

C. DIFFICILE

Case definition

CONFIRMED CASE

A patient is defined as a case if they are one year of age or older **AND** have **one** of the following requirements:

- A laboratory confirmation of a positive toxin assay for *C. difficile*

OR

- A diagnosis of pseudomembranes on sigmoidoscopy or colonoscopy or histological/pathological diagnosis of *C. difficile*

OR

- A diagnosis of toxic megacolon

Causative agent

Clostridium difficile (*C. difficile*) is a spore-forming, obligate anaerobic, gram-positive bacillus. Disease is related to the action of toxin(s) produced by these organisms. Although other toxins exist, toxins A and B have been associated most strongly with human disease.

Source

The reservoir is mainly humans; however, spores are also present in soil and water. The source of *C. difficile* may be endogenous (colonized patient flora) or exogenous, such as hospital environment and equipment that have been contaminated with stool (commodes, bedrails, and bedpans).

Incubation

The incubation period is unknown. However; the onset of clinical disease is typically 5-10 days after initiation of antimicrobial treatment.

Transmission

The transmission of *C. difficile* occurs through fecal-oral transmission, direct contact or indirect contact transmission from hands or items contaminated with stool from symptomatic and/or asymptomatic (colonized) patients.

Communicability

The period of communicability is not well defined because asymptomatic patients may be colonized with the bacteria and patients who have been successfully treated may still have organisms and spores in their stools. *C. difficile* spores can survive up to 60 days (and sometimes longer) in the environment.

Symptoms

Symptoms associated with *C. difficile* include:

- watery diarrhea
- fever
- loss of appetite
- nausea
- abdominal pain/tenderness

Pseudomembranous colitis generally is characterized by diarrhea, abdominal cramps, fever, systemic toxicity and abdominal tenderness.

Diagnostic testing

The laboratory diagnosis of *C. difficile* can be accomplished by a variety of testing methods which include:

- Detection of toxins by enzyme-linked immunoassays (EIAs)
- Cytotoxicity assay using tissue culture
- Nucleic acid amplification techniques
- Bacterial culture to isolate the organism with subsequent testing of the ability of the isolate to produce toxin
- Histological examination of the colon

Specimen Required: Stool—**Only liquid specimens**, “taking the shape of the container”, should be processed in a dry sterile container and transported at 4°C. *C. difficile* toxin is unstable and may become undetectable within a few hours if a stool specimen is left at room temperature. Formed specimens and “test of cure” specimens should not be sent or processed. Currently, in Nova Scotia, all Regional Hospitals perform EIA for toxin. The cytotoxicity test is performed at Capital District Health Authority and some Regional hospitals use antigen testing and refer specimens for further testing if toxin negative but antigen positive.

The approach to testing is evolving quickly, and changes can be anticipated over the next few years.

Treatment

Discontinue all current antibiotic therapy as soon as possible if significant diarrhea or colitis develops. Drugs that decrease intestinal motility should not be administered. Antimicrobial therapy for *C. difficile* disease is indicated for patients whose diarrhea persists after antimicrobial therapy is discontinued. Strains of *C. difficile* are susceptible to metronidazole and vancomycin. Treatment

recommendations for at least 10 days are as follows:

- Metronidazole [30 mg/kg per day in 4 divided doses, max 2 g/day] is the drug of choice for the initial treatment of most children and adolescents with colitis.
- Oral vancomycin [40 mg/kg per day, orally, in 4 divided doses, to a maximum 125 mg, orally, 4 times/day] for initial therapy for patients with severe disease [hospitalized in an intensive care unit, pseudomembranous colitis on endoscopy, underlying intestinal tract disease].

PUBLIC HEALTH MANAGEMENT & CONTROL

Case management

Individual cases of *C. difficile* are not followed by Public Health

Special considerations

Case/s in an institution/long term care facility

The communicable disease prevention and control (CDPC) nurse is typically the lead in investigations of communicable disease outbreaks. Upon request of the CDPC lead/Medical Officer of Health, a Public Health Inspector with the Department of Agriculture may complete an on-site inspection of the facility to ensure compliance with outbreak management directives.

