

IMPORTANT NOTE: As of April 1, 2024, Shiga toxin-producing *E. coli* (STEC) has been adopted as the nomenclature for this group of *E. coli* strains. Panorama IOM will reflect all previously reported verotoxigenic *Escherichia coli* infections as Shiga toxin-producing *Escherichia coli* infections.

Notification Timeline:

From Lab/Practitioner to Public Health: Immediate.

From Public Health to Ministry of Health: Within 3 days (or immediate if an outbreak is suspected or anticipated).

Public Health Follow-up Timeline: Immediate.

Public Health Purpose for Notification of Shiga Toxin-producing *E. Coli* (adapted from Massachusetts, 2017)

- To identify whether the case may be a source of infection for other persons (e.g., a diapered child, childcare attendee, or food handler), and if so, to prevent further transmission.
- To identify transmission sources of public health concern (e.g., a restaurant or a commercially distributed food product), and to stop transmission from such sources.
- To monitor the effectiveness of prevention and control measures;
- To make timely and evidence informed actions on outbreaks; and
- To inform the public and medical community about Shiga toxin-producing *E. coli*.

Information

Table 1. Surveillance Case Definition¹ (Public Health Agency of Canada [PHAC], December 2023)

Confirmed Case	Laboratory confirmation of infection with or without clinical illness*: • isolation of Shiga toxin-producing <i>Escherichia coli</i> from an appropriate clinical specimen (e.g., stool, urine, blood) OR
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¹ Surveillance case definitions ensure uniform reporting to allow comparability of surveillance data. The definition is not intended to be used for clinical or laboratory diagnosis or management of cases.

	• detection of antigen or nucleic acid of Shiga toxin in an appropriate clinical specimen (dependent on the test used) using a culture independent diagnostic test (CIDT), such as a nucleic acid test (NAT), or polymerase chain reaction (PCR). [§]
Probable Case	Clinical illness* in a person who is epidemiologically linked to a confirmed case, which would include persons with haemolytic uremic syndrome (HUS); OR Detection of <i>E. coli</i> O157 nucleic acid that is Shiga toxin negative or pending, with or without clinical illness, in an appropriate clinical specimen (i.e., dependent on the test used), such as a nucleic acid test (NAT), or polymerase chain reaction (PCR). ^{§, ¶}
*Clinical illness may be characterized by diarrhea (often bloody), severe abdominal pain, vomiting, and less commonly, fever. Illness may be complicated by haemolytic uremic syndrome (HUS). The severity of illness may vary. While not considered clinical illness, asymptomatic infections may occur. [§] Culture is required for public health and clinical management, especially when the Shiga toxin type is unknown (i.e., unable to differentiate between <i>stx1</i> and <i>stx2</i>). Thus, culture must be performed on CIDT/NAT-positive (CIDT+/NAT+) specimens to enable molecular typing (e.g., whole genome sequencing) for surveillance, outbreak detection and response, as per Canadian Public Health Laboratory Network (CPHLN) guidance. An isolate may also be required for antimicrobial susceptibility testing (AST) and/or antimicrobial resistance (AMR) predictions for AMR surveillance. [¶] NAT- positive (NAT+) and culture-negative (culture-) results for <i>E. coli</i> O157 would still be considered a probable case.	

Epidemiology and Occurrence

For the most recent food recalls and alerts, refer to:

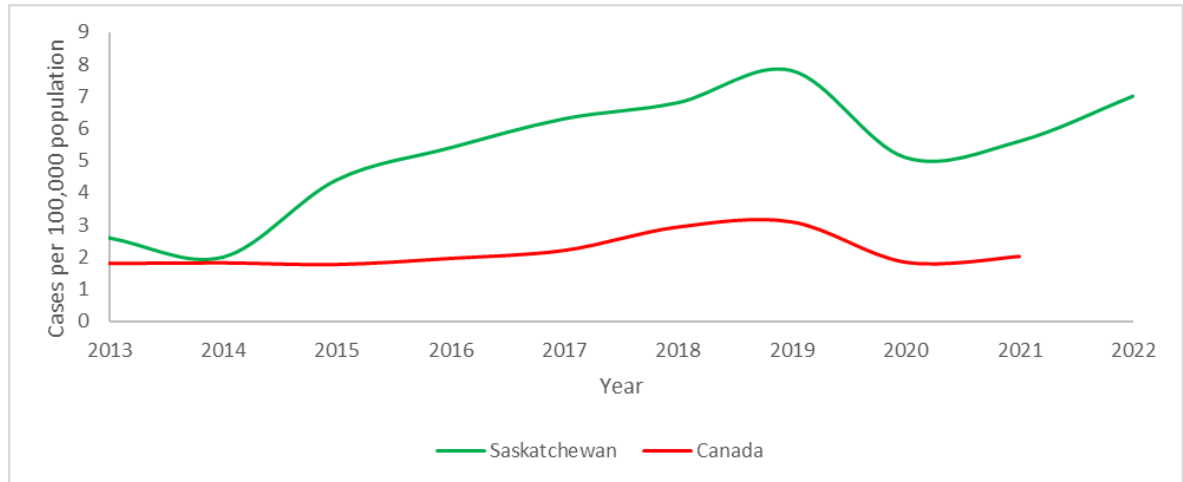
- Public Health Agency of Canada: www.canada.ca/en/public-health/services/public-health-notices.html
- Canadian Food Inspection Agency: inspection.canada.ca/

Global and National

- Shiga toxin-producing *E. coli* (STEC), also referred to as verotoxigenic *E. coli* (VTEC) or enterohemorrhagic *E. coli* (EHEC) is ubiquitous and responsible for approximately 63,000 deaths globally every year. STEC is reported to be among the most important foodborne pathogen in North America, and cases are usually associated with travel to intermediate and high-risk countries (NCEZID, 2023).
- *Escherichia coli*, with other foodborne pathogens are responsible for >95% of the foodborne illnesses in the WHO Region of the Americas (WHO, 2015).
- In Canada, *E. coli* remains a major foodborne pathogen causing severe illness with over 12,800 cases, and about 250 hospitalizations reported in 2016. In 2019, the incidence rate of *E. coli* infection reached a high of 3.1 cases per 100,000 from 2007 when the incidence rate was 3.24 cases per 100,000 population.

