

**To:** Nova Scotia Health, Public Health Practitioners

**From:** Jayne Boutilier, Director, Health Protection, Public Health Branch, DHW

**Date:** February 28, 2024

**Re:** *Changes for select bacterial enteric diseases*

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The purpose of this memo is to advise Public Health about the addition of molecular testing in Central Zone for Salmonellosis (including Typhoid fever and Paratyphoid fever), Shigellosis, Campylobacteriosis, Cholera and Verotoxigenic E. coli (VTEC), also reported as Shiga toxin-producing E. coli (STEC). This laboratory change is anticipated to be implemented in Summer 2024.

Once the Provincial Public Health Laboratory Network (PHLLN) implements these changes, Public Health practitioners will begin to see molecular test results for the above diseases.

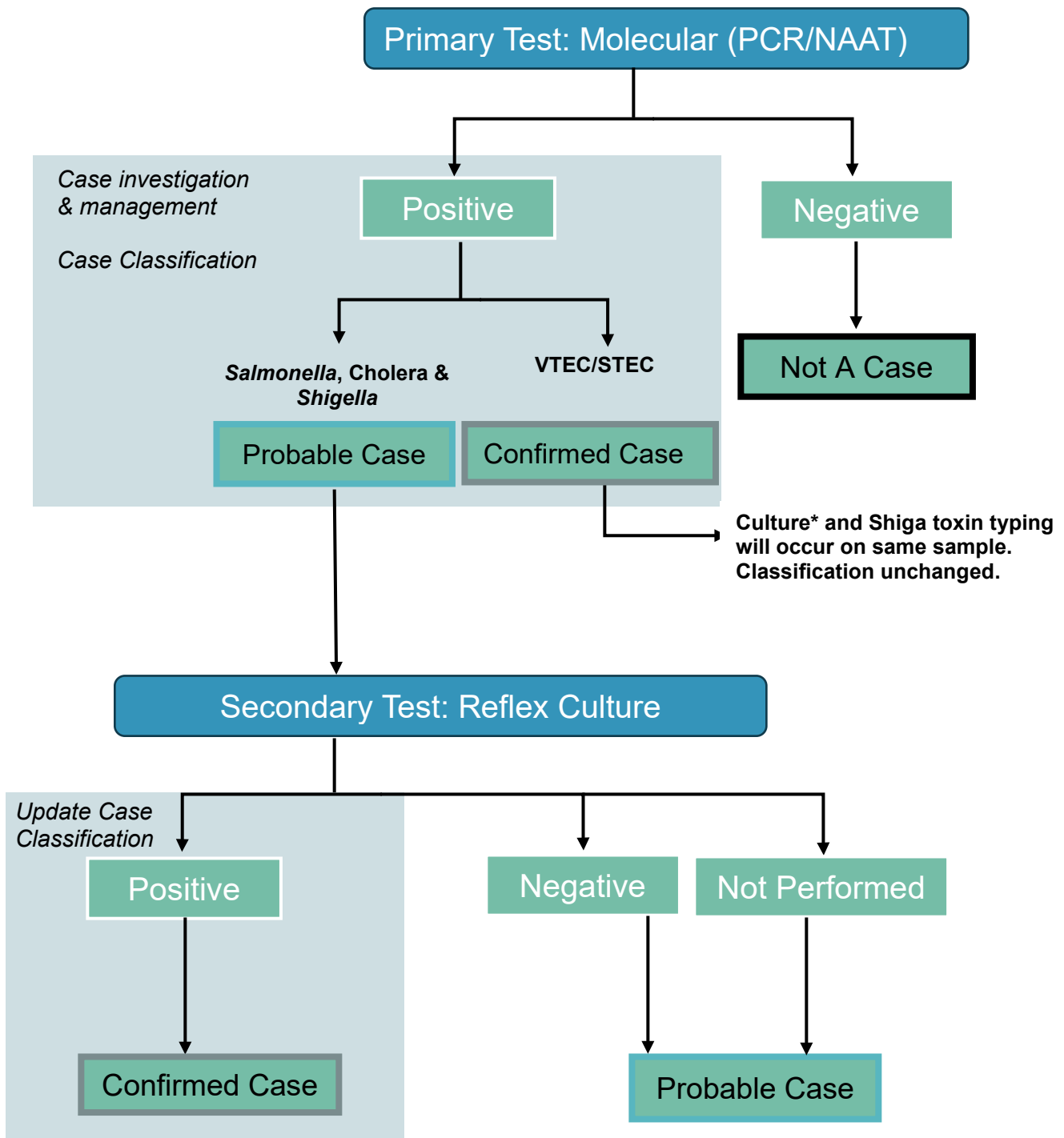
This change will impact specimens processed in Central zone and is expected to expand to other zones over time. The following table and algorithm provide guidance on actions required for these laboratory results.

The [Nova Scotia Surveillance Guidelines for Notifiable Diseases and Conditions](#) have been updated to reflect this change. While the Communicable Disease Manual chapters are being updated, please refer to the surveillance guidelines for the current symptom lists for the above noted diseases.

