# Epidemiologic Summary of Shigellosis in California, 2001 - 2008

## Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 15,997 cases of shigellosis with estimated symptom onset dates from 2001 through 2008. This corresponds to an average annual incidence rate of 5.5 cases per 100,000 Californians.
- Shigellosis incidence rates decreased by 32.8 percent from 2001 (6.4 per 100,000) to 2008 (4.3 per 100,000).
- During the surveillance period, 30 (0.2 percent) cases were reported to have died with shigellosis. Case fatality rates were 6.5 times higher in cases ≥ 65 years of age (1.3 percent) compared to cases < 65 years of age (0.2 percent).
- Average annual shigellosis incidence rates were higher among children 1 to 4 years of age (21.3 per 100,000), and 5 to 14 years of age (8.8 per 100,000).
- From 2001 through 2008, CDPH received reports of 23 outbreaks (19 confirmed, 4 suspected) of foodborne shigellosis involving 472 cases.
- *S. sonnei* (68.5 percent), and *S. flexneri* (28.5 percent) infections were most common and varied, respectively by median age (12 years vs. 26 years) and by the ratio of male to female cases (1.0:1.0 vs. 1.6:1.0).
- Early diagnosis and reporting of cases, and education on hand hygiene and safe sexual practices are cornerstones of disease control.

### Background

*Shigella* is a commonly reported enteric bacterial pathogen in the United States (US), causing an estimated 500,000 infections, 6,000 hospitalizations, and 70 deaths each year[1]. *Shigella* infection is restricted to humans and is efficiently and predominantly transmitted from person-to-person through direct or indirect fecal-oral contact. Other sources of infection include contaminated food and drinking or recreational water and sexual contact (especially among men who have sex with men). *Shigella* species include *S. dysenteriae*, *S. flexneri*, *S. boydii* and *S. sonnei*. *S. sonnei* is predominate in industrialized countries whereas *S. flexneri* is predominate in developing countries. There is no national *Healthy People 2010* target objective for shigellosis.

Acute illness, usually gastroenteritis, occurs after an incubation period of 1 to 3 days. The severity of shigellosis varies by patient age and by infecting species. *S. dysenteriae* is associated with life threatening complications including toxic megacolon and hemolytic uremic syndrome. Post-infectious arthritis is a rare, late complication of *S. flexneri* infection. Although most shigellosis appear to be sporadic cases, large outbreaks of *Shigella* have occurred in crowded settings where personal hygiene may be difficult (custodial institutions, day care centers), and in association with contaminated food or water. Other persons at increased risk of infection include men who have sex with men, persons with human immunodeficiency virus (HIV) infection[2], and international travelers. Increasing resistance to antimicrobial agents has been noted among nationally-reported infections acquired domestically and abroad.

We describe here the epidemiology of shigellosis in California from 2001 through 2008. Data for 2008 are provisional and may differ from data in future publications. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes[3].

### California reporting requirements and surveillance case definition

California Code of Regulations Title 17, requires health care providers to report suspected cases of shigellosis to their local health department within one working day of identification or immediately by

telephone if an outbreak is supsected. Clinical and reference laboratories must also notify the local health department when laboratory testing yields evidence suggestive of *Shigella*; notification must occur within one working day after the health care provider has been notified.

Local health officers are required by regulation to report to CDPH cases of shigellosis. CDPH officially counted cases that satisfied the Centers for Disease Control and Prevention (CDC) surveillance case definition, including both confirmed and probable case classifications. During the surveillance period, CDC defined a confirmed case as one with *Shigella* isolated from a clinical specimen, including asymptomatic and extraintestinal infections. A probable case was one with clinically compatible illness and an established epidemiologic link to a laboratory-confirmed case.

**Epidemiology of shigellosis in California**

CDPH received reports of 15,997 cases of shigellosis with estimated symptom onset dates from 2001 through 2008. This corresponds to an average annual incidence rate of 5.5 cases per 100,000 Californians. Incidence rates decreased by 32.8 percent from 2001 (6.4 per 100,000) to 2008 (4.3 per 100,000) ($p < 0.001$) [Figure 1]. During the surveillance period, 30 (0.2 percent) cases were reported to have died with shigellosis during the surveillance period. Case fatality rates were 6.5 times higher in cases ≥ 65 years of age (1.3 percent) compared to cases < 65 years of age (0.2 percent).

