National Enteric Disease Surveillance: *Shigella* Annual Report, 2010

An overview of surveillance methods and systems for *Shigella* infections is available online at http://www.cdc.gov/ncezid/dfwed/PDFs/Shigella-Overview-508.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 *Shigella* infections from state public health laboratories. Reporting to LEDS is voluntary, and the number of states submitting isolates 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 *Shigella* species 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 *Shigella* infections in humans reported for a given year, divided by the state population for that year. Data were received from 49 of 51 reporting jurisdictions (50 states plus the District of Columbia) in 2010.

Data in this report current as of 1/14/2013.

Photograph depicting the colonial morphology displayed by *Shigella boydii* bacteria cultivated on a Hektoen enteric (HE) agar surface.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Foodborne Waterborne, and Environmental Diseases

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Table 1. Laboratory-confirmed *Shigella* infections reported to CDC, by species, United States, 2010

Rank	Serotype	Number Reported	Percent
1	*S. sonnei*	7122	79.5
2	*S. flexneri*	1026	11.5
3	*S. boydii*	73	0.9
4	*S. dysenteriae*	34	0.4
	Sub Total	**8256**	**92.1**
	Unknown	707	7.9
	Sub Total	**707**	**7.9**
	Total	**8962**	**100**

State public health laboratories reported 8,962 laboratory-confirmed *Shigella* infections to CDC through LEDS

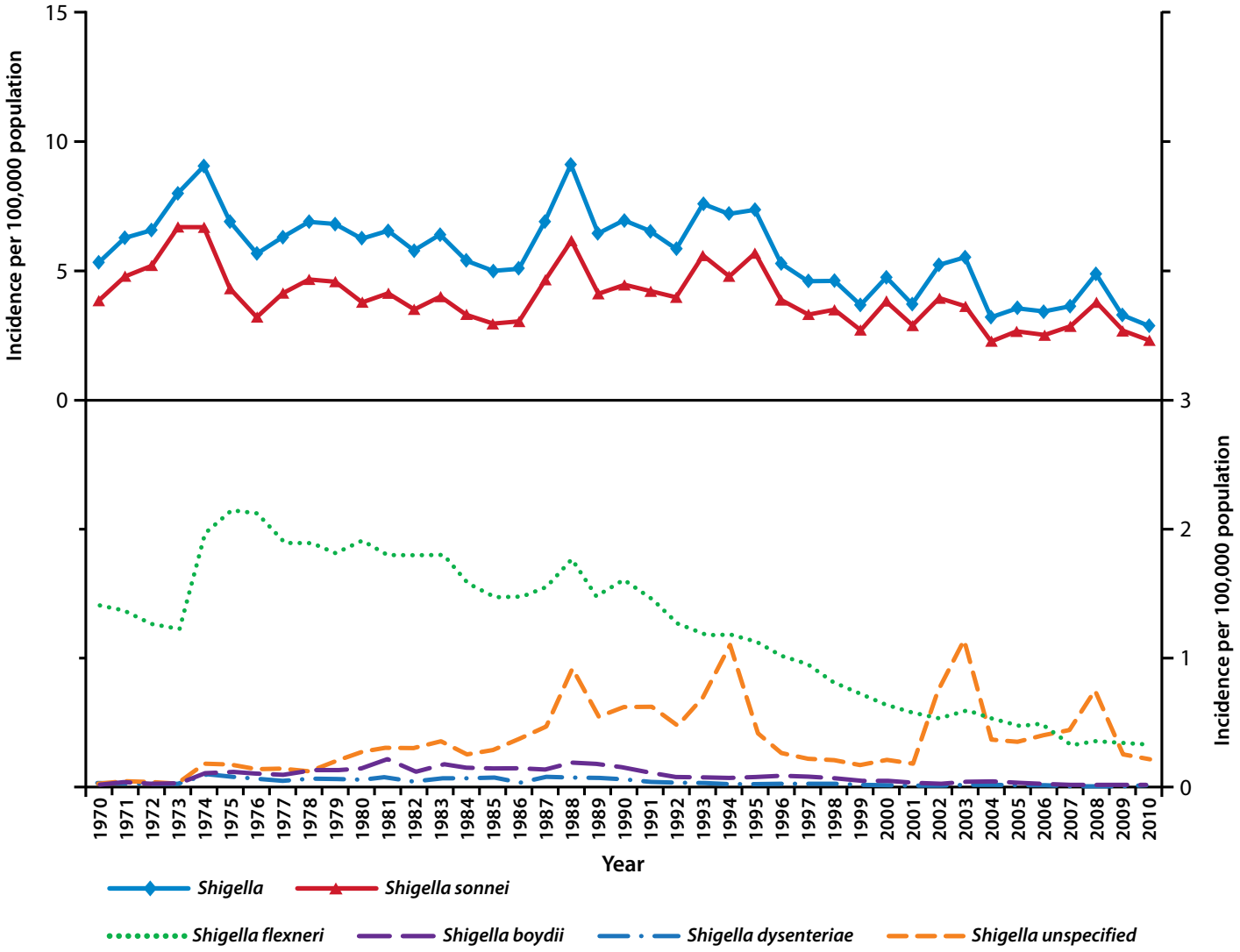
- Of the 8,962 isolates, 8,256 (92%) were identified to species level.
- Distribution by species was similar to previous years, with *Shigella sonnei* accounting for the largest percentage of infections (79.5%), followed by *Shigella flexneri* (11.5%), *Shigella boydii* (0.9%), and *Shigella dysenteriae* (0.4%).

