Ministry of Health

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1: Case Definitions and Disease-Specific Information

Disease: Shigellosis

Effective: August 2023

Ontario

Shigellosis

☒ Communicable
☐ Virulent

Health Protection and Promotion Act (HPPA)[1]
Ontario Regulation (O. Reg.) 135/18 (Designation of Diseases)[2]

Provincial Reporting Requirements

☒ Confirmed case
☒ Probable case

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- O. Reg. 569 (Reports) under the HPPA;
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.[3-5]

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

Laboratory confirmation of infection with or without clinically compatible signs and symptoms:

- Isolation of *Shigella* spp. by culture from an appropriate clinical specimen (e.g., stool, urine, rectal swab, or sterile site specimen)

Probable Case

- Clinically compatible signs and symptoms in a person with an epidemiologic link to a laboratory-confirmed case

OR

Supportive laboratory evidence of *Shigella* spp. infection (with or without clinically compatible signs and symptoms):

- Detection of *Shigella* spp. nucleic acids by molecular methods (e.g., polymerase chain reaction) from an appropriate clinical specimen, **or**
- Detection of *Shigella spp./*enteroinvasive *E. coli* nucleic acid acids by molecular methods (e.g., polymerase chain reaction) from an appropriate clinical specimen (see 'Limitations' under 'Laboratory Evidence' below).

Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.[3]

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified, if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (i.e., confirmed and/or probable).

Clinical Information

Clinical Evidence

Clinically compatible signs and symptoms are characterized by diarrhea, fever, nausea, vomiting, abdominal cramping, and tenesmus. Asymptomatic infections may occur.

Clinical Presentation

Shigellosis is characterized by watery, loose stools, often accompanied by fever and sometimes presenting with abdominal cramps, vomiting, and tenesmus. Depending on the species, stools may contain mucus and blood.[6,7] Illness is usually self-limiting, lasting an average of 4–7 days.[6] Severity and case-fatality vary with the age of the host and the species of *Shigella*.[6] Rare complications include hemolytic-uremic syndrome (HUS), toxic megacolon, intestinal obstruction, colonic perforation, proctitis, rectal prolapse, and reactive arthritis. Bacteremia is uncommon and predominantly seen in infants and elderly.

Laboratory Evidence

Laboratory Confirmation

- Isolation of *Shigella* spp. by culture from an appropriate clinical specimen

Supportive Laboratory Evidence of Infection

- Detection of *Shigella* spp. nucleic acids by molecular methods (e.g., polymerase chain reaction) from an appropriate clinical specimen.

OR

- Detection of *Shigella* spp./enteroinvasive *E. coli* nucleic acids by molecular methods (e.g., polymerase chain reaction) from an appropriate clinical specimen (see 'Limitations' below).

Indications and Limitations

- Culture is required for optimal clinical and public health management. Sites performing testing for *Shigella* spp. by molecular methods should reflex any positive molecular finding to culture for appropriate isolation of the organism and routine susceptibility testing.
- *Shigella* spp. has limited viability outside the body and requires rapid processing under specific specimen transport and storage conditions (e.g., freezing or transport medium) to maintain its recovery in culture.
- *Shigella* spp. may be challenging to distinguish from enteroinvasive *E. coli*

(EIEC) or other "inactive" *E. coli* strains by routine methods. A combination of biochemical and serological tests is required to differentiate *Shigella* from "inactive" *E. coli* strains.

- All cultured *Shigella* spp. isolates should be sent as soon as possible to PHO's laboratory for routine serotyping, subtyping (e.g., whole genome sequencing) and antimicrobial resistance surveillance.
- Molecular methods for *Shigella* spp. have superior sensitivity over traditional culture methods. However, potential cross-reactivity, co-infection, horizontal gene transfer, or loss of gene target may not be able to be ruled out solely based on molecular test results.
- Many commercial molecular methods target the *ipaH* gene, which is shared between *Shigella* spp. and EIEC. Laboratories may report the detection of "*Shigella* spp./EIEC" nucleic acids instead of "*Shigella* spp." nucleic acids to imply the inability to distinguish between these two bacterial types using these molecular platforms.

For further information about human diagnostic testing, contact PHO's Laboratory Services at: https://www.publichealthontario.ca/en/Laboratory-Services/Laboratory-Contact.

