

Annual Summary

2003

Shigella



Department of Health and Human Services
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National Center for Infectious Diseases
Division of Bacterial and Mycotic Diseases
Foodborne and Diarrheal Diseases Branch
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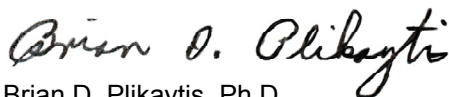




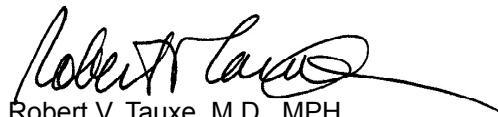
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Laboratory-Confirmed *Shigella* Surveillance Annual Summary, 2003

The Annual Summary contains surveillance data on reported laboratory-confirmed *Shigella* isolates in the United States. The National *Shigella* Surveillance System collects reports of isolates of *Shigella* from every state in the United States. This information is reported electronically through the Public Health Laboratory Information System (PHLIS) by the State Public Health Laboratory Directors and State and Territorial Epidemiologists to the Foodborne and Diarrheal Diseases Branch (FDDB) and the Biostatistics and Information Management Branch (BIMB) of the Division of Bacterial and Mycotic Diseases in the National Center for Infectious Diseases.

The National *Shigella* Surveillance System is based on data collected by state and territorial public health laboratories. *Shigella* isolates are submitted to the state public health laboratory by clinical diagnostic laboratories. The state and territorial laboratories confirm the isolates as *Shigella*, perform subtyping, and submit the data for reporting through PHLIS. Unusual or untypable isolates are forwarded to the National *Shigella* Reference Laboratory at the Centers for Disease Control and Prevention for further characterization or confirmation. These results are reported back to the state laboratory, where they are reported to CDC through PHLIS.

The capture of isolates in the National *Shigella* Surveillance System is considered to be consistent. However, some *Shigella* isolates may not be forwarded or reported to state public health laboratories and therefore are not captured. In addition, irrespective of the surveillance system, many cases of *Shigella* illness are not reported because the ill person does not seek medical care, the health-care provider does not obtain a specimen for diagnosis or the laboratory does not perform culture for *Shigella*. The results of surveillance reported herein are therefore substantial underestimates of the true number of infections.

The number of isolates reported by state represents the state where laboratory confirmation and subtyping were performed. In some instances, the reporting state is not the same as the state of residence of the person from whom the isolate was obtained. For the Annual Summaries, duplicate records were deleted. All isolates reported herein were from infected humans.

There are 4 major subgroups of *Shigella*, designated A, B, C and D, and 44 recognized serotypes (Table A). Subgroups A, B, C and D have historically been treated as species: subgroup A for *Shigella dysenteriae*; subgroup B for *Shigella flexneri*; subgroup C for *Shigella boydii* and subgroup D for *Shigella sonnei*. These subgroups and serotypes are differentiated from one another by their biochemical traits (ability to ferment D-mannitol) and antigenic properties. The most recently recognized serotype belongs to subgroup C (*S. boydii*) (1).

Table A. Classification of *Shigella* Subgroups

Subgroup	Species	Number of serotypes	Fermentation of D-mannitol	Subgroup B group antigens
A	<i>S. dysenteriae</i>	15	-	-
B	<i>S. flexneri</i>	8 ^a	+	+
C	<i>S. boydii</i>	20	+	-
D	<i>S. sonnei</i>	1	+	-

^a = Serotypes 1-5 are subdivided into 11 subserotypes.

The Statistical Outbreak Detection Algorithm (SODA), developed by BIMB and FDDB, is a statistical algorithm performed on the National Surveillance Data to detect unusual clusters of *Shigella* infection. SODA compares current *Shigella* isolates reported through PHLIS by subgroup or serotype with a 5 year historical baseline for that subgroup or serotype for the specified time period to detect unusual increases from the baseline. Analyses can be conducted at state, regional, or national levels. Since 1996, SODA has been implemented at CDC and selected state health departments. If you would like more information on SODA, please call the PHLIS Helpdesk (404) 639-3365.