This memo will be added to the beginning of all affected [Nova Scotia Communicable Disease Manual Chapters](#). As a reminder, all chapters in the Nova Scotia Communicable Disease Manual are evergreen and online versions are dated as the most current version.

| Disease   | Public Health initiation of case based on laboratory result   | <a href="#">Public Health Management</a> considerations for high-risk exclusions and return-to-work   | Other Considerations  |
|---|---|---|---|
| <b>Cholera</b>  | Public Health investigation to begin when positive molecular result received.   | <ul style="list-style-type: none"> <li>Public Health management as per NSH resources and the <a href="#">Cholera chapter</a> guidance.</li> </ul>   | N/A   |
| <b>Salmonellosis</b>  | <p>Public Health investigation to begin when positive molecular result received.</p> <p>All <i>Salmonella</i> positive molecular (PCR) tests will be cultured.</p> <p>Public Health case managers should monitor closely for culture results as public health management will differ <i>Salmonella</i> Paratyphi* or Typhi†</p> | <ul style="list-style-type: none"> <li>See the <a href="#">Salmonellosis chapter</a>.</li> <li>For Paratyphoid Fever or Typhoid Fever, see below and each CD Manual chapter guidance.</li> </ul>  | <ul style="list-style-type: none"> <li>Let client know their lab has been submitted for further testing and they may receive an additional call with more information based on culture results. (e.g., culture may detect <i>Salmonella</i> Paratyphi* or <i>Salmonella</i> Typhi†) which are 2 species where Public Health management criteria differs slightly from the other species.</li> </ul> |
| <b>*Paratyphoid Fever</b><br>( <i>Salmonella</i> Paratyphi) | Public Health would have already initiated case investigation as a <i>Salmonella</i> species as PPHLN would not identify <i>Salmonella</i> Paratyphi on molecular testing (see <i>salmonellosis</i> above). The detection of <i>Salmonella</i> Paratyphi will be identified upon culture.                                       | <ul style="list-style-type: none"> <li>If positive culture for <i>Salmonella</i> Paratyphi, Public Health management will follow the <a href="#">Paratyphoid Fever chapter</a>.</li> <li>When follow up samples are required, these should be clearly marked as “Follow-up for Public Health” with a RMOH name indicated so that the lab will know to skip the molecular testing stage and only complete culture.</li> <li>Follow-up culture testing should be used to determine if carriage has cleared, as molecular testing may detect nonviable organisms.</li> </ul> | N/A   |
| <b>†Typhoid Fever</b><br>( <i>Salmonella</i> Typhi)         | Public Health would have already initiated case investigation as a <i>Salmonella</i> species as PPHLN would not identify <i>Salmonella</i> Typhi on molecular testing (see <i>salmonellosis</i> above). <i>Salmonella</i> Typhi will be identified upon culture.  | <ul style="list-style-type: none"> <li>If positive culture for <i>Salmonella</i> Typhi, Public Health follow-up will occur as per the <a href="#">Typhoid Fever chapter</a>.</li> <li>When follow-up samples are required, these should be clearly marked as “Follow up for Public Health” with an RMOH name indicated so that the lab will skip the molecular testing stage, only completing culture.</li> <li>Follow-up culture testing should be used to determine if carriage has cleared, as molecular testing may detect nonviable organisms.</li> </ul>            | N/A   |

| Disease  | Public Health initiation of case based on laboratory result                   | <a href="#">Public Health Management</a> considerations for high-risk exclusions and return-to-work  | Other Considerations   |
|--|---|--|--|
| <b>Shigellosis</b>   | Public Health investigation to begin when positive molecular result received. | <ul style="list-style-type: none"> <li>• See the <a href="#">Shigellosis chapter</a>.</li> <li>• When follow up samples are required, these should be clearly marked as "Follow up for Public Health" with a RMOH name indicated so that the lab will know to skip the molecular testing stage.</li> <li>• Follow-up culture testing should be used to determine if carriage has cleared, as molecular testing may detect nonviable organisms.</li> </ul>  | <ul style="list-style-type: none"> <li>• Let client know their lab has been submitted for further testing and they may receive an additional call with more information based on culture results.</li> </ul>   |
| <b>Verotoxigenic E. coli (VTEC)/Shiga toxin-producing E. coli (STEC)</b> | Public Health investigation to begin when positive molecular result received. | <ul style="list-style-type: none"> <li>• See the <a href="#">VTEC chapter</a>.</li> <li>• Molecular negative tests can be used to inform exclusion criteria.</li> <li>• When follow up samples are required, these should be clearly marked as "Follow up for Public Health" with a RMOH name so that the lab will know to skip the molecular testing stage.</li> <li>• Follow-up culture testing should be used to determine if carriage has cleared, as molecular testing may detect nonviable organisms.</li> </ul> | <ul style="list-style-type: none"> <li>• VTEC may also be reported as STEC.</li> <li>• Let client know their lab has been submitted for further testing and they may receive an additional call with more information based on culture results.</li> </ul> |
| <b>Campylobacteriosis</b>  | Public Health investigation to begin when positive molecular result received. | <ul style="list-style-type: none"> <li>• Public Health management as per NSH resources and the <a href="#">Campylobacteriosis chapter</a> guidance.</li> </ul>   | N/A  |



