Control of *Clostridium difficile* Infection (CDI) Outbreaks in Hospitals

A Guide for Hospital and Health Unit Staff

Public Health Division: Public Health Protection and Prevention Branch Ministry of Health and Long-Term Care December 2009



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Glossary of Terms^{1 2}

Additional Precautions

These precautions (i.e. Contact Precautions, Droplet Precautions, Airborne Precautions) are carried out in addition to Routine Practices when infections caused by organisms transmitted by these routes are suspected or diagnosed. They include the physical separation of infected or colonized clients/patients/residents from other individuals and the use of barriers (e.g. gowns, gloves, masks) to prevent, or limit, the transmission of the infectious agent from colonized or infected individuals to those who are susceptible to infection or to those who may spread the agent to others.

Alcohol-based Hand Rub (ABHR)

A liquid, gel or foam formulation of alcohol (e.g. ethanol, isopropanol) which is used to reduce the number of microorganisms on hands in clinical situations when the hands are not visibly soiled. ABHRs contain emollients to reduce skin irritation and are less time-consuming to use than washing with soap and water.

Contact Precautions

A type of Additional Precautions to reduce the risk of transmitting infectious agents via contact with an infectious person. Contact Precautions are used in addition to Routine Practices.

Clostridium difficile infection (formerly known as Clostridium difficile Associated Disease)

For most people, *C. difficile* does not pose a health risk. When *C. difficile* bacteria grow in the bowel, they produce toxins. These toxins can damage the bowel and cause diarrhea, causing a disease known as *Clostridium difficile* Infection (CDI). The effects of CDI are usually mild but sometimes can be more severe. Symptoms can range from mild or severe diarrhea to high fever, abdominal cramping, abdominal pain and dehydration. In severe cases, surgery may be needed, and in extreme cases CDI may cause death.

Diarrhea

Loose/watery bowel movements (conform to the shape of the container) and the bowel movements are unusual or different for the patient; and there is no other recognized aetiology for the diarrhea (for example, laxative use).

Environment of the Patient

The immediate space around a client/patient/resident that may be touched by the patient and may also be touched by the health care provider when providing care. The patient environment includes equipment, medical devices, furniture (e.g. bed, chair, bedside table), telephone, curtains and personal belongings (e.g. clothes, books). In a multi-bed room, the client/patient/resident environment is the area inside the individual's curtain. In an ambulatory setting, the client/patient/resident environment is the area that may come into contact with the patient within their cubicle.

Hand Hygiene

A general term referring to any action of hand cleaning. Hand hygiene relates to the removal of visible soil and removal or killing of transient microorganisms from the hands. Hand hygiene may be accomplished using soap and running water or an alcohol-based hand rub. Hand hygiene includes surgical hand antisepsis.

High-Touch Surfaces

High-touch surfaces are those that have frequent contact with hands. Examples include doorknobs, call bells, bedrails, light switches, and wall areas around the toilet and edges of privacy curtains.

Hospital Grade Disinfectant

A disinfectant that has a drug identification number (DIN) from Health Canada indicating approval for use in Canadian hospitals.

Outbreak Management Team (OMT)

A multidisciplinary team including representatives from all areas within the health care setting that provide service to the affected patients and/or units. The OMT must include as a minimum representation from Infection Prevention and Control, Occupational Health and Safety, Administration, Nursing, Medical Staff, Support Services and Public Health.

Nosocomial Infection

Infection acquired during the delivery of health care (also known as "health care-associated infection").

Routine Practices

Health Canada/Public Health Agency of Canada term to describe the system of infection prevention and control practices recommended in Canada to prevent and control transmission of microorganisms in health care settings. In the United States these are called Standard Precautions. These practices describe prevention and control strategies to be used with all patients during all patient care, and include:

- Hand hygiene with an alcohol-based hand rub or with soap and water before and after any direct contact with a patient.
- The use of additional barrier precautions to prevent staff contact with a patient's blood, body fluids, secretions, excretions, non intact skin or mucous membranes
- Gloves are to be worn when there is a risk of hand contact with a patient's blood, body fluids, secretions, excretions, non intact skin or mucous membranes; gloves should be used as an additional measure, not as a substitute for hand hygiene.
- Gowns are to be worn if contamination of uniform or clothing is anticipated.
- The wearing of masks and eye protection or face shields where appropriate to protect the mucous membranes of the eyes, nose and mouth during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.
- All equipment that is being used by more than one patient must be cleaned between patients according to recommendations.

The full description of Routine Practices and Additional Precautions is available in the current PIDAC, *Routine Practices and Additional Precautions In All Health Care Settings* document, available at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_routine.html

See also the Public Health Agency of Canada's *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, available at: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/99vol25/25s4/index.html.

Staff

For purposes of this document, "staff" refers to anyone conducting activities within a health care setting that will bring him/her into contact with patients including: all health care providers (e.g. emergency service workers, physicians, nurses, clergy, allied health professionals, students), support services (e.g. housekeeping), and volunteers.

1.0 Background

Clostridium difficile (*C. difficile*) has been a known cause of health care associated (nosocomial) diarrhea for about 30 years. *C. difficile* can be acquired in both hospital and community settings, and is the most common cause of infectious diarrhea in hospitalized patients. Infection is almost exclusively a complication of antibiotic use. Since antibiotic utilization is a necessary component of certain treatment regimens the focus of *C. difficile* management in hospitals is preventing acquisition when possible, and surveillance to allow for early identification and treatment of cases *C. difficile* infection can lead to diseases ranging from mild diarrhea to toxic megacolon and death.^{3 4} Since 2000, CDI rates have increased in some health care settings.^{5 6} In some of these settings this has been associated with an epidemic strain of *C. difficile* (i.e. NAP 1).

1.1 Purpose of the Guide

The purpose of this guide is to support the appropriate management of CDI outbreaks by:

- Defining the roles of the hospital and public health staff in outbreak control processes;
- Providing specific guidance for CDI outbreak control; and
- Providing a compilation of tools and resources for management of CDI outbreaks.

Although this guide is primarily intended for hospital infection prevention and control (IPAC) teams and health unit staff, the principles of CDI outbreak management apply to other facilities such as long-term care and retirement homes.

1.2 Legal *Clostridium difficile* Infection (CDI) Reporting Responsibilities for Hospitals, Health Units and the Ministry of Health and Long-Term Care (MOHLTC)

As of September 1, 2008, hospitals are required under the *Health Protection and Promotion Act* (HPPA) to report CDI outbreaks and outbreak-associated cases to the local medical officer of health.

Reporting requirements for hospitals and public health units are defined under the *Public Hospitals Act* (PHA) and the HPPA.

CDI outbreaks and outbreak-associated cases in public hospitals are designated as per regulations under the HPPA as follows:

- O. Reg. 558/91, includes outbreaks of CDI in hospitals on the list of communicable diseases in Ontario;
- O. Reg. 559/91, includes outbreaks of CDI in hospitals on the list of reportable diseases in Ontario; and
- O. Reg. 569, which includes the specific data elements for outbreaks of CDI which hospitals must provide to their local medical officers of health.

1.3 Ontario's CDI Reporting and Notification Processes

Public reporting of CDI in Ontario hospitals began on September 30, 2008. The reporting process has two streams. One stream is Patient Safety Indicator Reporting of monthly CDI rates. Hospitals will post rates of CDI and case counts acquired in their facility on their website each month, and will also report their data to the Ministry of Health and Long-Term Care through an online template captured by the Web-Enabled Reporting System (WERS), a central database. The second stream is the reporting of CDI outbreaks. Hospitals are required to report outbreaks and outbreak-associated cases of CDI to their local public health unit when the definition of an outbreak is met in their facility (refer to reporting flowchart diagram on page 7).

The Ontario government has introduced full public reporting on eight patient safety indicators as part of a comprehensive plan to create an unprecedented level of transparency in Ontario's hospitals.

C. difficile was the first of the eight patient safety indicators to be publicly reported. As of September 30, 2008, all Ontario public hospitals were required to publicly report on *C. difficile* rates in their facilities through a public website.

Hospitals are strongly encouraged to post information on their public website when:

- They are actively in an outbreak;
- A ward/unit or the entire facility is affected;
- The outbreak is declared over.

The public is encouraged to contact the hospital directly for additional information.

Public Health Reporting

Local Public Health Units report CDI outbreaks, update the status of ongoing outbreaks and enter final data to MOHLTC through the integrated Public Health Information System (iPHIS).

The Chief Medical Officer of Health (CMOH) notifies all health units of the CDI case numbers and rates by hospital twice per month (i.e. preliminary and final data). If one of the notification thresholds is reached (see 3.0 Outbreak Detection and Management for definitions and parameters for declaring an outbreak) a discussion between the local MOH and the facility is required. The purpose of this discussion will be to investigate the situation and try to minimize the rates of CDI. Specific elements of the discussion will include:

- Investigation of immediate event;
- Review of past unit or facility CDI activity and expected risk of CDI for the unit's patient population (e.g. oncology unit versus obstetric unit);
- Review of control measures that have been implemented as per the current PIDAC Best Practices Document for the Management of Clostridium difficile In All Health Care Settings.

The MOHLTC reports hospitals that experienced an outbreak in the previous month in addition to all new nosocomial counts and rates and current CDI outbreaks on its patient safety website.

As outlined below, all CDI outbreaks and outbreak-associated cases in public hospitals must be reported. The following chart outlines reporting requirements of health units for CDI outbreaks and outbreak-associated cases:

iPHIS Entry	Deadline to input information into iPHIS
Preliminary Report	• Within <u>one business day</u> of a health unit receiving notification of the outbreak.
Cases	• Within <u>one business day</u> 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 <u>15 business days</u> after the outbreak is declared over.

For detailed instruction on entering CDI outbreaks and outbreak-associated cases in iPHIS, please refer to the current CDAD iPHIS User Guide and CDAD iPHIS Quick Reference Guide. These documents are also available on the Public Health Ontario portal in the iPHIS Ontario Community in the Mandated Materials directory (www.publichealthontario.ca).



Available electronically at: http://www.health.gov.on.ca/patient_safety/pro/cdad/toolkit_ricn/flowchart_20080718.pdf

1.4 Roles and Responsibilities of Health Units and Hospitals in Outbreak Management

Hospital IPAC teams and public health unit staff are expected to work collaboratively in the prevention, early detection and management of CDI outbreaks and outbreak-associated cases.

