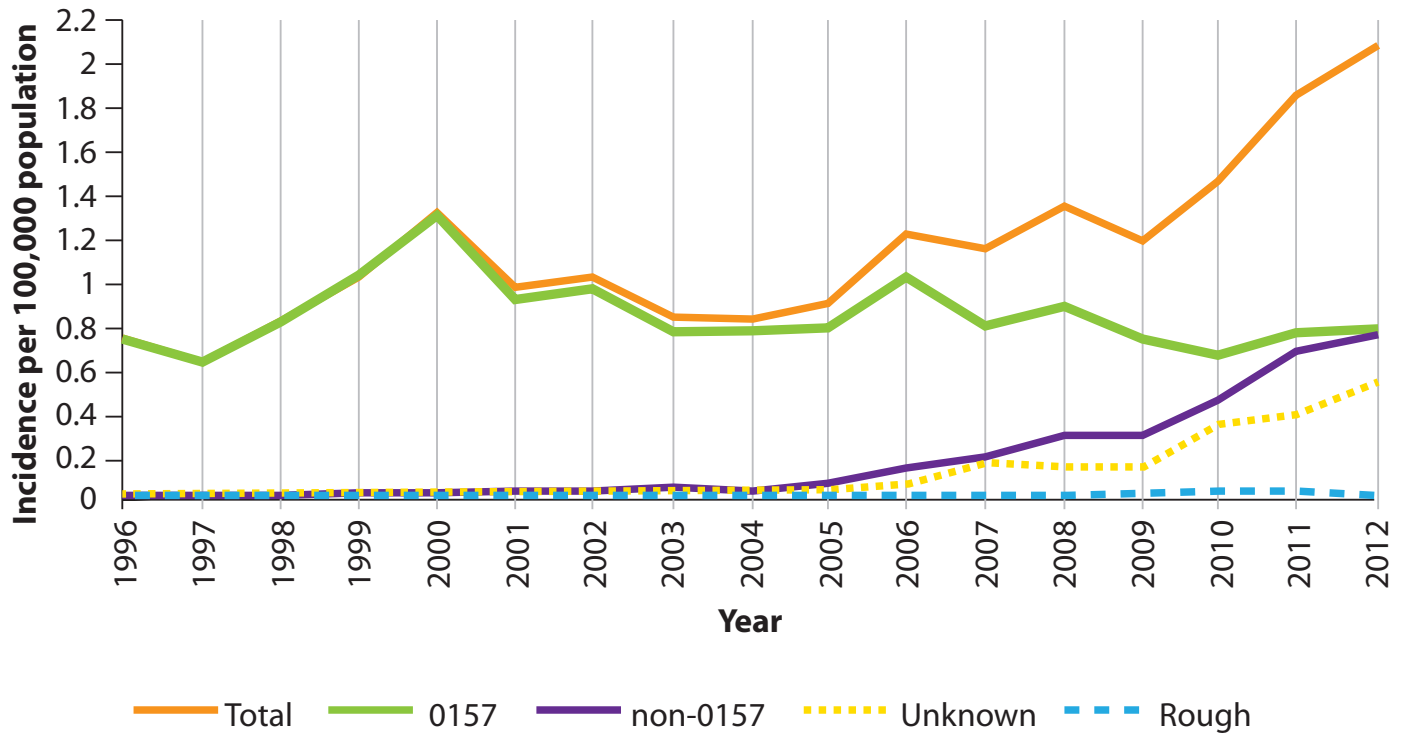
Rank	Serogroup	Number Reported	Percent
1	O157	2460	51.7
2	O26	655	13.8
3	O103	568	11.9
4	O111	365	7.7
5	O121	163	3.4
6	O45	120	2.5
7	O145	109	2.3
8	O118	38	0.8
9	O186	28	0.6
10	O5	24	0.5
10	O69	24	0.5
12	O71	23	0.5
13	O91	18	0.4
14	O146	13	0.3
15	O165	11	0.2
16	O181	8	0.2
16	O76	8	0.2
18	O84	7	0.1
19	O113	5	0.1
	Subtotal	4654	97.9
	Non-O157, other serogroups	73	1.5
	Rough*	29	0.6
	Subtotal	102	2.1
		4756	100.0

* When isolates are rough, the O group cannot be determined by serology. These isolates can be O157 or non-O157.

State public health laboratories reported 4,756 cases with laboratory evidence of STEC infections to CDC through LEDS. An additional 1,749 STEC infections were reported, but are of unknown serogroup and not laboratory-confirmed.