Annual Highlights for 2003

A total of 11,552 *Shigella* isolates were reported from public health laboratories in 50 states in 2003 (Table 1). This represents a 41% decrease compared with 1993 and a 11% decrease from 2002. The national rate of reported *Shigella* isolates in 2003 was 4.0 per 100,000 population based on 2003 census population estimate figures for the United States.

Similar to previous years, *Shigella* was isolated frequently from children under 5 years of age, who accounted for 30.5% of all isolates. About 30.1% of all isolates came from persons aged 5-19 years, and 29.7% from persons aged 20-59, with declining numbers thereafter. The median age of patients by species is shown in Table 4. The overall distribution of *Shigella* isolates between the sexes was similar, with females accounting for 48.6% of persons from whom *Shigella* was isolated. Gender differences were most notable for a preponderance of females in four age groups, 10-19 (54.4%), 20-29 (63.3%), 60-69 (58.4%), and 70-79 (55.5%) and for a relative paucity of females in three age groups 30-39 (46.7%), 40-49 (41.5%), and 80+ (37.1%). These gender differences reflect similar findings among reported isolates of *Shigella sonnei*. Among reported isolates of *Shigella flexneri*, a male predominance is seen, particularly in the age groups 20-29 (58.3%), 30-39 (71.4%), and 40-49 (73.1%). These estimates, however, are not complete since Wyoming did not report the age of persons from whom *Shigella* isolates were obtained. In addition, gender information was not reported for 5.3% of all isolates and age information was not reported for 5.4% of isolates.

The frequency of reported species, and the frequency of reported serotypes within these groups for all *Shigella* isolates are shown in Tables 1 and 2. Of the 11,552 isolates, 11,089 (96.0%) were subgrouped. Trends of subgroups remained constant, with subgroup D (*S. sonnei*) accounting for the largest percentage of isolates (80.2%), followed by subgroup B (*S. flexneri*, 14.4%), subgroup C (*S. boydii*, 1.1%) and subgroup A (*S. dysenteriae*, 0.4%). *Shigella* isolate serotype trends by year are shown in Table 5 and in Figure 2. Over the past decade, the numbers of reported *Shigella* isolates in subgroups A, B and C, and the proportions of all reported *Shigella* isolates due to these three subgroups have declined; however, 2003 marks the first year since 1994 in which the reported numbers of *Shigella* subgroup B (*S. flexneri*) isolates have increased. A very slight increase in the number of *S. boydii* was also observed. The number (463) and the proportion (4.0%) of all reported *Shigella* isolates that were not identified as belonging to a specific subgroup also increased. The highest numbers and proportions of all reported *Shigella* isolates that were not identified as belonging to a specific subgroup were reported by California (347, 15.4%) and Tennessee (84, 18.8%).

Shigella transmission occurs via the fecal-oral route. The majority of subgroup D (*S. sonnei*) infections in the United States occur in young children and in association with crowding and poor personal hygiene. Daycare centers have been implicated in many large *S. sonnei* outbreaks that can last many months and affect many persons (2, 3). From December 2001 through at least March 2003, a prolonged multi-state daycare-associated outbreak of *S. sonnei* infections in the South and Mid-Atlantic regions contributed significantly to the national burden of culture-confirmed shigellosis (4). *S. sonnei* has also been transmitted through unchlorinated wading pools

(5), interactive water fountains (6), food items such as parsley (7) and bean dip (8), and men who have sex with men (MSM) (9). Until recently, the dominant subgroup causing illness among MSM was subgroup B (*S. flexneri*) (10). However, in a large outbreak among MSM in San Francisco, the dominant serotype was subgroup D (*S. sonnei*) (9). Recent trends in shigellosis in the United States are reviewed in a publication by Dr. Amita Gupta and co-authors (11).

Geographic trends by region for subgroup D (*S. sonnei*) isolates from 1989 to 2003 are illustrated in Figure 3. Only the Mid Atlantic, West South Central, and Mountain regions registered increases in subgroup D (*S. sonnei*) isolates from 2002 to 2003.

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