Campylobacter Infection

Manitoba
Public Health Branch

Summary of Updates

November 2024

Minor updates to case definitions to align with national case definitions (include NAT-positive results), and reporting requirements.

1. Case Definition

1.1 1Laboratory Confirmed case

Laboratory confirmation of infection with or without clinical illness[1].

- Isolation of Campylobacter species from an appropriate clinical specimen (e.g., stool, rectal swab, blood).(1)

1.2 Probable case

Clinical illness[1] in a person who is epidemiologically linked to a confirmed case;

OR

Detection of *Campylobacter* spp. nucleic acid with or without clinical illness, in an appropriate clinical specimen (dependent on the test used), using a nucleic acid test (NAT), such as a polymerase chain reaction (PCR).(1)

Note:

- Culture may be required for public health and clinical management. Thus culture should be performed on NAT-positive (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 to guide clinical treatment and/or for AMR surveillance.
- NAT-positive (NAT+) and culture-negative (culture–) results would still be considered a probable case.

Laboratory comments:

Further strain characterization (e.g., whole genome sequencing [WGS]) may be required for epidemiologic, public health, and clinical management.

If more than one target is positive on the gastrointestinal NAT panel, it may be indicative of a cross-reaction, co-infection and/or a single organism harbouring these genes. Reflex culture should be performed to confirm all suspect bacterial NAT signals and to meet requirements for epidemiologic, public health, and clinical management of that organism.

[1] Clinical illness may be characterized by the following signs or symptoms: Diarrhea (with blood or mucous), abdominal pain, malaise, fever, nausea and/or vomiting. The severity of illness may vary. While not considered clinical illness, asymptomatic infections may also occur.

Back to Top

2. Reporting Requirements

Laboratory:

All positive laboratory results noted in the case definition are reportable by laboratory to the Manitoba Health Surveillance Unit (MHSU) via secure fax (204-948-3044) or established electronic interface.

Clinical laboratories are required to submit isolate sub-cultures from individuals who tested positive for *Campylobacter* species and are associated with a known outbreak to Cadham Provincial Laboratory (CPL) within seven days of report.

Health Care Professional:

Probable (clinical) cases of *Campylobacter* are reportable to the MHSU using the Clinical Notification of Reportable Diseases and Conditions form (MHSU-0013) (found in MHSU's Surveillance Forms webpage at https://www.gov.mb.ca/health/publichealth/surveillance/forms.html) ONLY if a positive lab result is not anticipated (e.g., poor or no specimen taken, person has recovered).

Regional Public Health/First Nations Inuit Health Branch (FNIHB)

All case investigations are to be completed in the Public Health Information Management System (PHIMS). For public health providers without access to PHIMS, the Communicable Disease Control Investigation Form (MHSU-0002) (found in MHSU's Surveillance Forms webpage at https://www.gov.mb.ca/health/publichealth/surveillance/forms.html) should be completed and submitted to Manitoba Health, Seniors and Long-Term Care (MHSLTC) by secure fax (204-948-3044). The critical data elements, which are required documentation for all case and contact investigation, are listed with an asterisk (*) on the investigation forms.

3. Clinical Presentation/Natural History

Acute enteritis of variable severity, characterized by diarrhea, which is often bloody, abdominal pain, malaise, nausea and occasionally vomiting.(2) Bloody diarrhea may be the only symptom in neonates and young infant.(3) A prodrome with fever, headache, myalgia and malaise may occur 12 to 24 hours before the onset of clinical symptoms.(4) Diarrhea may range in severity from loose stools to massive watery or bloody stools.(4) Cases may clinically mimic acute appendicitis or inflammatory bowel disease.(2) Many infections are asymptomatic.(2) Illness usually resolves within two to five days; however, symptoms may occasionally persist for one to two weeks and prolonged illness or relapses may occur.(2-5) Systemic disease is rare in immunocompetent individuals.(6) Immunocompromised hosts may experience prolonged, relapsing or extra-intestinal infections, usually with *C. fetus* and other *Campylobacter* species.(3)

Serious complications are uncommon. Local complications of *Campylobacter* infections occur as a result of direct spread from the gastrointestinal tract and may include cholecystitis, pancreatitis, peritonitis and massive gastrointestinal hemorrhage.(7) Immunoreactive complications including Guillain-Barré syndrome,(2-4, 6, 8) reactive arthritis(2-4) and Reiter syndrome (arthritis,

Back to Top

urethritis and bilateral conjunctivitis) may occur.(3)

4. Etiology

Campylobacter species are motile, comma-shaped, gram-negative bacilli.(3) *Campylobacter jejuni* and less commonly *C. coli* are the main causes of *Campylobacter* diarrhea in humans.(2) Over 90 different serotypes of *C. jejuni* have been identified.(4) Other *Campylobacter* organisms including *C. lari* and *C. upsaliensis* have been associated with diarrhea in normal hosts (2). *C. fetus* causes systemic illness in neonates and debilitated hosts.(3) In Canada, approximately 95% of cases are caused by *Campylobacter jejuni*, 4% by *C. coli* and 1% by other *Campylobacter* species.(5)