- The top 7 serogroups in 2012 were O157 (51.7%), O26 (13.8%), O103 (11.9%), O111 (7.7%), O121 (3.4%), O45 (2.5%), and O145 (2.3%)

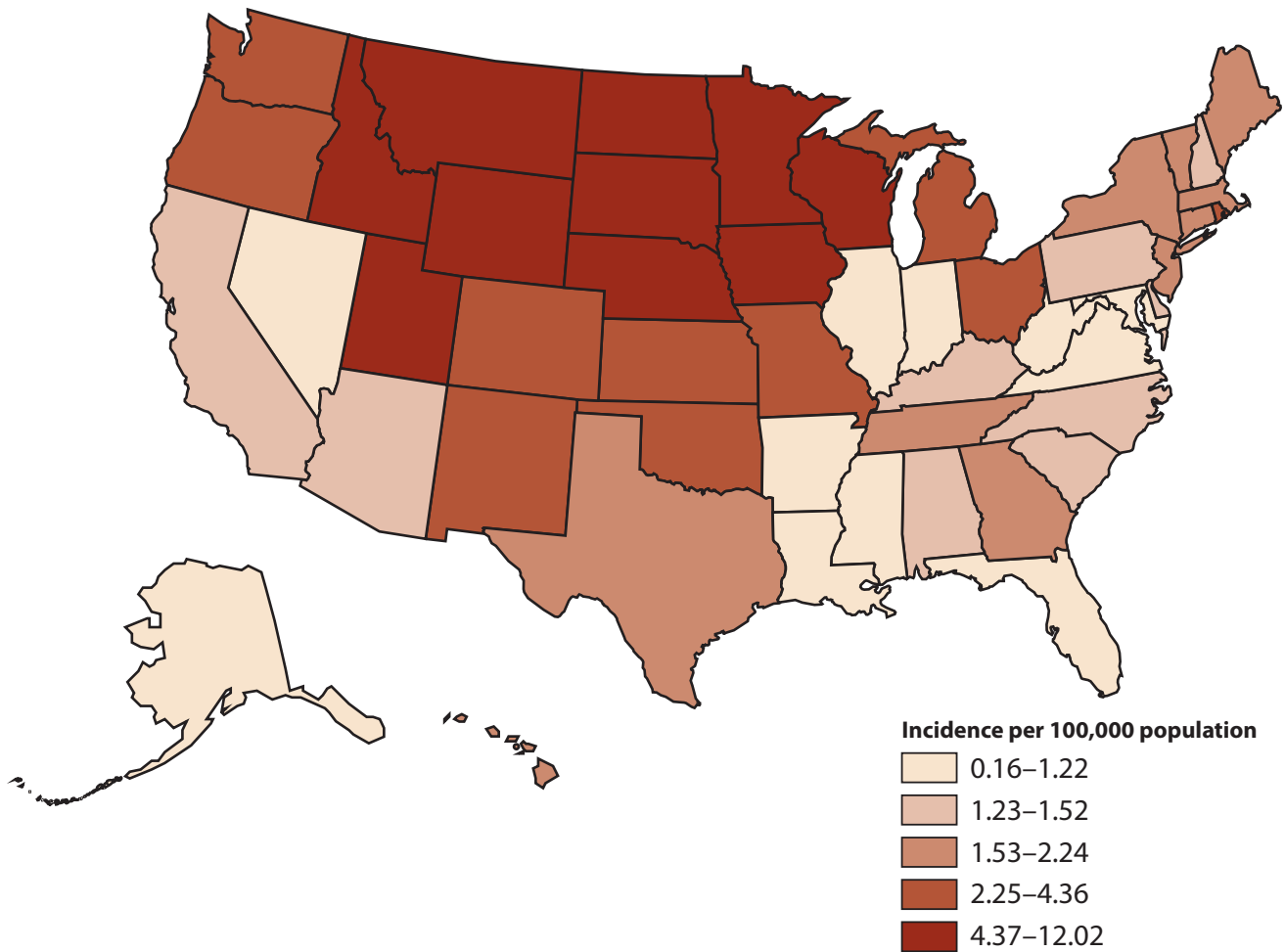
Figure 1. Incidence rate of STEC infection reported to CDC, by serogroup, United States, 1996–2012 (n=55,596)



The overall incidence rate of STEC infection in 2012 (2.1) was higher than in 2011 (1.8).

- The incidence rate of STEC infection of unknown serogroup increased markedly from 2000 to 2012, likely caused by increased testing of diarrheal stools for Shiga toxin in clinical laboratories, without concomitant bacterial culture and serotyping. An unknown proportion of reports with unknown serogroup may represent Shiga toxin-positive stool specimens from which an STEC was not isolated; these reports do not meet the Council of State and Territorial Epidemiologists (CSTE) case definition for laboratory-confirmed STEC infection.