Role of the Hospital in CDI outbreak management

- Primarily responsible for outbreak management;
- Responsible for clinical management of patients;
- Responsible for development and implementation of infection prevention and control policies and procedures;
- Review current infection prevention and control best practice recommendations in conjunction with public health units to develop and regularly update infection prevention and control outbreak management procedures;
- Coordinate education of staff, patients, and visitors;
- Discuss with the local Medical Officer of Health (MOH) if one of the notification thresholds is met. Consider declaring an outbreak in collaboration with the local health unit.

Role of the Public Health Unit in CDI outbreak management

- Assist in the investigation, confirmation, declaration and management of the outbreak;
- Provide support and consultation about the outbreak to Infection Prevention and Control staff at the hospital;
- Facilitate specimen testing at public health laboratories;
- Provide representation on infection prevention and control programs and committees on the outbreak management team (OMT) (as per the Ontario Public Health Standards which are published under section 7 of the HPPA);
- Consult on surveillance and infection prevention and control policies and procedures (Ontario Public Health Standards – published under section 7 of the HPPA);
- Consult with hospital to declare the outbreak over;
- Request provincial assistance when local resources for outbreak control are exhausted.

Health Unit Authority under the HPPA

Under the HPPA, medical officers of health have the power to monitor and control the spread of communicable diseases. These powers include:

- Participating in each hospital's infection prevention and control program. The Medical Officer of Health's (or designate) involvement must include being a member of the hospital's infection prevention and control committee; receiving reports of communicable diseases that occur in the hospital; consultation on the development and revision of infection prevention and control policies; and providing advice when needed/requested on the management of communicable diseases and infection prevention and control (Ontario Public Health Standards published under the authority of Section 7 of the HPPA);
- Issue orders with respect to outbreaks of communicable disease at a hospital or institution (including a long-term care home) as described in Section 29.2 of the HPPA;
- Under the order issued under S. 29.2, require a public hospital or institution "to take any actions specified in the order for the purpose of monitoring, investigating and responding to an outbreak of communicable disease at the hospital or institution."
- Issue an order, under Section 22 of the Act, if, in part, the MOH is of the opinion, on reasonable and probable grounds, that a) there exists or may exist a communicable disease or b) there is an immediate risk of an outbreak of a communicable disease at a public hospital or institution.

Occupational Health and Safety

Health care facilities are required to comply with applicable provisions of the *Occupational Health and Safety Act* (OHSA) and its regulations. Employers, supervisors and workers have rights, duties and obligations under the OHSA.

Specific requirements under the OHSA can be found at: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90001_e.htm

Specific requirements for certain health care and residential facilities may be found in the Regulation for Health Care and Residential Facilities, accessible at: <u>http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_930067_e.htm</u>

When developing or updating measures and procedures for the health and safety of workers, including infection prevention and control for worker safety, and for protecting workers from chemical disinfectants, the healthcare facility must consult with the workplace joint health and safety committee, and provide education and training

programs for staff.

Health care associated CDI acquired by workers as a result of workplace exposures are occupational illnesses and must be reported to the Ministry of Labour, to the workplace joint health and safety committee, and to the trade union, if any, in accordance with the *Occupational Health and Safety Act* s.52 (2) and the Regulation for Health Care and Residential Facilities s.5 (5).

For further information, see the Ministry of Labour website information on *Clostridium difficile*-Associated Disease (CDAD) for Health Care Workers accessible at: <u>http://www.labour.gov.on.ca/english/hs/ua_c-difficile.html</u>

1.5 Other Stakeholders involved in Outbreak Management

Ministry of Health and Long-Term Care- Public Health Protection and Prevention Branch (PHPPB)

- Provide consultation to the health unit with regards to infection prevention and control; and
- Provide ongoing support to the health unit to augment outbreak control efforts.

Regional Infection Control Networks (RICNs)

The RICN role includes the dissemination of best practice guidelines, as well as training and education for all health sectors. In this capacity, they may:

- Provide expert advice to the outbreak management team (OMT) during an outbreak; and
- Connect the OMT with additional expert resources.

Local Health Integrated Networks (LHINs)

LHINs may request information regarding hospital CDI outbreaks from hospitals in their jurisdiction.

Ontario Agency for Health Protection and Promotion (OAHPP)

OAHPP provides expert advice regarding CDI outbreaks, and deploys infection control resource teams (ICRTs) upon the CMOH's request. The CMOH consults with the local MOH and the MOHLTC's PHPPB to determine if local capacity has been maximized, and additional specialized expertise is required. If contacted by a hospital, OAHPP will work with them directly, including sending OAHPP staff to assist the hospital with the CDI outbreak through education, etc. if needed.

The ICRT will act as an expert consulting group to the hospital, and as a support to any investigation that may be underway. It will operate as part of the hospital's outbreak management team.

The team will also work with the local public health unit, the regional infection control network and the hospital to improve local infection prevention and control capacity.

At the end of the outbreak, the ICRT will debrief the hospital's outbreak management team and prepare a report about the outbreak. A final report, with recommendations, will be made available to the MOHLTC, the OAHPP, the LHIN, local public health unit and the hospital.

For further information on ICRT's please refer to: http://www.health.gov.on.ca/english/media/news_releases/archives/nr_08/sep/infection_team_bg_01_20080925.pdf

2.0 Definitions for CDI Cases

Diarrhea:

Loose/watery bowel movements (conforming to the shape of the container), the bowel movements are unusual or different for the patient, and there is no other recognized etiology for the diarrhea (for example, laxative use).

Note: There is no reference in this definition to a specific number of episodes of diarrhea or a time frame, as the focus is not on the frequency but on identification of the first bout of diarrhea, in order to implement appropriate control measures. It is important to place patients on Contact Precautions and to send stool specimens for laboratory testing at the onset of any new or unexplained episode of diarrhea.

CDI Case Definition:

Diarrhea (as defined above) with: laboratory confirmation of a positive toxin assay (A/B) for *C. difficile*; OR visualization of pseudomembranes on sigmoidoscopy or colonoscopy; OR histological/pathological diagnosis of pseudomembranous colitis.

New Nosocomial Case of CDI Associated with Reporting Facility:

A case that meets the case definition for CDI; AND CDI was not present on admission (i.e., onset of symptoms >72 hours after admission); OR the infection was present at time of admission but was related to a previous admission to the same facility within the last 4 weeks; AND the case has not had CDI in the past 8 weeks.

Note: In the event of a ward/unit outbreak, it is important to determine the length of time the CDI case has been a patient of the outbreak unit.

Nosocomial Cases Attributed to other Health Care Facilities:

A case that meets the case definition for CDI; AND CDI was present on admission; OR the case had symptom onset <72 hours after admission; AND the case was exposed to any other health care facility (including long-term care) other than the reporting facility within the last 4 weeks; AND the case has not had CDI in the past 8 weeks.

Cases Attributed to Sources other than Health Care Facility or an Indeterminant Source:

A case that meets the case definition for CDI; AND CDI was present on admission; OR the case had symptom onset <72 hours after admission; AND there was no exposure to <u>any</u> health care facility within the last 4 weeks OR the source of infection cannot be determined; AND the case has not had CDI in the past 8 weeks.

Hospitals should be conducting *C. difficile* surveillance and collecting data on a routine basis. Refer to the current PIDAC document *Best Practices for Surveillance of Health Care Associated Infections in Patient and Resident Populations* for guidance accessible at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_hai.pdf.

3.0 Outbreak Detection and Management⁷ For all facilities every case of nosocomial CDI should be evaluated by Infection Prevention control and the unit manager for transmission risk.

Threshold Definition

CDI outbreak definitions incorporate the concept of notification thresholds that optimally trigger action and dialogue between public health and hospitals to determine if an outbreak is occurring.

The following CDI notification thresholds replace the existing outbreak definitions that were issued on September 1, 2008.

Outbreak definitions have been redefined to incorporate notification thresholds.

Notification thresholds are more sensitive than outbreak definitions and are defined as:

- 1. For wards/units with \geq 20 beds, 3 cases of nosocomial CDI identified on one ward/unit within a seven day period or 5 cases within a 4 week period; OR
- 2. For wards/units with < 20 beds, 2 cases of nosocomial CDI identified on one ward/unit within a seven day period or 4 cases within a 4 week period; OR
- 3. Hospitals that have a baseline CDI rate for two months that is at or above the 80th percentile for comparator hospitals; OR
- 4. Hospitals that have a facility rate that is greater than or equal to 2 standard deviations above their baseline. Note: This does not apply to small hospitals with a single case of nosocomial CDI which artificially elevates the facility rate

It should be noted that exceeding a threshold does not necessarily imply that an outbreak will be declared.

CDI Outbreak thresholds

Following consultation between the institution and the Medical Officer of Health (MOH), decisions on the declaration of an outbreak will be made based on the following two criteria:

- Significant* (as determined by the facility and health unit) increase in CDI numbers or rate compared to own baseline and/or that of comparator institutions
- Epidemiologic evidence of ongoing nosocomial transmission within the ward/unit or facility

*Significance may be determined by reviewing:

- Number of new nosocomial cases associated with the reporting ward/unit or facility;
- Historic level of CDI activity of the ward/unit or facility;
- Current trend in ward/unit CDI activity or facility rate;
- Location of current cases and possible epidemiologic links between cases;
- Current control measures (and evidence that they are being implemented);

Declaration of an outbreak can be made by either the institution or the MOH.

In the event of a disagreement between the institution and the MOH regarding the declaration of an outbreak, the MOH has the authority to determine if an outbreak of a communicable disease exists, for purposes of exercising statutory powers under the HPPA. Once an outbreak is declared it is reported to the Ministry of Health and Long-Term Care through iPHIS.

An ICRT review can be requested by the MOH or by the facility Chief Executive Officer (CEO) through the MOH at any time during the threshold investigation or for outbreak control.

The hospital may declare an outbreak over and shall consult with the MOH in doing so. Rationale for declaring or not declaring an outbreak, and declaring an outbreak over should be documented.

3.1 Steps to follow during a CDI outbreak

Refer to Hospital and Public Health Management of CDI outbreaks diagram on page 17 and *C. difficile* Associated Disease Outbreak Management Checklist on page 18. Also refer to the current PIDAC *Best Practices Document for the Management of Clostridium difficile in all health care settings*. Accessible at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cdiff.pdf

Step 1: Hospital Assessment of the Situation

Best practices support ongoing surveillance as a measure to identify CDI cases. Once a case has been detected, enhanced surveillance measures can assist in the early detection of new CDI cases.⁸

Review the cases based on the provincial surveillance definition and begin a line listing once a threshold has been reached; Discussion with the local MOH is required once any of the criteria for a threshold has been met. Ensure all patients with unexplained diarrhea are recorded on the line listing. The line listing helps to provide a quick assessment of the extent and nature of the situation.

