

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

Infectious Disease Protocol

Appendix 1:

Case Definitions and Disease-Specific Information

Disease: Salmonellosis

Effective: May 2022

Salmonellosis

- Communicable
- Virulent

[Health Protection and Promotion Act \(HPPA\)](#)

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)

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;⁵
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

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

- Isolation of *Salmonella* spp. by culture (excluding *Salmonella* Typhi or Paratyphi) from an appropriate clinical specimen (e.g., sterile site, blood, stool, urine)

Probable Case

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

OR

- Positive/detection of *Salmonella* spp. by a nucleic acid amplification test (NAAT)

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.

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 headache, diarrhea, abdominal pain, nausea, fever and sometimes vomiting. Asymptomatic infections may occur, and the organism may cause extra-intestinal infections.

Clinical Presentation

Salmonellosis commonly manifests as sudden onset of diarrhea, which may be bloody, abdominal pain, fever, nausea, and vomiting.^{1,2} The illness usually lasts 4 to 7 days, and most individuals recover without treatment.^{3,4} Diarrhea may lead to dehydration, which can be severe among the young, the elderly and those with impaired immune systems.¹⁻³ Severity of the disease is related to serotype, number of organisms ingested and host factors; severity can be increased when the organism is resistant to antimicrobial agents used to treat the patient.¹

Salmonella infections can spread to urine, blood, bones, joints, the brain, or the nervous system, or other internal organs causing symptoms related to that part of the body or system. These extra-intestinal infections can have long-term effects, may be severe, and are potentially fatal.³ Death is uncommon, except among the very young, the frail elderly, and the immunosuppressed.^{1,3}

Laboratory Evidence

Laboratory Confirmation

- Positive *Salmonella* spp. culture

Approved/Validated Tests

- Standard culture for *Salmonella* spp. including serotyping
- Nucleic acid amplification test (NAAT) (which includes polymerase chain (PCR) and multiplex molecular tests) for *Salmonella* spp.

Indications and Limitations

Further strain typing (e.g.: serotype, phage typing, PFGE typing) is conducted, as appropriate, and may be used to support linkage of cases.

For further information about human diagnostic testing, contact the [Public Health Ontario Laboratories](#).

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. 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:

- Food consumed and exposure to animals, animal feed/ pet treats or recreational water for the 3 day period prior to gastrointestinal symptom onset;

- Known exposure to a carrier or person with clinical signs and symptoms compatible with salmonellosis;
- History of occupation or activities involving vulnerable populations, food handling, childcare and healthcare; and
- History of visits to farms, petting zoos, zoos, and travelling animal shows.

Investigators should also note any treatment prescribed including name of medication, dose duration of treatment and start and finish dates.

Decisions regarding treatment of individual cases are at the discretion of the attending clinician. For uncomplicated enterocolitis, treatment is generally supportive (e.g., rehydration and electrolyte replacement as needed).¹ Evidence suggests that antibiotic therapy does not shorten the duration of disease, can prolong the duration of fecal excretion, may not eliminate the carrier state, and may lead to resistant strains or more severe infections.⁶⁻⁹ Antibiotic treatment may be considered for certain groups, including infants up to 2 months, the elderly, the debilitated, those with sickle cell disease, persons with HIV, or patients with continued high fever or manifestations of extra-intestinal infection.^{1,2}

If available, collect and test suspected food items and prevent further consumption by recalling, holding or otherwise disposing of the suspected items. Please see Outbreak Management section for more information.

Provide education about transmission of infection and prevention via proper hand hygiene and safe food handling.

Exclusion criteria for symptomatic cases (confirmed and probable):

- Exclude symptomatic individuals from food handling, from attending or working in day nurseries, from direct care of infants, elderly, immunocompromised and institutionalized patients until symptom free for 24 hours, or symptom free for 48 hours after discontinuing use of anti-diarrheal medication.
- The rationale for exclusion for 48 hours after discontinuing the use of anti-diarrheal medication is to ensure that diarrhea does not return after the anti-diarrheal medication has been discontinued. In the event that antibiotics are used, the person should be excluded until symptom-free for 24 hours.

If the case is working in a hospital, use the "[Enteric Diseases Surveillance Protocol for Ontario Hospitals](#)" (OHA and OMA Joint Communicable Diseases Surveillance Protocols Committee, 2017 or as current) for exclusion criteria,

Exclusion considerations for asymptomatic food handlers with laboratory confirmation of salmonellosis (see the case definition for Salmonellosis for appropriate clinical specimens):

- Consider the need for work exclusion based on an assessment of the potential risk of food contamination in the context of the following factors:
 - The understanding and anticipated compliance of the affected food handler and the food premise operator(s) with:
 - Safe food handling practices
 - Appropriate hand hygiene practices
 - The nature of the specific food handling duties, type of food items being prepared (e.g., preparing ready-to-eat foods with multiple ingredients may require more food handling, handling unpackaged food to be consumed without further processing).
 - Preparing food for a population (such as the very young, elderly and immunocompromised) with risk factors for severe disease and complications.
 - Reassignment to low-risk activities (e.g., no direct contact with food or patient care) may be considered as an alternative to exclusion.