Provincial

- In Saskatchewan, STEC has been adopted as the nomenclature that refers to this group of *E. coli* strains as of April 1, 2024. Some cases of *E. coli* in Saskatchewan have been linked to multi-provincial outbreaks in the past, and a collaborative investigation by local public health, Public Health Agency of Canada (PHAC) and Canadian Food Inspection Agency (CFIA) led to the recall of implicated flour products.
- Over the last 10 years, the incidence rate of STEC infection has been consistently higher than the rates across Canada with a 10-year high of 7.8 cases per 100,000 population which was more than double the rate across Canada.
- Overall, in the past 10 years, incidence rate of *E. coli* infection in Saskatchewan has been increasing, and higher than national rate with an average of 67 cases reported annually. However, increase in rates especially after 2014 was likely due to change in testing and reporting to include non-O157 *E. coli* cases.



*Canada (CNDSS) has data up to 2021

1. NCZID (2023). National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) Division of Global Migration Health (DGMH)
2. WHO (2015). <https://www.who.int/news/item/03-12-2015-who-s-first-ever-global-estimates-of-foodborne-diseases-find-children-under-5-account-for-almost-one-third-of-deaths>

Additional Background Information

Causative Agent (Heymann, 2022)

- Shiga toxin (Stx) is one of the most potent bacterial toxins known (Melton-Celsa, 2014).
- Shiga toxin-producing *E. coli* (STEC) is also referred to as enterohemorrhagic *E. coli* (EHEC), verotoxin-producing *E. coli*, Verotoxigenic *E. coli* and Verocytotoxin-producing *E. coli* (VTEC). STEC express potent cytotoxins called shiga toxins 1 (Stx1) and shiga toxin 2 (Stx2) with Stx2 being more virulent and is more commonly associated with the most serious manifestation of the disease, the hemolytic uremic syndrome or HUS.
- The main STEC serotype is *Escherichia coli* O157:H7; this serotype is thought to cause approximately 95% of *E. coli* diarrhea-associated haemolytic uremic syndrome (HUS) cases in North America (D+HUS).
- The other most common serogroups in North America include O26, O111, O103, O45, O145 and O121.
- The infective dose is very low in the range of 10 to 100 cells (US Food and Drug Administration [FDA], 2012).

Symptoms

- The illness is characterized by severe abdominal pain/cramping, diarrhea (which is initially watery and may become grossly bloody), and vomiting. Fever is either low-grade or absent.

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- The illness is usually self-limited lasting for an average of eight days (U.S. FDA, 2012). Some individuals exhibit watery diarrhea only.
 - Some, particularly the very young, have developed hemolytic uremic syndrome (HUS), characterized by acute renal failure, hemolytic anemia and thrombocytopenia.
 - HUS develops during the 2 weeks after onset of diarrhea. D+HUS is used to describe HUS that follows a diarrheal illness (Heymann, 2022).
 - From 8% to 15% of children with *E. coli* O157, and a much smaller proportion of adults, develop HUS (American Academy of Pediatrics [AAP], 2018).
 - Children between the ages of 1-4 have the greatest risk of developing HUS.
 - Approximately 55% of HUS patients require dialysis, and 5% die, however rates vary by serotype.
 - Older adults over age 60 are at greatest risk of death from HUS (Heymann, 2022).

Incubation Period

Typically ranges from 1 to 10 days with a median of 3-4 days (Centers for Disease Control and Prevention [CDC], 2014).

Risk Factors

Risk factors are associated with individual susceptibility for severe disease and settings that create opportunities for acquisition or transmission to others.

- children under the age of five (Heymann, 2022).
- adults 60 years and older (PHAC, 2017)
- immunocompromised individuals (CDC, 2023)
- pregnancy (PHAC, 2017)
- food handlers
- healthcare workers
- childcare workers

Specimen Collection and Transportation

Refer to RRPL Compendium of Tests: <https://rrpl-testviewer.ehealthsask.ca/>

Lab Reports and Interpretation

- The final interpretation of a test result and how it aligns with the case definition must take into account the type of test and if the clinical presentation.
- Further characterization (e.g., serotyping, whole genome sequencing [WGS]) is required for epidemiologic, public health, and clinical management, including to monitor for and identify clusters or to establish linkages to known outbreaks.
- NAAT testing is expected to be more sensitive than culture in some cases; culture recovery following NAAT positivity is not guaranteed.
- Culture positive specimens with confirmed O157 antigen and/or Shiga toxin production are referred to RRPL for O157 and H7 tests.
- All isolates are referred to NML for WGS.
- Isolates suspected to be positive are subject to PCR testing that detects both Shiga toxin 1 and/or Shiga toxin 2.
- No further laboratory workup if culture is negative.

