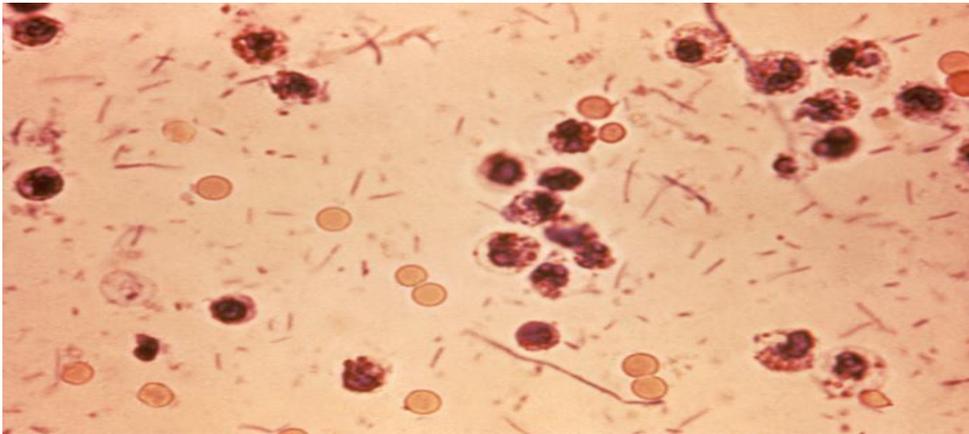


SURVEILLANCE SUMMARY

SHIGELLOSIS



Photomicrograph of Shigellosis.
Image #6659 from CDC's Public Health Image Library
Available at: <http://phil.cdc.gov/phil/details.asp>

**Ohio Department of Health
Infectious Disease Surveillance
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Shigellosis Surveillance Trends in Ohio, 2001-2008

Background

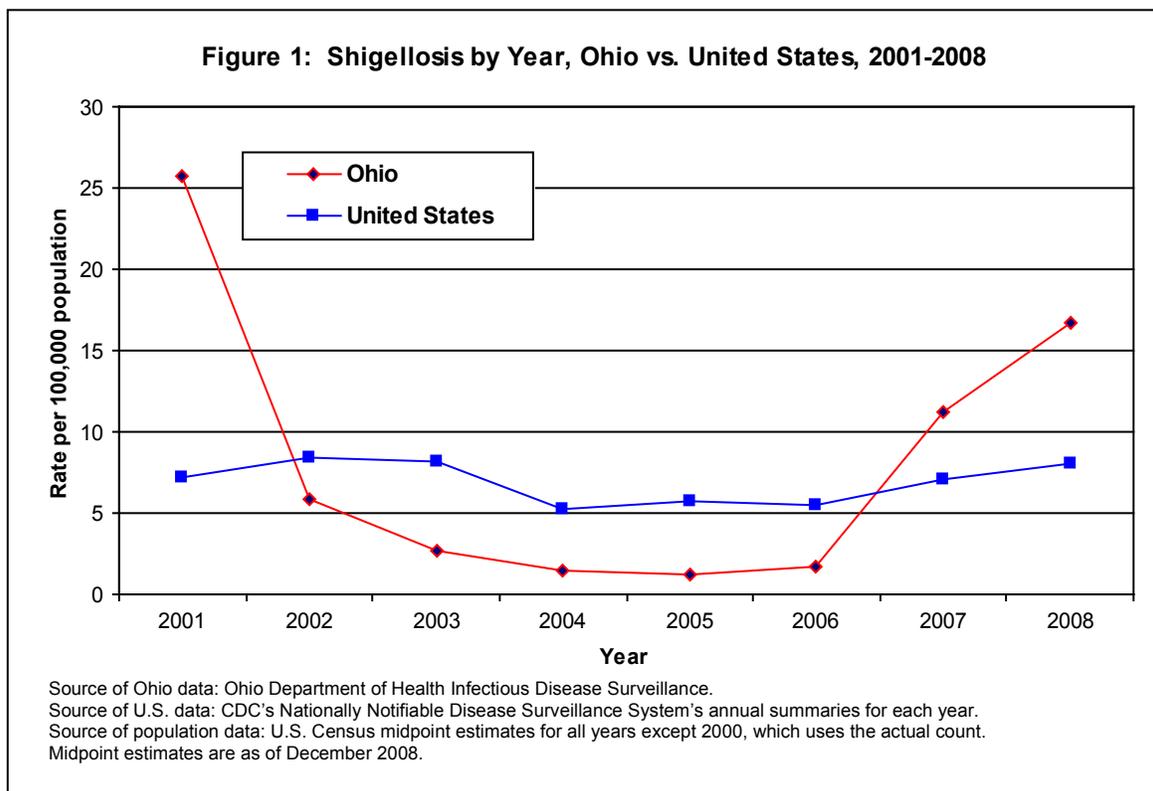
Shigellosis is an intestinal illness caused by a group of bacteria called *Shigella*.^{1, 2} Illness is usually mild but complications may develop and lengthen recovery time. Shigellosis occurs world-wide; most cases occur in the very young, however, it can affect persons of any age. Personal hygiene and community sanitation play a role in the spread of shigellosis, and therefore, are key targets for public health prevention and control.

