

Shigellosis Outbreak Associated with Travel to Haiti – Kansas and Multiple States, 2015



Background

On December 2, 2015, the Riley County Health Department (RCHD) notified the Kansas Department of Health and Environment's Infectious Disease Epidemiology and Response Section (KDHE) of a potential outbreak of shigellosis. During routine investigation of a single shigellosis case, other symptomatic persons were identified; all traveled as a group to Haiti. Travelers resided in Kansas, North Carolina, and Tennessee. Those state health departments and the Centers for Disease Control and Prevention (CDC) were notified, and an outbreak investigation was initiated on December 2, 2015 to determine the cause and scope of the outbreak and to provide prevention resources.

Methods

Epidemiologic Investigation

A retrospective cohort study was conducted among members of the travel group. With permission from the other state health departments, travelers were interviewed by investigators from KDHE and RCHD. A standardized questionnaire was developed and utilized to obtain demographic information, clinical information, and exposure history, and to identify illnesses associated with secondary transmission of shigellosis.

A confirmed outbreak case was defined as laboratory evidence of *Shigella* infection in a person who traveled to Haiti between October 29 and November 9, 2015. A probable case was defined as diarrhea without confirmatory laboratory results in a member of the travel group.

Laboratory Analysis

Testing on stool specimens was performed at hospital and reference laboratories. Pulsed-field gel electrophoresis (PFGE) was conducted at Kansas Health and Environmental Laboratories.

Results

Epidemiologic Investigation

Ten women reported travel to Haiti for vacation and mission work between October 29 and November 9, 2015. Exact travel dates varied by group member. Nine travelers were interviewed; six reported illness. One confirmed and five probable cases of shigellosis were identified. All ill persons were adult females. Ill persons resided in Tennessee, North Carolina, and Riley County, Kansas. No shigellosis cases associated with secondary transmission were identified.

The most common symptom was diarrhea, which was experienced by all persons with outbreak cases of shigellosis [Table 1]. Other reported symptoms included bloody stool, fever, vomiting, and abdominal cramps. One person developed sepsis. Onset of illness ranged from November 7 to November 8, 2015. All ill persons sought healthcare as a result of their illness.

Table 1: Symptoms reported among persons with confirmed or probable shigellosis (n=6)

Symptom	# of Cases with Symptom	% of Cases with Symptom
Diarrhea	6	100%
Fever	5	83%
Abdominal cramps/pain	5	83%
Fatigue	4	67%
Vomiting	3	50%
Headache	3	50%
Bloody stool	2	33%
Bacteremia/sepsis	1	17%

Travelers reported that most meals were prepared and eaten at lodging sites, and a variety of food items were consumed. Most water was from personal-sized containers filled at facilities with water purification systems. Some ill travelers reported purchasing bottled water at a roadside stand; other ill persons ate a lunch that was prepared during an outing at a park. No individual food item, beverage, or meal was associated with illness. Two persons who did not become ill received prophylactic antibiotic treatment; one person who did not become ill was taking antibiotics for an unrelated illness at the time of the outbreak.

Laboratory Analysis

Two persons submitted stool specimens to be tested for enteric pathogens. One specimen was positive for *Shigella dysenteriae* with PFGE pattern JZPX01.0094. The other specimen was not tested for *Shigella*.

Conclusions

This outbreak of acute gastroenteritis was associated with travel to Haiti. One confirmed and five probable cases of shigellosis were identified. Although one positive result is insufficient to confirm *Shigella* as the etiologic cause of the outbreak, the clinical information provided by travelers is consistent with illness caused by *Shigella* infection. No single food item, meal, or event could be associated with illness.

This investigation was limited by several factors: only one clinical specimen was tested for *Shigella*, not all travelers were interviewed, and inaccuracies may exist in interviewees' food and symptom histories due to recall bias. The investigation was aided by the quick response of and cooperation between the Riley County Health Department, KDHE, the state health departments in North Carolina and Tennessee, and CDC. During interview, transmission of *Shigella* was discussed and travelers were provided with illness prevention education and recommendations to prevent secondary transmission and future travel-associated shigellosis.

Discussion

Shigella bacteria causes an estimated 500,000 illnesses in the United States¹ and more than 160 million illnesses globally² each year. Persons infected with *Shigella* will become ill in one to three days. Illness usually lasts about a week, and severity can range from mild to severe. Symptoms include diarrhea that may be bloody, fever, abdominal cramping, and vomiting^{1,3}.