Table 2. Interpretation of Test Results

Type of Specimen	Type of test	Result	Interpretation as per Case Definition (in conjunction with clinical presentation)	Test Details
Stool	Culture	Shiga Toxin-producing <i>E. Coli</i> Isolated ¹	Confirmed	

Type of Specimen	Type of test	Result	Interpretation as per Case Definition (in conjunction with clinical presentation)	Test Details
Stool	Shiga toxin PCR	Positive	Confirmed	
Stool	PCR	<i>E. coli</i> O157 Isolated	Probable	Shiga toxin results negative or pending.

¹ Refer to Causative Agent section for examples of Shiga toxin-producing *E. coli*.

Treatment/Supportive Therapy

Treatment for clinical management is at the discretion of the primary care provider. The following serves as a reference for the public health investigator:

- *Fluid replacement is the cornerstone of treatment for Shiga toxin-producing *E. coli* (STEC) diarrhea.*
- *Reasonable concern exists that some antimicrobial agents increase the risk of HUS, although proof is lacking (Heymann, 2022). Most experts would not use an antimicrobial agent to treat persons with *E. coli* O157:H7 (American Academy of Pediatrics, 2018).*
- *Use of antidiarrheal medications may also increase the risk of HUS and are generally not recommended (Centers for Disease Control and Prevention, 2014).*

Public Health Investigation

I. Case

Refer to [Attachment – Shiga toxin-producing *E. Coli* Infection Data Collection Worksheet](#) to assist in follow-up.

History

- Onset of illness – to determine incubation period and period of communicability which helps to identify the possible source and contacts to be followed.

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- In the 10 days prior to onset of illness:
 - Identify history of travel
 - Exposure other individual(s) with similar symptoms.
 - Identify potentially contaminated swimming pools or other recreational waters
 - Exposure to potentially contaminated drinking water sources.
 - Exposure to farm animals (cattle sheep, goats, horses, pigs, chickens, turkeys), wildlife (e.g., deer), and/or pets (e.g., dogs, cats, rabbits). This may include visiting a petting zoo or handling raw pet food or animal feed.
 - Obtain a detailed food history Ensure source, preparation, storage etc., are captured for foods with a greater probability of transmission such as beef, pork, other meats, unpasteurized cow's milk, grocery produce including melons, leaf greens, lettuce, fresh spinach, coleslaw, apple cider, alfalfa sprouts, raw flour (complete the [User Defined Form](#))
 - Assess for safe food handling procedures (e.g., possible cross-contamination such as cutting boards).
 - Determine history of child care or hospital exposure.
 - Determine history of high-risk sexual practices, particularly activities that result in contact with feces.
 - Identify other individuals who may have been exposed to the same source(s).
 - Assess for history of similar symptoms in visitors or other members of the household.
 - Occupational considerations for transmission exist for food handlers, health care and childcare workers.

Public Health Interventions

Assessment

- Assess for [contacts](#) paying particular attention to individuals that have had exposure to the same source or are a risk for further transmission.

Communication

- Letters can be used to inform contacts of the exposure, symptom monitoring and when to seek medical attention (see Sample letter)
- Letters can also be used when exclusion from school or work settings are required as a public health intervention. Refer to [Exclusion](#) for specific guidance.

Education

- All cases should be provided information on prevention and control measures including safe food handling and handwashing. See [Appendix F](#).

Exclusion and Public Health Order

- Exclude the following groups until diarrhea has resolved² **and** testing requirements met (refer to [Testing](#)):
 - food handlers;
 - health care workers;
 - childcare or personal care workers, or other staff involved with personal hygiene;
 - children below the age of five years in childcare; and
 - older children and adults unable to maintain adequate standards of personal hygiene (i.e. have mental or physical disabilities)
- Individuals should be excluded from using recreational water (e.g., swimming pools, whirlpools, etc.) while diarrhea present. Those who are incontinent should be excluded for 1 additional week after diarrhea resolved (AAP, 2018).
- A Public Health Order may be used for exclusion, if necessary.

Referral

- Depending on the suspected source, investigation/management may involve local Medical Health Officer, Ministry of Health, PHAC, Ministry of Agriculture, and/or CFIA.

Testing

- Two consecutive negative stool cultures taken at least 24 hours apart and at least 48 hours after discontinuation of antibiotics and anti-diarrheal medication (if

² Diarrhea is considered resolved when stools have been normal for that individual for 48 hours and antibiotics and/or antidiarrheal medication has stopped for at least 48 hours.

treatment was provided) are required before exclusion requirements can be removed for food handlers, health care and childcare workers or other staff involved with personal care. NAAT should not be used to confirm clearance of organism.

II. Contacts/Contact Investigation

Contact Definition

Contacts include:

- persons living in the same household;
- children and childcare workers in the same child care facility/day home;
- persons who have eaten food prepared by the case during the period of communicability;
- persons who have attended events where food was shared with the case (e.g., potluck);
- individuals exposed to the same source (if it is identified); and
- individuals practicing sexual activities that increases risk for fecal-oral transmission.

Public Health Interventions

Assessment

- Assess for symptoms.
- Symptomatic contacts should be assessed by a physician.

Communication

- Follow-up individual contacts in high-risk settings and occupations. Refer to [Risk Factors](#) section.

Education

- All contacts should be provided information on prevention and control measures including safe food handling and handwashing. See Prevention Measures.

Environmental Health

- If a common exposure is identified through the case and contact investigations, environmental health assessments may be required. See Outbreak and Epidemic Measures.

Exclusion

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- **Symptomatic contacts** (i.e. probable case) - Exclude those who are from risk groups³ until testing requirements met (refer to contacts [Testing](#) section). Managed as cases (see [Exclusion](#) for cases).
 - **Asymptomatic contacts** – exclusion generally not required. In some cases (as per risk determined by MHO), asymptomatic contacts may be asked or required to provide a stool sample or be excluded from a high-risk transmission setting/activity (e.g. child care, food handler, health care worker)

Referral

- Depending on the suspected source, investigation/management may involve local MHO, Ministry of Health, PHAC, Ministry of Agriculture, and/or CFIA.

