

Appendix A: Disease-Specific Chapters

Chapter: *Clostridium difficile* Infection (CDI) outbreaks in public hospitals

[Known as *Clostridium difficile* associated disease (CDAD) in the regulations under the HPPA]

Revised January, 2011

***Clostridium difficile* Infection (CDI) outbreaks in public hospitals**

- Communicable
 Virulent

**Health Protection and Promotion Act:
Ontario Regulation 558/91 – Specification of Communicable Diseases**

**Health Protection and Promotion Act:
Ontario Regulation 559/91 – Specification of Reportable Diseases**

1) Aetiologic Agent:	<i>Clostridium difficile</i> (<i>C.difficile</i>) is a spore-forming gram-positive anaerobic bacillus that produces two exotoxins: toxin A and toxin B. It is present in the environment and can colonize in up to three to five per cent of adults in the community without causing symptoms.
2) Case Definition:	
Surveillance Case Definition	See Appendix B
Outbreak Case Definition	See Appendix B
3) Identification:	
Clinical Presentation	<p>Symptoms of CDI include (1):</p> <ul style="list-style-type: none">• Diarrhea (as defined in Appendix B)• Fever• Loss of appetite• Nausea and• Abdominal pain or tenderness <p>Complications include dehydration and colitis (1) and may also lead to life threatening systemic toxicity requiring surgical intervention and may also lead to death (2).</p> <p>Recurrence of CDI is common and occurs in about 30% of cases (3).</p>
Diagnosis	<p>See Appendix B</p> <p>For additional information, please consult the following issues of <i>Labstract</i>, a publication of the Ontario Agency for Health Protection and Promotion:</p> <p><i>Clostridium difficile</i> toxin testing: specimen acceptance criteria (4).</p> <p><i>Clostridium difficile</i>: specimen acceptance during outbreaks (5).</p>

4) Epidemiology:

Occurrence	<p><i>C. difficile</i> infection (CDI) has been associated with infectious diarrhea in health care settings for about 30 years and can be acquired in both hospital and community settings (3). It may occur when antibiotics kill normal bowel bacteria and allow the <i>C. difficile</i> to grow. When <i>C. difficile</i> grows, it may produce toxins, which can damage the bowel and may cause diarrhea. <i>C. difficile</i> infection is usually mild but sometimes can be more severe. In severe cases, surgery may be needed, and in extreme cases <i>C. difficile</i> may cause death (6).</p> <p>Since 2000 there has been an increase in the rates of <i>C. difficile</i> in some health care settings. In some of these settings this has been associated with the appearance of an epidemic strain of <i>C. difficile</i>. Some characteristics of this strain include the presence of binary toxin, increased resistance to clindamycin and fluoroquinolones, and potential for increased adverse events. This strain has been associated with outbreaks in Europe, the United States and Canada (3).</p>
Reservoir	<p><i>C. difficile</i> bacteria are found in feces of humans (1).</p>
Modes of Transmission	<p><i>C. difficile</i> is widely distributed in the environment. It produces spores that survive for longer periods of time and are resistant to destruction by environmental factors (e.g. temperature, humidity), including standard cleaning agents (7). In an effort to protect itself from undesirable environmental conditions, it assumes its spore form. <i>C. difficile</i> can be transmitted and/or acquired by patients and/or health care workers through contact with contaminated surfaces (including both vegetative cells and spores). <i>C. difficile</i> is spread via a fecal-oral route and therefore activities that can result in moving the organism into the mouth should be included as part of the preventative measures (1).</p>
Incubation Period	<p>The incubation period of <i>C. difficile</i> following acquisition has not been clearly defined. Studies have determined that onset of infection can occur within 48 hours after exposure and up to 3 months of discharge (8, 9).</p>
Period of Communicability	<p>Precise period of communicability is unknown; it may vary depending on the amount of toxin in the stool, which can vary from very small to large; also, the spores are very difficult to eliminate from surfaces and objects (10); cytotoxins may persist in stool for weeks (3).</p>
Susceptibility and Resistance	<p>Certain people are at increased risk for acquiring CDI. These risk factors include (3):</p> <ul style="list-style-type: none">• A history of antibiotic usage• Bowel surgery• Chemotherapy• Prolonged hospitalization <p>Additional risk factors that predispose some people to develop more</p>