Figure 2a. Incidence rates of STEC infection reported to CDC, by reporting jurisdiction, United States, 2012 (n=6,506)*

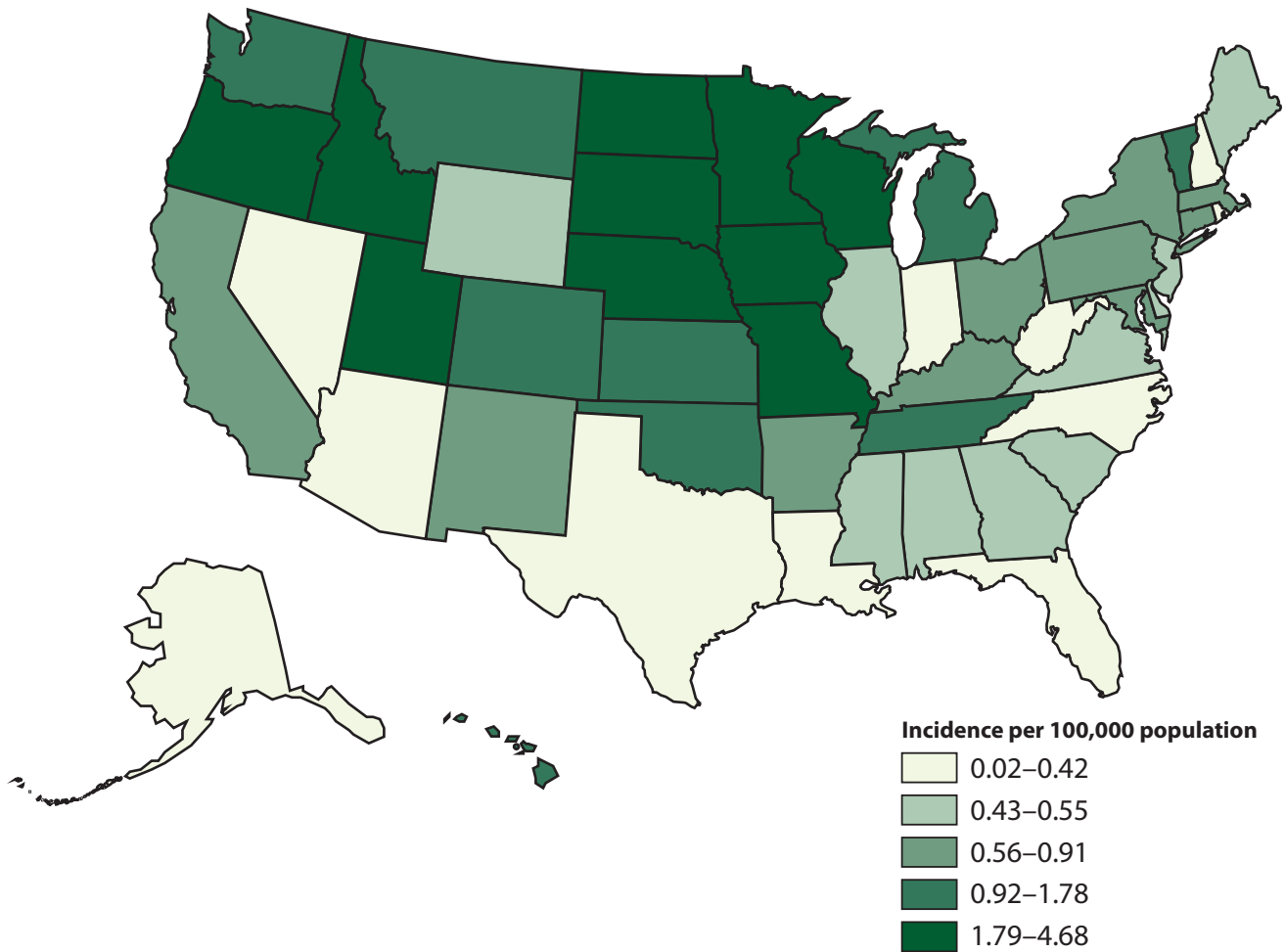


* Includes infections of rough serotype and not laboratory-confirmed.

All jurisdictions reported STEC infections in 2012. The overall incidence rate (cases per 100,000 population) was 2.1, moderately higher than in 2011 (1.8).

- Incidence rates were generally highest in the northern-latitude jurisdictions. The jurisdictions with the highest rates were Nebraska (9.9), Idaho (6.3), and South Dakota (6.0).