Public Health Reporting

Shigellosis is a reportable disease in Ohio and throughout the United States. In Ohio, shigellosis is a class B(1) reportable disease, meaning all cases, suspected cases and positive laboratory results are to be reported to the health department by the close of the next business day.¹ A probable case is defined as a clinically compatible individual who is epidemiologically linked to a confirmed case. A confirmed case is defined as a clinically compatible individual with isolation of *Shigella* from a clinical specimen.

Burden of Disease

Ohio's rate was above the national rate for shigellosis infection for three of the eight years compared. Although a general decline has been observed in the incidence of shigellosis, Ohio had several reports of day care-associated outbreaks of shigellosis in 2007 and 2008 (Figure 1). The overall burden of shigellosis is unknown as many milder cases are not diagnosed or reported.



Causative Agent

Shigella species are gram-negative, non-spore forming, rod-shaped bacilli in the family Enterobacteriaceae. There are four species of *Shigella*: *Shigella boydii* (Group C), *Shigella dysenteriae* (Group A), *Shigella flexneri* (Group B), and *Shigella sonnei* (Group D), containing 44 recognized serotypes and subgroups. Shigellosis is one of the most contagious types of diarrhea-causing bacteria.

Transmission

Shigella species primarily infect the large intestine, and transmission is most often from person to person via the fecal-oral route.^{1,3} Indirect fecal-oral transmission may also occur. The organism is shed in the stool throughout the acute illness phase, and possibly for up to one month after infection. Two features of the bacteria facilitate person-to-person transmission: 1) many persons with shigellosis have mild illness and remain in contact with and transmit the infection to others; and 2) the infectious dose is low, so even minor lapses in hand hygiene can allow fecal-oral spread.⁴

Person-to-person transmission is particularly common among toddlers who are mobile, but are yet to develop hygiene practices adequate to prevent transmission. Child and day care centers providing care for diapered children are recognized as a common setting for the spread of shigellosis, including outbreaks of shigellosis.^{2,4} In this setting, child care workers can facilitate the spread of *Shigella* between children if they are both preparing meals and changing diapers. Whenever possible, diaper changing and food preparation responsibilities should be performed by different people.

Transmission can also occur from ingestion of contaminated foods and water. Foods can become contaminated with *Shigella* when infected food handlers do not practice proper hand washing techniques. In addition, the inadvertent consumption of contaminated recreational water (e.g. swimming pools, water parks, play water fountains) rather than drinking water, can also serve as a vehicle for *Shigella* transmission.⁴

