TYPHOID FEVER

Case definition

Clinical illness with laboratory confirmation of infection:

- isolation of *Salmonella typhi* from an appropriate clinical specimen.

Causative agent

Salmonella typhi

Source

Humans: Stool and/or urine of an infected person.

Incubation

Dependent on infectious dose. From 3 days to over 60 days, average of 8-14 days.

Transmission

- Fecal-oral from person to person or by ingestion of food or water contaminated by feces or urine of the infected person.
- Consumption of shellfish harvested from sewage-contaminated waters, consumption of uncooked fruits and vegetables fertilized with human waste or consumption of contaminated milk/milk products (usually cross-contaminated through the hands of carriers).
- Flies may also be a vehicle for the contamination of food.

Communicability

Usually from the first week of illness throughout convalescence. Chronic carrier state (< 5% of population) is usually linked to the biliary or urinary tract and should be distinguished from short-term fecal carriage. Approximately 10% of untreated patients will shed for 3 months after onset of symptoms.

Symptoms

Characterized by insidious onset of sustained fever, headache, malaise, anorexia, splenomegaly, diarrhea (more common in children) or constipation (more common in adults) and non-productive cough. Relative bradycardia and occasionally a transient, macular rash of rose-coloured spots can be seen on the trunk.

Clinically can vary from mild illness to severe clinical disease with abdominal discomfort and other complications. The severity of illness is dependent on the infecting dose, the virulence of the bacterial strain, duration of the illness before initiation of appropriate treatment, age and vaccine history.

Relapses (generally milder than the initial clinical illness) can occur depending on what antimicrobials are used in treatment.

Diagnostic testing

Stool, urine, bone marrow or blood for culture. Organisms are often absent from stool.

Testing may also need to be completed for schistosomiasis if case history indicates travel or having lived in an endemic area. As schistosome infections can be hepatic, intestinal and/or urinary, multiple sample types may be required for definitive diagnosis.

Treatment

Treatment may include antibiotics and/or corticosteroids.

PUBLIC HEALTH MANAGEMENT & RESPONSE

Case management

Follow up the case using the following steps:

1. Contact the primary care provider to obtain clinical information on the case.
2. Interview the case, review clinical information, determine food history, travel history and travel activities, employment, potential source of exposure and determine any contacts that may require investigation (see "***Contact tracing***" section).
3. Educate the case and/or family about Typhoid Fever and prevention measures, providing access to website, general information, etc.
4. Implement the necessary exclusions as per the "***Exclusion of cases and carriers***" section for those cases identifying as belonging to one or more risk group(s). For cases that are not listed in either of the risk groups, recommend that the case remain at home until 48 hours after stools have returned to normal and 48 hours after stopping the use of anti-diarrheal medication.
5. If the case has no travel history and identifies consuming shellfish, especially shellfish harvested from an area possibly contaminated with sewage, or raw fruits and vegetables purchased at a food establishment, contact a Food Safety Specialist with the Department of Environment.
6. Document the information on the Enteric Case Report Form.

Exclusion of cases and carriers

Individuals who continue to shed *Salmonella typhi* for one year or more are considered to be chronic carriers.

Case management of carriers employed in any of the below high-risk groups should be done in consultation with the regional MOH as redeployment of staff to lower-risk activities may be possible.

Exclude cases and carriers in the risk groups below:

Risk Group	Criteria for Exclusion
Food handlers	Until 3 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area.
Health care, child care or other staff who have contact with susceptible persons	Until 3 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area.
Children attending child care	Until 3 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area.
Carrier(s) (both symptomatic and asymptomatic) employed in: • food handling • child care* • health care and/ or other staff who have contact with susceptible persons * Inclusive of those attending child care.	Until 3 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area. If any of these samples are positive, repeat cultures at weekly intervals for 8 weeks until 3 consecutive samples are negative. If 3 consecutive negative samples are not obtained after 8 weekly samples, repeat cultures monthly for up to 10 months until 3 consecutive samples are negative. If 3 consecutive negative samples are not obtained after 10 monthly samples the person is considered a chronic carrier.

Note: Ensure that all samples submitted to the laboratory for testing are labelled "Public Health management requirement to inform exclusion".