Shigella is transmitted via the fecal-oral route, through direct person-to-person contact, or by consumption of contaminated food or water. Environmental contamination can also act as a source of infection. *Shigella* is highly contagious; as few as 10 organisms are sufficient to cause illness^{1, 4}.

Mild illness typically resolves without treatment; although antimicrobial treatment can slightly shorten the duration of illness in some cases, resistance to antibiotics is common^{1, 4, 5}.

Antibiotic-resistant *Shigella* was declared an urgent threat in the United States by CDC in 2013. In cases of shigellosis for which antibiotic treatment is necessary, healthcare providers should conduct antimicrobial susceptibility testing to determine the appropriate antibiotic for that specific infection¹. Preventative antibiotic treatment is not recommended for persons who may have been exposed to *Shigella*⁵.

Of the four species of *Shigella* that cause illness in humans, *Shigella sonnei* is the most common in developed countries including the United States^{2, 4}. *Shigella dysenteriae*, the bacteria isolated from the patient with the confirmed outbreak case of shigellosis, can cause more severe illness and can lead to epidemics of bacillary dysentery, particularly in developing countries and in confined populations². More than half of *Shigella dysenteriae* infections diagnosed in the United States are travel-associated⁴. The Centers for Disease Control and Prevention (CDC) reports that persons traveling to developing countries are at risk for illnesses caused by *Shigella*¹.

To prevent travel-associated diarrheal illness including shigellosis or bacillary dysentery, the CDC recommends taking precautions to avoid contaminated food, drinking water, or recreational water, including:

- **SELECT FOOD WITH CARE.** Be aware that all raw food is subject to contamination. In areas where hygiene and sanitation are inadequate or unknown, travelers should be advised to avoid eating salads, uncooked vegetables, unpasteurized fruit juices, and unpasteurized milk and milk products, such as cheese and yogurt. In these areas, travelers should be advised to eat only food that is fully cooked and served hot and fruit that has been washed in clean water and then peeled by the traveler. Food and beverages from street vendors have been associated with increased risk of illness.
- **WASH YOUR HANDS** with soap and water before eating, after using the bathroom or changing diapers, after caring for someone who is ill, and after direct contact with preschool-age children, animals, or feces. If soap and water are not available, use an alcohol-based hand sanitizer (with $\geq 60\%$ alcohol) and wash hands with soap and water

as soon as they become available. Alcohol-based hand sanitizers are not effective against all illness-causing organisms and may not work well when hands are soiled.

- AVOID TAP WATER in areas where water treatment, sanitation, and hygiene are inadequate. Tap water in some places may be unsafe for drinking, preparing food and beverages, making ice, cooking, and brushing teeth. Commercially bottled water from an unopened, factory-sealed container or water that has been adequately disinfected should be used for drinking, preparing food and beverages, making ice, cooking, and carrying out oral hygiene, including brushing teeth⁶.

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¹ CDC. *Shigella*. Accessed 8 February 2016: <http://www.cdc.gov/shigella/>.

² World Health Organization. State of the art of new vaccine research and development. 2006. Accessed 8 February 2016: http://apps.who.int/iris/bitstream/10665/69348/1/WHO_IVB_06.01_eng.pdf.

³ Food Safety. *Shigella*. Accessed 8 February 2016: <http://www.foodsafety.gov/poisoning/causes/bacteriaviruses/shigella/>.

⁴ CDC. Shigellosis, Chapter 3: Infectious Diseases Related to Travel. CDC Health Information for the International Traveler 2014: The Yellow Book. Accessed 8 February 2016: <http://wwwnc.cdc.gov/travel/yellowbook/2016/infectious-diseases-related-to-travel/shigellosis>.

⁵ Sureshbabu J, Venugopalan P, Abuhammour W. *Shigella* Infection Medication. Accessed 8 February 2016: <http://emedicine.medscape.com/article/968773-medication>.

⁶ CDC. Food and Water Precautions, Chapter 2: The Pre-Travel Consultation. CDC Health Information for the International Traveler 2014: The Yellow Book. Accessed 8 February 2016: <http://wwwnc.cdc.gov/travel/yellowbook/2016/the-pre-travel-consultation/food-water-precautions>.