Average annual shigellosis incidence rates for the surveillance period were higher among children 1 to 4 years of age (21.3 per 100,000) and 5 to 14 years of age (8.8 per 100,000) followed by adults 25 to 44 years of age (4.8 per 100,000). Average incidence rates associated with these same age groups demonstrated the greatest decreases from the combined years of 2001 and 2002 to the combined years of 2007 and 2008 (42.9 percent, 44.1 percent, and 50.8 percent, respectively) [Figure 2]. Incidence rates by race/ethnicity were not calculated due to the substantial portion of missing data (19.5 percent) However, shigellosis cases with complete data reported Hispanic ethnicity more frequently than would be expected based on the overall demographic profile of California [Figure 3].

Average annual incidence rates for the surveillance

Figure 1. California shigellosis case counts and incidence rates

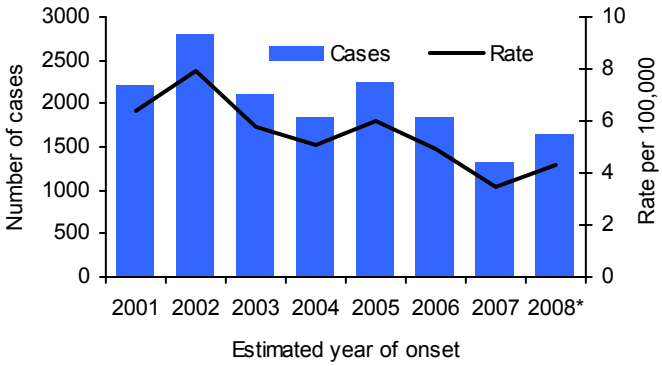



Figure 2. California shigellosis incidence rates by age and time period

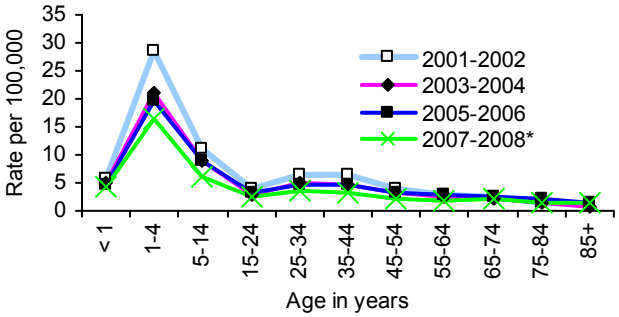
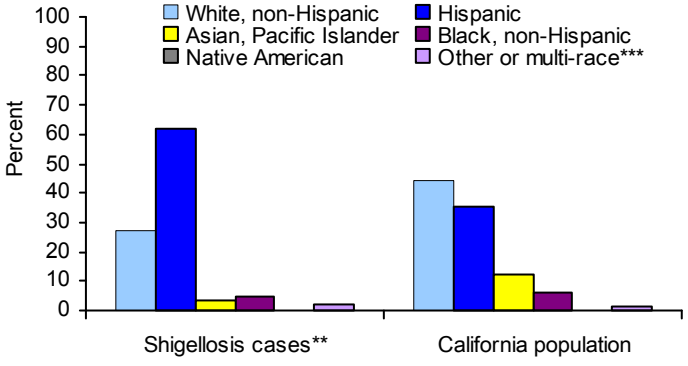



Figure 3. California shigellosis cases and population by race/ethnicity 2001 - 2008*