Symptom monitoring

- Contacts should be asked to monitor symptoms during the incubation period and be advised on testing and exclusion if symptoms develop.

Testing

- Two consecutive negative stool cultures are required before exclusion requirements can be removed. NAAT should not be used to confirm clearance of organism. The specimens must be taken at least 48 hours after antibiotics and antidiarrheal medications have stopped and at least 24 hours apart.

III. Environment**Child Care Centre/Schools Control Measures**

- Strict enforcement of infection control measures. Refer to Saskatchewan Ministry of Health Infection Control Manual for Child Care Facilities.⁴
- Isolated cases are managed as per case and contact management above.
- Two or more cases: If there are epidemiologically linked cases of STEC in children or employees, staff and attendees and food handlers should be assessed for illness. Stool cultures may be done on all staff and attendees to identify additional cases. Handwashing practices should be thoroughly reviewed. Additional prevention measures should be reviewed and reinforced with staff. Refer to [Outbreak and Epidemic Measures](#) section.

Health Facility Control Measures

³ Risk groups include: food handlers, health care workers, childcare or other staff involved with personal care, or children below the age of 5 years old.

⁴ <https://publications.saskatchewan.ca/#/products/88618>

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- Strict enforcement of infection control measures. Refer to your Health Authority Infection Control Manual and supporting resources (e.g., transmission-based precautions guidelines).
 - Isolated cases are managed as per case and contact management above.
 - Two or more cases: If there are epidemiologically linked cases of STEC in the institution's residents or employees, staff with direct contact and food handlers should be assessed for illness. Stool cultures may be done to identify additional cases. If cases continue, investigate as an outbreak. Refer to Health Authority outbreak guidelines.

Other Communal Living or Similar Environment with Higher Risk of Transmission

- This may include facilities where care may or may not be provided but the communal living and shared facilities increase risk of transmission such as group homes, private seniors residences, work camps, dormitories, etc.
- Isolated cases are managed as per case and contact management above.
- Two or more cases: Refer to Outbreak and Epidemic Measures section.
- Residential care facilities should follow the [Outbreak Management](#)⁵ toolkit
- The Health Authority Infection Control Manual and Residential Care Outbreak Management toolkit can be used to guide infection control measures in other settings.

IV. Outbreak and Epidemic Measures

When cases occur among a group of individuals that are known to each other, searching for possible common exposures such as travel or shared food sources. A history of food handling errors, use of unsafe raw ingredients, inadequate cooking, time-temperature abuses and cross-contamination may be the likely source.

When two or more cases are linked through genetic identification (such as PFGE or whole genome sequencing), but have not named each other as contacts, the risk of a common source is heightened. In such cases, further investigation is warranted into what and where the potential sources are. Environmental, food sampling and inspection of implicated public facilities (recreational water, restaurants, etc.) may be warranted. See

⁵ https://www.saswh.ca/wp-content/uploads/2023/01/Outbreak_Toolkit_December_2022-compressed-1.pdf

Saskatchewan FIOIP for protocol related to foodborne illness outbreaks in Saskatchewan (expected to be available in spring 2024).

When laboratories identify interprovincial or international linkages, a multi-jurisdictional Outbreak Incident Command Center may be activated to coordinate investigation. The CFIA would become involved with the goal to identify the implicated source and implement appropriate interventions such as product recalls to reduce further spread. See the national [FIORP](#) for foodborne illness outbreaks involving multiple provinces.

Prevention Measures

Refer to the [Enteric Introduction and General Considerations](#) section of the manual that highlights topics for client education that should be considered as well as provides information on high-risk groups and activities.

Education

- Educate about proper hand washing after defecation and ensure soap and individual paper towels are available.
- Provide prevention information and education to case or caregiver, child care or institution workers about personal hygiene and hand hygiene.
- Educate food handlers about proper food and equipment handling and personal hygiene, especially in avoiding cross-contamination of food products, and emphasize thorough hand washing. Recommend staying home when sick and taking a food safety training course.
- Educate eating establishment operators and workers regarding safe food handling and management and cleaning of equipment and to monitor practice within their establishments frequently. Ensure employees stay home when sick (workplace policy recommended).
- Educate about disinfecting diaper changing areas after use by child with diarrhea.
- Advise people to avoid food preparation and care of hospitalized patients, the elderly and children when ill with diarrhea.
- Information on Safe Food Handling at Home can be found in [Appendix F](#). Hands should be thoroughly washed after handling raw meat, especially hamburger and all surfaces and utensils should be thoroughly cleaned and sanitized (one ounce of bleach per gallon of water) after contact with raw meat to prevent cross contamination.
- Wash fruits and vegetables prior to peeling and/or consuming. Clean and disinfect work surfaces thoroughly before and after preparing raw meat, poultry and other foods.
- Cook beef adequately, especially ground beef, to an internal temperature of 71°C (160°F). Cooking until all pink colour is gone is not reliable. A meat thermometer should be used.
- Educate about the risk of sexual practices that permit fecal-oral contact.
- Ensure water is sourced from supplies that are appropriate and properly treated (i.e. municipal water, properly treated private water, etc.).
- Wash hands thoroughly after handling animals, their treats, toy, and food and after cleaning animal enclosures and picking up animal waste.