# PARATYPHOID FEVER

## Case definition

Please see the Salmonellosis case definition in the NS Surveillance Guidelines found here: <https://novascotia.ca/dhw/populationhealth/diseases-and-conditions-A-Z.asp>

## Causative agent

*Salmonella paratyphi*

## Source

Stool and/or urine of infected person. Rarely, domestic animals are a reservoir. A small number of people may become permanent carriers.

## Incubation

Dependent on infectious dose, generally from 1 day to 10 days.

## Transmission

- Fecal-oral from person-to-person or by ingestion of food or water contaminated by feces or urine of the infected person or domestic animal.
- Consumption of shellfish harvested from sewage contaminated waters or consumption of uncooked fruits and vegetables fertilized with human waste. Flies may be a vehicle for the contamination of food.

## Communicability

Usually from the first week of illness throughout convalescence, commonly 1-2 weeks. Carrier state is possible; short term fecal carriage is more likely than chronic carrier state. Chronic carrier state (< 5% of population) is usually linked to the biliary or urinary tract and should be distinguished from short-term fecal carriage.

## 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.

Atypical presentations occur, and the severity of illness varies, with a generally milder presentation than *S. typhi* and a much lower case fatality rate.

## 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

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## 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 Paratyphoid 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 paratyphi* 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: <ul style="list-style-type: none"> <li>• food handling</li> <li>• child care*</li> <li>• health care and/or other staff who have contact with susceptible persons</li> </ul> * 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.<br><br>If any of these samples are positive, repeat cultures at weekly intervals for 8 weeks until 3 consecutive samples are negative.<br><br>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.<br><br>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 Paratyphoid 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 Paratyphoid 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 Paratyphoid.

## 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 who 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)

### 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   |
|--|--|
| <p>Co-traveller(s) (both symptomatic and asymptomatic) employed in:</p> <ul style="list-style-type: none"> <li>• food handling</li> <li>• child care*</li> <li>• health care and/or other staff who have contact with susceptible persons</li> </ul> <p>* Inclusive of those attending child care.</p>                     | <p>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.</p> <p>Note: If any of the culture specimens are positive for <i>Salmonella paratyphi</i> then treat as a case.</p> |
| <p>Symptomatic close contacts of cases and carriers (household and sexual) employed in:</p> <ul style="list-style-type: none"> <li>• food handling</li> <li>• child care*</li> <li>• health care and/or other staff who have contact with susceptible persons</li> </ul> <p>* Inclusive of those attending child care.</p> | <p>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.</p> <p>Note: If any of the culture specimens are positive for <i>Salmonella paratyphi</i> then treat as a case.</p> |
| <p>Asymptomatic close contacts of cases (household and sexual) employed in:</p> <ul style="list-style-type: none"> <li>• food handling</li> <li>• child care*</li> <li>• health care and/or other staff who have contact with susceptible persons</li> </ul> <p>* Inclusive of those attending child care.</p>             | <p>Collect one screening stool sample.</p> <p>Exclusion not necessary while awaiting culture results.</p> <p>Note: If any of the culture specimens are positive for <i>Salmonella paratyphi</i> then treat as a case.</p>  |

(continued on next page)

| Risk Group   | Criteria for Exclusion   |
|--|--|
| <p>Asymptomatic close contacts (household and sexual) of carriers employed in:</p> <ul style="list-style-type: none"> <li>• food handling,</li> <li>• child care*</li> <li>• health care and/or other staff who have contact with susceptible persons</li> </ul> <p>* Inclusive of those attending child care.</p> | <p>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.</p> <p>Close contacts of carriers should be provided with information about symptoms, disease transmission, appropriate infection prevention and control measures and immunization (where applicable).</p> |

**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 Paratyphoid.

### 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](#).

## General Information Sheet

### References

Alberta Health. April 2014. Public Health Notifiable Disease Management Guidelines - Paratyphoid Fever. [health.alberta.ca/documents/Guidelines-Paratyphoid-Fever-2014.pdf](http://health.alberta.ca/documents/Guidelines-Paratyphoid-Fever-2014.pdf)

BC Centre for Disease Control. Exclusion of Enteric Cases and their Contacts from High Risk Settings. May 2013 [bccdc.ca/NR/rdonlyres/56C97580-5A9C-41C5-8F22-3818337C55A5/0/EntericCasesandtheirContacts\\_May2013.pdf](http://bccdc.ca/NR/rdonlyres/56C97580-5A9C-41C5-8F22-3818337C55A5/0/EntericCasesandtheirContacts_May2013.pdf)

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