Refer to Appendix 4.9 for an example of a line listing. In conjunction with the local public health unit, hospitals can add additional information as needed. The sample line listing can be also be accessed at: http://www.health.gov.on.ca/patient_safety/pro/cdad/pro_resource/sample_line_list.doc

Recommended Information to be documented on the Line Listing: Case Demographics:

- Name of patient (last, first)
- Current and previous location (ward/unit, room number)
- Sex (male/female)
- Date of birth
- Admission date
- Roommates

Symptom:

Date of onset of diarrhea

Case confirmed by:

- Toxin Detection
- Diagnostic condition: pseudomembranous colitis
- Histopathology

The above categories are used to determine whether or not the patient meets the established provincial surveillance case definition for CDI and therefore is to be considered as part of the outbreak, once one is declared.

Meets the case definition:

 Only those cases that meet the provincial case definition are to be entered into iPHIS by the local public health unit

Treatment:

- Antibiotic prescribed (refer to the current PIDAC document *Best Practices Document for the Management of Clostridium difficile in all Health Care Settings*, for treatment regimen)
- Hospitals may wish to also capture the dosage, route and length of treatment

Symptoms resolved:

Record the date on which the symptoms resolved

This can assist in determining when Contact Precautions can be discontinued for a particular patient (i.e. at least 48 hours without symptoms - formed or normal stool for the individual).

Complications:

Record complications for each outbreak-associated case

- Colectomy
- Toxic Megacolon
- Death, including the relationship of CDI to death (i.e. whether CDI is a direct cause, a contributing cause, or an unrelated cause or unknown)
- Other

Role of the Laboratory:

The laboratory test for *C. difficile* detects the presence of cytotoxins A and B. The current toxin test, ELISA (Enzymelinked immunoabsorbant assay), has a sensitivity of approximately 80%.⁹ Although there are a number of 'point of care' tests available, they are not recommended, due to low sensitivity.

To assist the processing of CDI lab specimens:

- Collect stool specimens as soon as possible after the onset of diarrhea.
- During an outbreak, specimens for *C. difficile* toxin testing should be sent from any patient with unexplained diarrhea on affected units even if another cause for the diarrhea is likely. Procedures should be developed so that stool can be sent for testing without a specific physician order (e.g. as per policy approved by Medical Advisory Committee, MAC, or using a medical directive).
- The microbiology laboratory should be represented on the Outbreak Management Team (OMT).
- During an outbreak, steps should be taken to ensure that the laboratory can provide a 24-hour turn around time on all CDI specimens and that both attending physicians and IPAC are notified immediately (e.g. by pager or email) of positive results. Local public units can liaise with the public health lab to facilitate the turnaround of test results where applicable.
- Do not rely on a single negative test to rule out *C. difficile*. If a single test is negative, and the patient remains symptomatic, a second test should be sent.¹⁰ If the second test is also negative, it is not recommended to repeat.

If a CDI outbreak has been identified, the Central Public Health Lab (CPHL) can conduct the following specialized testing:

- Culture and typing of *C.difficile* strain by PFGE (pulse field gel electrophoresis) e.g. NAP 1 strain;
- Antibiotic susceptibility testing, including metronidazole and vancomycin; and

 Specialized toxin testing by PCR (polymerase chain reaction), includes binary toxin elaborated by the epidemic NAP 1 strain.

Note: All laboratories performing routine toxin testing are encouraged to maintain faeces that are *C.difficile* toxin-positive at -20C for a minimum of two months to enable retrospective typing should the need arise.

Caveats For Testing^{11 12}

- Do not test formed stools. These samples will be rejected by the lab (unless the requisition states patient may have pseudomembranous colitis);
- There is no evidence to support toxin assay testing on asymptomatic patients;
- Do not test infants less than one year of age. *C. difficile* is considered normal flora for this age group. This group has been shown to be asymptomatic carriers with colonization rates as high as 50%; and
- *C. difficile* toxin testing is not reliable as a test of cure. Toxin may be detected long after clinical symptoms have resolved. As such, it is not helpful in determining treatment duration or when to discontinue infection prevention and control precautions.

As per routine processes, laboratories will send individual positive results to the ordering physician and report to the local public health unit for confirmed outbreaks, as per the existing mechanism for contacting health units.

Refer to Appendices 4.13- Lab Contact List; 4.14 Labstract: *Clostridium difficile* toxin testing- Specimen Acceptance Criteria; 4.15 Labstract: *Clostridium difficile* - Specimen Acceptance and Testing During Outbreaks; 4.16 Testing Guidelines and 4.17-Public Health Laboratories *Clostridium difficile* Kit

Step 2: Hospital Institutes Infection Prevention and Control Measures¹³

Initiate Contact Precautions

- Contact Precautions should include personal protective equipment (PPE) and hand hygiene with either an alcoholbased hand rub (i.e. 70-90% alcohol) or soap and water.
- Contact Precautions should be implemented for all patients with diarrhea as soon as symptoms are identified and should be maintained until the patient is symptom free for 48 hours.
- Ensure other control measures are in place (refer to Appendix 4.10 for the Best Practices Audit tool).

Accommodation

- All patients suspected of having CDI should be placed in a single room with dedicated toileting facilities (private bathroom or individual commode chair), if available.¹⁴
- During an outbreak, it is not acceptable to manage patients with confirmed CDI in the same room as patients who
 do not have the infection.
- If the patient has recurrent CDI, consideration may be given to leaving the patient in a single room accommodation even after resolution of symptoms to minimize the risk of transmission.

Hand Hygiene

 All health care facilities should follow the current PIDAC Best Practices for Hand Hygiene in All Health Care Settings document. Supplemental resources are also available as part of the Ministry of Health and Long-Term Care's "Just Clean Your Hands" program at: <u>http://www.justcleanyourhands.ca/index.html</u>.

Environmental Cleaning

- Cleaning protocols should be reviewed, evaluated and revised as necessary.
- Ensure there are enough cleaning and disinfecting supplies and equipment to respond to outbreak management recommendations related to environmental cleaning.
- Ensure environmental services are aware of items and surfaces in the patient's environment that require cleaning specific for CDI. The cleaning team must be part of the infection prevention and control culture and need to know the importance of their work and its contribution to outbreak prevention and management. A checklist posted on the back of the door in the CDI patient's room or housekeeping closet can be useful in reminding cleaning staff of what needs to be done.

- During an outbreak, if possible, dedicate equipment to individual patients. However, if the use of dedicated
 equipment is not possible, hospitals need to clean everything in the mobile environment (e.g. stretchers, blood
 pressure cuff, bladder scanners, thermometers, med carts, IV poles).
- In patient care areas where there are multiple cases or ongoing transmission of *C. difficile*, use of hypochlorite-based products for disinfection after the room is cleaned with hospital-grade disinfectant may be considered, in consultation with Infection Prevention and Control and Occupational Health and Safety.¹⁵ Alternatively, the health care setting may consider the use of new disinfectant products with in vitro evidence of sporicidal activity.
- Hospitals may consider an audit tool to augment their infection prevention and control measures (refer to Appendix 4.10 for a sample audit tool).

Note: Contact Precautions should remain in place until proper discharge/transfer cleaning has occurred. (See Appendix 4.11 Checklist for discharge/Transfer Cleaning of all Rooms).

Antibiotic Management

It may be beneficial to implement an antibiotic stewardship program with regular reports made to the Pharmacy and Therapeutics Committee and copied to the Infection Prevention and Control Committee (IPACC). Narrow spectrum antibiotics utilized for the minimum possible duration will reduce the risk of CDI acquisition. (Refer to Appendix 4.7 for recommendations regarding antibiotic stewardship).

Education

- Reinforce all infection prevention and control measures for staff, including Routine Practices, Additional Precautions, hand hygiene, and environmental cleaning protocols; and
- Educate visitors on infection prevention and control measures.

Step 3: Hospital and Public Health Unit Consultation

Health unit- hospital discussion can include but is not limited to:

- Consult the local MOH/designate if one of the notification thresholds have been reached;
- Hospital and health unit arrange a meeting to discuss the data/review line list;
- Discuss the historical baseline for the ward/unit/facility, if available; review case counts on the affected unit(s) and for the entire hospital;
- Discuss control measures instituted (i.e. review current PIDAC Best Practices Document for the Management of Clostridium difficile in all health care settings document);
- Review with the facility, their surveillance practices, along with infection prevention and control practices in order to identify possible areas for improvement
- Exchange contact information for hospital ICP and local public health unit staff to facilitate future communications; and
- Hospital and health unit determine who will be responsible for coordinating communication (e.g. media inquiries)

Step 4: Outbreak declared

Declaration of an outbreak can be made by either the institution or the MOH.

The following should be considered for declaring a ward/unit/facility outbreak:

- Number of new nosocomial cases associated with the reporting ward/unit or facility;
- Historic level of CDI activity of the ward/unit or facility;
- Current trend in ward/unit CDI activity or facility rate;
- Location of current cases and possible epidemiologic links between cases;
- Current control measures (and evidence that they are being implemented);
- Comparison with like hospitals

Ensure that the rationale for declaring the outbreak is documented.

Once an outbreak is declared, the health unit will provide the hospital with an outbreak number and will enter preliminary data into iPHIS within one business day of outbreak notification.

Step 5: Outbreak Management Team

The Outbreak Management Team (OMT) directs and oversees the management of all aspects of an outbreak. The team should include a representative from the local public health unit and representatives from the hospital IPAC program, senior administration and appropriate hospital departments (e.g. housekeeping, pharmacy, the lab, purchasing, Occupational Health and Safety, public relations staff to handle media inquiries, etc.). It is important that representatives on OMT have decision-making power.

The first order of business for the OMT is to conduct a meeting where the following should be addressed:

- Confirm that the criteria for declaring an outbreak has been met;
- Review the line listing to ensure that all team members are knowledgeable about the situation;
- Ensure the necessary control measures needed to prevent the outbreak from spreading are in place;
- Review bed and room transfers among cases;
- Confirm with the laboratory that CDI test results can be obtained within 24 hours and where possible, on weekends;
- Discuss significance of lab results and their appropriate use and limitations;
- Notify the Ministry of Labour of any health care associated CDI acquired by staff as a result of workplace exposure;
- Determine plan for communicating to hospital departments (including education) and stakeholders, including other health care facilities, RICNs, emergency medical services (EMS), LHINs, etc.;
- Define roles and responsibilities, including a news media representative;
- Prepare a communication plan, which may include a media release;
- Determine how inquiries from the public and media will be addressed (e.g. public health will direct callers to designated line);
- Establish how and when daily communications will take place between the hospital and local public health unit;
- Determine how frequently the OMT will meet and set next meeting; and
- Identify any necessary additional measures needed.