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- Educate populations at risk about the risks associated with attending events where they come into contact with animals, their food/feed, and waste, such as branding or calving gatherings, petting zoos, farm tours, etc.
 - Ensure adequate hygiene in childcare centres, and encourage frequent handwashing, with soap (Heymann, 2022).

Revisions

Date	Change
March 2024	• Disease name updated to Shiga toxin-producing <i>E. coli</i> (STEC). • Case definitions updated to align with PHAC December 2023 updates. • Additional Background Information- section updated, including Risk Factors. • Lab Reports and Interpretation section added, including Interpretation of Test Results table. • Treatment/Supportive Therapy textbox- added “<i>Use of antidiarrheal medications may also increase the risk of HUS and are generally not recommended</i>” • Case History- clarified exposure sources. • Case Exclusion- clarified exclusion, including added children below the age of five years in childcare and personal care workers. • Definition of resolved diarrhea- added antibiotics and/or antidiarrheal medication has stopped for at least 48 hours. • Testing- added stool cultures should be taken at least 48 hours after discontinuation of antidiarrheal medication. • Contact definition- added persons who have eaten food prepared by the case during the period of communicability; persons who have attended events where food was shared with the case (e.g., potluck); and individuals practicing sexual activities that increases risk for fecal-oral transmission. • Contact Exclusion- clarified risk groups. • Child Care Centre/Schools Control Measures- related to an isolated case, added “manage as per case and contact management”. • Health Facilities Control Measures- related to an isolated case, added “manage as per case and contact management”; removed “Contact precautions for cases that are hospitalized patients and residents”; added refer to “supporting resources (e.g. transmission-based precautions guidelines)”; clarified wording within management of two or more cases “...staff with direct contact and food handlers should be assessed for illness. Stool

	cultures may be done to identify additional cases.” • Outbreak and preventative measures- referred to provincial FIOIP and national FIORP and removed bullets covered in those documents. • Prevention measures- updated. • Throughout- consistent wording used for child care/facility (previously used both child care and daycare). • References updated. • Updated Data Collection Worksheet.
September 2018	• Clarified the purpose for notification of cases to public health • Incorporated an Epidemiology and Occurrence section to the chapter as a placeholder. • Incorporated standardized Verotoxigenic <i>E. Coli</i> Data Collection Worksheet. • Added graphic to help calculate incubation and communicability. • Rearranged and updated the style into the new format of the Manual. • References reaffirmed or updated as necessary.

References

- American Academy of Pediatrics. (2018). *Red book: 2018-2021 report of the Committee on Infectious Diseases* (31st ed.). Elk Grove Village, IL: Author.
- British Columbia Center for Disease Control (2018). *Shigatoxigenic E. coli Case Report Form*. Retrieved September, 2018 from http://www.bccdc.ca/resource-gallery/Documents/Guidelines%20and%20Forms/Forms/Epid/Enterics/VTEC_FollowupForm.pdf
- Centers for Disease Control and Prevention. (2014). *E. coli (Escherichia coli)*. Retrieved December, 2023 from <https://www.cdc.gov/ecoli/general/index.html>
- Centers for Disease Control and Prevention. (2023). *E. coli and Food Safety*. Retrieved February, 2024 from <https://www.cdc.gov/foodsafety/communication/ecoli-and-food-safety.html>.
- Heymann, D. L., (Ed.). (2022). *Control of communicable diseases manual* (21st ed.). Washington, DC: American Public Health Association.
- Massachusetts Department of Public Health (2017). *Guide to surveillance reporting and control: Shiga toxin-producing Escherichia coli*. Retrieved December, 2023 from <https://www.mass.gov/handbook/guide-to-surveillance-reporting-and-control>
- Melton-Celsa AR. (2014). Shiga Toxin (Stx) Classification, Structure, and Function. *Microbiology Spectrum*. August 2014. Retrieved January 2024 from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4270005/>.
- Public Health Agency of Canada. (December 2023). *National case definition: Shiga toxin-producing Escherichia coli (STEC) Infection*. Retrieved January, 2024 from <https://www.canada.ca/en/public-health/services/diseases/e-coli/health-professionals-e-coli/national-case-definition.html>.
- Public Health Agency of Canada. (2017). *Risks of E. coli (Escherichia coli) infection*. Retrieved December, 2023 from <https://www.who.int/news-room/fact-sheets/detail/e-coli>
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U.S. Food and Drug Administration. (2012). *Bad bug book: Foodborne pathogenic microorganisms and natural toxins handbook: Enterohemorrhagic Escherichia coli (EHEC)*. Retrieved December, 2023 from <http://www.fda.gov/downloads/Food/FoodSafety/FoodbornIllness/FoodbornIllness/FoodbornePathogensNaturalToxins/BadBugBook/UCM297627.pdf>

World Health Organization. (2018). *Fact sheet: E. coli*. Retrieved December, 2023 from <https://www.who.int/news-room/fact-sheets/detail/e-coli>

Shiga toxin-producing Escherichia Coli Infection DCW

Please complete **all** sections.