Clinical Presentation

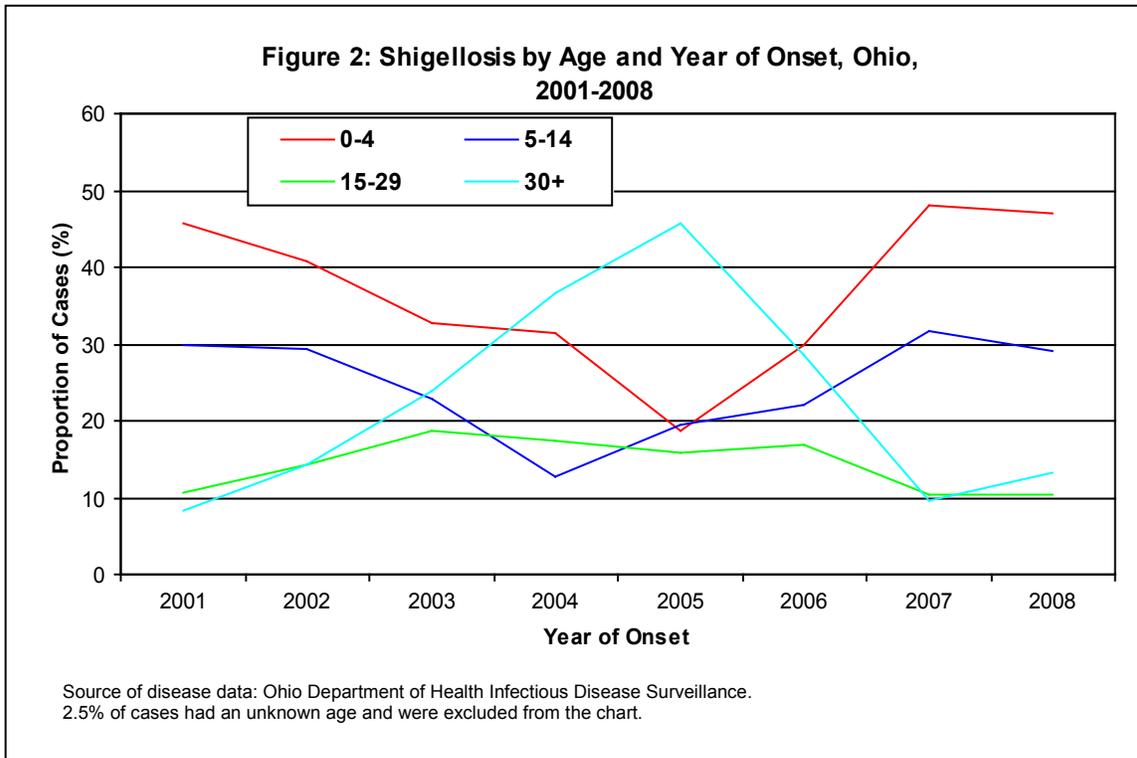
Symptoms of shigellosis usually begin within one to three days after exposure, and may last four to seven days.^{2,6} Cases may be asymptomatic or present with clinical manifestations ranging from loose or watery stools to more severe symptoms including fever, abdominal tenderness or cramps and mucoid stools with or without blood. Persons with diarrhea usually recover completely, although it may be several months before bowel habits return to normal.^{3,5}

Diagnosis

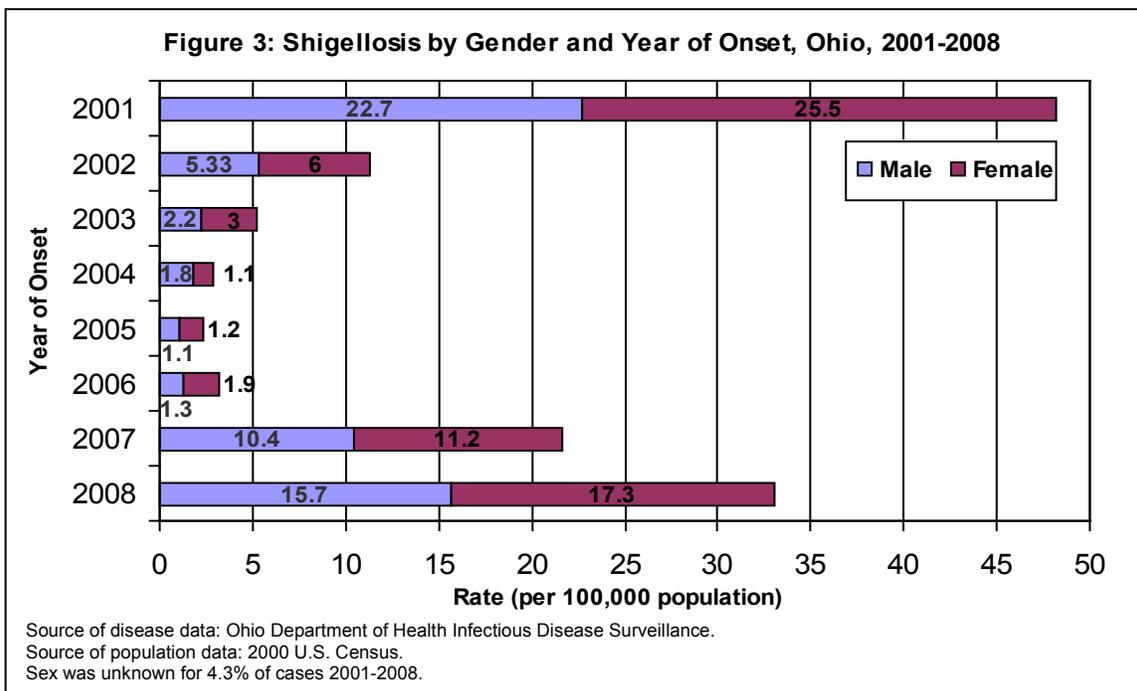
Shigellosis is diagnosed by isolating the organism from a clinical specimen via a stool culture.¹