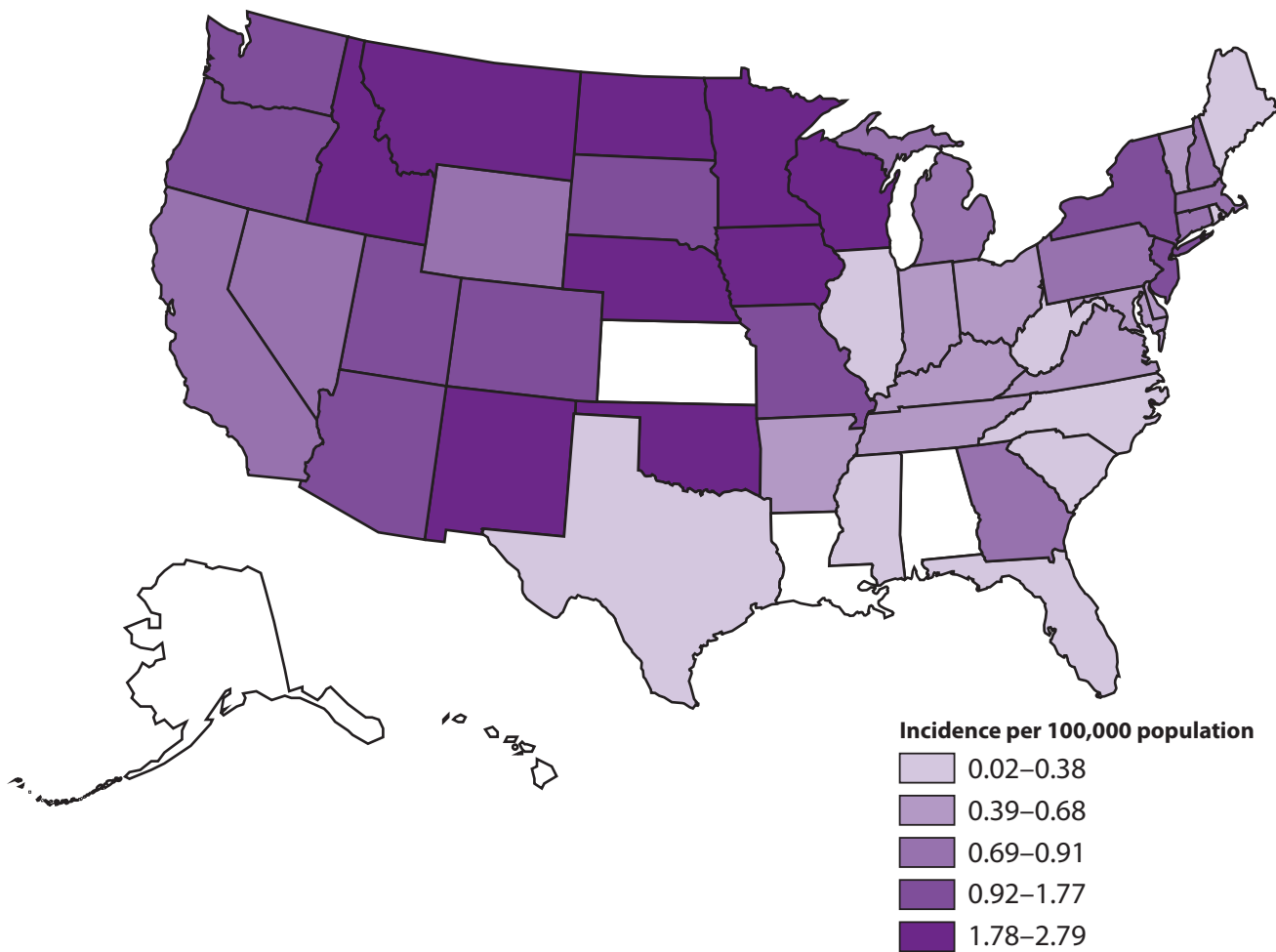
Figure 2b. Incidence rate of laboratory-confirmed STEC O157 infection reported to CDC, by reporting jurisdiction, United States, 2012 (n=2,460)



Jurisdictions reported 2,460 STEC O157 infections, corresponding to an incidence rate (cases per 100,000 population) of 0.78.

- The highest incidence rates were in geographically varied regions, although they tended to cluster in northern latitude jurisdictions in the central and western United States, whereas southern latitude jurisdictions generally had lower incidence rates. The jurisdictions with the highest reported incidence rates were South Dakota (4.7), Idaho (3.5), and Utah (2.5).

Figure 2c. Incidence rate of laboratory-confirmed non-O157 STEC infection reported to CDC, by reporting jurisdiction, United States, 2012 (n=2,267)*