Step 6: Ongoing Outbreak Management

- The OMT will meet regularly during the outbreak. The frequency will be dependent on the nature of the outbreak;
- Monitoring of the outbreak must include ongoing surveillance to identify new cases and to update the status of line listed patients
- The line listing should be reviewed daily by the hospital and the local public health unit
- Evidence of ongoing transmission and the effectiveness of the control measures should be reviewed. If all control measures are in place (i.e. Contact Precautions, environmental cleaning, hand hygiene) and new cases of CDI continue to be detected/diagnosed, the OMT may want to consider closing the affected unit to admissions until there are no further cases (i.e. there is a defined "clean" cohort of patients).¹⁶ The rationale for closing a ward/unit is that closure could reduce the number of patients at risk.
- Any additional IPAC measures and communication required should be implemented as needed.
- As outlined in Section 1.3, health units must enter/report monthly outbreak updates (e.g. aggregate case counts, complications and IPAC measures) into iPHIS on the last business day of every month while the outbreak is ongoing.

When local capacity has been exhausted (i.e. hospital, local public health unit and RICN) and additional outbreak management assistance is needed, the local MOH can contact the CMOH with a request for additional assistance. When the CMOH determines the need for additional support, beyond PHPPB and local resources, an ICRT will be assembled and deployed by the OAHPP. (Refer to Appendix 4.18 for more information on Infection Control Resources Team).

Step 7: Declaring a Unit/Facility Outbreak Over

The hospital may declare an outbreak over and shall consult with the MOH in doing so. Rationale for declaring an outbreak over would be documented.

Factors for consideration for declaring an outbreak over include, but are not limited to:

- There is evidence that good infection prevention and control practices are in place;
- Nososomial transmission rates are decreasing; and
- Returned to an expected rate of CDI appropriate to the facility/unit based on patient demographics.

Note: *C. difficile* spores can remain viable in the environment for several months acting as a source of infection. IPAC measures should remain in place after the outbreak is declared over.

Step 8: Review and Evaluation of the Outbreak

Once the outbreak has been declared over, the OMT should meet to:

- Review the course and management of the outbreak. This debrief meeting provides an opportunity to identify aspects of the outbreak that were handled well and aspects that could be improved;
- Prepare an outbreak report including lessons learned, and recommendations to prevent future outbreaks; and
- A joint report should be prepared and copies should be kept as deemed appropriate (e.g. hospital IPAC team and public health each keep a copy). A copy should be provided to the senior management team.



C. difficile Infection (CDI) Outbreak Management Checklist

This checklist outlines the basic steps to be followed when managing a CDI outbreak. It is expected that hospitals and Public Health will work collaboratively towards successfully managing a CDI outbreak.

1. ASSESSMENT When an increased number of cases of CDI are identified in the facility the ICP should complete the following: • Data on all line listed patients reviewed based on the provincial surveillance definition. • All patients with symptoms of diarrhea line listed. • Available laboratory results included on line listed patients. • Appropriate infection prevention and control (IPAC) measures are implemented. • Does a possible outbreak exist? • Senior Management Team notified. • Liaise with local PHU to discuss findings. 2. INFECTION PREVENTION AND CONTROL MEASURES'	YES	NO
 When an increased number of cases of CDI are identified in the facility the ICP should complete the following: Data on all line listed patients reviewed based on the provincial surveillance definition. All patients with symptoms of diarrhea line listed. Available laboratory results included on line listed patients. Appropriate infection prevention and control (IPAC) measures are implemented. Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. 2. INFECTION PREVENTION AND CONTROL MEASURES'		
 Data on all line listed patients reviewed based on the provincial surveillance definition. All patients with symptoms of diarrhea line listed. Available laboratory results included on line listed patients. Appropriate infection prevention and control (IPAC) measures are implemented. Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. 2. INFECTION PREVENTION AND CONTROL MEASURES'		
All patients with symptoms of diarrhealine listed. Available laboratory results included on line listed patients. Appropriate infection prevention and control (IPAC) measures are implemented. Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES'		
Available laboratory results included on line listed patients. Appropriate infection prevention and control (IPAC) measures are implemented. Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES'		
Appropriate infection prevention and control (IPAC) measures are implemented. Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES'		
Does a possible outbreak exist? Senior Management Team notified. Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES'		
Senior Management Team notified. Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES'		
Liaise with local PHU to discuss findings. INFECTION PREVENTION AND CONTROL MEASURES ¹		
2. INFECTION PREVENTION AND CONTROL MEASURES		
	YES	NC
Contact Precautions initiated for all patients with diarrhea as soon as symptoms identified:		
Appropriate PPE used.		
Hand Hygiene practice reinforced (with either alcohol-based hand rub or soap and water).		
Dedicated equipment provided for all affected patients or cleaning protocols in place for equipment that must be shared.		
Education provided and reinforced for staff, patients and visitors.		
Environmental deaning protocols reviewed with housekeeping.		
3. CONSULT WITH PUBLIC HEALTH UNIT	YES	NC
Local MOH/designate notified and line listing provided.		
lf outbreak identified, obtain outbreak number.		
Contact information for hospital ICP and PH assigned staff responsible for outbreak exchanged.		
4. OUTBREAK DECLARED	YES	NC
Outbreak declared in consultation with local MOH.		
Outbreak Management Team (OMT) established.		
nplement measures as outlined in "Best Practices Document for the Management of <i>Clostridium difficile</i> all health care settings," Ministry of Health and Long-Term Care, revised January 2009, accessible at: tp://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_cdfif.pdf		

com	LETED
YES	NO
YES	NO
	YES

Available electronically at: http://www.health.gov.on.ca/patient_safety/pro/cdad/toolkit_ricn/clist_cdad_20080725.pdf

4.0 Appendices

Appendix 4.1 Clostridium difficile: Background Information

C. difficile is a gram positive, anaerobic, spore-forming bacillus that produces two exotoxins: toxin A and toxin B. It is widely distributed in the environment and can colonize up to 3-5% of healthy adults in the community without causing symptoms. It produces spores that survive for long periods of time and are resistant to destruction by environmental factors¹⁷ (e.g. temperature, humidity), including standard cleaning agents used in hospitals.

C. difficile is shed in faeces. It can be picked up by hands touching objects contaminated with *C. difficile* in the environment, and can get into the stomach after touching one's mouth, or if contaminated food is consumed. Once in the stomach, the bacteria does not usually cause problems unless normal bowel bacteria is disturbed, which can happen when antibiotics are taken. Antimicrobial exposure is the major risk factor for the disease.¹⁸

There are two conditions usually necessary for the development of CDI: the acquisition and growth of *C. difficile* and the suppression of the normal flora of the colon, most commonly through broad spectrum antimicrobial exposure.¹⁹ Without the presence of normal bowel bacteria, *C. difficile* bacteria can start to grow and produce a toxin that can cause illness. *C. difficile* can cause mild diarrheal infections or life-threatening disease such as pseudomembranous colitis, toxic megacolon and on occasion, death. The incidence and severity of illness appear to be increasing-possibly the result of a new strain of *C. difficile*, that appears to produce greater amounts of toxins A and B, is resistant to fluoroquinolones, and is associated with higher rates of morbidity and mortality.^{20 21} Healthcare professionals should be aware of the changing epidemiology of this increasingly virulent pathogen and apply evidence-based principles for the diagnosis and treatment of *C. difficile* infection.

The transmission of *C. difficile* occurs due to inadequate hand hygiene and environmental cleaning. Proper infection prevention and control is achieved through meticulous hand hygiene and thorough and frequent cleaning of the patient environment.^{22 23}

Risk Factors

Like other illness, some individuals are at an increased risk for acquiring CDI. CDI can occur when²⁴:

- There is disruption of gut flora allowing *C.difficile* to proliferate;
- Individuals have a history of antibiotic use, bowel surgery and chemotherapy; are elderly, have serious underlying illness or debilitation, or are on proton pump inhibitor (PPI) therapy;
- There is exposure to *C. difficile* through prolonged hospitalization.

Re-infection can be the result of persistent spores from the same strain or from a different *C. difficile* strain that has been acquired from the environment. As many as half of all recurrences are caused by re-infection rather than by relapse. This suggests that re-exposure to *C. difficile* from other patients or from the environment is a major source of recurrent symptoms.

C. difficile is not new. *C. difficile* has been recognized as a cause of healthcare and community associated diarrhea for more than 30 years. However, recently there has been an appearance of an epidemic strain (NAP 1) of *C. difficile*. 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.²⁵ While the identification of the NAP 1 strain has resulted in a substantial increase in the severity of illness experienced in individuals infected with CDI and the number of outbreaks, the NAP 1, and other new virulent strains are transmitted by the same mechanisms as other *C. difficile* strains and therefore the infection prevention and control practices for this strain are the same as for other strains of *C. difficile*.

Appendix 4.2 C. difficile Algorithm



Available electronically at:

http://www.health.gov.on.ca/patient_safety/pro/CDI/toolkit_ricn/algorithm_20080722.pdf

Appendix 4.3 How is the epidemiology of hospital CDI outbreaks different from other hospital enteric outbreaks?

The majority of hospital and nursing home enteric outbreaks are caused by noroviruses. Noroviruses affect both residents and staff and are characterized by occurrence during the winter when community incidence of norovirus is also high. Indicators of a norovirus outbreak are the sudden onset of symptoms, a significant proportion of affected persons experiencing nausea and vomiting (higher in staff than patients/residents) as well as diarrhea, the greatest severity of symptoms is in the first 24 hours, and a usual duration of illness of 48-72 hours. During the first few days, outbreaks are usually explosive, with many residents becoming ill simultaneously.

Outbreaks of food-borne disease usually present either similarly to norovirus, or (if due to *Salmonella, Shigella, Campylobacter* or *E. coli*) as a cluster of ill patients occurring over several days (reflecting exposure to a single food item and incubation periods usually ranging from 2-7 days). Nausea and vomiting are uncommon. Cramps are very common, and bloody diarrhea may occur. Symptoms usually, but not invariably, improve whether or not antibiotic treatment is ordered. Staff and visitors may be ill if they are exposed to the same food items as patients/residents.

In contrast CDI, which usually occurs in patients who have recently had antibiotic therapy, may occur at any time of the year. CDI is very rarely associated with vomiting, usually begins with mild diarrhea, and progresses over several days to more severe disease. Symptoms will persist or worsen if appropriate antibiotic therapy is not started. Outbreaks progress more slowly (Allison McGeer, personal communication, September 3, 2008).