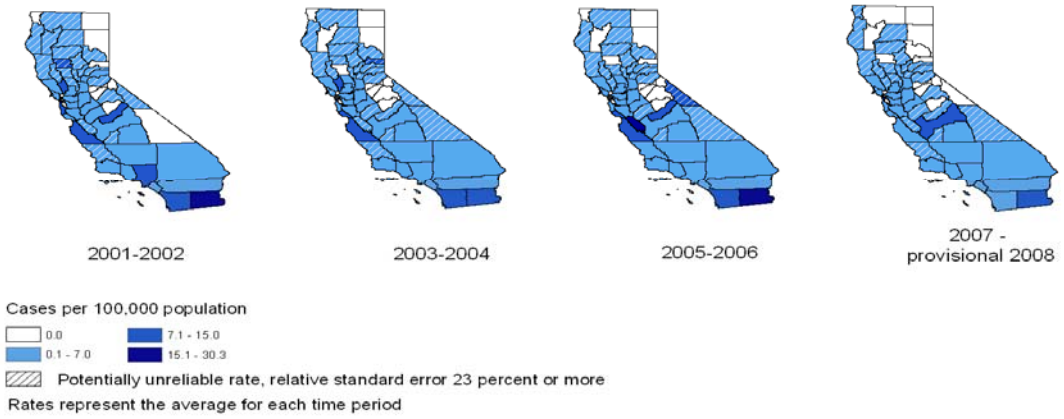

**Notes for Figures 1-3**

*2008 data are provisional

**Unknowns were excluded

***Includes cases who identified 'other' as their race and Californians ('population') who identified more than one race

Figure 4. California county-specific shigellosis incidence rates




period were 11.8 percent higher in Southern California (5.7 per 100,000) than in Northern California (5.1 per 100,000). County-specific incidence rates for each two-year interval of the report period ranged from 0 to 30.3 per 100,000 residents [Figure 4]. The highest rates occurred in San Francisco (30.3 per 100,000) and Imperial (28.0 per 100,000) counties during the years 2001 and 2002. From 2000 to 2001, San Francisco experienced a large, sustained community-based outbreak of *S. sonnei* outbreak among men who have sex with men[4].

From 2001 through 2008, CDPH received reports of 23 outbreaks (19 confirmed, 4 suspected) of foodborne shigellosis involving 472 cases.

From 2001 through 2008, 13,484 (84.3 percent) cases had a *Shigella* isolate with the species identified and reported. Among these, *S. sonnei* (9,237, 68.5 percent), and *S. flexneri* (3,836, 28.4 percent) infections were the most common species reported. *S. sonnei* cases tended to be younger (median age 12 years) and infections were equally distributed among both sexes (male to female ratio: 1.0:1.0). *S. flexneri* cases tended to be adult (median age 26 years) and male (male to female ratio: 1.6:1.0). By comparison, in the US, *S. sonnei* (71.7 percent), and *S. flexneri* (18.4 percent) were also the most common species identified and reported but differed by proportion[5].

**Comment**

From 2001 to 2008, there was a significant decrease in shigellosis cases in California although the rate of decline was not consistent from year to year. *S. sonnei* and *S. flexneri were* the most frequently identified species but were associated with different epidemiologic characteristics.

Public health measures such as early diagnosis and reporting of cases, education on hand hygiene and safe sexual practices, and targeted education for high-risk groups likely offer the best opportunities for reducing disease transmission.

**References and additional resources**

[1]Mead PS, Slutsker L, Dietz V et al. Food-related illness and death in the United States. Emerg Infect Dis 1999;5:607-25.
http://www.cdc.gov/ncidod/eid/Vol5no5/pdf/mead.pdf
[2]Aragón TJ, Vugia DJ, Shallow S, Samuel MC, et al. Case-control study of shigellosis in San Francisco: the role of sexual transmission and HIV infection. Clin Infect Dis 2007;44:327-34.
[3]Epidemiologic Summaries of Selected General Communicable Diseases in California, 2001-2008: Technical Notes
http://www.cdph.ca.gov/data/statistics/Documents/technicalnotes-episummary-aug2409.pdf
[4]Centers for Disease Control and Prevention. *Shigella* sonnei outbreak among men who have sex with men -- San Francisco, California, 2000-2001. Morb Mort Week Rep 2001;50(42):922-6.
[5]Gupta A, Polyak CS, Bishop RD, et al. Laboratory-confirmed shigellosis in the US, 1989-2002: Epidemiologic trends and patterns. Clin Infect Dis 2004;38:1372-7.

California Department of Public Health shigellosis information web page
http://www.cdph.ca.gov/HealthInfo/discond/Pages/Shigellosis.aspx

*Last updated 9/29/2009*

*Prepared by Kate Cummings, MPH, and Akiko Kimura, MD, Infectious Diseases Branch*