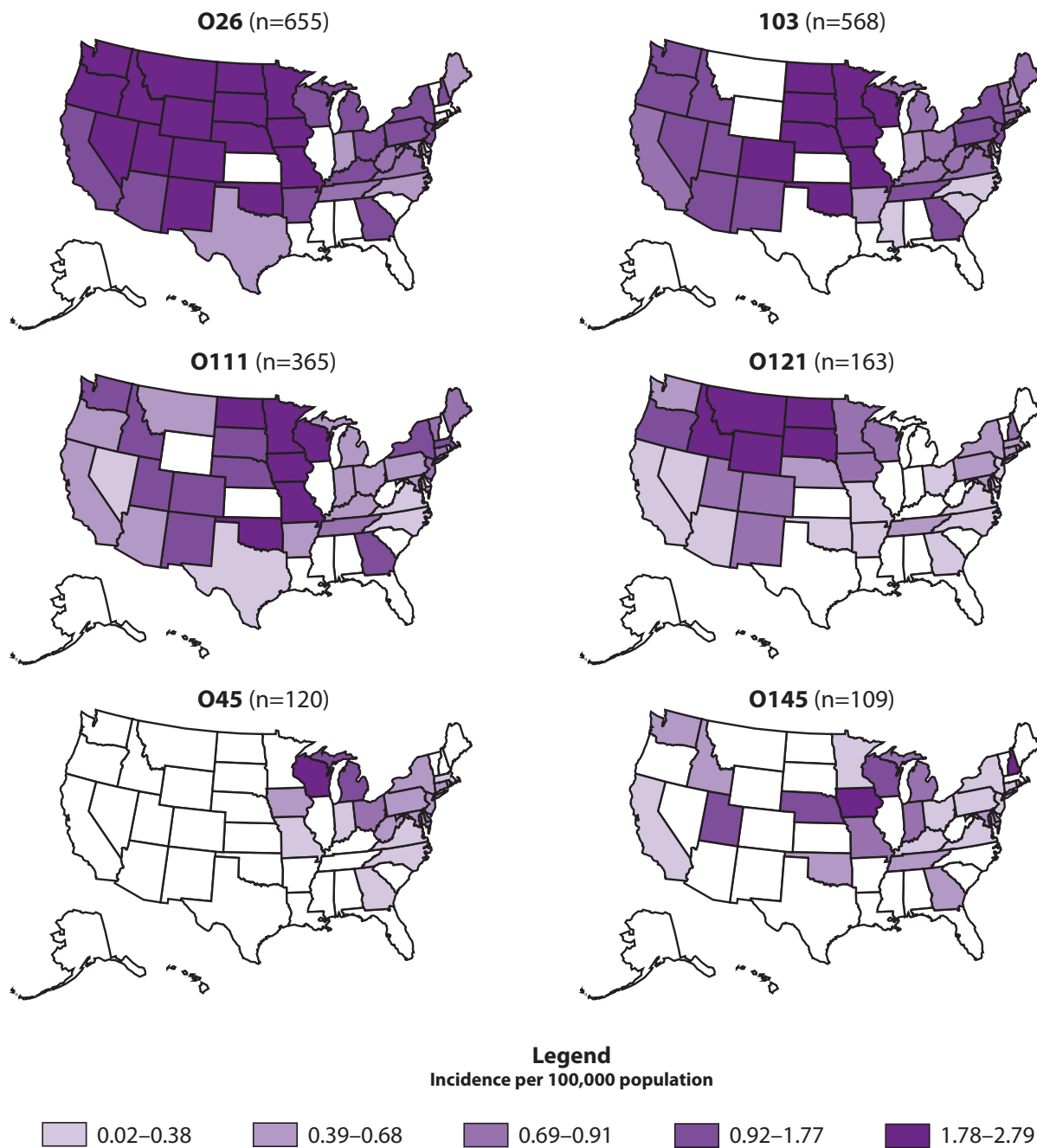


* Unshaded reporting jurisdictions are those that reported no non-O157 STEC infections (i.e., no infections were diagnosed or the jurisdiction did not report to CDC).

Forty-five jurisdictions reported a total of 2,267 non-O157 STEC infections, corresponding to an overall incidence rate (cases per 100,000 population) of 0.72.

- The jurisdictions with the highest reported incidence rates were Montana (2.8), Idaho (2.8), and Wisconsin (2.5).
- The geographic distribution of non-O157 STEC infections was similar to that of O157 STEC infections.

Figure 2d. Incidence rates of laboratory-confirmed non-O157 STEC infections, top 6 non-O157 STEC serogroups reported to CDC, by reporting jurisdiction, United States, 2012 (n=1,980)*



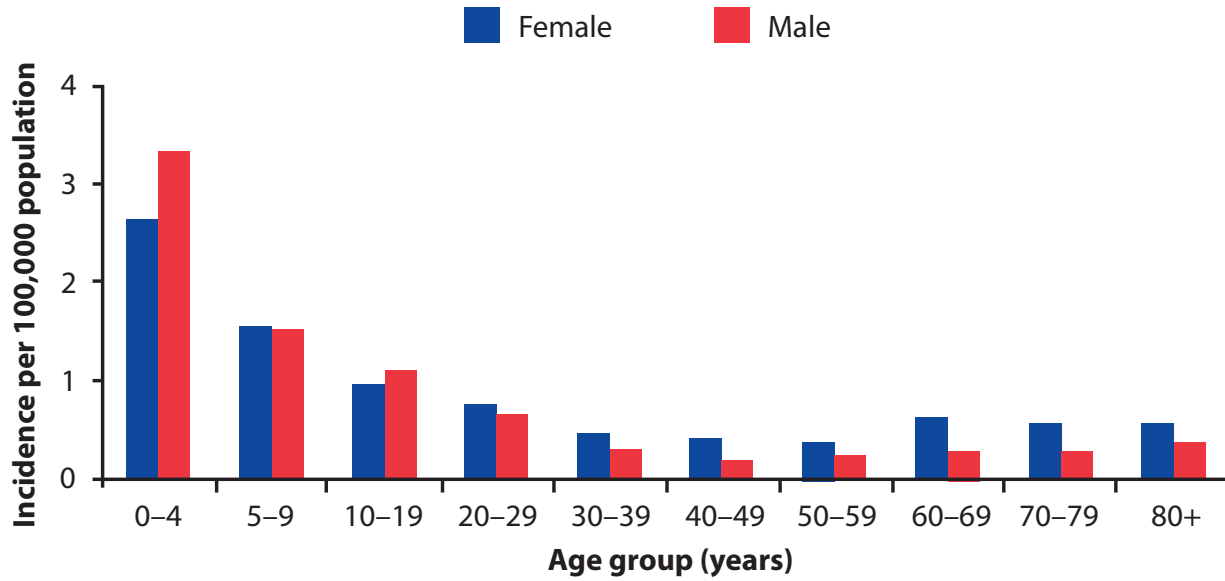
* Unshaded reporting jurisdictions are those that reported no non-O157 STEC infections (i.e., no infections were diagnosed or the jurisdiction did not report to CDC).

