

Shigellosis



Case Definition

Confirmed case: Isolation of *Shigella* species from any site, regardless of symptoms.

Clinical case: Person with clinically compatible illness (see below), epidemiologically linked to a confirmed case.

Reporting Requirements

- All positive laboratory tests are reportable by laboratory.
- All cases are reportable by attending health care professional.

Clinical Presentation/Natural History

An acute bacterial disease involving the large and distal small intestine, characterized by varying severity of diarrhea, accompanied by constitutional symptoms (fever, abdominal cramps, nausea, and sometimes toxemia). Typically, the stools contain blood and mucus (dysentery) resulting from the confluent micro-abscesses caused by the invasive organisms; however, many cases present with a watery diarrhea. The disease may be biphasic, with an initial period of watery diarrhea and cramps followed by development of dysentery. Convulsions may be an important complication in young children. Bacteremia is uncommon. Mild and asymptomatic infections occur. Illness is usually self-limited, lasting an average of four to seven days.

S. dysenteriae: is often associated with serious disease and severe complications, including toxic megacolon and the hemolytic-uremic syndrome; case-fatality rates have been as high as 20% among hospitalized cases, even in recent years.

S. sonnei: often results in a short clinical course and an almost negligible case-fatality rate, except in immune-compromised hosts.

S. flexneri: Certain strains can often cause a reactive arthropathy (Reiter's syndrome) in

persons who are genetically predisposed, although Reiter's syndrome can occur with any *Shigella* strain.

Etiology

Shigella species – gram-negative enteric bacillus

Shigella is comprised of four serogroups:

- Group A, *S. dysenteriae*;
- Group B, *S. flexneri*;
- Group C, *S. boydii*;
- Group D, *S. sonnei*.

A specific virulence plasmid is necessary for the epithelial-cell invasiveness manifested by *Shigellae*.

Epidemiology

Reservoir and Source: Reservoir is humans (although prolonged outbreaks have occurred in primate colonies) and the source is usually feces of infected humans with diarrhea. Asymptomatic excretors with normal, well-formed stools are rarely a source, except in special risk groups. Contaminated food (especially non-refrigerated) and water are also potential sources.

Transmission: Person-to-person, fecal-oral transmission. The infectious dose for humans is low (10-100 bacteria).

Direct: especially in children and those who fail to clean hands and under fingernails thoroughly after defecation.

Indirect: Via contaminated food (milk) or water, and less commonly contaminated inanimate objects, and houseflies as vectors of infected feces.

Occurrence:

General: Worldwide; it is estimated that shigellosis causes about 600,000 deaths per year in the world. Two-thirds of the cases (and most of the deaths) occur in children under 10 years

of age. Illness in infants under six months is unusual. Secondary attack rates in households can be as high as 40%. Outbreaks have been reported in men who have sex with men; under conditions of crowding; and where personal hygiene is poor, such as in jails, institutions for children, day-care centres and mental hospitals. Reported cases represent only a small proportion of all cases. More than one serotype is commonly present in a community; mixed infections with other intestinal pathogens also occur. *S. sonnei* is most common and *S. dysenteriae* is least common in developed countries. Multi-antibiotic-resistant *Shigella* has appeared in all areas of the world, related to widespread use of antimicrobial agents.

Manitoba: There were large outbreaks of shigellosis in 1974, 1980, 1984 and 1993. In 1999, the incidence rate was 14/100,000. Typically, the age distribution peaks in those under 10 years of age. The highest rates are in the northern regions of the province.

Incubation Period: Twelve to 96 hours (usually one to three days); up to one week for *S. dysenteriae*.

Susceptibility and Resistance: Susceptibility is general. Infection follows ingestion of a very small number of organisms. The severity of illness and the case-fatality rate are functions of the host (it is more severe in the young, the elderly, the debilitated, the malnourished and the immunocompromised) and the serotype. Breastfeeding is protective for infants and young children.

Period of Communicability: While the organism is present in feces — up to four weeks from acute illness. Appropriate antimicrobial treatment usually reduces duration of carriage to a few days.

Diagnosis

Isolation of *Shigella* from feces or rectal swabs. Infection is usually associated with the presence of pus cells in the stool.

Prompt processing and use of appropriate selective media increase the likelihood of isolation, especially *S. dysenteriae*.

Key Investigations

- Culture symptomatic contacts.
- Investigate food, water and milk supplies.
- Investigate sewage and/or garbage facilities.

Control

Management of Cases:

- Patients must be advised of the importance and effectiveness of hand-washing with soap and water after defecation.
- Contact precautions should be used for hospitalized children and adults who have poor hygiene or incontinence which cannot be contained. Otherwise, routine infection control precautions are adequate.
- Patients should not handle food or provide child or patient care until symptoms have resolved and two consecutive stool specimens (collected 24 hours apart, or 48 hours after any antibiotics are discontinued) are free of *Shigella*.
- In communities with a modern and adequate sewage disposal system, feces can be discharged directly into sewers.

Treatment:

- Antimotility agents are contraindicated; they may prolong the illness.
- Fluid and electrolyte replacement is important when diarrhea is watery or there are signs of dehydration.
- Antibacterials shorten the duration and severity of illness and the duration of pathogen excretion; they should be used in individual cases if warranted by the severity of the illness or to protect contacts (i.e., in day care centres or institutions). Multi-drug resistance is common in Manitoba, especially to cotrimoxazole, thus antibiotic choice should be based on culture and sensitivity results. A fluoroquinolone antibiotic such as ciprofloxacin (250-500 mg bid for seven to 14 days) or ofloxacin is a good empiric choice until culture results become available. Nalidixic acid is an alternative.

Management of Contacts:

- The search for unrecognized mild cases and convalescent carriers among contacts may be unproductive in sporadic cases and seldom contributes to the control of an outbreak.
- Symptomatic contacts should be managed as cases until stools are determined to be negative. Whenever feasible, ill contacts of shigellosis patients should be excluded from food handling and the care of children or patients, until diarrhea ceases and two successive negative stool cultures are obtained.
- Screening of asymptomatic contacts in the course of an investigation is necessary only for food handlers, hospital attendants, and in situations where the spread of infection is particularly likely.

Management of Outbreaks:

Infections in some situations (institutions, day care centres, or where there is inadequate water supply or sewage disposal) and with some species (*S. dysenteriae*) are more difficult to manage than in others. Because of the diverse problems that may be involved in shigellosis, it is not possible to provide a specific set of guidelines applicable to all situations.

- Common-source foodborne or waterborne outbreaks require prompt investigation and intervention without regard to the infecting species.
- General measures to improve hygiene are important but often are difficult to implement because of cost.

- Emphasize the importance of hand-washing with soap and water after defecation.
- Identify source(s) of all infections.
- Outbreaks in nursing homes or institutions for the developmentally handicapped may require special measures, such as separate housing for cases and new admissions, and a vigorous program of supervised hand-washing.
- Closure of affected day-care centres may lead to placement of infected children in other centres (with subsequent transmission in those centres) and is not, by itself, an effective control measure.
- Prophylactic administration of antibiotics is not recommended.
- In large outbreaks, it may not be practical or necessary to obtain laboratory clearance in every case before persons are allowed to return to work or school.

Preventive Measures:

- Education in personal hygiene — especially good hand-washing.
- Sanitary disposal of feces.
- Provision of safe and adequate water supplies.
- Provision of suitable hand-washing facilities.
- Control of flies.
- Cleanliness in preparation and handling of food and milk.
- Encouragement of breast feeding infants.