There is no specified time period for work exclusion of asymptomatic food handlers with laboratory confirmation of salmonellosis. Work exclusion should include conditions for return to regular duties and should be based on a risk assessment.

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 if infected and should be excluded as specified for 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.

Two or more cases linked by time, common exposure, and/or place 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](#) (2021, or as current).¹⁰

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.

Prevention and Control Measures

Personal Prevention Measures

Preventive measures:¹

- Minimize cross-contamination through the use of safe food handling techniques, including keeping raw meats separate from cooked or ready-to-eat foods.
- Practice good hand hygiene: after using sanitary facilities, after assisting others with personal care (e.g., diapering or toileting), after touching or handling pets and other animals, and before, during, and after food handling.
- Cook and reheat food thoroughly to the appropriate temperatures. For temperatures, see the ministry's publication "[Food Safety: Cook](#)"
- Follow manufacturer's directions for cooking and re-heating of high-risk food items (such as raw or frozen poultry and processed poultry products).
- For high risk individuals, avoid consuming raw sprouts of any kind.
- Avoid preparing or serving food while ill.

- Treat or boil water intended for consumption.
- Avoid consuming raw or undercooked eggs and dirty or cracked eggs. Use pasteurized eggs or egg products in recipes that would result in the consumption of raw or undercooked eggs (e.g., Hollandaise sauce).
- Avoid consuming raw or unpasteurized milk and milk products.
- Keep storage of hazardous food at room temperature for no more than 2 hours.

For more food safety prevention measures, please see the ministry's food safety "[Frequently Asked Questions](#)".

Infection Prevention and Control Strategies

Strategies:

- Educate food handlers and the general public about the importance of hand hygiene before, during, and after food preparation; thorough cooking of all foods; proper food handling and storage especially avoiding cross-contamination between raw and cooked foods; maintaining a sanitary kitchen.¹
- Implement routine practices and contact precautions for incontinent and diapered cases.²
- Refer to PHO's website at www.publichealthontario.ca to search for the most up-to-date information on Infection Prevention and Control.

Disease Characteristics

Aetiologic Agent - Salmonellosis is caused by the bacterium, *Salmonella*, a gram-negative, non-spore forming bacillus that has over 2,500 serotypes, belonging to the *Enterobacteriaceae* family.^{1,2} Nomenclature for *Salmonella* is *Salmonella enterica* subsp *enterica*. Serotypes include Typhimurium, Enteriditis, etc.¹

Modes of Transmission - *Salmonella* live in the intestines of humans and other animals, including poultry and other birds.^{3,4} Infection is acquired by direct or indirect contact with infected animals or their environment.^{1,4}

The predominant mode of transmission is through the ingestion of contaminated food, often times of animal origin. The most common food sources include raw and undercooked poultry and poultry products (e.g. frozen breaded chicken products), unpasteurized/raw milk and milk products, eggs, meat and meat products, processed foods and produce.^{1,3,4} *Salmonella* has also been found in pet food and treats.^{1,4}

Contaminated water is also an important mode of transmission, especially in areas where drinking water supplies are not disinfected.¹

Fecal-oral transmission from person-to-person has also been observed when diarrhea is present, especially in institutional settings. Infants and stool incontinent adults pose a greater risk of transmission than do asymptomatic carriers.¹

Incubation Period - From 6-72 hours, usually about 12-36 hours. Longer incubation periods of up to 16 days have been documented, and may not be uncommon following low-dose ingestion.¹

Period of Communicability - The period of communicability extends throughout the course of infection and carriage. A temporary carrier state may continue for months, especially in infants. Depending on the serotype, approximately 1% of infected adults and 5% of children younger than 5 years, may excrete the organism for up to 1 year.¹ Antimicrobial therapy can prolong excretion.²

Reservoir - Domestic and wild animals, including poultry (e.g., chickens, especially chicks, turkeys, geese, ducks), reptiles (e.g., turtles, iguanas, snakes), amphibians (e.g., frogs, toads), swine, cattle, rodents (e.g., hamsters, rats, mice), and pets (e.g., dogs, cats, hedgehogs).^{1,2,4} Humans infected with *Salmonella* bacteria and convalescent carriers.^{1,4}

Host Susceptibility and Resistance - Susceptibility is universal and increased by achlorhydria, antacid treatment, gastrointestinal surgery, prior or current antibiotic therapy, neoplastic disease, and other immunosuppressive conditions, including malnutrition. Immunosuppressed patients, infants and the elderly are at increased risk for invasive infection.¹

Please refer to [PHO's Reportable Disease Trends in Ontario reporting tool](#) for the most up-to-date information on infectious disease trends in Ontario.

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.