Demographic Trends

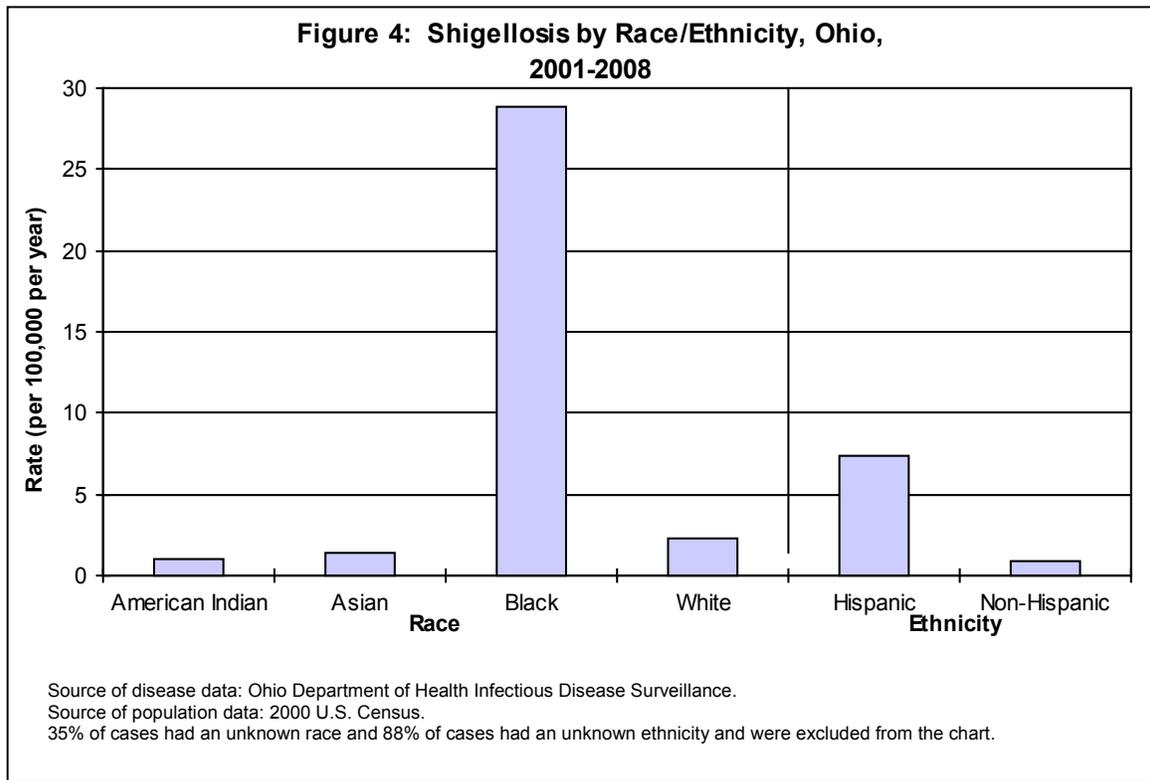
Figure 2 demonstrates the burden of shigellosis over the past eight years in Ohio by age group. Children under 5 years of age accounted for more than 44 percent of Ohio cases from 2001-2008 (3,346 Ohio cases). The years 2001, 2007 and 2008 saw disproportionate rates of shigellosis in the under 5 years of age group compared to all other age groups. This is likely due to known outbreaks in child care facilities during these years of reporting. Although most recognized cases occur in children less than 5 years of age, persons of all ages are at risk for shigellosis. Age information was not reported for 2.5 percent of shigellosis cases from 2001-2008.