The causative organism/s of a cluster or and outbreak will inform the direction of the investigation.

Appendix 4.4 Canadian Nosocomial Infection Surveillance Program (CNISP)

Nosocomial-CDAD Surveillance Project

The Canadian Nosocomial Infection Surveillance Program (CNISP) conducted a six week prospective surveillance study called the Nosocomial-CDAD Surveillance Project in 1997.²⁶ This study examined the healthcare burden of *C. difficile* on Canadian hospitals to provide baseline rates to which other Canadian hospitals could compare. Hospitalized patients with diarrheal stools were tested for *C. difficile* toxin detection among those inpatients with diarrheal stools; 13% were caused by *C. difficile*. The mean number of N-CDAD cases was 5.9 cases/1000 patient admissions (0.66 cases/1000 patient days).

A portion of patients infected with CDI were examined with respect to morbidity, mortality and healthcare burden of N-CDAD in the same hospitals. Forty-one (15.2%) of the 269 patients died, 4 (1.5%) of these were directly related to CDAD.²⁷

Hospital Acquired CDI, CNISP, (HA-CDI) Study

CNISP conducted a follow-up study in 2004-2005, looking at the incidence and burden of illness of hospital acquired-CDI (HA-CDAD). Samples were collected from each patient to establish a large collection of Canadian isolates linked to the patients' clinical outcome. Older age groups were found to bear the brunt of disease with the mean age of CDAD cases of 70 ± 16 years. The mean CDAD rate for all hospitals was 4.5 per 1000 admissions compared to the previous 6 per 1000 admissions in the 1997 study. While the rate appeared to have decreased since 1997, there were more hospitals above the mean in this survey, compared to 1997 (some were 3-4 times the mean) with more deaths and other severe outcomes. Quebec was hit the hardest with 11.1 cases per 1000 admissions and Ontario followed with 5.7 per 1000 admissions. Cases with the NAP 1 strain were identified in all CNISP participating provinces.

The study also looked at case fatality rate or CFR (directly and indirectly related to *C.difficile*); the province of Quebec's rate was 14.9%. The overall case fatality rate was 5.6%, which was approximately 3.5 times higher than the 1997 rate. This increased rate was believed to be due to the NAP 1 strain (identified in Quebec). Deaths indirectly related to *C.difficile* in Ontario were at a rate of 3.2% with CFRs directly related to C. difficile infection was one to three times higher than the 1997 national average.

Analysis of the *C. difficile* isolates available (i.e. 1008 isolates out of 1430 adults with HA-CDAD) revealed 31 % of all isolates were NAP 1 and 28% were NAP 2 (i.e. the old 'J' strain), with the rest being a variety of strains (i.e. NAP 3, NAP 4, NAP 5, NAP 6 among others). Distribution of *C. difficile* NAP 1 in adults was found to be highest in Quebec with Ontario and Alberta closely following. Quebec had the highest incidence rates and the highest mortality.

In each hospital, roughly 70-75% of *C. difficile* patients were infected with the NAP 1 strain. When patients with severe CDAD (i.e. death and ICU admission or colectomy due to CDAD) were compared to patients without severe outcome, 12.5% of adults infected with the NAP 1 strain died and 5.9% of patients infected with other strains died. Adults infected with NAP 1 were twice as likely to die as compared to infections with other strains.

The study also found that age of the patient appears to impact patient outcome. The effect of the strain makes the greatest difference between the ages of 60-90 years, possibly related to the reduced immunity among the aged. On average, the strain type does not appear to be associated with severe outcomes in patients under 60 years of age. For patients over the age of 60, infection with NAP 1 is highly associated with severe outcomes (approximately three times the incidence). In the extreme elderly (i.e. those over 90 years of age) severe outcomes are frequent, regardless of the strain type.

The results of antibiotic susceptibility testing showed no resistance to metronidazole or vancomycin (and teicoplanin) used to treat the disease in vitro regardless of the strain. All of the isolates were found to be resistant to ciprofloxacin, cefuroxime, and cefotaxime.

Appendix 4.5 Liaison models between hospitals and health units

A number of health units and hospitals across the province are utilizing a liaison model to manage reportable diseases. Designated public health unit staff associated with one or more hospitals support the day-to-day disease follow-up and assist with outbreak management. Many health units and hospitals have found this to be beneficial for both parties.

Appendix 4.6 Information about infection prevention and control (IPAC) programs in hospitals

The goal in health care is to provide the best possible care in an environment that is safe for patients, staff and visitors. IPAC programs are both clinically and cost effective, providing significant cost savings because of fewer health careassociated infections, reduced length of hospital stay, decreased antibiotic resistance and treatment cost for infections. A properly resourced and effectively functioning IPAC program is essential to improving patient and health care provider safety.²⁸

Hospital senior administration is responsible for ensuring the infection prevention and control program in health care settings is adequately resourced and has the appropriate authority to implement the program. The implementation of the program should be a collaborative effort of the IPAC team, senior administration, nursing managers, environmental services, occupational health and safety, medical directors, central reprocessing and other departments in the facility, in order to effectively deliver the program.

The core functions of infection prevention and control focus on strategies to protect clients/patients/residents, staff and others from exposure to infections. These include²⁹:

- Management of critical data and information, including surveillance for nosocomial and other infections;
- Implementation of evidence-based practices, standards and guidelines through setting-specific policies and procedures;
- Direct interventions to prevent the transmission of infection, including outbreak prevention and control;
- Effective occupational health programs (including healthy workplace policies and immunization services);
- Education and training of health care providers, patients and their families;
- Communication of infection-related issues and relevant practices to leaders and staff to facilitate improvement; and
- Ongoing evaluation and continuous improvement of the IPAC program.

It is assumed that all hospitals currently have some type of IPAC program. Ongoing review of the entire facility, considering the strengths, weaknesses, opportunities and threats related to infection prevention and control practices can assist in prioritizing evolving needs of the program.

For further information, refer to the current PIDAC *Best Practices for Infection Prevention and Control Programs in Ontario in all Health Care Settings* document, accessible at: http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_ipcp_20080905.pdf

Appendix 4.7 Antibiotic Stewardship

Appropriate use of antimicrobials is an important component of patient safety, requiring careful oversight and guidance. Combining effective antimicrobial stewardship with a comprehensive infection control program has been shown to limit the emergence and transmission of antimicrobial-resistant bacteria and can reduce healthcare costs without adversely impacting quality of care. Summary conclusions from a recent Cochrane review of hospital antibiotic use indicated that up to 50% of antibiotic use in hospitals is inappropriate; 51/66 (77%) studies of interventions to improve antibiotic use in hospitals had positive results. Many different interventions have been successful. Programs instituted and managed in individual hospitals have been the most successful.

Reduced antibiotic use is clearly associated with lower individual risk of disease. Antibiotic management is an important component of outbreak management for *C. difficile*.

Antimicrobial stewardship involves limiting inappropriate use, optimizing antimicrobial selection, dosing, route, and the duration of therapy in an effort to maximize clinical cure or prevention of infection while limiting the unintended consequences, such as the emergence of resistance, adverse drug events, and costs.³⁰

The Infectious Diseases Society of America (IDSA)³¹ recommends:

- An antimicrobial stewardship team consisting of an infectious disease (ID) physician and clinical pharmacist as essential members; other team members that should be included: clinical microbiologist, infection control professional, and hospital epidemiologist;
- Conducting prospective auditing of antimicrobial use with direct interaction and feedback to the prescriber, performed by either an ID physician or a clinical pharmacist with ID training. It may also be beneficial to implement formulary restrictions and preauthorization requirements;
- Education to influence prescribing behaviour is essential, however is only marginally effective without the incorporation of active interventions;
- Developing evidence-based practice guidelines that incorporate local microbiology and resistance patterns;
- Utilizing antimicrobial order forms;
- Streamlining or de-escalation of empirical antimicrobial therapy on the basis of culture results can
 effectively target the causative pathogen, resulting in decreased antimicrobial exposure and substantial cost
 savings;
- Antimicrobial dose optimization based on individual patient characteristics, causative organism, site of
 infection, and pharmacokinetic and pharmacodynamic characteristics of the drug;
- A systematic plan for parenteral to oral conversion of antimicrobials with excellent bioavailabilty (provided the patients condition allows);
- Health care information technology in the form of electronic medical records and clinical decision support as a way to improve antimicrobial decisions. (Computer-based surveillance can facilitate good stewardship by more efficient targeting of antimicrobial interventions, tracking of antimicrobial resistance patterns, and identification of nosocomial infections and adverse drug events);
- Acknowledging the critical role the clinical microbiology laboratory plays by providing patient-specific culture and susceptibility data to optimize individual antimicrobial management and by assisting infection control efforts in the surveillance of resistant organisms and in the molecular epidemiologic investigation of outbreaks; and
- Acknowledging the usefulness of process measures (e.g. did the intervention result in the desired change in antimicrobial use?) and outcome measures (e.g. did the process implemented reduce or prevent resistance or other unintended consequences of antimicrobial use?) in determining the impact of antimicrobial stewardship on antimicrobial use and resistance patterns.

According to the IDSA, there is insufficient data to recommend routine use of:

- Antimicrobial cycling as a means of preventing or reducing antimicrobial resistance over a prolonged period of time; and
- Routine use of combination therapy to prevent the emergence of resistance.

Appendix 4.8 Data Elements for Public Reporting in WERS

Data Elements for Public Reporting on WERS

	User Input	Definition
Report Date:		Date reported to the MOHLTC (Month, Day, Year).
Facility Number:		Input the facility number.
Institution Number:		Input the site specific identifier.
Person Reporting, Title:		Name and title of the person reporting the data (e.g., Jane Doe, ICP).
Reporting Period:		Input the reporting period (Month, Year).
Number of new nosocomial cases of CDI:		 Input the number of new cases of CDI (i.e., the patient has not had CDI in the past 8 weeks) where: CDI was not present on admission (i.e., the onset of symptoms is >72 hours after admission) OR The infection was present on admission but related to a previous admission to the same facility within the last 4 weeks.
Number of new nosocomial cases of CDI associated with other health care facilities:		 Input the number of new cases of CDI where: CDI was present on admission OR With symptom onset <72 hours after admission AND The patient was exposed to any other health care facility (including LTC) within the last 4 weeks.
Number or new cases of CDI associated with a source other than a health care facility or unknown/indeterminate source:		 Input the number of new cases of CDI where: CDI was present on admission OR With symptom onset <72 hours after admission AND There was no exposure to any health care facility within the last 4 weeks OR The source of infection cannot be determined.
Total number of patient days for the hospital reporting period:		The number of patient days for the hospital for the month of reporting (or the average number for the last 3 months for which data is available), excluding NICU patient days.