Case Management

In addition to the requirements set out in the Requirement #2 of the "Management of Infectious Diseases – Sporadic Cases" and "Investigation and Management of Infectious Diseases Outbreaks" sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection.[3] Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

In addition, the following disease-specific information may also be collected:

- Travel history
- Food consumed for the 7-day period prior to gastrointestinal symptom onset;
- Known exposure to a person with clinical signs and symptoms compatible

with shigellosis;

- History of occupation or activities involving food handling, childcare, and healthcare; and
- Sexual history
- Housing status

Educate the case regarding the risk of transmission and proper hand hygiene.

Further follow-up may be required for those with risk factors related to sexually transmitted shigellosis. For management of these cases refer to the *Sexual Health and Sexually Transmitted/Blood-Borne Infections Prevention and Control Protocol, 2018* (or as current) and the Sexually transmitted and blood-borne infectious: Guides for health professionals (2023, or as current) and STI-associated syndromes guide: Syndromic management (2021, or as current).[8-10] Where there is evidence of sexual transmission, advise symptomatic cases to avoid sexual contact for at least seven days after symptoms have stopped and faecal-oral contact during sex to reduce transmission and referral should be made to the health unit's Sexual Transmitted Infection (STI) team for appropriate counselling and investigation.

Advise the case against attending swimming pools, hot tubs, or water spray parks for at least 7 days after their symptoms have resolved.

Oral rehydration with electrolyte replacement is essential in patients who are dehydrated. Most patients will improve without antibiotic treatment. Antibiotic therapy should be reserved for patients with severe disease (e.g., hospitalization) and immunocompromised patients. In those who require antibiotics, therapy should be guided by antimicrobial susceptibility testing.

Emergence of extensively drug-resistant (XDR) *Shigella* outbreaks have been reported in the UK, the US, and Ontario since 2022, whereby sexual contact between men who have sex with men (MSM) was the predominant route of transmission.[23] Since that time, the emergence and spread of XDR *S. sonnei* have been reported in other European countries with genetically related cases dating back to 2020.[21,22] It is important to bear in mind that the demographic may also shift from MSM to other at-risk populations, similar to what was observed in Seattle, where the cases of multi-drug resistant *Shigella* were MSM and/or homeless

population.[11,20]

Antibiotic treatment options for XDR *Shigella* are currently very limited.[21,23] Consultation with an infectious diseases specialist or other clinician knowledgeable in treating antibiotic resistant bacteria is recommended to determine appropriate treatment options based on antimicrobial susceptibility testing. Given the extremely limited treatment options, judicious antibiotic use is strongly encouraged in patients with or at high risk of *Shigella* infection to reduce the risk of contributing further to antimicrobial resistance.

Exclusion Criteria:

Exclude symptomatic cases who are food handlers, healthcare providers, caregivers or daycare attendees until the provision of a negative stool sample or rectal swab collected at least 24 hours after cessation of symptoms **OR** 48 hours after completion of antibiotic therapy used.

Contact Management

Consider household members as close contacts of a case. Provide education about transmission of infection and proper hand hygiene.

Symptomatic contacts that work in high-risk settings should be assessed by their health care provider to determine whether they are infected, and should be excluded as above (i.e., as per exclusion of symptomatic cases).

Outbreak Management

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.[3]

Two or more unrelated cases of the same serotype of shigellosis with a common exposure is suggestive of an outbreak.

For more information regarding specimen collection and testing, please see the Public Health Inspector's Guide to the Environmental Microbiology Laboratory Testing (2017, or as current).[19]

Refer to Ontario's Foodborne Illness Outbreak Response Protocol (ON-FIORP) 2020 (or as current) for multi-jurisdictional foodborne outbreaks which require the response of more than two Partners (as defined in ON-FIORP) to carry out an investigation.[12]

Prevention and Control Measures

Personal Prevention Measures

Thorough and frequent hand hygiene is the most important prevention measure for decreasing the risk of transmission.

Avoid consuming food and beverages from unsafe or questionable sources.