Panorama Client ID: _____

Panorama Investigation ID: _____

Panorama QA complete: ☐ Yes ☐ No

Initials: _____

A) CLIENT INFORMATION

LHN -> SUBJECT -> CLIENT DETAILS -> PERSONAL INFORMATION

Last Name: _____		First Name: and Middle Name: _____	Alternate Name (Goes by): _____
DOB: YYYY / MM / DD Age: _____		Health Card Province: _____ Health Card Number (PHN): _____	Preferred Communication Method: (specify - i.e. home phone, text): Email Address: ☐ Work ☐ Personal
Phone #: ☐ Primary Home: ☐ Mobile contact: ☐ Workplace:			
Place of Employment/School: _____		Gender: ☐ Male ☐ Female ☐ Other ☐ Unknown	
Alternate Contact: _____ Relationship: _____ Alt. Contact phone: _____		Address Type: ☐ No fixed ☐ Postal Address ☐ Primary Home ☐ Temporary ☐ Legal Land Description Mailing (Postal address): Street Address or FN Community (Primary Home): Address at time of infection if not the same:	

B) INVESTIGATION INFORMATION

LHN-> SUBJECT SUMMARY-> ENTERIC ENCOUNTER GROUP ->CREATE INVESTIGATION

Disease Summary Classification:	Date	Classification:	Date	LAB TEST INFORMATION:																
CASE		CONTACT		Date specimen collected:																
☐ Confirmed	YYYY / MM / DD	☐ Contact	YYYY / MM / DD	YYYY / MM / DD																
☐ Does Not Meet Case	YYYY / MM / DD	☐ Not a Contact	YYYY / MM / DD	Specimen type:																
☐ Person Under Investigation	YYYY / MM / DD	☐ Person Under Investigation	YYYY / MM / DD	☐ Blood																
☐ Probable	YYYY / MM / DD			☐ Urine																
				☐ Stool																
Disposition: FOLLOW UP: <table border="0"> <tr> <td>☐ In progress</td> <td>YYYY / MM / DD</td> <td>☐ Complete</td> <td>YYYY / MM / DD</td> </tr> <tr> <td>☐ Incomplete - Declined</td> <td>YYYY / MM / DD</td> <td>☐ Not required</td> <td>YYYY / MM / DD</td> </tr> <tr> <td>☐ Incomplete – Lost contact</td> <td>YYYY / MM / DD</td> <td>☐ Referred – Out of province</td> <td>YYYY / MM / DD</td> </tr> <tr> <td>☐ Incomplete – Unable to locate</td> <td>YYYY / MM / DD</td> <td colspan="2">(specify where)</td> </tr> </table>					☐ In progress	YYYY / MM / DD	☐ Complete	YYYY / MM / DD	☐ Incomplete - Declined	YYYY / MM / DD	☐ Not required	YYYY / MM / DD	☐ Incomplete – Lost contact	YYYY / MM / DD	☐ Referred – Out of province	YYYY / MM / DD	☐ Incomplete – Unable to locate	YYYY / MM / DD	(specify where)	
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☐ Incomplete – Unable to locate	YYYY / MM / DD	(specify where)																		
REPORTING NOTIFICATION		Location:																		
Name of Attending Physician or Nurse: _____																				
Physician/Nurse Phone number: _____		Date Received (Public Health): YYYY / MM / DD																		
Type of Reporting Source: ☐ Health Care Facility ☐ Lab Report ☐ Nurse Practitioner ☐ Physician ☐ Other _____																				

Verotoxigenic Escherichia Coli Infection Data Collection Worksheet

Please complete all sections

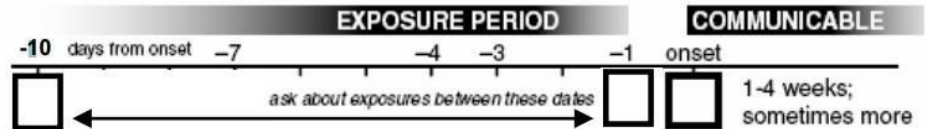
Panorama Client ID: _____
Panorama Investigation ID: _____

C) SIGNS & SYMPTOMS

LHN-> INVESTIGATION->SIGNS & SYMPTOMS

Description	Yes Date of onset	Date of recovery	Description	Yes Date of onset	Date of recovery
Abdominal - cramping	YYYY / MM / DD	YYYY / MM / DD	Hemolytic uremic syndrome (HUS)	YYYY / MM / DD	YYYY / MM / DD
Asymptomatic	YYYY / MM / DD	YYYY / MM / DD	Pain - abdominal	YYYY / MM / DD	YYYY / MM / DD
Diarrhea - bloody	YYYY / MM / DD	YYYY / MM / DD	Stool - bloody	YYYY / MM / DD	YYYY / MM / DD
Diarrhea - watery	YYYY / MM / DD	YYYY / MM / DD	Vomiting	YYYY / MM / DD	YYYY / MM / DD
Fever	YYYY / MM / DD	YYYY / MM / DD			
Other Signs & Symptoms if applicable					

Enter onset date in heavy box. Count back to figure the probable exposure period.



D) INCUBATION AND COMMUNICABILITY

LHN-> INVESTIGATION->INCUBATION & COMMUNICABILITY

Incubation for Case (period for acquisition):	
Earliest Possible Exposure Date: YYYY / MM / DD	Latest Possible Exposure Date: YYYY / MM / DD
<i>Exposure Calculation details:</i>	
Communicability for Case (period for transmission):	
Earliest Possible Communicability Date: YYYY / MM / DD	Latest Possible Communicability Date: YYYY / MM / DD
<i>Communicability Calculation Details:</i>	

