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.

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:

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Criteria for Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food handlers</td>
<td>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.</td>
</tr>
<tr>
<td>Health care, child care or other staff who have contact with susceptible persons</td>
<td>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.</td>
</tr>
<tr>
<td>Children attending child care</td>
<td>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.</td>
</tr>
<tr>
<td>Carrier(s) (both symptomatic and asymptomatic) employed in:</td>
<td>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.</td>
</tr>
<tr>
<td>• food handling</td>
<td>If any of these samples are positive, repeat cultures at weekly intervals for 8 weeks until 3 consecutive samples are negative.</td>
</tr>
<tr>
<td>• child care*</td>
<td>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.</td>
</tr>
<tr>
<td>• health care and/or other staff who have contact with susceptible persons</td>
<td>If 3 consecutive negative samples are not obtained after 10 monthly samples the person is considered a chronic carrier.</td>
</tr>
<tr>
<td>* Inclusive of those attending child care.</td>
<td></td>
</tr>
</tbody>
</table>

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

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*Nova Scotia Communicable Diseases Manual*

Section: Typhoid Fever [February 2016]
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:

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Criteria for Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-traveller[s] (both symptomatic and asymptomatic) employed in:</td>
<td>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.</td>
</tr>
<tr>
<td>• food handling</td>
<td>Note: If any of the culture specimens are positive for <em>Salmonella typhi</em> then treat as a case.</td>
</tr>
<tr>
<td>• child care*</td>
<td></td>
</tr>
<tr>
<td>• health care and/or other staff who have contact with susceptible persons</td>
<td></td>
</tr>
<tr>
<td>* Inclusive of those attending child care.</td>
<td></td>
</tr>
<tr>
<td>Symptomatic close contacts of cases and carriers (household and sexual)</td>
<td>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.</td>
</tr>
<tr>
<td>employed in:</td>
<td>Note: If any of the culture specimens are positive for <em>Salmonella typhi</em> then treat as a case.</td>
</tr>
<tr>
<td>• food handling</td>
<td></td>
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<tr>
<td>• child care*</td>
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</table>

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<table>
<thead>
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<th>Risk Group</th>
<th>Criteria for Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic close contacts of cases (household and sexual) employed in:</td>
<td>Collect one screening stool sample.</td>
</tr>
<tr>
<td>• food handling</td>
<td>Exclusion not necessary while awaiting culture results.</td>
</tr>
<tr>
<td>• child care*</td>
<td>Note: If any of the culture specimens are positive for <em>Salmonella typhi</em> then treat as a case.</td>
</tr>
<tr>
<td>• health care and/or other staff who have contact with susceptible persons</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Asymptomatic close contacts (household and sexual) of carriers employed in:</td>
<td>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.</td>
</tr>
<tr>
<td>• food handling</td>
<td>Close contacts of carriers should be provided with information about symptoms, disease transmission, appropriate infection prevention and control measures and immunization (where applicable).</td>
</tr>
<tr>
<td>• child care*</td>
<td></td>
</tr>
<tr>
<td>• health care and/or other staff who have contact with susceptible persons</td>
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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**


Centers for Disease Control and Prevention. Schistosomiasis Endemic Area map. [cdc.gov/travel-static/yellowbook/2016/map_3-12.pdf](#)


[Provincial Microbiology User’s Manual](#). [cdha.nshealth.ca/pathology-laboratory-medicine](#)