For Outbreak Management, routine practices should be used with all clients at all times:

- Contact precautions for the case(s)
- Conduct a risk assessment considering the potential for:
 - Exposure to body fluids [i.e. active vomiting, explosive diarrhea]
 - Exposure to large deposits of body fluids [vomitus, feces] on environmental surfaces
 - Resident's continence level and ability to comply with instructions
- Care givers should wear the following Personal Protective Equipment (PPE) when giving direct care to symptomatic residents/clients:
 - Gloves for providing any direct care
 - Gowns when contamination of health care provider's [HCP's] clothing is possible
 - Surgical mask with eye protection/face shield to protect mucous membranes from exposure to viral particles when assisting someone who is actively vomiting or has explosive uncontained diarrhea or when cleaning an area grossly contaminated with vomitus or feces.

- Hand washing with soap and water is the most effective hand hygiene practice. Alcohol-based hand sanitizers are less effective in destroying *C. difficile* spores.
- Resident/Client Placement:
 - Contact Precautions – residents/clients should be confined to their rooms as much as possible until asymptomatic for 48 hours.
 - Contact precautions may be discontinued when the patient has had at least 48 hours without symptoms of diarrhea [e.g. formed or normal stool for the individual].
 - In a shared room, a resident/client with symptoms should not share a toilet with a well resident/client. Assign a dedicated toilet or commode, if possible.
 - In shared rooms, roommates and all visitors must be aware of the precautions.
 - Whenever possible, dedicate equipment to be used only on the ill resident/client. In the event that equipment must be shared, thorough cleaning and disinfection is required in between residents.
- Ill HCPs and food handlers should not work, if they develop symptoms consistent with a gastro-intestinal [GI] infection [e.g. vomiting, diarrhea] while at work the employee should be required to leave work immediately.
- Staff should remain off work when experiencing diarrhea, unless there is a known underlying non-infectious cause.
- Exclude ill staff from work until 48 hours after symptoms have stopped [e.g. formed or normal stool for the individual].
- Limitation and restriction of visitors may be necessary in an outbreak situation. Visitors and volunteers should be advised that they may be at risk of acquiring an infection within the facility, instructed how to wear appropriate PPE and required to use hand hygiene before and after their visit. Visitors should visit only their own friend/relative in their own room, unless otherwise approved by the Health care provider.
- Effective cleaning of the environment around clients/patients/residents who have *C. difficile* is essential in limiting the acquisition and spread of *C. difficile*.
- Contact the Department of Agriculture as necessary. Food Safety Specialists [FSS] may visit the facility to ensure all precautions are being adhered to when cases are found in the facility and they can provide environmental sanitation advice and resources.
- The Infection Prevention and Control Centre at Department of Health and Wellness can provide advice on environmental sanitation in patient care areas.

Case(s) in a child care setting

- Children and ill staff with *C. difficile* diarrhea should be excluded from child care settings for the duration of diarrhea, and infection control measures should be enforced.
- Contact the Department of Agriculture as necessary. Food Safety Specialists (FSS) are able to provide advice and resources regarding environmental sanitation.

Please refer to the “Guidelines for Communicable Disease Prevention and Control for Child Care Settings, November 2013 novascotia.ca/DHW/CDPC/documents/Guidelines_CDPC_Child_care_Setting.pdf

Education

- Exercise meticulous hand hygiene with soap and water.
- Alcohol-based hygiene products do not make *C. difficile* spores inactive.
- Proper waste handling (including diapers).
- Cleaning and disinfecting of surfaces contaminated with vomitus and feces.
- Limiting the use of antimicrobial and proton pump inhibitor agents.
- Thorough cleaning and disinfecting of hospital rooms and bathrooms of patients with *C. difficile*.

General Information Sheet

REFERENCES

Control of Communicable Disease Manual, 19th Edition. 2008. David Heymann, editor.

American Public Health Association.

Public Health Agency of Canada. [2009]. *Case Definitions for Communicable Diseases under National Surveillance*. CCDR 2009;3552,1-123. Retrieved from phac-aspc.gc.ca/publicat/ccdr-rmtc/09pdf/35s2-eng.pdf

Red Book. Report of the Committee on Infectious Diseases, 28th Edition. 2009. American Academy of Pediatrics.

Testing, Surveillance and Management of Clostridium Difficile [May 2010]. Retrieved from: oahpp.ca/resources/documents/pidac/RPAP%20Annex%20C%20Testing%20Surveillance%20Management%20of%20C%20diff.pdf

Viswanathan, V.K., Mallozzi, M.J. & Vedantam, G. [2010]. Clostridium difficile Infection: An overview of the disease and its pathogenesis, epidemiology and interventions. *Gut Microbes*, 1(4), 234-242