SALMONELLOSIS

Disease Overview

Nontyphoidal salmonellosis is caused by a gram-negative bacillus bacterium, *Salmonella*. The bacteria are found worldwide, and numerous serotypes have been identified in humans and animals. Most of the pathogenic serotypes are *S. enterica* subsp. *Enterica* - Enteritidis (commonly S. e*nteritidis*) and Typhimurium (commonly S. *typhimurium*). Paratyphoid fever caused by Salmonella *paratyph*i A, B, and C is reported under salmonellosis.

Symptoms

Infection is characterized by sudden onset of fever, headache, abdominal pain, diarrhea (sometimes bloody), nausea, and sometimes vomiting. Severe dehydration may occur-especially with the very young or elderly. Asymptomatic infections may occur. Deaths are uncommon but may occur in vulnerable cases (young, old, immunocompromised, or ill). Severity of the illness may vary and is related to serotype, number of bacteria ingested, susceptibility of the host, and anti-microbial drug resistance.

Reservoir

Humans. Also, domestic and wild animals, including poultry, swine, cattle, rodents, and pets such as iguanas, tortoises, turtles, terrapins, chicks, and other baby poultry, dogs, cats, hamsters, and hedgehogs.

Some serotypes are associated with specific animal reservoirs. S. *enteriditis* (chickens, other poultry, and cattle) and S. *typhimurium* (cattle, pigs, poultry, and sheep).

Mode of Transmission

Fecal-oral route. Common source outbreaks are related to consumption of food contaminated with fecal material. Outbreaks have been traced to food sources such as:

- processed meat products
- raw or undercooked poultry/poultry products
- raw or undercooked eggs/egg products
- raw milk and dairy products
- fresh and frozen fruits and vegetables

Fecal contamination of non-treated water can also be a source of infection.

Person-to-person transmission is less common and occurs by the fecal-oral route, especially when diarrhea is present.

Salmonella can also be transmitted by contact with infected farm animals and farm environments; and by contact with infected pets and their environment. Chronic carriers are rare in humans but occur in animals.

Incubation Period

Average12-36 hours (range 6-72 hours). Longer incubation periods have been documented (up to 16 days).

Period of Communicability

Throughout the course of the infection; and is extremely variable, usually several days to weeks. A temporary carrier state may continue for months, especially in infants.

Risk Factors

Not applicable

Surveillance Case Definition

Confirmed case

Laboratory confirmation of infection with or without clinical illness:

Isolation of *Salmonella* spp. (excluding *Salmonella* Typhi*)* from an appropriate clinical specimen (e.g., stool, blood, cerebrospinal fluid, rectal swab, deep tissue wounds, other sterile site, vomit, urine).

Probable case

Clinical illness in a person who is epidemiologically linked to a confirmed case.

OR

Detection of *Salmonella* spp. nucleic acid with or without clinical illness, in an appropriate clinical specimen (dependent on the test used), using a nucleic acid test (NAT), such as a polymerase chain reaction (PCR).

Diagnosis and Laboratory Guidelines

Isolation of organisms from stool sample (see Food and Water Borne Diseases Introduction).