Available electronically at: <u>http://www.health.gov.on.ca/patient_safety/pro/cdad/pro_resource/data_elements.pdf</u>

September 2009

Appendix 4.9 Sample line listing (adapted with permission from Waterloo Region Health Department)

Available electronically at: http://www.health.gov.on.ca/patient_safety/pro/cdad/pro_resource/sample_line_list.doc

OUTBREAK#: Date PHU notified:_____ Symptom onset date of index case: _____ PHU investigator name: Symptom onset date of last case: Patient/Resident data PHU investigator tel.#:_____ Fax #:_____

Staff data

Hospital Address:	
Contact Person:	

Hospital Name: _____

Contact tel. #: _____

Fax #: _____

Case Identification	า	Symptoms			Case Confirme	d By		Trea	Itment		Complications
Name	Admission Date	Date of Onset of First Symptom	Diarrhea (Y/N)	Pseudomembranous Colitis (sigmoid/colonoscopy)	Histopathology	Toxin Detection (Y/N), (A/B)	Meets Case Definition (Y/N)	Flagyl (Date Started) yy/mm/dd	Vancomycin (Date started) yy/mm/dd	Colectomy (Y/N)	Death (all cause mortality) yy/mm/dd
D.O.B: //// YY / MM / DD Unit: Sex:		// YY / MM / DD Date Resolved		Date of collection:	Date of collection:	Date of collection:				Toxic Megacolon (Y/N):	Date: □CDI = direct cause of death □CDI = contributing cause □CDI = unrelated to death □Relationship of CDI to death is unknown Other Complications:
Hospital File Number:	Interventions:	□Isolation □Educatio uip. □Other:	n	Risk Factors: □Abdo □Cher	ominal surgery notherapy	□Antacid/antiulcer □Proton pump inh	r medication	□Immunocomprom □Previous C diff inf	ised □Antimi fection □Other:	icrobial therapy	□Antibiotic use —
Case Identification	ı	Symptoms			Case Confirme	d By		Trea	itment		Complications
Case Identification	Admission Date	Symptoms Date of Onset of First Symptom	Diarrhea (Y/N)	Pseudomembranous Colitis (sigmoid/colonoscopy)	Case Confirme Histopathology	d By Toxin Detection (Y/N), (A/B)	Meets Case Definition (Y/N)	Trea Flagyl (Date Started) yy/mm/dd	tment Vancomycin (Date started) yy/mm/dd	Colectomy (Y/N)	Complications Death (all cause mortality) yy/mm/dd
Case Identification Name D.O.B: // YY / MM / DD Unit: Sex:	Admission Date	Symptoms Date of Onset of First Symptom	Diarrhea (Y/N)	Pseudomembranous Colitis (sigmoid/colonoscopy) Date of collection:	Case Confirme Histopathology Date of collection:	d By Toxin Detection (Y/N), (A/B) <u>Date of</u> <u>collection</u> :	Meets Case Definition (Y/N)	Trea Flagyl (Date Started) yy/mm/dd	tment Vancomycin (Date started) yy/mm/dd	Colectomy (Y/N) Toxic Megacolon (Y/N):	Complications Death (all cause mortality) yy/mm/dd Date: □CDI = direct cause of death □CDI = contributing cause □CDI = contributing cause □CDI = contributing cause □CDI = contributing cause □CDI to death is unknown Other Complications:

Appendix 4.10 Best Practice Audit Tool

Management of <i>Clostridium difficile</i> (CDI) in All Health (Care S	ettin	gs
SITE AUDITED			
DATE			
		OMPLET	
1. ACCOMMODATION	YES	NO	PARTIALL
All patients <i>suspected</i> of having CDI are placed in a single room with dedicated toilet facilities (i.e., private bathroom or individual commode chair).			
In some care settings where the number of cases exceeds single room capacity or practicality, it may not be possible to move every CDI patient to a single room. If a single room is not available, priority for accommodation should be:			
• Patients with <i>confirmed</i> CDI may be cohorted (under the direction of IPAC).			
Signage indicating the precautions is visibly displayed.			
A supply cart for PPE is easily accessible.			
A laundry hamper is placed as close to the patient's bed space as possible.			
A commode chair is dedicated for the patient's use if dedicated toilet facilities unavailable.			
2. CONTACT PRECAUTIONS	YES	NO	PARTIALL
Signage is on the door indicating Contact Precautions.			
Appropriate PPE (i.e., Gloves and gown are worn by all persons entering the room, and discarded properly).			
Gloves are worn for all contact with patient and environment and changed when moving from dirty to clean tasks.			
Equipment is dedicated (e.g., wheelchairs, lifts, scales, blood glucose metres, BP cuffs, thermometers).			
In the event that equipment must be shared, disinfection with approved for use hospital-grade disinfection occurs before use with another patient.			
Temperatures are not taken rectally.			
No special handling is used for trays, linen and waste for patients with C. difficile.			
All CDI cases are reviewed to ensure Contact Precautions are being used correctly.			
Commodes and bedpans are handled carefully. Commodes remain with patient, cleaned and disinfected by housekeeping staff. Disposable bedpans are recommended.			
3. HAND HYGIENE	YES	NO	PARTIALI
When a dedicated handwashing sink is immediately available, hands are washed with soap and water after glove removal.			
When a dedicated handwashing sink is not immediately available, hands are cleaned with alcohol-based rub after glove removal.			
Staff are not to use patient's sink to perform hand hygiene.			
Education is provided to the patient on the need and procedure to be used for hand hygiene.			



	110.0		
4. ENVIRONMENTAL CLEANING	YES	NO	PARTIALLY
All horizontal surfaces and items within the patient's reach are cleaned twice daily with hospital-grade disinfectent.			
Particular attention is paid to cleaning patient specific and "high touch" surfaces including bed rails, telephone, call bells, light switches, door handles, faucets, commodes and toilets.			
Items are deaned thoroughly from clean to dirty surfaces.			
Cleaning cloths and mop heads are changed frequently. Re-entry of used cloths into disinfectant solution is avoided.			
Disposable toilet brushes are used in the rooms of patients with CDI.			
All privacy, shower and window curtains are taken down and laundered for discharge/transfer cleaning.			
All disposable items including paper towels and toilet paper are thrown away for discharge/transfer cleaning.			
Contact Precautions remain in effect until proper discharge/transfer cleaning has taken place.			
When multiple cases or ongoing transmission of <i>C. difficile</i> is evident, use of hypochlorite-based product after hospital- grade disinfectant or other product with sporicidal claim (e.g., higher concentration accelerated hydrogen peroxide) is considered.			
A checklist is available for housekeeping / environmental services staff of cleaning protocols for C. difficile.			
Notification and scheduling of <i>C. difficile</i> cleaning of a specific patient room/isolation area is communicated with housekeeping/environmental staff.			
An audit tool is available to monitor the cleaning of areas where CDI is present.			
No special cleaning procedures are used for floor surfaces.			
5. PATIENT TRANSFERS	YES	NO	PARTIALLY
Both transportation services and the receiving department are notified that the patient is on Contact Precautions, prior to transfer.			
Notice of CDI is given to another unit or facility when transferring a patient with CDI.			
Infection Control is notified prior to transfer to enable appropriate accommodation, Contact Precautions and follow-up.			
Suspected or confirmed CDI does not preclude a patient from being transferred within the health care system, (i.e., to a LTCH), if the receiving facility is able to comply with requirements of accommodation.			
Staff accompanying a patient with CDI on transfer wear PPE and clean equipment used for the transfer (e.g., stretcher, bed, wheelchair) before use with another patient/resident.			
6. PATIENT DISCHARGE	YES	NO	PARTIALLY
Education is provided to the patient and family regarding good hand hygiene practices.			
7. DISCONTINUATION OF PRECAUTIONS FOR C. difficile	YES	NO	PARTIALLY
Contact Precautions are discontinued when the patient has had at least 48 hours without symptoms of diarrhea (e.g., formed normal stool for the individual).			
Contact Precautions are discontinued only under the direction of Infection Prevention & Control.			
Retesting for <i>C. difficile</i> is not used to determine the end of isolation.			
5			

September 2009

* Based on PIDAC Best Practices Reprinted with permission of the Regional Infection Control Networks.

Available electronically at: <u>http://www.health.gov.on.ca/patient_safety/pro/cdad/toolkit_ricn/audit_tool_20080725.pdf</u>

CHECKLIST	YES	NO
1. Were all dirty/used items removed?		
Suction container, etc.		
Disposable items		
2. Were the curtains removed before starting to clean if visibly soiled?		
3. Were clean cloths, mop, (all supplies) and solution used to clean the room?		
4. Did you fill one bucket of the disinfectant so it is the correct strength?		
5. Did you check to see if the mattress, pillows and chairs were not torn?		
If they were torn, did you report it to have them replaced?		
6. Were all cleaning cloths put into laundry or discarded after use?		
7. Did you use several cloths to clean a room?		
8. Did you always work from top to bottom?		
9. Did you clean all surfaces and allow for the appropriate contact time? (10 min.)		
Mattress		
Pillow		
BP cuff		
Bedrails and bed controls		
Call bell		
Stethoscope and column		
Flow metres		
Suction tube and outer container		
Pull cord in washroom		
Overbed table		
Inside drawers		
TV control		
Soap/alcohol-based hand rub dispensers		
Door handles		
Light switches		
Light cord		
Chair		

Appendix 4.11 Checklist for Discharge/Transfer Cleaning of All Rooms

	YES	NO
10. Did you clean the phone well?		
11. Were the following cleaned thoroughly before being used by another patient?		
Commodes/high toilet seat		
Wheelchairs		
Monitors		
IV poles		
12. If the sharps container was 2/3 full, was it replaced?		
13. Was the outer canister of the suction container and red tubing cleaned?		
14. Was all tape removed from the surfaces?		
15. Was the sheepskin washed between patients?		
16. Was the lift mesh or sheet washed between patients?		
ADDITIONAL ITEMS WHEN CLEANING A ROOM FOR A PATIENT OR ADDITIONAL PRECAUTIONS	YES	NO
1. Were the curtains removed before starting to clean the room that was used for additional precautions?		
2. Was the glove box discarded?		
3. Were the following discarded?		
Patient's bar soap		
Toilet paper		
4. Was the sharps container replaced?		