E) RISK FACTORS N—No, NA—Not asked, U—Unknown

LHN-> SUBJECT->RISK FACTORS

DESCRIPTION	Yes	N, NA, U	Start date	Add'l Info
Animal Exposure - Farms (Add'l Info)			YYYY / MM/DD	
Animal Exposure - Other (Add'l Info)			YYYY / MM/DD	
Animal Exposure - Pet treats and raw food (Add'l Info)			YYYY / MM/DD	
Animal Exposure - Pets (including reptiles) (Add'l Info)			YYYY / MM/DD	
Animal Exposure - Petting zoos/zoos/special events/other (Add'l Info)			YYYY / MM/DD	
Contact - Persons with diarrhea/vomiting			YYYY / MM/DD	
Contact to a known case (Add'l Info)			YYYY / MM/DD	
Immunocompromised - Related to underlying disease or treatment			YYYY / MM/DD	
Occupation - Child Care Worker	TE		YYYY / MM/DD	
Occupation - Food Handler	TE		YYYY / MM/DD	
Occupation - Health Care Worker - IOM Risk Factor	TE		YYYY / MM/DD	
Other risk factor (Add'l Info)			YYYY / MM/DD	
Sexual Behaviour - Oral-anal	TE			
Special Population - Attends childcare	TE		YYYY / MM/DD	
Special Population - Attends school	TE		YYYY / MM/DD	
Special Population - Pregnancy				
Travel - Outside of Canada (Add'l Info)	AE		YYYY / MM/DD	
Travel - Outside of Saskatchewan, but within Canada (Add'l Info)	AE		YYYY / MM/DD	
Water - Bottled water (Add'l Info)			YYYY / MM/DD	
Water - Private well or system (Add'l Info)			YYYY / MM/DD	

Verotoxigenic Escherichia Coli Infection Data Collection Worksheet

Please complete all sections

Panorama Client ID: _____
Panorama Investigation ID: _____

DESCRIPTION	Yes	N, NA, U	Start date	Add'l Info
Water - Public water system (Add'l Info)			YYYY / MM/DD	
Water - Untreated water (Add'l Info)			YYYY / MM/DD	
Water (Recreational) - Pond, stream, lake, river, ocean (Add'l Info)			YYYY / MM/DD	
Water (Recreational) - Private (swimming pool/whirl pool)			YYYY / MM/DD	
Water (Recreational) - Public (swimming/paddling pool/whirl pool)			YYYY / MM/DD	

F) USER DEFINED FORM (SEE ATTACHED) LHN-> INVESTIGATION-> INVESTIGATION DETAILS -> LINKS AND ATTACHMENTS -> VEROTOXIGENIC E. COLI FORM

G) TREATMENT LHN-> INVESTIGATION-> MEDICATIONS->MEDICATIONS SUMMARY

Medication (Antibiotics are contraindicated – refer to physician if on Rx)

(Panorama = Other Meds) : _____

Prescribed by: _____ Started on: YYYY / MM / DD

H) INTERVENTIONS LHN-> INVESTIGATION->TREATMENT & INTERVENTIONS->INTERVENTION SUMMARY

Intervention Type and Sub Type:				
Assessment: ☐ Assessed for contacts Investigator name		YYYY/MM/DD	Outbreak Declared YYYY / MM / DD Investigator name	
Communication: ☐ Other communication (See Investigator Notes) Investigator name ☐ Letter (See Document Management) Investigator name		YYYY / MM / DD YYYY / MM / DD	Public Health Order: ☐ Other (specify) Investigator name	
General: Investigator name ☐ Disease-Info/Prev-Control ☐ Disease-Info/Prev-Cont/Assess'd for Contacts		YYYY/ MM / DD YYYY/ MM / DD	Other Investigation Findings: ☐ Investigator Notes ☐ Document Management	
Education/counselling: Investigator name ☐ Prevention/Control measures ☐ Disease information provided		YYYY/ MM/DD YYYY/ MM/DD	Referral: Investigator name ☐ Canadian food inspection agency ☐ Primary care provider	
Exclusion: Investigator name ☐ Daycare YYYY/ MM/DD ☐ School YYYY/ MM/DD		☐ Preschool YYYY/ MM/DD ☐ Work YYYY/ MM/DD	Testing: Investigator name ☐ Stool testing recommended (e.g. for follow-up)	
Immunization: ☐ Eligible Immunization recommended Investigator name		YYYY/ MM/DD		

Date	Intervention subtype	Comments	Next follow-up Date	Initials
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	
YYYY / MM / DD			YYYY / MM / DD	

Verotoxigenic Escherichia Coli Infection Data Collection Worksheet

Please complete all sections

Panorama Client ID: _____
Panorama Investigation ID: _____

I) OUTCOMES

LHN-> INVESTIGATION-> OUTCOMES

☐ Not yet recovered/recovering YYYY / MM / DD ☐ ICU/intensive medical care YYYY / MM / DD ☐ Hospitalization YYYY / MM / DD
☐ Recovered YYYY / MM / DD ☐ Intubation /ventilation YYYY / MM / DD ☐ Unknown YYYY / MM / DD
☐ Fatal YYYY / MM / DD ☐ Other _____ YYYY / MM / DD

Cause of Death: (if Fatal was selected) _____

J) EXPOSURES

Acquisition Event

LHN-> INVESTIGATION-> EXPOSURE SUMMARY-> ACQUISITION QUICK ENTRY

Acquisition Event ID: _____

Exposure Name: _____

Acquisition Start YYYY / MM / DD to Acquisition End: YYYY / MM / DD

Location Name: _____

Setting Type

☐ Travel ☐ Exposure or consumption of potentially contaminated food or water ☐ Most likely source

Transmission Events

LHN -> INVESTIGATION-> EXPOSURE SUMMARY -> TRANSMISSION event SUMMARY -> QUICK ENTRY

Transmission Event ID	Exposure Name	Setting type	Date/Time	# of contacts
		☐ Food service establishment ☐ Health Care setting ☐ Public facilities ☐ Household Exposure		
		☐ Food service establishment ☐ Health Care setting ☐ Public facilities ☐ Household Exposure		
		☐ Food service establishment ☐ Health Care setting ☐ Public facilities ☐ Household Exposure		
		☐ Food service establishment ☐ Health Care setting ☐ Public facilities ☐ Household Exposure		
	VTEC Contacts – Inv ID# _____	☐ Multiple Settings	YYYY / MM / DD to YYYY / MM / DD	