Table 2. Median age (years) of persons with laboratory-confirmed *Shigella* infections reported to CDC by species and year, United States, 2000-2010

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
S. sonnei	8	8	7	7	7	7	7	6	6	6	6
S. flexneri	10	15	21	23	20	20	18	15	17	22	25
S. boydii	25	25	21	17	21	25	10	26	16	17	22
S. dysenteriae	10	28	29	22	9	25	20	8	15	31	28
Unknown	13	23	6	6	7	8	8	9	7	22	8

In 2010, the median age of persons with *S. sonnei* was 6 years. The median age has decreased since 2000. In contrast, the median age of persons with *S. flexneri* was 25 years, the highest since 2000.

Figure 1. Incidence rate of laboratory-confirmed *Shigella* infection reported to CDC (all species), United States, 1970-2010



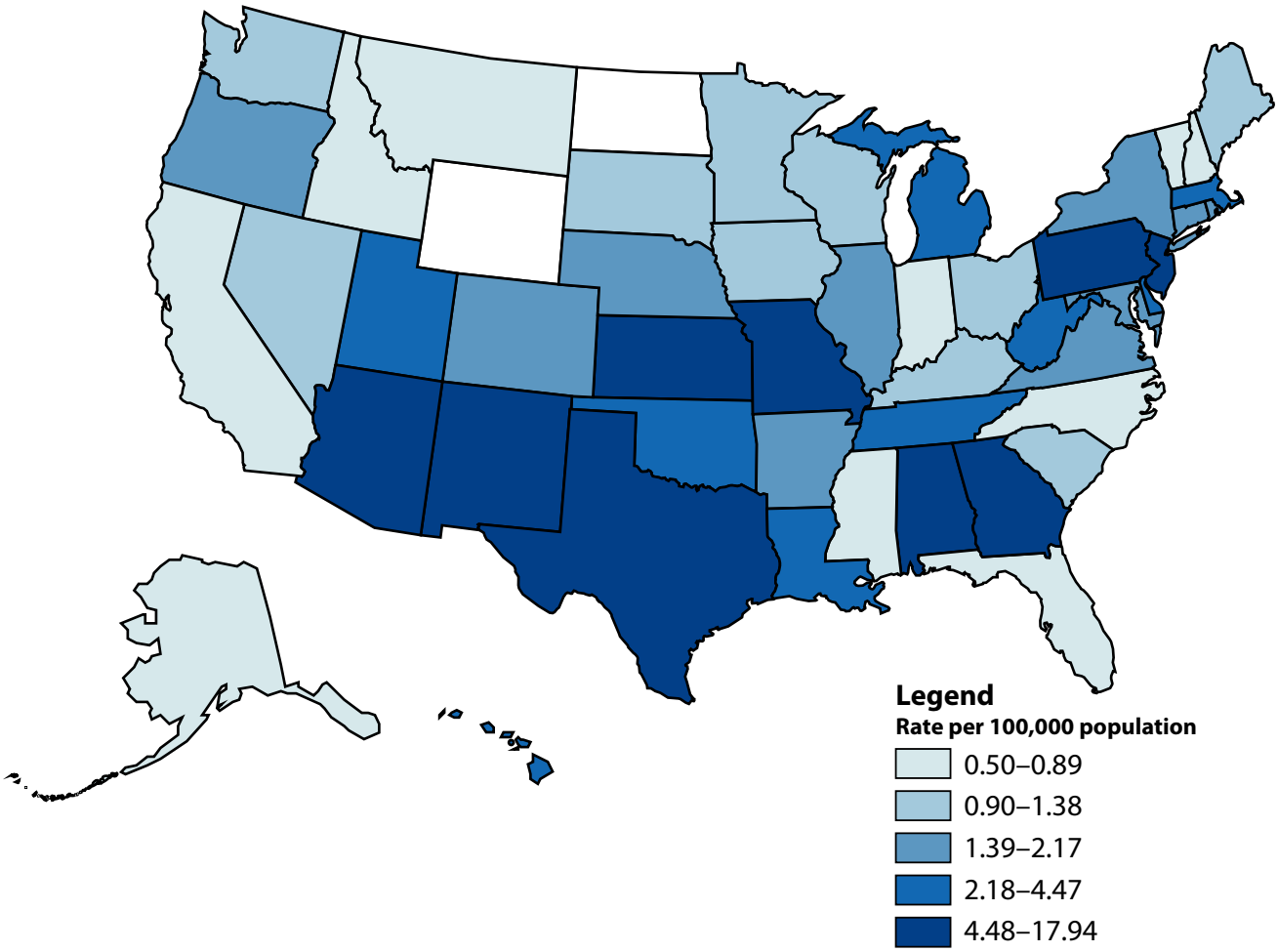
The top panel of this graph shows the incidence rates of infection with *Shigella* (all species) and *Shigella sonnei* from 1970 to 2010.

- Since 1970, the incidence rate of infection with *Shigella* (all species) has been driven by the incidence rate of infection with *Shigella sonnei*.

The bottom panel of this graph shows the incidence rate of infection with all *Shigella* species other than *Shigella sonnei* and includes infections with an unspecified species.

- The incidence rate of infection with *Shigella flexneri* has been decreasing since the 1980s.
- Since the mid-1980s, the incidence rate of *Shigella* infection in which the species is not identified has fluctuated, likely representing at least to some extent outbreak situations where public health laboratories did not characterize all outbreak-associated *Shigella* isolates to the species level.
- *Shigella boydii* and *Shigella dysenteriae* infections are rare in the United States.