The 6 non-O157 STEC serogroups that caused the most infections during 2012 were O26, O103, O111, O121, O45 and O145. Fewer jurisdictions reported non-O157 STEC infections to LEDS than reported STEC O157 infections. This, in part, reflects variation in clinical testing practices and public health reporting practices among jurisdictions.

See the National STEC Surveillance Overview for further information:
<http://www.cdc.gov/ncezid/dfwed/PDFs/national-stec-surveillance-overview-508c.pdf>

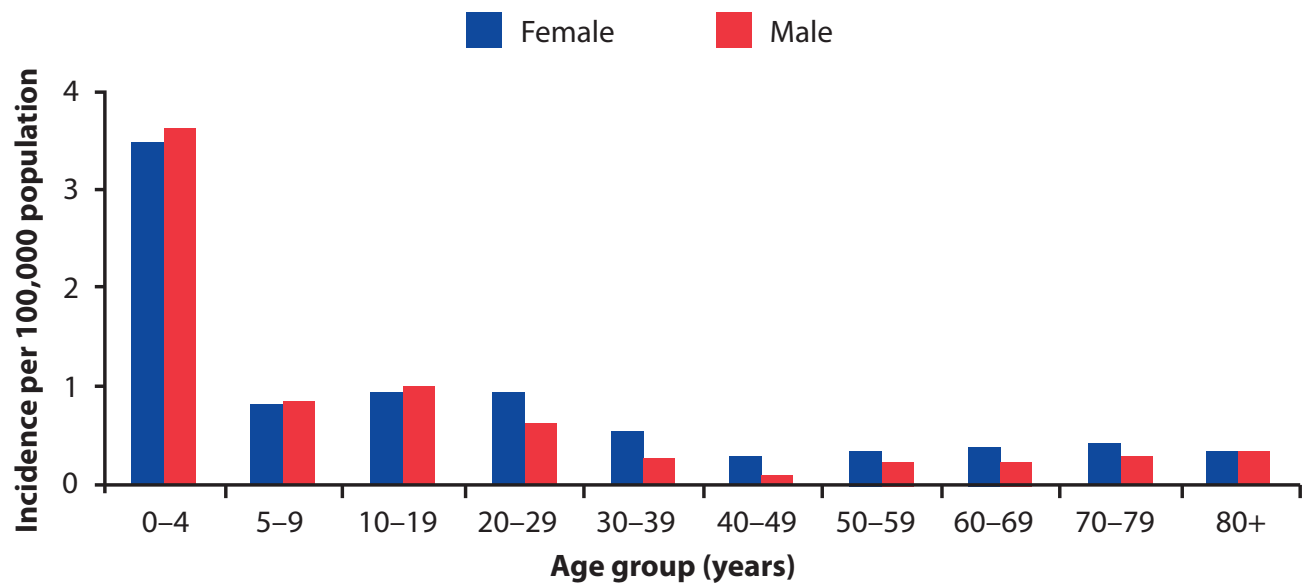
- Thirty-nine reporting jurisdictions reported 655 STEC O26 infections, corresponding to an incidence rate (cases per 100,000 population) of 0.21.
- Thirty-nine reporting jurisdictions reported 568 STEC O103 infections, corresponding to an incidence rate of 0.18.
- Thirty-seven reporting jurisdictions reported 365 STEC O111 infections, corresponding to an incidence rate of 0.12.
- Thirty-two reporting jurisdictions reported 163 STEC O121 infections, corresponding to an incidence rate of 0.05.
- Seventeen reporting jurisdictions reported 120 STEC O45 infections, corresponding to an incidence rate of 0.04.
- Twenty-six reporting jurisdictions reported 109 STEC O145 infections, corresponding to an incidence rate of 0.03.
- The jurisdictions with the highest incidence rate for each of the top 6 non-O157 serogroups were the following: STEC O26 Idaho (1.7 cases per 100,000 population), STEC O103 Nebraska (1.1), STEC O111 Oklahoma (0.8), STEC O121 (1.2), STEC O45 (0.4), and STEC O145 (0.3).