	<ul style="list-style-type: none"> • Increased age • Serious underlying illness or debilitation <p>Antibiotics considered to be associated with the highest risk of <i>C. difficile</i> infection include clindamycin, cephalosporins, ampicillin-amoxicillin and fluoroquinolones (8).</p>										
5) Reporting Requirements:	Mandatory and standardized reporting of <i>C. difficile</i> has been introduced for all Ontario hospitals to monitor rates, establish trends and inform best practices to help the health care system reduce the risk and prevent the spread of the disease.										
To local Board of Health	<p>On September 1, 2008, <i>Clostridium difficile</i> infection (CDI) outbreaks and outbreak-associated cases in hospitals became reportable as per changes to regulation O. Reg. 559/91 (11) under the <i>Health Protection and Promotion Act</i>, R.R.O. 1990. Hospitals with CDI outbreaks are required to report immediately to their local public health unit.</p> <p>All outbreaks of CDI in institutions, other than hospitals under the Public Hospitals Act, shall be reported using the current process (i.e., as Gastroenteritis, institutional outbreaks, selecting <i>Clostridium difficile</i>/<i>C.difficile</i> as the “causative agent”).</p>										
To Public Health Division (PHD)	<p>Public health units are to enter CDI outbreak and outbreak associated cases as outlined in the chart below:</p> <table border="1"> <thead> <tr> <th>iPHIS entry</th> <th>Deadline to input information into iPHIS</th> </tr> </thead> <tbody> <tr> <td>Preliminary Report</td> <td>Within one business day of a health unit receiving notification of the outbreak.</td> </tr> <tr> <td>Cases</td> <td>Within one business day of a health unit receiving notification of the case.</td> </tr> <tr> <td>Monthly Report</td> <td>While the outbreak is ongoing, monthly updates are to be submitted in iPHIS by the health unit on the last business day of every month.</td> </tr> <tr> <td>Final Report</td> <td>Within 15 business days after the outbreak is declared over.</td> </tr> </tbody> </table>	iPHIS entry	Deadline to input information into iPHIS	Preliminary Report	Within one business day of a health unit receiving notification of the outbreak.	Cases	Within one business day of a health unit receiving notification of the case.	Monthly Report	While the outbreak is ongoing, monthly updates are to be submitted in iPHIS by the health unit on the last business day of every month .	Final Report	Within 15 business days after the outbreak is declared over.
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6) Prevention and Control Measures:											
Personal Prevention Measures	<p>As with any infectious disease, washing hands often in warm soapy water for at least 20 seconds is the best defence against <i>C.difficile</i>. Before entering and leaving a health care facility the use of alcohol-based hand sanitizer provided at most entrances and units is also advised (1).</p> <p>Education for staff, patients, visitors/families, should include, but is not limited to (3):</p> <ul style="list-style-type: none"> • What is CDI; transmission; contact precautions, cleaning 										