Education of cases and carriers

Offer the following information:

- Ensure cases belonging to a high-risk group are aware of exclusion criteria.
- Remind cases about the importance of hand hygiene in stopping the spread of typhoid fever and to wash hands before preparing food and after using the bathroom and changing diapers.
- Inform the case about the potential to infect contacts and provide information on how to minimize transmission to others; including household and close contacts, including sexual contacts.
- Recommend that cases infected with typhoid fever or any other gastrointestinal illness should not prepare or serve food to other people (for food handlers see "***Exclusion of cases and carriers***" section).

See the ***General Information Sheet*** for further information on preventing the transmission of typhoid fever.

Contact tracing

Contact tracing should be initiated as part of case management if symptomatic contacts or contacts that belong to any of the risk groups identified in the "***Exclusion of contacts***" section are identified by the case.

Definition of a contact

A contact is a person who has had exposure to a case during the period of communicability and is at risk of infection by the fecal-oral route by either person-to person contact or the ingestion of contaminated food or water.

Contacts include:

- Household contacts (those living in the same residence)
- Close contacts including sexual contacts and persons that may have had hand-to-mouth contact with the case such as sharing meals the case has prepared.
- All members of a travel group associated with a case (e.g., those who travelled together to the same location(s), not just on the same flight)

Prophylaxis

Immunization may be considered for close (household and sexual) and long-term care facility contacts of carriers only.

Exclusion of contacts

Close contacts (household and sexual) of cases and carriers not employed in any of the risk groups listed below should be provided information about disease transmission and appropriate infection prevention and control measures, including seeking prompt medical assessment and notifying Public Health if they become symptomatic.

Exclude contacts in the risk groups below:

Risk Group	Criteria for Exclusion
Co-traveller(s) (both symptomatic and asymptomatic) employed in: • food handling • child care* • health care and/or other staff who have contact with susceptible persons * Inclusive of those attending child care.	Until 2 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area. Note: If any of the culture specimens are positive for *Salmonella typhi* then treat as a case.
Symptomatic close contacts of cases and carriers (household and sexual) employed in: • food handling • child care* • health care and/or other staff who have contact with susceptible persons * Inclusive of those attending child care.	Until 2 negative stool samples have been obtained at least 24 hours apart AND at least 48 hours after discontinuance of antibiotics AND one negative urine culture if travelled or lived in schistosomiasis endemic area. Note: If any of the culture specimens are positive for *Salmonella typhi* then treat as a case.

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Risk Group	Criteria for Exclusion
Asymptomatic close contacts of cases (household and sexual) employed in: • food handling • child care* • health care and/or other staff who have contact with susceptible persons * Inclusive of those attending child care.	Collect one screening stool sample. Exclusion not necessary while awaiting culture results. Note: If any of the culture specimens are positive for *Salmonella typhi* then treat as a case.
Asymptomatic close contacts (household and sexual) of carriers employed in: • food handling • child care* • health care and/or other staff who have contact with susceptible persons * Inclusive of those attending child care.	Are not excluded and no stool specimens are required, however are advised to seek prompt medical assessment and notify Public Health if they become symptomatic. Close contacts of carriers should be provided with information about symptoms, disease transmission, appropriate infection prevention and control measures and immunization (where applicable).

Note: Ensure that all samples submitted to the laboratory for testing are labelled "Public Health management requirement to inform exclusion".

Education of contacts

If Public Health is notifying contacts, inform the contacts of the following:

- Their potential exposure
- An explanation of the illness (description of the disease, symptoms, etc.)
- The range of clinical presentation
- Incubation period
- Report to Public Health if they become symptomatic.

See the ***General Information Sheet*** for further information on preventing the transmission of typhoid fever.

Outbreak control

Consult the ***Outbreak Response Plan*** for further guidance if an outbreak is suspected.

For outbreaks in child care settings also refer to the ***Guidelines for Communicable Disease Prevention and Control for Child Care Settings***.

For outbreaks in Long-Term Care Facilities also refer to Infection Prevention and Control Nova Scotia's (IPCNS) ***Infection Prevention and Control: Guidelines for Long-Term Care Facilities***.

Surveillance forms

novascotia.ca/dhw/populationhealth/surveillanceguidelines/NS_Notifiable_Disease_Surveillance_Case_Report_Form.docx

novascotia.ca/dhw/populationhealth/surveillanceguidelines/Enteric_Case_Report_Form.pdf

General Information Sheet

References

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