NOTE: Avoid stockpiling items in the room in order to prevent wastage.

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Available electronically at: http://www.health.gov.on.ca/patient_safety/pro/cdad/toolkit_ricn/clist_rooms.pdf





Reproduced with permission from "*Just Clean Your Hands*", Ontario's hand hygiene program for hospitals.⁶ Available online at: <u>http://www.justcleanyourhands.ca/pdf/10_1_4_moment_poster_Eng.pdf</u>.

Appendix 4.13 Lab Contact List

Most up to date version can be found on the website at http://www.health.gov.on.ca/english/providers/pub/labs/specimen.html

Central Public Health Laborator Address:	ry, Toronto				
Ontario Agency for Health Protect Ontario Public Health Laboratories	81 F Toronto	esources Road ON M9P 3T1			
OPHL HELPLINE (Monday to Fr AFTER HOURS EMERGENCY I	Tel: 1 Tel:	Tel: 1-800-640-7221 Tel: 416-605-3113			
Hours of Operation	Monday to Friday	8:00	AM – 5:00 PM		
Location/Po	sition	Telephone #	Fax #		
Manager, Direct Services		416-235-5941	416-235-6063		
Kits and Supplies Order Desk		416-235-5937	416-235-5753		
Medical Microbiologist, Clinical a Microbiology Office	nd Environmental	416-235-5712	416-235-5951		
Manager, Clinical and Environmen	ntal Microbiology	416-235-5988	416-235-5951		
Head, Enteric, Environmental, Mo STI	lecular Surveillance and	416-235-5707	416-235-5951		
Head Technologist, Enteric		416-235-6377	416-235-5951		
Head Technologist, Environmenta	l Microbiology	416-235-5718	416-235-5951		
Head Technologist, Parasitology L	aboratory	416-235-5722	416-235-6088		
Head Technologist, Molecular Dia	gnostics	416-235-5866	416-235-5951		
Medical Microbiologist, Clinical V	irology	416-235-5725	416-235-5800		
Manager, Clinical Virology		416-235-5723	416-235-5800		
Head Technologist, Virus Detectio	n	416-235-5730	416-235-6334		

Note: Most recent version of the Guide is available on www.oahpp.ca

Ontario Agency for Health Protection and Promotion 2008 Laboratory Guide for Gastroenteritis Outbreaks - Communication

Ontario Public Health Laboratories Page 3

Regional Public Health Laboratories

Hours of Operatio	on Monday to Friday	8:00	8:00 AM - 5:00 PM		
Regio	nal Public Health Laboratories	Telephone #	Fax #		
Hamilton	250 Fennell Avenue West, P.O. Box 2100 Hamilton ON L8N 3R5	905-385-5379	905-385-0083		
Kingston	181 Barrie Street, P.O. Box 240 Kingston ON K7L 4V8	613-548-6630	613 547-1185		
London	St. Joseph's Regional Mental Health Centre 850 Highbury Avenue, 5 th Floor, P.O. Box 5704, Postal Station 'A' London ON N6A 4L6	519-455-9310	519-455-3363		
Orillia	750 Memorial Avenue, P.O. Box 600 Orillia ON L3V 6K5	705-325-7449	705-329-6001		
Ottawa	2380 St. Laurent Blvd. Ottawa ON K1G 6C4	613-736-6800	613-736-6820		
Peterborough	99 Hospital Drive, P.O. Box 265, Peterborough ON K9J 6Y8	705-743-6811	705-745-1257		
Sault Ste. Marie	160 McDougall Street, P.O. Box 220, Sault Ste. Marie ON P6A 5L6	705-254-7132	705-945-6873		
Sudbury	1300 Paris Street, Suite 2 Sudbury ON P3E 6H3	705-564-6917	705-564-6918		
Thunder Bay	336 South Syndicate Avenue Thunder Bay ON P7E 1E3	807-622-6449	807-622-5423		
Timmins	67 Wilson Avenue Timmins ON P4N 2S5	705-267-6633	705-360-2006		
Windsor	3400 Huron Church Road, P.O. Box 1616 Windsor ON N9A 6S2	519-969-4341	519-973-1481		

Note: Most recent version of the Guide is available on www.oahpp.ca

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Direct weblink:

http://www.health.gov.on.ca/english/providers/pub/labs/specimen_guide/gastro_full_20080301.pdf

Appendix 4.14 Labstract: Clostridium difficile toxin testing-Specimen Acceptance Criteria

Onta	rio Public Health Laboratories
	August 200
Clos	stridium difficile toxin testing - Specimen Acceptance Criteria
To H	ealth Care Providers
C. di asso of no	fficile is a known cause of pseudomembranous colitis and antibiotic- ciated diarrhea (AAD). This organism has also proven to be a leading cause socomial diarrhea in hospitals and nursing homes.
The f spec Rout Onta testir	ollowing guidelines outline the procedures to be followed when submitting imens to be tested for <i>C. difficile</i> toxin A/B by enzyme immunoassay. ine toxin testing does not confirm if the strain is NAP1/O27. Note that the rio Public Health Laboratories do not routinely perform <i>C. difficile</i> toxin ng on weekends and holidays.
1) C p •	 hoose specimens from patients with diarrhea or with symptoms of seudomembranous colitis who are more than 12 months old. Faeces should be loose / watery enough to conform to the shape of the container. Formed faeces specimens will be rejected unless the requisitior indicates the patient may have pseudomembranous colitis. <i>C. difficile</i> toxin testing will not be performed on infants less than 12 months old, as this group has been shown to be asymptomatic carriers with colonization rates as high as 50%.
2) C c	ollect a maximum of three specimens with 18-24 hour intervals in between ollection. If two or more specimens are collected on the same day, only one will be tested and reported.
3) C •	ollect at least 3 to 5 ml of faeces. Rectal swabs are not an acceptable alternative and will not be tested for toxin.
4) T •	ighten cap to prevent leakage. Leaking specimens will be rejected.

Clostridium difficile toxin testing - Specimen Acceptance Criteria (continued)
 5) Transport the specimen to the laboratory as soon as possible. Refrigerated specimens must be received within 72 hours of collection during normal business hours. If the timeframe cannot be met, freeze the specimen and indicate the date frozen on the requisition. Unfrozen specimens more than 72 hours old will be rejected.
 6) C. difficile toxin testing is not reliable as a test of cure. Toxin may be detected long after clinical symptoms have resolved. Specimens from previously positive patients who are asymptomatic after completion of therapy will not be tested. Specimens from patients who are persistently symptomatic in spite of therapy (refractory disease) may be submitted for testing 4 weeks after a previously positive test.
For surveillance / outbreak related investigations of strain type or antibiotic susceptibility patterns of <i>C. difficile</i> , contact the Medical Microbiologist, Dr. Dylan Pillai at 416-235-6548.
For Further Information:
 Contact the Enteric Laboratory at 416-235-5938 or your local Public Health Laboratory
 Call the OPHL HELPLINE 1-800-640-7221
 Specimen Collection Guide www.health.gov.on.ca/english/providers/pub/labs/specimen.html
 Ministry website at <u>www.Health.gov.on.ca</u>
Ontario

Clostridium difficile toxin testing - Specimen Acceptance Criteria LAB-SD-002-002

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Available electronically <u>http://www.oahpp.ca/publichealthlabstracts.php</u> Direct weblink to this labstract:

http://www.health.gov.on.ca/english/providers/pub/labs/labstracts/cdiff_LAB-SD-002-002.pdf

Appendix 4.15 Labstract: *Clostridium difficile*- Specimen Acceptance and Testing During Outbreaks

Ontario Public Health Laboratories	
	November 200
Clostridium difficile - Specimen Acceptance and Testing During	Outbreaks
To Health Care Providers	
On September 1, 2008, Clostridium difficile associated d butbreaks and outbreak-associated cases in hospitals be changes to regulations under the <i>Health Protection and I</i> Public hospitals (as defined under the <i>Public Hospitals A</i> report outbreaks of CDAD and outbreak-associated case officer of health when the established provincial definition met in their facility.	lisease (CDAD) ecame reportable as per <i>Promotion Act</i> (HPPA). Act- PHA) are required to es to their local medical n for a CDAD outbreak is
If a public hospital has identified a CDAD cluster, or decl unpreserved faeces (no greater than 72 hrs old) or fresh accepted for the following specialized testing:	lared a CDAD outbreak, -frozen faeces will be
 During working hours, consult with the Medical Micro at 416-235-6548 to determine appropriate testing. If testing is approved then send unpreserved faeces i or fresh-frozen faeces directly to the Toronto Public H If an outbreak has been declared, indicate the outbre requisition. 	biologist, Dr Dylan Pillai no more than 72 hrs old Health Laboratory eak number on the
 The following specialized tests are available for outbreak nvestigations: Culture and typing of <i>C. difficile</i> strain by pulse field g NAP 1 strain refers to North American pulsotype 1) Antibiotic susceptibility testing, including metronidaze Specialized toxin typing by polymerase chain reaction elaborated by the "hyper virulent" NAP 1 strain) 	k or cluster gel electrophoresis (eg. ble and vancomycin n (includes binary toxin
Results are typically available within seven working days the Toronto Public Health Laboratory. Please continue t aboratory for routine CDAD toxin testing.	s of specimen receipt at to use your preferred

0	difficilo (Phoeimon	Accontance	and ⁻	Tecting During	Outbrooke	(continued)
υ.	uninclie – 3	specimen	Acceptance	anu	resung Duning	Outpreaks	(conunueu)

Specimen storage

All laboratories which perform routine toxin testing are encouraged to maintain faeces that are *C. difficile* toxin-positive at -20°C for a minimum of two months to enable retrospective typing should the need arise. Approximately 5 ml of well mixed liquid faeces is required. Specimens can be stored in the enteric outbreak white cap container (item L-5034) to optimize storage space.

