# *C. difficile* Infection (CDI) Protocol

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Alberta Health Services
Infection Prevention & Control

# Contents

INTRODUCTION....4
GOAL....4
OBJECTIVES....4
METHODOLOGY....5
Patient population....5
CASE DEFINITION....5
Symptomatic (symptoms related to CDI)....6
Insufficient information....6
For Information records (these are not primary records)....6
Inclusion criteria....6
Exclusion criteria....7
CASE CLASSIFICATION....7
Hospital-acquired....7
Healthcare-associated....8
Community-acquired....8
Other considerations for classification – delayed testing....8
DATA COLLECTION AND DATA ENTRY....9
Mandatory data entry....9
Minimum case information....9
Other considerations for data entry....9
Adverse outcomes....9
DENOMINATOR DATA....10
RATE CALCULATIONS....11
COMPARATOR RATES....11
REPORTING....11
DATA QUALITY....11
PROTOCOL REVISION HISTORY....12
REFERENCES....15
APPENDIX A: CDI PROTOCOL-SPECIFIC DEFINITIONS....16
APPENDIX B: GENERAL SURVEILLANCE DEFINITIONS....17
APPENDIX C: CDI SURVEILLANCE PRIMARY CASE ALGORITHM....19
APPENDIX D: CDI SURVEILLANCE CASE CLASSIFICATION ALGORITHM....20
APPENDIX E: TOOLS FOR SHARING INFORMATION WITH INFECTION CONTROL PHYSICIANS (OPTIONAL USE)....21

# Introduction

*Clostridioides difficile*, or *Clostridium difficile (C. difficile),* is a gram-positive spore forming bacteria that is often associated with healthcare infections and outbreaks (Public Health Agency of Canada, 2024). Although the most common clinical manifestation of *C. difficile* Infection (CDI) is diarrhea, the disease can vary in severity, ranging from mild symptoms to pseudomembranous colitis and toxic megacolon. In some cases, potentially fatal complications such as pseudomembranous colitis or toxic megacolon may occur without diarrhea, but instead present with signs of acute abdomen (e.g., distension, complaints of abdominal pain, tenderness on palpation).

*C. difficile and its spores* can be spread from patient to patient via the hands of healthcare workers or through contact with contaminated equipment or other surfaces.

CDI often occurs as a result of three critical events:

1. The disruption of the normal colonic flora, by antimicrobial agents, antineoplastic agents or proton pump inhibitors.
2. An exposure to toxigenic strains of *C. difficile* and the presence of one or more host factors that increase their susceptibility to any hospital-acquired infection such as advanced age.
3. Severe underlying illnesses and length of hospital stay.

In conjunction with the *C. difficile* Infection surveillance protocol, there are six supporting documents to assist in the interpretation and practical use of this protocol:

- Protocol-specific definitions and General surveillance definitions (Appendix A and Appendix B)
- CDI surveillance Primary case algorithm (Appendix C)
- Case classification algorithm (Appendix D)
- Collection tool for sharing information with physicians (Appendix E)
- CDI User Guide (Alberta Health Services [AHS], 2018).

# Goal

To decrease hospital-acquired and healthcare-associated CDI in Alberta Health Services (AHS) and Covenant Health facilities.

# Objectives

1. To determine the incidence of recognized hospital-acquired, healthcare-associated and community-acquired CDI in the population under surveillance in AHS and Covenant Health facilities.
2. To use surveillance results to develop and evaluate Infection Prevention and Control (IPC) interventions which support safer patient care.
3. To establish quarterly and annual CDI incidence rates for trend analysis over time and to compare with internal and external benchmarks.
4. To detect outbreaks and clusters of disease within and across health zones and sites.
5. To describe secular trends and disease patterns, including morbidity and mortality.

# Methodology

Cases eligible for surveillance are inpatients with either laboratory confirmed *C. difficile,* physician diagnosis of pseudomembranes on endoscopy (sigmoidoscopy or colonoscopy), histological/pathological diagnosis of CDI or physician diagnosis of toxic megacolon (symptomatic).

Reports of specimens originating from facilities under surveillance will be forwarded by laboratories to facility-based IPC programs or designates. Confirmation must be obtained at the reporting facility where the patient is an inpatient, except in the case of direct patient transfers within provincial facilities under surveillance, where acquisition is being attributed to the sending facility.