Figure 3a. Incidence rate of laboratory-confirmed STEC O157 infection reported to CDC by age group and sex, United States, 2012 (n=2,358)



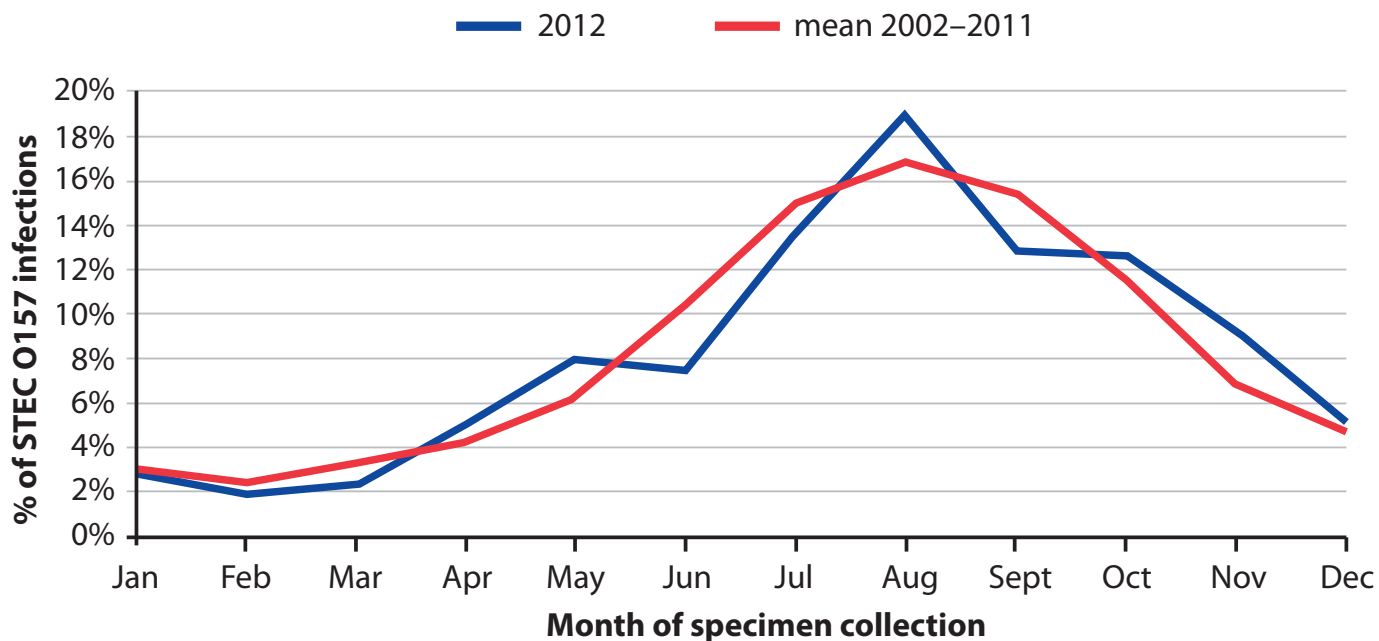
The highest incidence rates of STEC O157 infection were in children under 5 years old; this rate was considerably greater than the incidence rate in children 5 to 9 years old for both boys and girls.

Figure 3b. Incidence rate of laboratory-confirmed non-O157 STEC infection reported to CDC by age group and sex, United States, 2012 (n=2,212)



