Alberta Public Health Disease Management Guidelines

Cholera (O1 and O139)

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Health and Wellness Promotion Branch

Public Health and Compliance Branch

Alberta Health

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Case Definition

Confirmed Case

Clinical illness[(A)] with laboratory confirmation of infection:

- Isolation of cholera toxin-producing *Vibrio cholerae* serotype O1 or O139 from urine, stool or blood.

Probable Case

Clinical illness[(A)] in a person who is epidemiologically linked to a confirmed case.

[(A)] Clinical illness is characterized by acute watery diarrhea and/or vomiting. The severity of illness may vary.

Reporting Requirements

Physicians/Health Practitioners and Others

Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) (or designate) of the zone, of all confirmed and probable cases in the prescribed form by the Fastest Means Possible (FMP).

Laboratories

All laboratories shall report all positive laboratory results:

- by FMP to the MOH (or designate) of the zone, and
- by mail, fax or electronic transfer within 48 hours (two business days) to the Chief Medical Officer of Health (CMOH) (or designate).

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- The MOH (or designate) of the zone where the case currently resides shall notify the CMOH (or designate) by FMP of all confirmed and probable cases.
- The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed and probable cases to the CMOH (or designate) within one week of notification and the final NDR (amendment) within two weeks of notification.
- For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by FMP:
  - name,
  - date of birth,
  - out-of-province health care number,
  - out-of-province address and phone number,
  - positive laboratory report, and
  - other relevant clinical/epidemiological information.

Epidemiology

Etiology

Vibrio cholerae serogroups O1 and O139 are gram-negative, non-spore forming toxin-producing bacteria that cause the majority of cholera epidemics.[1] *V. cholerae* serogroup O1 is categorized into two biotypes, classical and El Tor and further classified into the Inaba, Ogawa, and (rarely) Hikojima serotypes.[2]

All other serogroups of *V. cholerae* are known collectively as *V. cholerae* non-O1/non-O139. These serogroups can be toxigenic and result in severe illness but have not been known to cause large cholera outbreaks.[3]

Clinical Presentation

Symptoms range from asymptomatic to severe illness. Asymptomatic cases occur more often than severe ones, especially with organisms of the El Tor type. The enterotoxin causes the acute intestinal illness. Symptomatic cholera infection initially starts with stomach cramps and vomiting and is followed by diarrhea.[1] Mild or moderate diarrhea is present in roughly 90% of cases. In 5–10% of cases, infected individuals experience sudden onset of copious painless watery stools, nausea, and vomiting. Stools are typically colorless with flecks of mucous (“rice water” diarrhea) with a fishy odor. The resulting loss of fluids in an infected individual can lead to rapid dehydration and hypovolemic shock which can be fatal within hours if left untreated. Mortality ranges from greater than 50% for those without treatment to less than 1% among adequately treated individuals.[2–5]

Diagnosis

The gold standard for diagnosis of *V. cholerae* O1 or O139 is by culture of stool specimens. Subsequent serotying is required for all positive results. Based on clinical symptoms, if the suspicion of cholera is high, contact the Microbiologist on call at Public Health Laboratories (ProvLab) for more information on specimen collection.

Treatment

- The main goal of treatment for cholera cases is appropriate and rapid rehydration.
- Those with mild to moderate disease should be treated with oral rehydration solution (ORS) and those with severe disease may require intravenous fluids.[6]
- Antibiotics are recommended for treatment of moderate or severe cases as they reduce the volume of rehydration solutions required, shorten the duration of the diarrhea and shedding of *Vibrio* excretion.[7]
- Antimicrobial susceptibility testing should be conducted and monitored and used to guide antimicrobial treatment options.
- Treatment options should be done in consultation with an infectious disease specialist.