5. Epidemiology

5.1 Reservoir and Source

Most frequently the gastrointestinal tracts of poultry and cattle, but puppies, kittens, other pets, swine, sheep, rodents and birds may also be sources of infection.(2, 3) *Campylobacter jejuni* survives in milk, water or other foods kept at 4°C for several weeks.(4) In 2008, wild birds were recognized as the source of contamination of raw peas leading to a human campylobacteriosis outbreak.(9) *Campylobacter jejuni* is sensitive to freezing, drying, acidic conditions (pH ≤ 5.0) and salinity.(10)

5.2 Transmission

Most cases are associated with the consumption of undercooked meat, particularly poultry.(2, 4, 5) Fecal-oral person-to-person transmission with *C. jejuni* appears uncommon,(2) but has been reported particularly among very young children.(3) Transmission may occur through contact with infected pets and farm animals. Outbreaks associated with contaminated drinking water, consumption of raw milk and men who have sex with men (MSM) have been reported.(5, 10, 11) The infective dose may be as few as 500 organisms.(2) Travel to a developing country is a risk factor for acquiring *Campylobacter*-associated diarrhea.(12)

5.3 Occurrence

General: *Campylobacter* infection is the most common cause of bacterial gastroenteritis worldwide.(13, 14) Most infections are sporadic.(2, 5, 6) *Campylobacter* infection is hyperendemic in developing countries.(12) In developed countries, the incidence of *Campylobacter jejuni* infections peaks during infancy and again during early childhood.(7) In tropical developing countries, *Campylobacter* infections are hyperendemic among young children, especially those aged < 2 years.(7, 12) In developed countries, *Campylobacter enteritis* epidemics occur in summer and autumn; however, there is no seasonal preference in developing countries.(12)

Canada: The reported isolation rate is an underrepresentation of actual infections as not all people exhibiting symptoms of gastroenteritis seek medical care and not all isolations of *Campylobacter* are reported. In 2008, the reported incidence rate for *Campylobacter* was 28.38 per 100,000

Back to Top

population.(15) The highest reported incidence rate (43.6 per 100,000 population) was in the 1-4 year age group and the lowest reported rate (14.7 per 100,000) was in the 10-14 year age group.(15) In 2009, 16% of *Campylobacter* cases reported to C-EnterNet were travel-associated.(16)

Manitoba: The reported incidence rate was 19.3 per 100,000 population in 2009 (234 cases) and 19.7 per 100,000 population in 2010 (242 cases). For 2010, the mean incidence rate was highest in the 1-4 year age group (48.8 per 100,000) and lowest in the 10-14 year age group (12.3 per 100,000).

5.4 Incubation Period

Usually two to five days but ranges from one to 10 days.(2)

5.5 Host Susceptibility

In developing countries, most people develop immunity within the first two years of life.(2)

5.6 Period of Communicability

Communicability is uncommon, but may occur, usually during the acute phase of the illness.(3) Without antibiotic treatment, excretion of *Campylobacter* organisms usually lasts two to three weeks.(3, 4)

5.7 Antimicrobial Resistance

The Canadian Integrated Program for Antimicrobial Resistance (CIPARS) has identified an emerging trend (> 10% prevalence) in ciprofloxacin-resistant *Campylobacter* isolated from retail chicken in the provinces of British Columbia and Saskatchewan.(17)

6. Laboratory Diagnosis

Isolation of *Campylobacter* by culture from stool specimen or, rarely, from blood. If the patient cannot pass a stool, a specimen should be collected with a sterile rectal swab and placed in transport media. When foodborne illness is suspected, "suspected foodborne illness" should be indicated on the requisition and the sample submitted directly to CPL for processing. Antimicrobial susceptibility testing may not be routinely performed in all laboratories but is available upon request (isolates may be forwarded to CPL if antimicrobial susceptibility testing is not available at the direct service laboratory).

7. Key Investigations for Public Health Response

- Investigation of food, water and milk supplies for source of infection or cross-contamination. Collection of implicated food/water samples for testing (usually performed by Public Health Inspectors). Refer to the Enteric Illness Protocol available at: www.gov.mb.ca/health/publichealth/cdc/protocol/enteric.pdf.
- Occupational exposure investigation (e.g., animal/poultry handling/processing).
- Travel history, especially when travel has occurred to areas with poor sanitation.
- Illness in pets.
- Investigation of food handlers in outbreak situations.