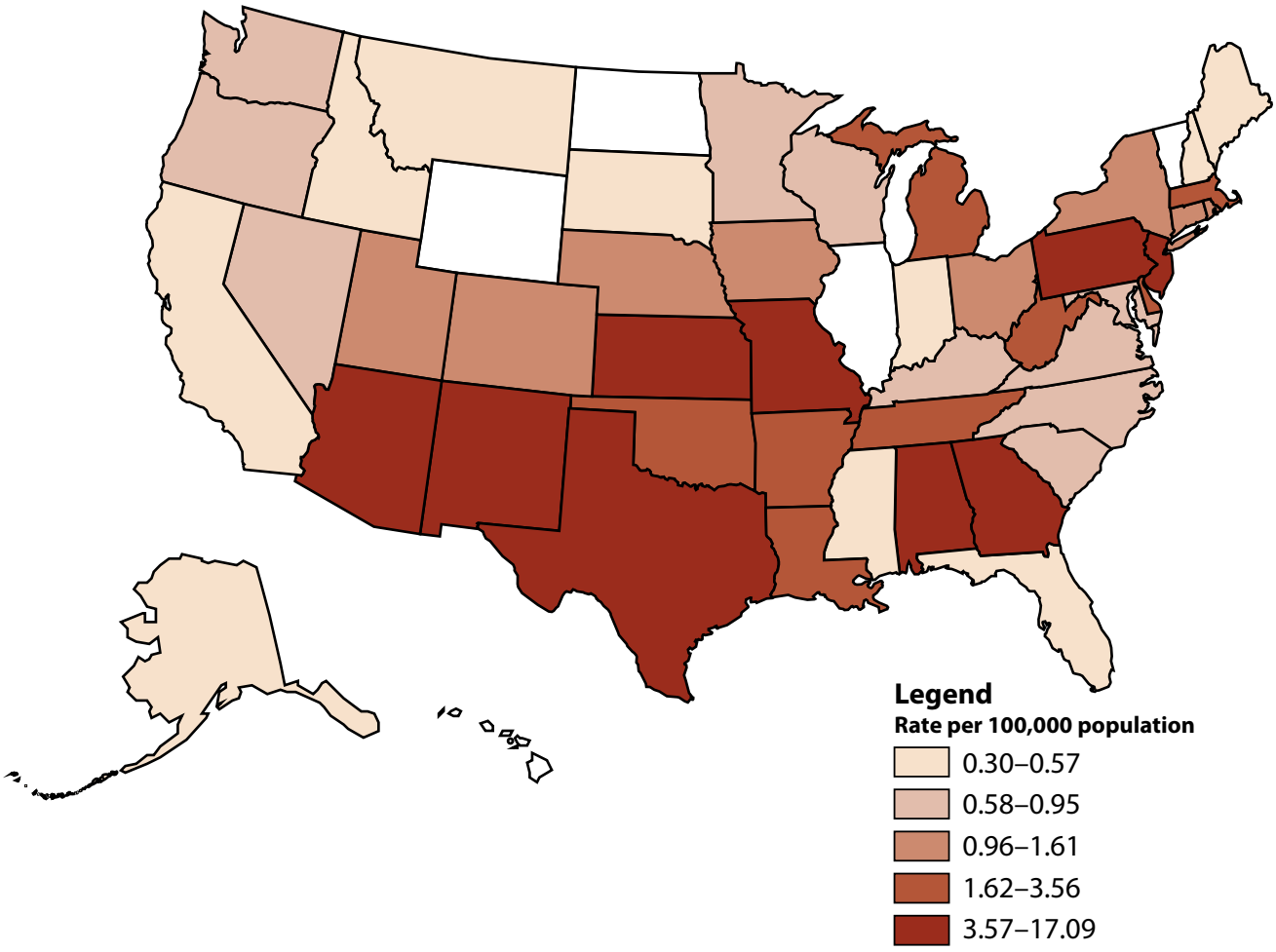
Figure 2a. Incidence rate of laboratory-confirmed *Shigella* infection reported to CDC (all species) by reporting jurisdiction, United States, 2010



* Unshaded reporting jurisdictions are those for which the reporting jurisdiction reported no *Shigella* isolates (i.e., no infections were diagnosed or the reporting jurisdiction did not report to CDC).

Forty-eight reporting jurisdictions reported a total of 8,962 *Shigella* infections, corresponding to an overall incidence rate (cases per 100,000 population) of 2.9. The reporting jurisdictions with the highest reported incidence rates of *Shigella* infection were Missouri (17.9), New Mexico (9.9), and Texas (8.6).