In the United States, the rate of shigellosis was slightly higher in females compared to males at 6.9 per 100,000 population per year and 7.4 per 100,000 population per year, respectively, between 2001-2008.⁷⁻¹⁴ Figure 3 demonstrates similar trends in Ohio. Females and males were fairly equally affected by shigellosis during 2001-2008. The total incidence for the eight-year period was 11.4 cases per 100,000 population among females and 10.6 cases per 100,000 among males.



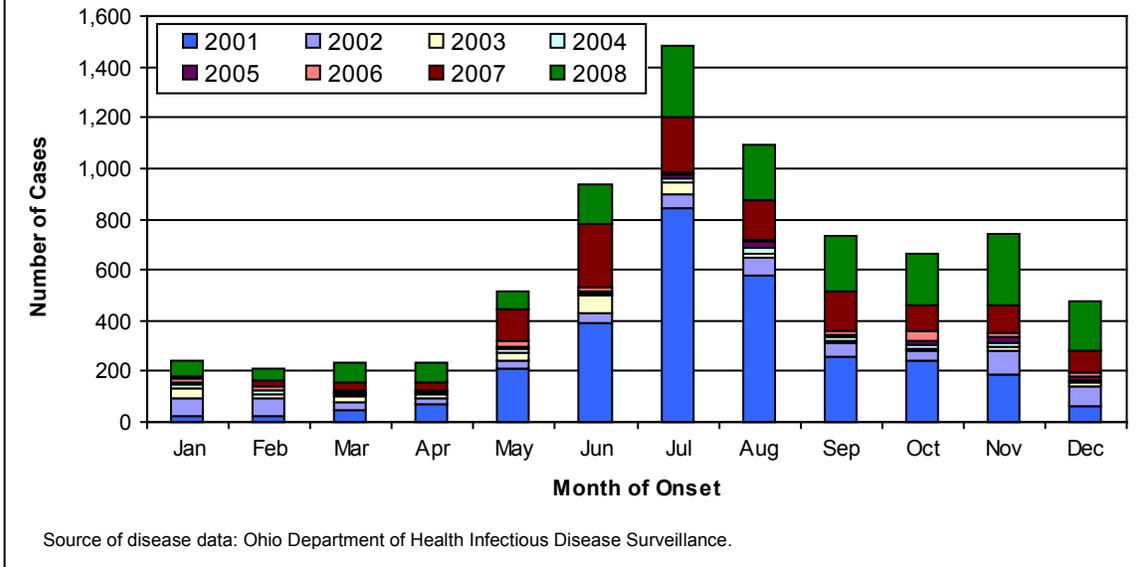
The incidence of shigellosis among blacks in Ohio was 12.7 times higher than the incidence among whites during 2001-2008 (Figure 4). The incidence among Hispanics (7.3 per 100,000) was 8.4 times greater than the incidence among non-Hispanics (0.9 per 100,000) during the eight- year interval. However, race and ethnicity were unknown for 35 percent and 88 percent of cases, respectively.



Seasonal Variation

In Ohio, shigellosis infections appear to have a seasonal pattern, occurring more commonly in summer than winter months.¹ The incidence of shigellosis infections over the past eight years peaked from early to mid summer months, particularly from May to July (Figure 5). Incidence decreased from late winter to early spring, from January to April.