K) TOTAL NUMBER OF CONTACTS

LHN -> INVESTIGATION-> EXPOSURE SUMMARY -> TRANSMISSION EVENT SUMMARY -> TE HYPERLINK -> UNKNOWN/ANONYMOUS CONTACTS

Anonymous contacts: _____ (total number of individuals exposed)

Initial Report
completed by:

Date initial report completed:
YYYY / MM / DD



Record type: Investigation
Record ID: 78
Record Name: UDF Investigation

In this form the answers (Yes, Probably, No, and Don't know) are from the perspective of the person being interviewed. "Probably" can be used if the client thinks he/she may have eaten this food or usually eats this food, but is unsure if it was eaten during the period in question.

Diet and Allergies

 Show/Hide

Are you a vegetarian?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not asked

Do you have any food Allergies / avoidances / special diet?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not asked

If yes, specify details



Food Exposures

Show/Hide

In the 10 days prior to onset, did you eat...

Any beef (not including deli meat)?

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

if yes, raw beef?

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any whole cut beef (e.g. steak, roast)

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

If yes, specify details (E.g., steak, roast, other, purchase location)

Any stewing beef?

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any ground beef?

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

if yes, any any home-made hamburgers?

☐ Yes

☐ Probably

☐ No

☐ Don't know

☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any store-bought frozen beef patties?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any other (e.g. store-bought fresh)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any other ground beef?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any ground beef consumed raw or undercooked?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any pork (not including deli-meat or bacon)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify type (e.g. ham), purchase location.

Any prepared products containing pork (e.g. spring rolls, dumplings)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify type (e.g. spring rolls), location purchased

- ☐ Yes
- ☐ Probably
- ☐ No
- ☐ Don't know
- ☐ None of the above

Any deli-meat?

If yes, specify details (E.g., where consumed, type, brand, location)

- ☐ Yes
- ☐ Probably
- ☐ No
- ☐ Don't know
- ☐ None of the above

Any sausage?

Meat type (select all that apply):

- ☐ Beef
- ☐ Chicken
- ☐ Pork
- ☐ Turkey
- ☐ Other
- ☐ Ready to eat
- ☐ Fermented
- ☐ Raw

Preparation type (select all that apply):

Location purchased:

- ☐ Yes
- ☐ Probably
- ☐ No
- ☐ Don't know
- ☐ None of the above

Any game or country meat (e.g. venison, bison)?

If yes, specify details (E.g., where consumed, type, brand, location)

- ☐ Yes
- ☐ Probably
- ☐ No
- ☐ Don't know
- ☐ None of the above

Any sprouts including any sprouts on a sandwich or salad?

If yes, specify details (E.g., where consumed, type, brand, location)

Any lettuce?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify types (select all that apply)

- ☐ Iceberg
☐ Romaine
☐ Mesclun

If yes, specify details (E.g., where consumed, type, brand, location)

Any pre-packaged greens?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any spinach?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any fresh herbs?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any fresh parsley?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any other fresh herbs (e.g. oregano, dill, mint, rosemary, chives, or thyme)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any melons (e.g. cantaloupe)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any berries?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify types (select all that apply)

- ☐ Strawberries
☐ Raspberries
☐ Blueberries
☐ Blackberries

If yes, specify details (E.g., where consumed, type, brand, location)

Any unpasteurized fruit juice (e.g. unpasteurized apple cider)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any nuts (on their own, in a granola bar, as a garnish, or as part of a dish)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify type (e.g. almonds) purchase location

Any unpasteurized (raw) dairy milk (excluding cheese)?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any cheese made with unpasteurized (raw) milk?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any raw flour used in the household?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Did you eat, taste, or lick any uncooked or unbaked dough or batter (e.g. cookie dough, cake or muffin batter)?

- ☐ Yes
☐ Probably
☐ no
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Food Handling

In the 10 days before onset, of illness did you handle or prepare...

Any raw beef?

- ☐ Yes
☐ Probably
☐ No
☐ Don't know
☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Any raw pork?

- ☐ Yes
- ☐ Probably
- ☐ No
- ☐ Don't know
- ☐ None of the above

If yes, specify details (E.g., where consumed, type, brand, location)

Social Functions

[Show/Hide](#)

In the 10 days prior to onset, did you attend any social functions (e.g. parties, weddings, showers, potlucks, community events)?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not asked

Click the Add button to add social event/function details

Add

Restaurants

[Show/Hide](#)

In the 10 days prior to onset, did you attend any restaurants (including take-out, cafeteria, bakery, deli, kiosk)?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not asked

Click the Add button to add restaurant details

Add

Grocery Stores

[Show/Hide](#)

In the past 10 days prior to onset, did you visit grocery stores for foods consumed during the incubation period?

- ☐ Yes
- ☐ No
- ☐ Don't know
- ☐ Not asked

Click the Add button to add grocery store details

Add

Loyalty card/store issued card (for outbreak investigation only)

Show/Hide

This section is only for use in some specific outbreak situations, with client consent. It is not a routine question for sporadic cases.

Has the client given consent (written or verbal)?

☐ Yes

☐ No

☐ Not applicable

Loyalty card details (names and numbers)

Interviewer Details and Notes

Show/Hide

Interviewer Name

Interview date

7/24/2024

Any special notes regarding this interview

Save as Draft

Submit

Clear