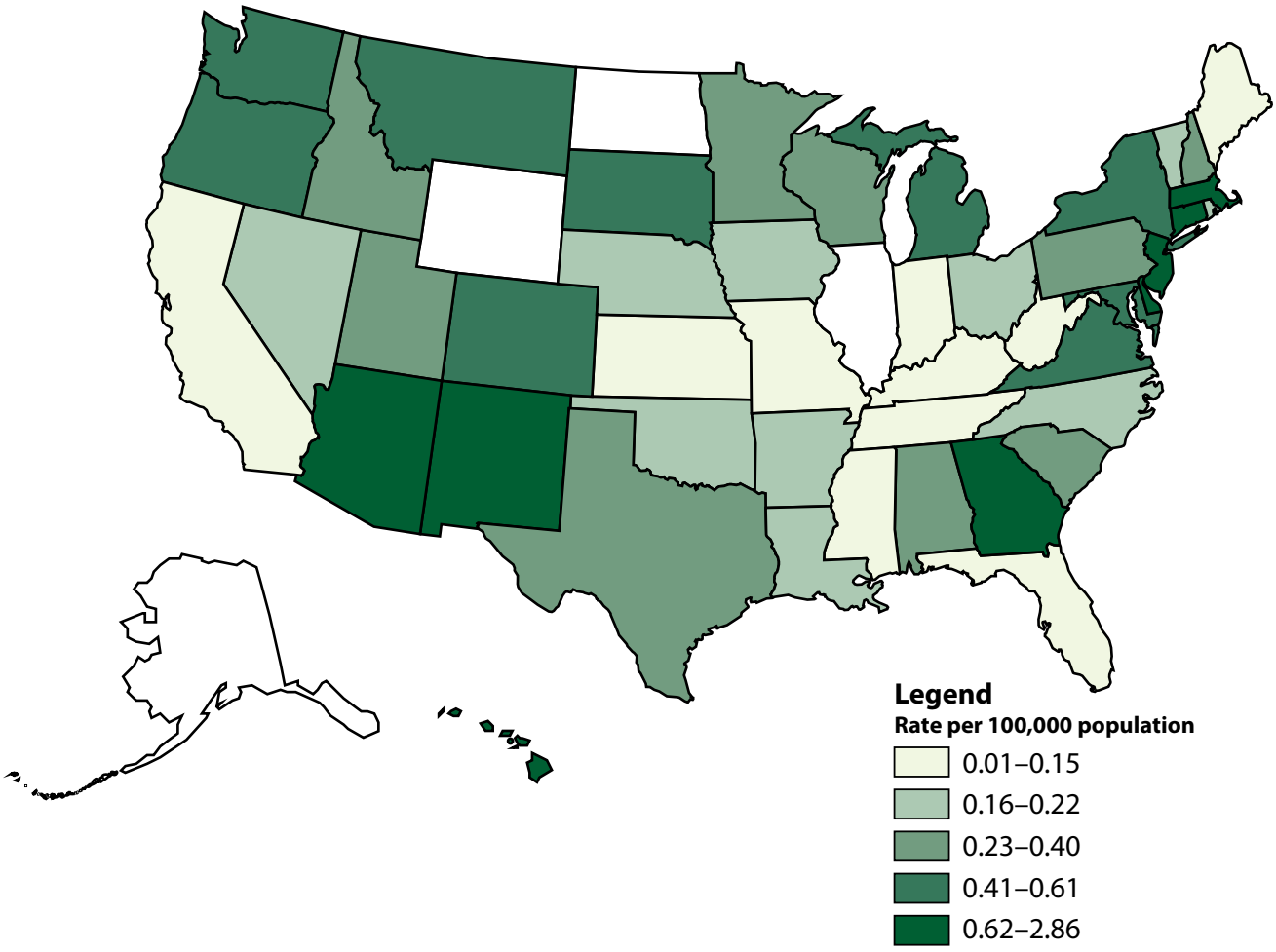
Figure 2b. Incidence rate of laboratory-confirmed human *Shigella sonnei* infection reported to CDC, by reporting jurisdiction, United States, 2010*



* Unshaded reporting jurisdictions are those for which the reporting jurisdiction reported no *Shigella* isolates (i.e., no infections were diagnosed or the reporting jurisdiction did not report to CDC).

Forty-six reporting jurisdictions reported a total of 7,122 *Shigella sonnei* infections, corresponding to an overall incidence rate (cases per 100,000 population) of 2.3. The reporting jurisdictions with the highest reported incidence rates of *Shigella sonnei* infection were Missouri (17.1), New Mexico (8.5), and Texas (7.2).