For Further Information:

- Contact the Enteric Department at the Toronto Public Health Laboratories at 416-235-6377
- After hours, approval for specialized testing should be directed to the Medical Microbiologist on call by phoning the OPHL help line at 1-800-640-7221

	Ontario
C. difficile – Specimen Acceptance and Testing During Outbreaks	Page 2 of 2

Available electronically <u>http://www.oahpp.ca/publichealthlabstracts.php</u> Direct weblink to this labstract:

http://www.health.gov.on.ca/english/providers/pub/labs/labstracts/cdiff_specimen_LAB-SD-045-000.pdf

Appendix 4.16 Testing Guidelines

Testing Guidelines

4.4

Disease / Syndrome / Causal Agent / Test	Test Code	Specimens	Collection Kit	Test Available	Section	TAT Negative Results Reported	TAT Positive or Confirmatory Results Reported	Notes
	1	1	1	Bacterial A	Agents	1		1
Diarrhoea, Antibiotic Associated Clostridium difficile (Pseudomembrane ous colitis)	B03	Faeces 5–10 ml of diarrhoeal faeces	TB / CD (90 ml sterile container)	Toxin detection	Enteric	1 day	1 day	Refer to Labstract LAB- SD-002 Clostridium difficile Toxin Testing – Specimen Acceptance Criteria

Direct weblink to the Laboratory Guidelines for Gastroenteritis outbreaks, Public Health Laboratories Branch, OAHPP, March 2008 (see p. 14)

http://www.health.gov.on.ca/english/providers/pub/labs/specimen_guide/gastro_full_20080301.pdf

Appendix 4.17 Public Health Laboratories Clostridium difficile Kit

CI	LOSTRIDIUM DIFFICILE KIT
Inst	ructions for the use of the CB kit for the collection and transportation of clinical specimens for CLOSTRIDIUM DIFFICILE.
The	CD kit consists of: one 90 mL sterile container, one wooden stick, one biohazard bag, and a Public Health Laboratory (PHL) Requisition.
SPE	CIMEN COLLECTION
1.	Open the biohazard bag and remove the sterile container.
2.	Collect specimen directly into container, or transfer from bedpan or plastic wrap stretched over toilet bowl using wooden stick. Specimen should be 3 - 5 mL of diarrhoeal stool. Dry or formed stool is unacceptable. Multiple specimens should be collected at least one day apart.
3.	Recap the specimen container tightly.
4.	Label specimen container with patient's Full Name and a second unique identifier (e.g. accession number, date of birth, Health Card number). Note: Specimens received not including the patient's full name and a second identifier will not be processed by the laboratory.
5.	Place the specimen in the biohazard bag and seal the bag.
6.	Complete the enclosed data sheet including the patient's full name, date of birth, Health Card number, PHL test code B03 or test requested, source of specimen, collection date, and clinical diagnosis/symptoms/onset date. The name, telephone number and complete address of the health care requester must also be provided.
7.	Insert the data sheet in the pocket on the outside of the biohazard bag. Do not place data sheet inside the bag with the specimen.
STO refri	DRAGE AND TRANSPORT - Transport collected specimen to the Laboratory as soon as possible. If unable to transport same day, store under geration until it can be transported. Specimens should be transported within 3 days; otherwise, specimen must be frozen and shipped on ice.
To o	order kits - MOHLTC order desk, @ telephone: 416-235-5937 or order fax: 416-235-5753. - For information regarding the kits call the order desk at 416-235-5937 or the local Public Health Laboratory
F-SI	Rev. March, 2008

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Supplies - Kit Instruction Sheets – Clostridium difficile Note: Most recent version of the Guide is available on www.oahpp.ca

Direct weblink to the Specimen Collection Guide (see p. 126):

http://www.health.gov.on.ca/english/providers/pub/labs/specimen_guide/full_guide_specimen_collection.p df



Appendix 4.18 Access to Infection Control Resource Teams

Available electronically at:

http://www.health.gov.on.ca/patient_safety/pro/cdad/pro_resource/icrt_20081031.pdf

5.0 List of Resources

Bartlett, J.G. The Case for Vancomycin as the Preferred Drug for Treatment of *Clostridium difficile* Infection, CID 2008:46 (15 May) p. 1489-1492.

Dellit, T.H., Owens, R.C, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines for Developing Institutional Program to Enhance Antimicrobial Stewardship CID 2007:44 (15 January) p. 159-177

Ministry of Health and Long-Term Care, Just Clean Your Hands Program <u>http://www.justcleanyourhands.ca/</u>

Ontario Agency for Health Protection and Promotion: Labstracts <u>http://www.oahpp.ca/publichealthlabstracts.php</u>

Public Health Laboratories, Labstract, Ontario Agency for Health and Protection and Promotion. *Clostridium difficile* toxin testing, Specimen Acceptance Criteria, August, 2008 http://www.health.gov.on.ca/english/providers/pub/labs/labstracts/cdiff_LAB-SD-002-002.pdf

Public Health Laboratories, Labstract, Ontario Agency for Health and Protection and Promotion *Clostridium difficile*- Specimen Acceptance and Testing During Outbreaks, November 2008 http://www.health.gov.on.ca/english/providers/pub/labs/labstracts/cdiff specimen LAB-SD-045-000.pdf

Public Health Laboratories, Ontario Agency for Health Protection and Promotion. Specimen Collection Guide, (refer to pg. 14 for diarrhea, antibiotic associated) http://www.health.gov.on.ca/english/providers/pub/labs/specimen_guide/gastro_full_20080301.pdf

Public Health Laboratories, Ontario Agency for Health Protection and Promotion, Laboratory Guide for Gastroenteritis Outbreaks, March 2008 http://www.health.gov.on.ca/english/providers/pub/labs/specimen_guide/gastro_full_20080301.pdf

Pepin, J. Vancomycin for the Treatment of *Clostridium difficile* Infection: For Whom is This Expensive Bullet Really Magic? CID 2008: 46 (15 May) p. 1493- 1498.

PIDAC, Best Practices for Infection Prevention and Control Programs in Ontario, in All Healthcare Settings, published September 2008.

http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_ipcp_20080905.pdf

PIDAC, Fact Sheet for Medical Professionals- *C.difficile* http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/fs_CDIff_pro.pdf

PIDAC, Hand Hygiene Fact Sheet for Health Care Settings http://www.health.gov.on.ca/english/providers/program/infectious/pidac/fact_sheet/fs_handwash_010107.pdf

PIDAC, Best Practices for Hand Hygiene in All Healthcare Settings, revised January 2009 http://www.health.gov.on.ca/english/providers/program/infectious/diseases/best_prac/bp_hh_20080501.pdf

PIDAC, Best Practice Manual, Surveillance of Health Care-Associated Infections in Patient and Resident Populations

http://www.health.gov.on.ca/english/providers/program/infectious/diseases/ic_hai.html

OHA Videoconferences

Hand Hygiene Training

http://oha.mediasite.com/oha/Viewer/Viewers/Viewer240TL.aspx?mode=Default&peid=2dbf0944-2d09-4bf0-94ad-f3c3d9b47324&pid=79674a96-fa5c-4dc0-abc3-340fd4039053&playerType=WM7#

Best Practices for Hand Hygiene in All Health Care Settings - June 10, 2008 <u>http://oha.mediasite.com/oha/Viewer/Viewers/Viewer240TL.aspx?mode=Default&peid=611f3821-be5f-481e-b22b-295f70f7b353&pid=57feeae7-bdbd-4eb2-98dd-8280b10c4e7a&playerType=WM7</u>

Ministry Update on *C. difficile* and Public Reporting - June 26, 2008 <u>http://oha.mediasite.com/oha/Viewer/Viewers/Viewer240TL.aspx?mode=Default&peid=82e8df95-ee15-4bfc-bc16-bae35c4b08ae&pid=c8d16239-0090-4457-9d6b-6ac14794009c&playerType=WM7</u>

Link to question and answer document for above event:

http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Patient+Safety+Indicators/\$file/CD I_QA. June <u>26</u> videoconference.pdf

Best Practices for Surveillance of Health-Care Associated Infections in Patient and Resident Populations, August 7, 2008

http://oha.mediasite.com/oha/Viewer/Viewers/Viewer240TL.aspx?mode=Default&peid=a4df29d3-7cfc-450a-8a56-bdae87171769&pid=cf7f2319-2153-40dc-8a52-fb6f9c3a4109&playerType=WM7

Update on *C. difficile* Public Reporting, August 19, 2008 <u>http://oha.mediasite.com/oha/Viewer/Viewers/Viewer240TL.aspx?mode=Default&peid=8d8dafc3-8c9f-4ffb-a481-862497798251&pid=4a141d56-c0d8-4a0e-9418-33d9627a6381&playerType=WM7#</u>

Regional Infection Control Networks http://www.health.gov.on.ca/english/providers/project/ohp/ricn_mn.html

6.0 End Notes

¹ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009, pg. 9.

² PIDAC- Best Practices for Hand Hygiene in All Healthcare Settings, revised January 2009 http://health.gov.on.ca/english/providers/infectious/diseases/ic_hh.html, pg. 10 & 11.

³ Elliott B, Chang BJ, Golledge CL, Riley TV. *Clostridium difficile*-associated diarrhoea. Intern.Med.J. 2007 Aug;37(8):561-568

⁴ Siemann M, Koch-Dorfler M, Rabenhorst G. *Clostridium difficile* associated diseases. The clinical courses of 18 fatal cases. Intensive Care Med. 2000; 26:416–21.

⁵ McDonald, L.C, Owings, M., and Jernigan, D.B. (March 2006). *Clostridium difficile* Infection in Patients Discharged from US Short-stay Hospitals, 1996–2003 http://www.cdc.gov/ncidod/EID/vol12no03/pdfs/05-1064.pdf

⁶ Valiquette, L., Low, D.E., Pépin, J., McGeer, A. *Clostridium difficile* infection in hospitals: a brewing storm. CMAJ • JULY 6, 2004; 171 (1)

⁷ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009.

⁸ APIC Elimination Guide: Guide to the Elimination of *Clostridium difficile* in Healthcare Settings, 2008.

⁹ Miller, M. (August 23, 2007). International Infection Control Council Global Consensus Conference, Infection Prevention and Control Practice, *Clostridium difficile* Associated Diarrhea (CDI) - "Epidemiology of N-CDI among adults in Canadian hospitals in the CNISP/CHEC program: Patient characteristics, strain characterization, and correlation with severe disease and death." P.51.

¹⁰ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009, pg. 11.

¹¹ Labstract, Ontario Public Health Laboratories Branch, OHAPP, August 2008. *Clostridium difficile* toxin testing acceptance criteria.

¹² PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009, pg. 10 & 11.

¹³ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009.

¹⁴ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009, pg. 12.

¹⁵ Mayfield JL, Leet T, Miller J, Mundy LM. Environmental control to reduce transmission of *Clostridium difficile*. Clin Infect Dis 2000; 31(4):995-1000.

¹⁶ PIDAC Best Practice Document for the Management of *Clostridium difficile* in all health care settings, revised January 2009, pg. 18

¹⁷ McFarland, L.V., Beneda, H.W. et al Implications of the changing face of *Clostridium difficile* disease for health care practitioners. AIJC, vol 35. No.4, pg. 237-253.

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