Reservoir

The main reservoir is humans. Cholera bacteria may also be found in brackish water (i.e., high variability of salinity) or estuarine environments (i.e., where fresh water meets the sea) and is associated with copepods or other zooplankton. Undercooked or raw shellfish have been associated with infection.[8,9]

Transmission

Cholera is transmitted via contaminated food or water. Faulty water systems, beverages prepared with contaminated water or ice, raw or undercooked shellfish, raw or partially dried fish, cooked grains with sauces, fruits and vegetables washed with untreated water have served as vehicles of transmission.[2]

Person-to-person transmission is rare.[4] Outbreaks are usually caused by contaminated water, where sewage and drinking water supplies have been inadequately treated.[8]

The infectious dose required to cause illness ranges from 10^6–10^{11} organisms which can also be impacted by the mode the virus is ingested:10^3–10^6 if ingested with water and with food 10^2–10^4 organisms.[10,11]

Incubation Period

The incubation period ranges from a few hours to five days.[9,11]

Period of Communicability

Symptomatic individuals may shed bacteria before onset of symptoms and continue for seven to14 days. Those who are asymptomatic mostly shed bacteria for one day.[1] Occasionally intermittent shedding may exist for several months, however chronic carriage is rare.[7] Appropriate antibiotics may shorten the period of communicability.

Host Susceptibility

Susceptibility is variable. Risk and severity of symptoms depends on the following:[1,12]

- the number of cholera bacteria ingested;
- immunity either from vaccination or previous exposure;
- pregnancy;
- lack of immunity seen in infants (breast feeding offers some protection);
- poor nourishment;
- underlying immunocompromised condition;
- gastric hypochlorhydria (gastric acid neutralizes the virus); and
- having blood type group O (the reason for this susceptibility is unknown).

Infection by *V. cholerae* O1 of the classical biotype confers protection against either classical or El Tor biotypes. In contrast, an initial clinical infection caused by biotype El Tor results in only a modest level of long-term protection that is limited to El Tor infections. Infection with serogroup O1 affords no protection against O139 infection and vice versa.[12]

Incidence in Alberta

Cholera has been notifiable in Alberta since 1979; however, no cases were reported until 1993.[13] Between 1993 and 2017, there have been 17 cases reported, all acquired via travel outside of Canada.

Public Health Management

Key Investigation

- Confirm that the case meets the case definition.
- Obtain a history of illness including the date of onset, signs and symptoms.
- Determine the occupation of the case (e.g., food handler, childcare facility worker, healthcare worker) and identify specific duties at work.
- Determine the possible source of infection taking into consideration the incubation period, reservoir, and mode of transmission.
- Assessment may include determining, obtaining or identifying:
  - a detailed food history, including recent consumption of potentially contaminated food or water and the time of consumption;
  - attendance at daycare or institutions;
  - recent travel;
  - residing in areas with poor sanitation, including improper water treatment and sewage disposal either in Canada or abroad;
  - high risk sexual practices, especially contact with feces; and
  - immunization history with cholera vaccine.
- Suspected contaminated food may be held or destroyed to prevent consumption.
- Identify contacts, especially those that are in sensitive situations or occupations (see Table 1):
  - persons living in the household,
  - children and childcare workers at a childcare facility (daycare, day home, or other childcare site), and
  - individuals exposed to the same source where the source is identified.

Table 1: Sensitive Situations or Occupations (SSO)

SSO	Definition
Food handler	• Touches unwrapped food to be consumed, and/or • Handles equipment or utensils that touch unwrapped food to be consumed.*
Healthcare, child care or other staff	• Has contact through serving food to highly susceptible persons. • Provides direct patient care and is involved in the care of young children, elderly or dependent persons.
Child attending a childcare facility or similar facilities	• Is diapered or unable to implement good standards of personal hygiene.
Any individual (older child or adult)	• Is unable to implement good standards of personal hygiene (e.g., with disabilities/challenges that may impact ability to perform good hand hygiene) and is involved in an activity that may promote disease transmission.

∗ NOTE: Generally, food handlers who do not touch food, equipment or utensils in this way are not considered to pose a transmission risk; however, circumstances for each case should be assessed on an individual basis.