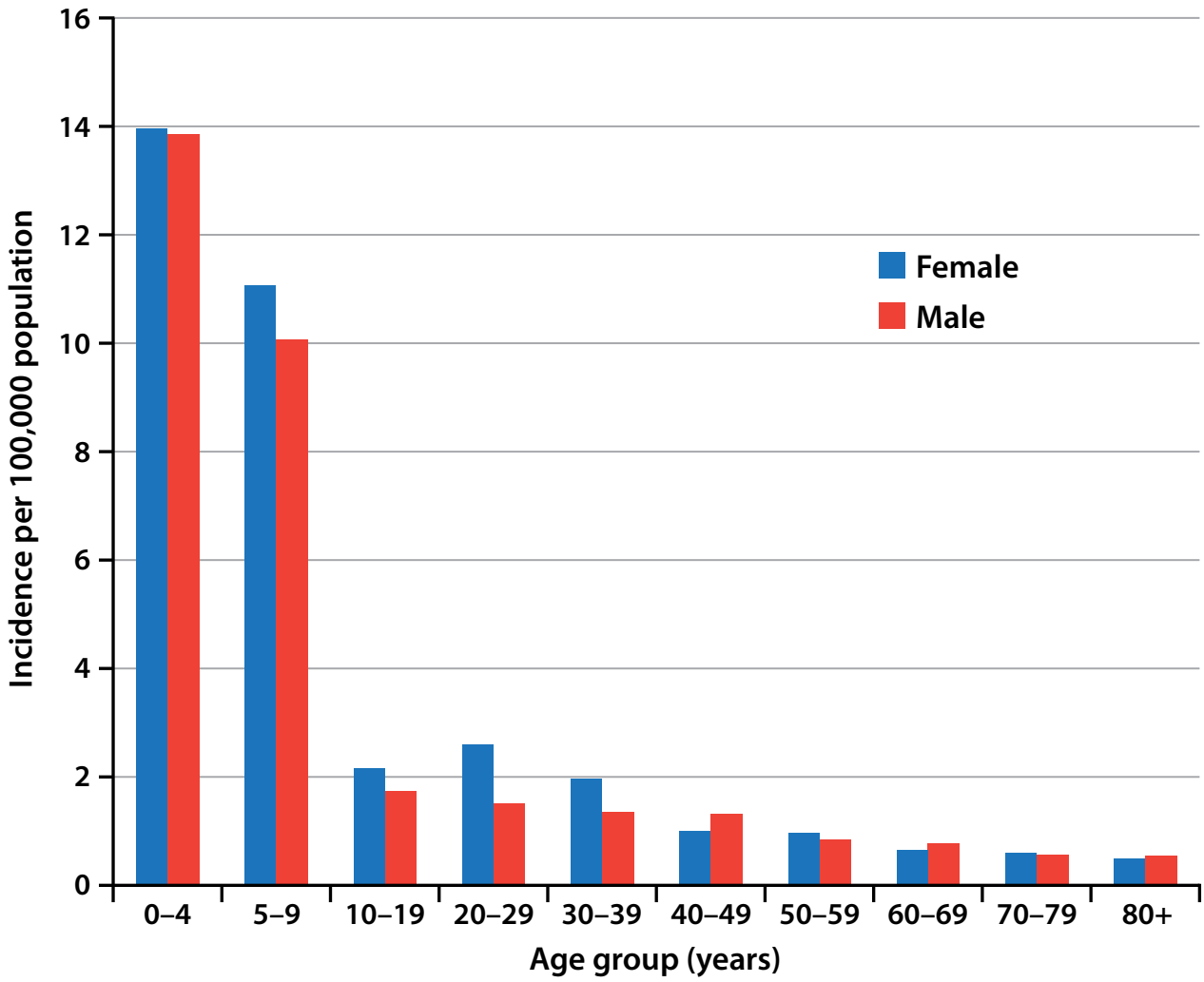
Figure 2c. Incidence rate of laboratory-confirmed *Shigella flexneri* infection reported to CDC, by reporting jurisdiction, United States, 2010*



* Unshaded reporting jurisdictions are those for which the reporting jurisdiction reported no *Shigella* isolates (i.e., no infections were diagnosed or the reporting jurisdiction did not report to CDC).