Back to Top

8. Control

8.1 Management of Cases

Exclusion from food handling and from direct care of infants and young children, the elderly and immunocompromised and institutionalized patients should be considered until 48 hours after the last symptoms.(2, 3)

Symptomatic infants and children in diapers should be excluded from child care or cared for in a separate area until diarrhea has resolved.(3)

Asymptomatic cases may be excluded from food handling and from direct care of infants and young children, the elderly and immunocompromised and institutionalized patients if personal hygiene measures including hand hygiene are considered inadequate.(2, 3) This decision is at the discretion of the regional Medical Officer of Health (MOH) or designate.

Education on personal and food hygiene should be provided (e.g., proper hand washing).

Infection Control Measures:

Contact Precautions are indicated in children who are incontinent or unable to comply with hygiene and should be considered for incontinent adults if stool cannot be contained or for adults with poor hygiene who contaminate their environment. Otherwise, Routine Practices are adequate.

Treatment:

Rehydration and electrolyte replacement.(2-4) Antimotility agents are not recommended.

Antibiotic treatment is not routinely indicated but should be considered for individuals with severe or prolonged illness, those with extra-intestinal infections(12) or those who are immunocompromised.(4, 7) Erythromycin and extended spectrum macrolides (e.g., clarithromycin, azithromycin) are preferred.(3, 4) Ciprofloxacin is an alternative but resistance rates have increased in recent years.(4) Most *C. jejuni* and *C. coli* isolates are not susceptible to most cephalosporins or penicillin, and those agents should not be used.(4)

8.2 Management of Contacts

Education on personal and food hygiene should be provided (e.g., proper hand washing).

Symptomatic contacts should have stools cultured and be encouraged to seek medical attention.

Symptomatic contacts should be managed as cases until culture results are known. Management can be modified as necessary.

Stool cultures are not recommended for asymptomatic contacts unless needed to assist in identification of the source of an outbreak. Asymptomatic contacts do not require exclusion from work or child care facilities.

Back to Top

8.3 Management of Outbreaks

An outbreak is defined as the occurrence of case(s) in a particular area and period of time in excess of the expected number of cases.

- Outbreaks should be investigated to identify a common source of infection and prevent further exposure to that source. The extent of outbreak investigations will depend upon the number of cases, the likely source of contamination and other factors.
- Refer to the Enteric Illness Protocol available at www.gov.mb.ca/health/publichealth/cdc/protocol/enteric.pdf and Outbreak Report form at http://www.gov.mb.ca/health/publichealth/cdc/protocol/form10.pdf
- Public notification should occur. The level of notification will usually be at the discretion of regional Public Health and/or the provincial Public Health Division for local outbreaks but may be at the discretion of the Federal Government for nationally linked foodborne outbreaks as per *Canada's Foodborne Illness Outbreak Response Protocol (FIORP) 2017* to guide a multijurisdictional response available at: https://www.canada.ca/en/public-health/services/publications/health-risks-safety/canadas-foodborne-illness-outbreak-response-protocol-fiorp-guide-multi-jurisdictional-enteric-outbreak-response.html
- Education on preventive measures should occur (refer to Section 8.4 below).

8.4 Preventive Measures

- Education on personal hygiene, especially good hand washing.
- Supervision of hand washing in young children after toileting and before eating/preparing food.
- Close supervision of young children when they are in contact with animals (e.g., petting zoos) to discourage hand-to-mouth activities (e.g., nail-biting and thumb-sucking).(18)
- Washing hands with soap and running water after any contact with animals and their environment, especially in children.(19)
- Ensuring that young children avoid contact with animals who are ill/symptomatic.
- Individuals with any acute diarrheal illness should avoid preparation and handling of food until illness resolves.(7)
- Inspection and adequate supervision of abattoirs, food processing plants, feed blending mills, egg grading stations and butcher shops.
- Raw or unpasteurized milk and other unpasteurized dairy products should not be consumed (20).
- Drinking water from a safe supply (bottled, treated or boiled).(21)

Back to Top

- Cross-contamination of foods should be avoided:
  - Uncooked meats should be kept separate from produce, cooked foods and ready-to-eat foods.
  - Hands, food preparation surfaces and utensils should be cleaned after touching uncooked foods.
  - Hands should be washed with soap and water before handling food and between handling different food items.(22)
  - Utensils and surfaces used to prepare raw food should never come in contact with cooked foods or foods that will be eaten raw.(9)
- Thorough cooking of eggs and other foods of animal origin before consumption.(2) The following internal cooking temperatures are recommended:
  - 63°C (145°F) for all whole cuts of meat (allow three minutes resting time before carving/consuming) and fish;
  - 71°C (160°F) for all ground meats and egg dishes; and
  - 74°C (165°F) for all whole and ground poultry (chicken and turkey) including stuffing and casseroles.(22)
  - More information is available at: https://www.fsis.usda.gov/news-events/publications/it-done-yet-brochure.

Back to Top

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Back to Top

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