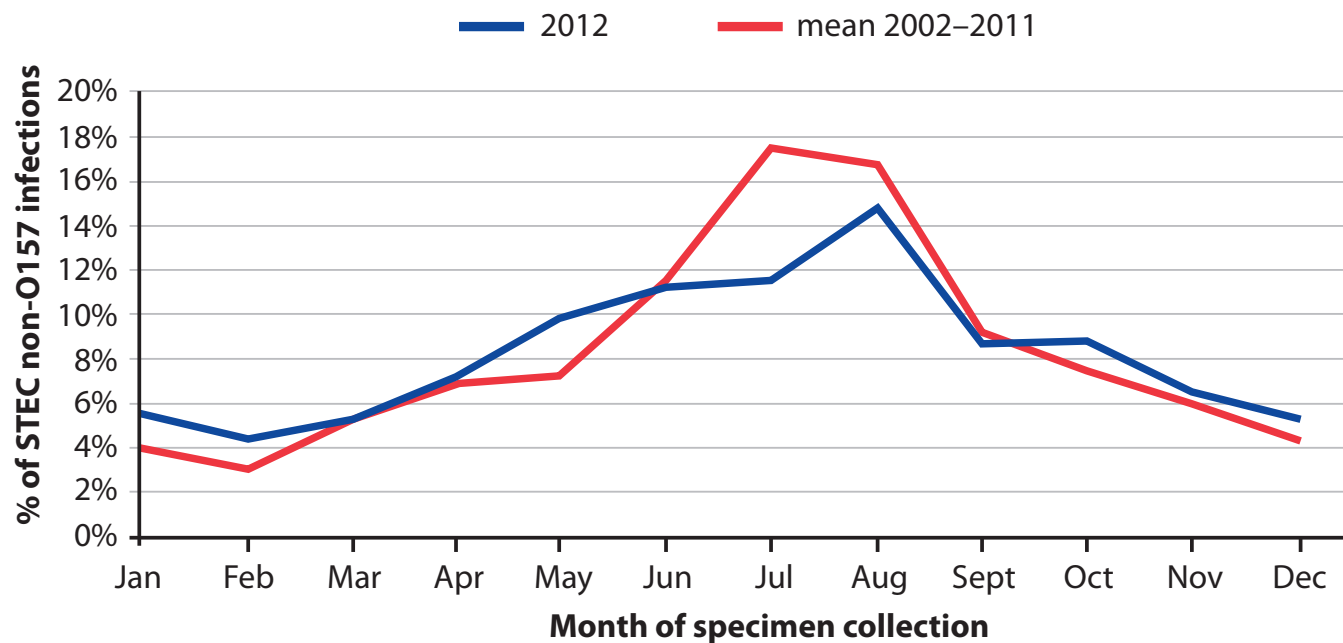
The highest incidence rates of infection with non-O157 STEC were in children under 5 years old; this rate was nearly 3 times the incidence rate in children 5 to 9 years old.

Figure 4. Percentage of laboratory-confirmed STEC O157 infections reported to CDC, by month of specimen collection, United States, 2012 and mean annual percentage during 2002–2011



STEC O157 infections reported during 2012 had seasonal variation similar to those during 2002-2011.

Figure 5. Percentage of laboratory-confirmed non-O157 STEC infections reported to CDC, by month of specimen collection, United States, 2012 and mean annual percentage during 2002–2011



Non-O157 STEC infections reported during 2012 had seasonal variation similar to those during 2002-2011.

Human Surveillance Data: National Notifiable Diseases Surveillance Systems (NNDSS)

The National Notifiable Disease Surveillance System (NNDSS) collects and compiles reports of nationally notifiable infectious diseases, including STEC. This system includes reports of laboratory-confirmed cases and probable cases (clinically compatible cases with an epidemiological link to a confirmed case). The STEC case definition is available at: <http://wwwn.cdc.gov/NNDSS/script/casedef.aspx?CondYrID=951&DatePub=1/1/2014 12:00:00 AM>

The report for 2012 was not yet available when this report was written. Reports are available at http://www.cdc.gov/mmwr/mmwr_nd/index.html

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

The National Antimicrobial Resistance Monitoring System (NARMS) monitors antimicrobial resistance among enteric bacteria (including STEC) isolated from humans. Reports are available at <http://www.cdc.gov/narms/reports/index.html>

Human Outbreak Data: Foodborne Disease Outbreak Surveillance System (FDOSS) and Waterborne Disease Outbreak Surveillance System (WBD OSS)

The Foodborne Disease Outbreak Surveillance System (FDOSS) collects reports of foodborne disease outbreaks from local, state, tribal, and territorial public health agencies.

Reports are available at <http://www.cdc.gov/foodsafety/fdoss/data/annual-summaries/index.html>.

The Waterborne Disease and Outbreak Surveillance System (WBD OSS) collects reports of waterborne disease outbreaks associated with drinking water and recreational water from local, state, tribal, and territorial public health agencies.

The report for 2012 was not yet available when this report was written. Reports are available at <http://www.cdc.gov/healthywater/surveillance/surveillance-reports.html>.

References

1. Centers for Disease Control and Prevention (CDC). National STEC Surveillance Overview. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2012.

Recommended Citation:

Centers for Disease Control and Prevention (CDC). Shiga toxin-producing *Escherichia coli* (STEC) National Surveillance Annual Summary, 2012. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2014.

NCEZID Atlanta:

**For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333 MS C-09
Telephone: 1-404-639-2206 Email: cdcinfo@cdc.gov**

APPENDICES (separate document; listed here for reference)

Appendix 1. Laboratory-confirmed Shiga toxin-producing *Escherichia coli* (STEC) infections reported to CDC by serogroup, age group, and sex, 2012

Appendix 2. Laboratory-confirmed Shiga toxin-producing *Escherichia coli* (STEC) infections reported to CDC by serogroup and reporting jurisdiction, 2012

Appendix 3. Laboratory-confirmed Shiga toxin-producing *Escherichia coli* (STEC) infections reported to CDC by serogroup and year, 2001-2012