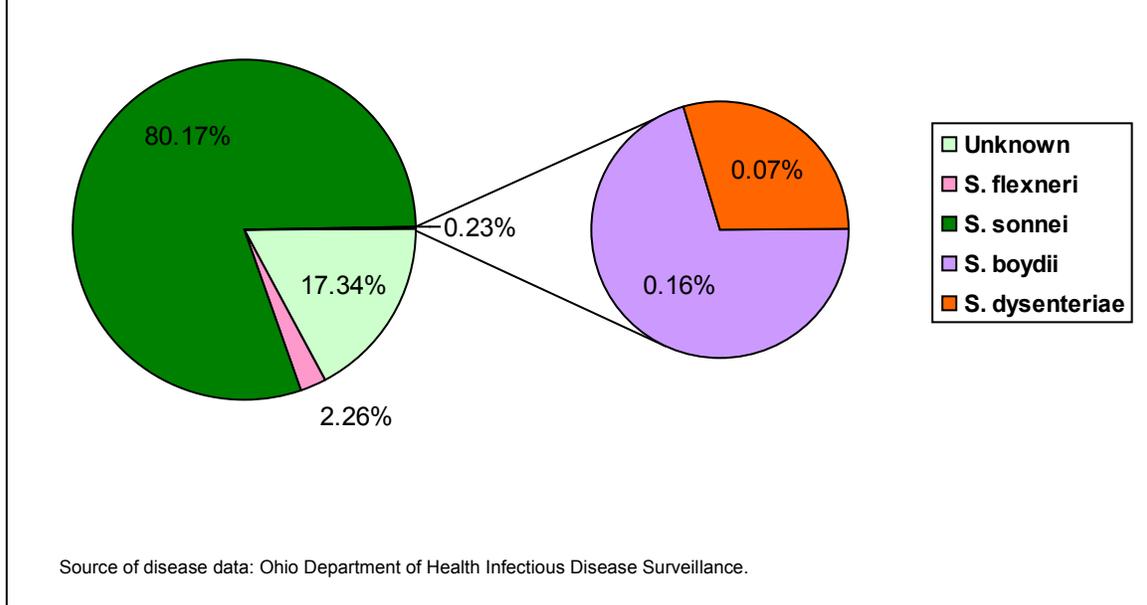
Figure 5: Shigellosis by Month and Year of Onset, Ohio, 2001-2008



Serotype Trends

In the United States, *Shigella sonnei* (*S. sonnei*) is the most commonly reported serotype followed by *Shigella flexneri* (*S. flexneri*), *Shigella boydii* (*S. boydii*) and *Shigella dysenteriae* (*S. dysenteriae*).⁷⁻¹⁴ *Shigella* isolates reported in Ohio from 2001 to 2008 appear to be consistent with these national serotype trends: 80 percent were *S. sonnei*, 2 percent were *S. flexneri* and less than 1 percent were either *S. boydii* or *S. dysenteriae*. In addition, approximately 17 percent of shigellosis cases did not have a serotype reported (Figure 6).

Figure 6: Shigellosis by Serotype, Ohio, 2001-2008



Prevention

Education emphasizing the importance of hand washing with soap and warm water can limit person-to-person spread.^{1,3} Frequent, supervised hand washing by children should be followed in child care centers and in homes with children who are not completely toilet-trained (including children in diapers). Adult employees of child care centers and employees preparing foods in the restaurant/hospitality business should also engage in frequent hand washing with warm, soapy water.

Antibiotic treatment can limit the course of the illness and shorten the duration of the shedding of the organism in the stool.¹⁻³ Treatment is recommended for patients with underlying immunosuppressive conditions. The inappropriate use of antibiotics to treat shigellosis can lead to more resistant organisms over time.⁶ Therefore, when many persons in a community are affected by shigellosis, antibiotics are sometimes used to treat only the most severe cases. Antidiarrheal agents such as loperamide or diphenoxylate with atropine should be avoided due to the likeliness of making the illness worse.

Conclusion

Shigellosis is one of the most contagious types of diarrheal illnesses caused by bacteria. *Shigella* species are found in every part of the United States, as well as throughout the world. The majority of disease in Ohio is attributed to *Shigella sonnei* with children less than 5 years of age afflicted with the heaviest burden of disease. Continued efforts emphasizing the importance of proper hygiene can aid in the prevention of person-to-person spread.

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