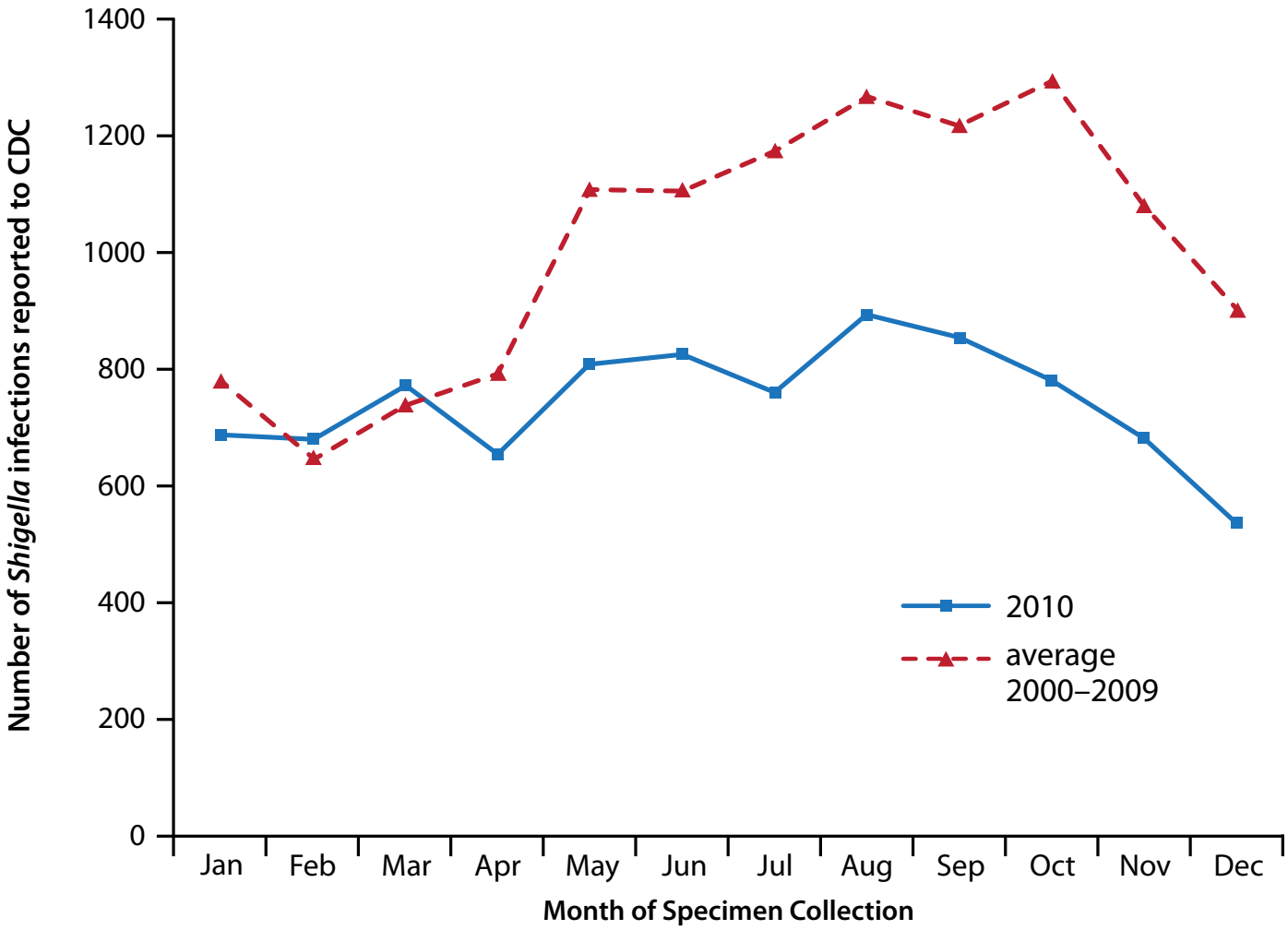
Forty-seven reporting jurisdictions reported a total of 1,026 *Shigella flexneri* infections, corresponding to an overall incidence rate (cases per 100,000 population) of 0.33. The reporting jurisdictions with the highest reported incidence rates of *Shigella flexneri* infection were Hawaii (2.9), the District of Columbia (2.3), and Arizona (1.4).