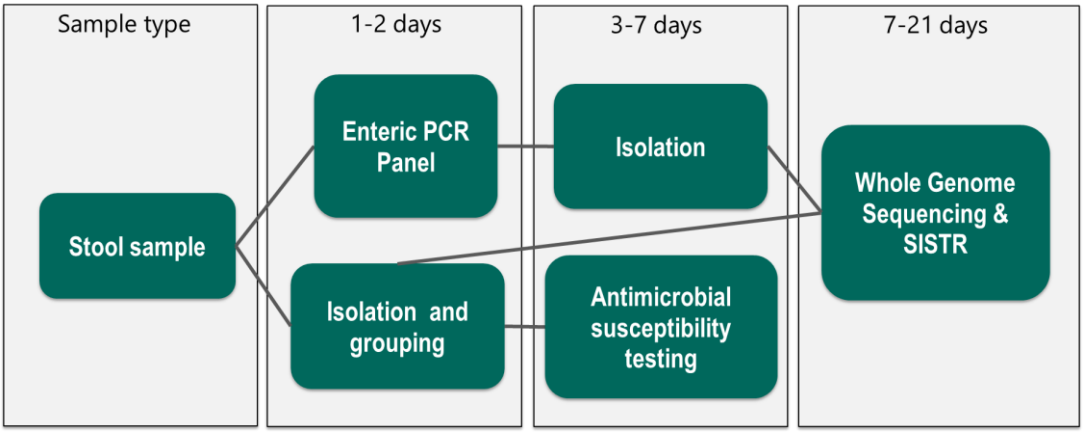
Regional laboratories can also process other specimens (blood, vomit, urine, and wounds) for Salmonella isolation, identification and antibiotics susceptibilities testing.

Enteric PCR can detect Salmonella species through their genetic material, and laboratories have been reporting these results to the regional offices as a positive identification. Reflex culture is done on positives but may not always be available.

Whole genome sequencing (WGS) provides stronger laboratory evidence than previous typing methods (pulsed field gel electrophoresis and phage typing) to support enteric foodborne illness surveillance and outbreak investigations. WGS is used for Salmonella, Listeria, E. coli, and Shigella. WGS can provide serovar data through a program called SISTR which can read serovar in the genetic code.

WGS methods used in Canada include whole genome multi locus sequence typing (wgMLST) analysis and single nucleotide variant (SNV) analysis. WgMLST analysis is currently routinely used by the PulseNet Canada program through the National Microbiology Laboratory in Winnipeg for surveillance and outbreak support. SNV analysis may be used if further laboratory evidence is required to support an investigation by providing additional genetic resolution.

The usual turnaround time is 5 to 10 days for WGS analysis. Turnaround times are averages and may change depending on the urgency of the situation.



Reporting

Per Policy 2.2 Disease and Event Notification to OCMOHE and section 3 Disease and Event Reporting.

- Routine surveillance (RDSS) for all confirmed cases.
- Enhanced Surveillance. For all confirmed cases and for probable cases that are NAT or PCR positive, an enhanced surveillance form should be completed and information entered in the Access databases. Database extracts are submitted to OCMOHE on a weekly basis.

Case Management

Education

Case or relevant caregiver should be informed about:

- Nature of infection, length of communicable period and mode of transmission
- Enteric disease precautions
- Hand washing
- Food safety, especially care with raw poultry and eggs and other identified high risk foods
- Safe water source

Investigation

The severity of disease, particularly in the elderly, immunosuppressed and pregnant women, and the ability to spread via contaminated food and secondary spread (person to person) means single cases require prompt investigation.

Use enhanced Salmonella investigation form and obtain detailed history before onset including food, water, animal contact, farms, swimming, daycares and other institutions, and travel. Potential sources of infection should receive follow up appropriate to risk.

Exclusion/Social Distancing

Follow exclusion period guidelines for cases under investigation (cases, symptomatic and asymptomatic contacts) identified in high-risk individuals (food handlers, caregivers, and individuals in daycare centres and kindergartens).

Treatment

Not applicable

Immunization

Not applicable

Contact Management

Education

Per case management

Investigation

Identify contacts with significant exposure to cases (household contacts).

After discussion with RMOH, provide stool specimen kits to contacts in high-risk groups (food handlers or caregivers involved in direct patient care or care for children or elderly in institutional settings).

Exclusion/Social Distancing

Follow exclusion period guidelines for cases under investigation (cases, symptomatic and asymptomatic contacts) identified in high-risk individuals (food handlers, caregivers, and individuals in daycare centres and kindergartens).

Confirmed asymptomatic cases do not require exclusion provided they can adhere to proper hygiene practices as determined by the MOH.

Prophylaxis

Not applicable

Outbreak Management

Activate the local outbreak plan when an outbreak is declared.

Use enhanced *Salmonella* investigation form.