Management of a Case

- All cholera cases should be advised of the following:
  - disease transmission, appropriate personal hygiene, routine infection prevention and control practices, and contact precautions,
  - to avoid food preparation until symptoms have resolved,
  - to practice safer sex and avoid sexual practices that facilitate fecal-oral transmission, and
  - to avoid use of recreational water (e.g., swimming pools) until after treatment is completed and 48 hrs after diarrhea has resolved.
- Contact precautions should be used in healthcare settings where children or adults have poor hygiene or incontinence that cannot be contained.
- Exclusion should be considered for symptomatic SSO cases (see Table 2).

Table 2: Case Exclusion

Cases	Category	Exclusion Criteria
Symptomatic	SSO*	• The MOH may by order exclude the case until 48 hours after appropriate antibiotic treatment has been completed and stools have returned to normal or the MOH is satisfied that the case is no longer infectious. - The case must be symptom free for 48 hours after stopping any antidiarrheal medication (if taken). - Lifting of exclusions is not conditional upon submission of stool specimens to demonstrate clearance of the organism.** - If possible, consideration may be given to temporary redeployment away from activities that involve increased risk of transmission.
Symptomatic	Non-SSO	• No exclusion required, however all cases of gastroenteritis or enteritis should be regarded as potentially infectious and should remain home from work, school or daycare until 48 hours after diarrhea has stopped.
Asymptomatic	SSO*	• Generally not required unless otherwise recommended by the MOH.
Asymptomatic	Non-SSO	• No exclusion required.

* Persons who are involved in sensitive situations or occupations.

** Specimens may still be submitted as determined by the MOH on a case-by-case basis.

Management of Contacts

- Contacts of cholera should be advised on disease transmission, appropriate personal hygiene, routine practices for infection prevention and control, and contact precautions.
- Symptomatic contacts should be assessed by a physician. Contacts with positive stool specimens should be managed and treated as cases.
- Persons who shared food and drink with a confirmed cholera case should be asked to report any diarrheal symptoms that occur within five days from their last exposure.
- Exclusion may be considered for symptomatic SSO contacts (see Table 3).
- Post-exposure prophylaxis is not recommended, except where the probability to fecal exposure is high and medication can be delivered rapidly.[3] The recommended duration and dosages are the same as those for treatment.

Table 3: Contact Exclusion

Contacts	Category	Exclusion Criteria
Symptomatic	SSO*	• The MOH may by order exclude (same as per case). - Ensure the contact is assessed by their physician.
Symptomatic	Non-SSO	• No exclusion required. • Refer to their physician for assessment and testing, if required.
Asymptomatic	All	• No exclusion – contacts should monitor themselves for gastrointestinal symptoms, maintain good hand hygiene and food handling practices and seek medical attention if symptoms develop.

* Persons who are involved in sensitive situations or occupations.

Preventative Measures

General Public

- Education on personal hygiene, especially:
  - sanitary disposal of feces,
  - careful hand washing after defecation and sexual contact, and
  - careful handwashing before and after food handling or before eating food.
- Encourage breastfeeding of infants.
- Emphasize the importance of:
  - good sanitation,
  - proper arrangements for safe water supplies,
  - avoiding contact with or ingestion of potentially contaminated food or water, and

Travelers

- Educate on the following:
  - The key principals for food safety: boil it, cook it, peel it, or leave it.
  - Scrupulous personal hygiene while travelling.
  - To seek travel advice six to eight weeks before visiting areas where cholera is endemic. Most travelers are at very low risk of acquiring infection. Immunization should never take the place of standard prevention, and control measures as cholera vaccines offer incomplete protection. Refer to the Canadian Immunization Guide for current recommendations.

Food Handlers

- Education on proper food handling and hygiene, especially:
  - avoiding cross-contamination from raw meat products, and
  - thorough hand washing before and after handling food.

Appendix 1: Revision History

Revision Date	Document Section	Description of Revision
September 2021	General	• Updated Template • Diagnosis and Treatment section moved to Epidemiology • Checked all web links
	Key Investigation	• Removed “consumed raw or without further cooking” from Food handler section of Table 1: Sensitive Situations or Occupations (SSO) in alignment with new definition.

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