	<ul style="list-style-type: none"> • reinforce that health care providers are not at risk of acquisition with consistent use of routine practices • reinforce safe work practices- no eating or drinking in patient/resident care areas <p>Patients with CDI are permitted to have visitors, provided visitors understand how they can protect themselves (3).</p> <p>Messaging to visitors should be written in clear language at a grade 6 level and include the following:</p> <ul style="list-style-type: none"> • What is CDI and what their risk of acquiring it is • How to properly clean their hands (and its importance) • When PPE is needed and how to put on and take off • Measures to take when providing care to/or having significant contact with the patient (i.e. wear gown and gloves) • Instructions to only use visitor washrooms and where they are located • Instructions to visit their significant other in isolation last if they are visiting more than one person in the hospital
<p>Infection Prevention and Control Strategies</p>	<p>Prevention Strategies in institutions include (3):</p> <ul style="list-style-type: none"> • early identification and testing of patients with symptoms • empowering front-line staff to institute additional precautions at onset of symptoms • daily surveillance reporting to Infection Prevention and Control program staff <p>Control Strategies in institutions include (3):</p> <ul style="list-style-type: none"> • In addition to routine practices, initiate contact precautions, which include signage for contact precautions, use of gloves and gown upon entering room, use of dedicated patient care equipment including bedpans and commodes • Isolate patients in private rooms or cohort patient(s) if necessary • Discontinue antibiotic therapy and commence treatment if applicable • Appropriate environmental cleaning practices • Reinforce hand hygiene practices <p>More detailed information is available in the Provincial Infectious Diseases Advisory Committee's <i>Testing, Surveillance and Management of Clostridium difficile In All Health Care Settings</i> (3).</p>
<p>Management of Cases</p>	<p>Individual cases will be managed as per individual facility protocols.</p> <p>The following recommendations may be considered when treating CDI patients (3)</p> <ul style="list-style-type: none"> ▪ Cessation of antibiotic therapy, if possible. Consult an ID physician if this is not possible. ▪ Rehydration of the patient ▪ Avoid antimotility agents (e.g. loperamide)

	For more information on recommended therapies, please refer to the Provincial Infectious Diseases Advisory Committee's <i>Testing, Surveillance and Management of Clostridium difficile In All Health Care Settings</i> (3).
Management of Contacts	Not applicable
Management of Outbreaks	<p>Outbreak measures include (3,12):</p> <ul style="list-style-type: none"> • Place all symptomatic patients on contact precautions and in private rooms • If necessary, cohort patients and staff • Report outbreak to the local medical officer of health/designate • Form a multidisciplinary outbreak team to include front line workers and environmental services • Provide education to staff (e.g. emphasizing diligent hand hygiene practices), patients and families • Environmental cleaning (Please refer to the Provincial Infectious Diseases Advisory Committee's <i>Testing, Surveillance and Management of Clostridium difficile In All Health Care Settings</i> (3)) • Antibiotic stewardship (13,14) • If all control measures are not controlling spread, consider closing affected unit to admissions • Hospitals in discussion with public health units declare the outbreak over based on: <ul style="list-style-type: none"> ○ Number of cases has decreased to the hospital's baseline ○ Sustained IPAC measures to prevent transmission ○ No ongoing transmission is occurring <p>It may take weeks and possibly months to bring a CDI outbreak under control, and for hospital administrators and public health professionals to reach a level of confidence that measures to prevent ongoing transmission will be in place effectively even after declaring the outbreak over.</p>
7) References	<p>(1) Health Canada; Public Health Agency of Canada. It's your health: <i>C. difficile</i> (<i>Clostridium difficile</i>). Ottawa: Health Canada; 2006. Available from http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/diseases-maladies/cdifficile-eng.pdf.</p> <p>(2) Dallal RM, Harbrecht BG, Boujoukas AJ, et al. Fulminant <i>Clostridium difficile</i>: an underappreciated and increasing cause of death and complications. <i>Ann Surg</i>. 2002 Mar; 235(3):363-72.</p> <p>(3) Provincial Infectious Diseases Advisory Committee. <i>Testing, Surveillance and Management of Clostridium difficile In All Health Care Settings</i>. 2010. Available from http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cdifff.pdf.</p>

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- (5) Ontario Agency for Health Protection and Promotion. Labstract. *Clostridium difficile*: specimen acceptance and testing during outbreaks. 2008. Available from http://www.oahpp.ca/resources/documents/labstracts/LAB-SD-045-000_C_diff_outbreaks_with_revisions_drp2.pdf.
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8) Additional Resources

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