Ministry of Health and Long-Term Care

Infectious Diseases Protocol

Appendix B: Provincial Case Definitions for Diseases of Public Health Significance

Disease: Verotoxin-producing E. coli infection indicator conditions, including Hemolytic Uremic Syndrome (HUS)

Effective: February 2019

Ontario

Verotoxin-producing E. coli infection indicator conditions, including Hemolytic Uremic Syndrome (HUS)

1.0 Provincial Reporting

Confirmed and probable cases of disease

2.0 Type of Surveillance

Case-by-case

3.0 Case Classification

3.1 Confirmed Case

Laboratory confirmation of infection with or without clinically compatible signs and symptoms:

- Isolation of verotoxin-producing *Escherichia coli* (VTEC) by culture from an appropriate clinical specimen (e.g., stool, urine, blood)

3.2 Probable Case

- Clinically compatible signs and symptoms in a person with an epidemiologic link to a laboratory-confirmed case
  OR
- Hemolytic uremic syndrome (HUS) diagnosed by a physician and not caused by defects in serum complement, chemotherapy, immunosuppressant drugs, pregnancy, oral contraceptives, or known infections other than *Escherichia coli* (*E. coli)* VTEC
  OR
- Positive/detection of verotoxin/shigatoxin by antigen test (e.g. Enzyme Immunoassay (EIA)) or nucleic acid amplification test (NAAT)

4.0 Laboratory Evidence

4.1 Laboratory Confirmation

Any of the following will constitute a confirmed case of verotoxigenic *E. coli* infection:

- Positive VTEC culture

4.2 Approved/Validated Tests

- Standard culture for VTEC including serotyping
- Enzyme Immunoassay (EIA) for the detection of verotoxin/shigatoxin

- Nucleic Acid Amplification Test (NAAT) (which includes polymerase chain reaction (PCR) and multiplex molecular tests) for the detection of genes encoding verotoxin/ shigatoxin

4.3 Indications and Limitations

- Sorbitol MacConkey agar is reliable for detecting most isolates of VTEC serotype O157:H7 and O157:H- because these serovars are sorbitol-negative. It is not reliable for detecting other VTEC serotypes.
- Routine screening for non-O157 VTEC is not routinely performed in most laboratories. This testing can be performed at the Public Health Ontario Laboratories if specifically requested.
- Serotyping is indicated to ensure identification of *E. coli* O157:H7 as well as non-O157 serotypes that are associated with serious disease especially serogroups O26, O45, O103, O111, O121 and O145.
- Further strain characterization is indicated for public health purposes.

5.0 Clinical Evidence

Clinically compatible signs and symptoms are characterized by diarrhea (often bloody) and abdominal cramps. Fever is often absent. Illness may be complicated by HUS, thrombocytopenia purpura (TTP) or pulmonary edema. Asymptomatic infections may also occur and the organism may cause extra-intestinal infections.

Clinical evidence of HUS includes: uremia, thrombocytopenia, acute renal failure and central nervous system signs and symptoms. A diarrheal prodrome usually occurs in 86- 95% of patients and of those with diarrhea, 60-75% of the diarrhea is bloody.

6.0 ICD 10 Code(s)

A04.3 Enterohaemorrhagic *E. coli* infection (includes VTEC)

7.0 Comments

- O157 strains of VTEC that do not include the H7 motility factor nonetheless meet case definition
- Non-O157 VTEC strains also meet case definition
- Although VTEC has been renamed to Shiga toxin-producing *E. coli*, this is not reflected in Ontario's Reportable Diseases Regulation

8.0 Sources

Acha P, Szyfres B. Zoonoses and Communicable Diseases Common to Man and Animals. Vol. 1. 3 ed. Washington, DC: Pan American Health Organization; 2001.

Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.

Public Health Agency of Canada. Verotoxigenic *Escherichia coli* Infection. In: Case Definitions for Communicable Diseases under National Surveillance. Canada Communicable Disease Report. 2009;35S2.

9.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
December 2014	General	New template. Title of Section 8.0 changed from "References" to "Sources". Section 9.0 Document History added.
December 2014	3.1 Confirmed Case	Removed bullet two "OR Detection of verotoxin antigen or nucleic acid from an appropriate clinical specimen (e.g., stool, urine, blood)".
December 2014	3.2 Probable Case	Bullet two, changed from "…immunosuppressants in organ transplants, pregnancy, oral contraceptives, or known infections other than *Escherichia coli (E. coli)*" to "immunosuppressant drugs, pregnancy, oral contraceptives, or known infections other than *E. coli* VTEC." Third bullet added, "OR Detection of verotoxin antigen or nucleic acid from an appropriate clinical specimen (e.g., stool, urine, blood)".
December 2014	4.1 Laboratory Confirmation	Bullet two removed.
December 2014	4.2 Approved/Validated Tests	Bullet one, removed "with confirmation". Bullet two, changed from "EIA for VTEC detection" to "Enzyme Immunoassay (EIA) for the detection of verotoxin". Added new third bullet, "Nucleic Acid Amplification Test for the detection of a gene encoding verotoxin". Previous third bullet becomes fourth bullet.

Revision Date	Document Section	Description of Revisions
December 2014	4.3 Indications and Limitations	New bullet two added, “Routine screening for non-O157 VTEC is not routinely performed in most laboratories. This testing can be performed at the Public Health Ontario Laboratories if specifically requested.” Previous second bullet becomes third bullet. Bullet four, removed “including page-typing and molecular typing”.
December 2014	8.0 Sources	Updated.
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance.


Ontario