Travelling

- Take special precautions when traveling to developing countries, such as drinking only treated or boiled water, and avoiding consumption of food and beverages from unsafe or questionable sources; eat only cooked hot foods or fruits you peel yourself.[13]

Food Safety at Home

- Practice good hygiene, especially hand washing, before food preparation and eating, and after using sanitary facilities;
- Ensure potentially hazardous foods are stored at either below 4˚C or above 60˚C;
- Thoroughly wash fresh fruits and vegetables using clean, potable running water;
- Prevent cross-contamination between raw foods and ready-to-eat foods during food preparation and storage;
- Cook and reheat food thoroughly to the appropriate temperatures. For temperatures, see the Ministry of Health (ministry) "Food Safety: Cook" publication.[14]
- For more food safety measures, please see the ministry's food safety "Frequently Asked Questions".[15]

Caregivers

- Follow proper diapering procedures;
- Clean and sanitize baby diaper changing areas regularly;
- The use of alcohol-based hand rubs may be effective where access to soap and clean water is limited, and when hands are not soiled; and
- Ensure young children wash their hands thoroughly and frequently with adult supervision, especially after using the toilet.

Sexual Contact

- Education about safe sex practices, including the risk of sexual practices that permit anal-oral contact.

Infection Prevention and Control Strategies

Strategies:

- Contact precautions are indicated for the duration of the illness in addition to routine practices for hospitalized cases;[7]
- Promote and emphasize frequent and proper hand washing with soap and water; and
- Exclude infected persons from:
    - food handling;
    - providing care in childcare and health care settings; and
    - attending childcare settings.

Refer to PHO's website as follows: https://www.publichealthontario.ca/en/Health-Topics/Infection-Prevention-Control to search for the most up-to-date information on Infection Prevention and Control (IPAC).

Disease Characteristics

Aetiologic Agent - Shigellosis is caused by a bacteria of the genus *Shigella* within the *Enterobacteriaceae* family. The genus *Shigella* includes four species: *S. dysenteriae* (also known as serogroup A, consisting of 15 unique serotypes), *S.*

flexneri (also known as serogroup B, consisting of 14 unique serotypes), *S. boydii* (also known as serogroup C, consisting of 20 unique serotypes), and *S. sonnei* (also known as serogroup D, consisting of only one unique serotype).[6,7]

Modes of Transmission - Primary mode of transmission is fecal-oral. Transmission occurs through person-to-person contact, contact with contaminated inanimate objects, ingestion of contaminated food or water, and through sexual contact.[7] Prolonged organism survival in water (up to 6 months) and food (up to 30 days) can occur with *Shigella* species.[7] Direct transmission is common in children, and among men who have sex with men (MSM).[6,16,17,21] Risk of transmission increases for individuals engaging in anal-oral sex or in settings where personal hygiene is inadequate, such as in daycare centres.[6,7] Flies also may be vectors through physical transport of organisms from infected feces to uncovered food items.[6,7] Foodborne outbreaks of shigellosis associated with an infected food handler have occurred in Ontario. There have also been outbreaks of the XDR *Shigella sonnei* due to person-to-person transmission among the MSM population and the homeless population.[11,23]

As few as 10-100 bacteria have been shown to cause disease.[6]

Incubation Period – Usually 1-3 days but may range from 12-96 hours and up to 1 week for *Shigella dysenteriae*.[6]

Period of Communicability - During acute infection and until the infectious agent is no longer present in feces, usually within 4 weeks after illness. Secondary attack rates in households can be as high as 40%.[6] Asymptomatic carriers may transmit infection.[6] Appropriate antimicrobial treatment usually reduces the duration of carriage to a few days.[6]

Reservoir - The only significant reservoir is humans.[6]

Host Susceptibility and Resistance - Susceptibility is general. Two-thirds of cases occur in children younger than 10 years. The elderly, debilitated and malnourished individuals of all ages, and those infected with HIV are particularly susceptible to severe disease and death.[6]

Please refer to PHO's Infectious Disease Trends in Ontario (IDTO) interactive tool for the most up-to-date information on infectious disease trends in Ontario.[18]

For additional national and international epidemiological information, please refer to

the Public Health Agency of Canada and the World Health Organization.

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Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.
August 2023	Laboratory Evidence	Addition of whole genome sequencing and removal of phage typing and PFGE under 'Indications and Limitations'
August 2023	Case Management	Information on XDR Shigella
August 2023	Entire Document	Document revised with current laboratory content and hyper links.