Figure 3. Incidence rate of laboratory-confirmed *Shigella* infection reported to CDC, by age group and sex, United States, 2010 (n=8,963)



During 2010, the incidence rate of *Shigella* infection was highest in children under 5 years old. From ages 0 to 39, females had a higher incidence rate of *Shigella* infection than males, with an increase in incidence rate of infection between ages 20 to 39. For ages 40 and older, incidence rates of infection were similar among males and females.

Figure 4. Number of laboratory-confirmed *Shigella* isolates reported to CDC by month of specimen collection, United States, 2010 and average number during 2000 to 2009



Compared to the previous 10 years (2000–2009), fewer *Shigella* isolates were reported most months in 2010. During 2010, reports of *Shigella* infections did not reflect any distinct seasonality as opposed to reports received in the previous ten years, which show a peak in late summer and fall months.

Human 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 *Shigella*. This system includes reports of laboratory-confirmed cases and probable cases (clinically compatible cases with an epidemiological link to a confirmed case).

The 2010 NNDSS report is available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5953a1.htm.

- A total of 11,719 confirmed cases of shigellosis were reported to NNDSS during 2010; species information was not available in this system for 2010 (2).

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

The National Antimicrobial Resistance Monitoring System (NARMS) monitors antimicrobial resistance among enteric bacteria (including *Shigella*) isolated from humans. The 2010 NARMS report on human isolates is available at http://www.cdc.gov/narms/pdf/2010-annual-report-narms.pdf.

Among the family Enterobacteriaceae, which includes *Shigella*, resistance to nalidixic acid, an elementary quinolone, correlates with decreased susceptibility to ciprofloxacin (MIC ≥0.12 µg/mL) and possible fluoroquinolone treatment failure.

- 4.4% of *Shigella* isolates were resistant to nalidixic acid and 1.7% were resistant to ciprofloxacin.

Multidrug resistance is described in NARMS as resistance to three or more antimicrobial classes, as defined by the Clinical and Laboratory Standards Institute (CLSI).

- 40.0% (163/407) of *Shigella* isolates were resistant to three or more classes.

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

The Foodborne Disease Outbreak Surveillance System (FDOSS) collects reports of foodborne disease outbreaks from local, state, and territorial public health agencies. Reports are available at http://www.cdc.gov/outbreaknet/surveillance_data.html.

- In 2010, 5 confirmed, single-etiology *Shigella* outbreaks with 385 illnesses were reported; all were *Shigella sonnei* (4).

The Waterborne Disease and Outbreak Surveillance System (WBDOSS) collects reports of waterborne disease outbreaks associated with drinking water and recreational water from local, state, tribal, and territorial public health agencies. Reports are available at http://www.cdc.gov/healthywater/statistics/wbdoss/surveillance.html.

References

1. Centers for Disease Control and Prevention (CDC). National *Shigella* Surveillance Overview. Atlanta, Georgia: US Department of Health and Human Services, CDC, 2011.
2. Centers for Disease Control and Prevention (CDC). Summary of notifiable diseases--United States, 2010. MMWR Morb Mortal Wkly Rep. 2012 Jun 1;59(53):1–111 Erratum in: MMWR Morb Mortal Wkly Rep. 2012 Jul 27;61:562.
3. Centers for Disease Control and Prevention (CDC). National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS): Human Isolates Final Report, 2010. Atlanta, Georgia: U.S. Department of Health and Human Services, CDC, 2012.
4. Centers for Disease Control and Prevention (CDC). Surveillance for foodborne disease outbreaks—United States, 2009–2010. MMWR Morb Mortal Wkly Rep. 2013 Jan 25;62:41–7.

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