Facility infection control professionals (ICPs) receiving *C. difficile* laboratory reports will determine if cases meet Primary CDI case definition, case classify as hospital-acquired, healthcare-associated or community-acquired, and compile and record at least the minimum case information. Data from completed CDI surveillance will be entered into the provincial surveillance data management system.

## Patient population

All individuals admitted to AHS and Covenant Health acute and acute tertiary rehabilitation care facilities, where inpatient care is provided 24 hours/day, 7 days a week, who are ≥ 1 year of age. Acute and acute tertiary rehabilitation facilities will be referred to as the "facilities under surveillance" in this protocol for simplicity. Please refer to Appendix B: General surveillance definitions (Encounter Types) for facilities that would be included under this term.

# Case definition

**A primary CDI case meets either 1, 2, or 3.**

1. Lab confirmed positive toxin assay or positive polymerase chain reaction (PCR) for *C. difficile* test (by toxin gene(s).

**AND**

Meets either **symptomatic** or **insufficient Information** definitions below at the time of admission or during hospitalization.

2. Physician diagnosis of pseudomembranes on endoscopy (sigmoidoscopy or colonoscopy) or histological/pathological diagnosis of CDI (Primary, Symptomatic).
3. Diagnosed with toxic megacolon (Primary, Symptomatic).

NOTE: Documentation of antibiotic treatment of CDI cannot be used as a proxy for physician diagnosis or symptom documentation. Also, the use of stool softeners/laxatives/enemas by a patient does not alter the case definition for CDI and cannot be used as a reason to discount CDI as the cause of diarrhea.


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## Symptomatic (symptoms related to CDI)

Laboratory confirmation of a positive toxin assay or positive polymerase chain reaction (PCR) for *C. difficile* toxin gene(s) in addition to at least one of the following – see Appendix A for examples of positive tests:

- Diarrhea – see Appendix A defined as **one of the following**:

1. Six or more watery/unformed stools in a 36-hour period
2. Three or more watery/unformed stools in a 24-hour period and this is new or unusual for the patient
3. Patients with ostomy bags will be assessed on an individual basis
    - For example: Increased output
4. Fever and abdominal pain **or** fever and ileus.

## Insufficient information

If the patient's medical record (e.g. the patient chart) lacks detailed documentation on the frequency and consistency of stools, **a positive *C. difficile* test will still be considered a case**, but there must be a strong suspicion that the case meets definition, if it had been charted completely and consistently**.** This applies when there is some documentation of symptoms, such as the patient reporting diarrhea, but details regarding the frequency or consistency of loose stools are missing or inconsistently recorded. Information can be gathered through discussions with frontline staff, review of physician notes, and other documentation indicating that the patient was symptomatic even though the charting was incomplete.

## For Information records (these are not primary records)

These **For Info** cases are recorded as *Symptomatic, Insufficient Info or Symptoms Not Meeting Definition*:

- An inpatient CDI case that occurs ≤ 8 weeks after a Primary CDI case (optional data entry)

**OR**

- A positive *C. difficile* test from an outpatient, community or continuing care facility test location (optional data entry)

**OR**

- For an inpatient positive *C. difficile* test – if after review of patient's healthcare record and discussions with frontline staff, the information about the frequency and consistency of stools is determined to be accurate and complete at the time of testing and symptoms do not meet CDI case definition, a positive *C. difficile* test is entered as For Info, Symptoms Not Meeting Definition (mandatory data entry).

## Inclusion criteria

- For patients with multiple *C. difficile* tests, a positive *C. difficile* test performed while the patient is hospitalized is eligible to be considered for a primary CDI case every 8 weeks, provided symptoms had resolved.
- Patients (>1 year of age) admitted at the time of a positive *C. difficile test*., includes patients who are discharged from an AHS/Covenant Health facility prior to their test results being received but the laboratory specimen was collected during admission.
- Positive *C. difficile* tests collected on patients who were admitted at the time of specimen collection, or those who were subsequently admitted as an inpatient directly following an emergency department/urgent care centre visit where the specimen was collected, will be used to determine

whether a case qualifies as a Primary CDI. This also includes patients transferred directly from one facility's emergency department to another, as long as the patient was subsequently admitted as an inpatient to the transferred facility (continuation of care).

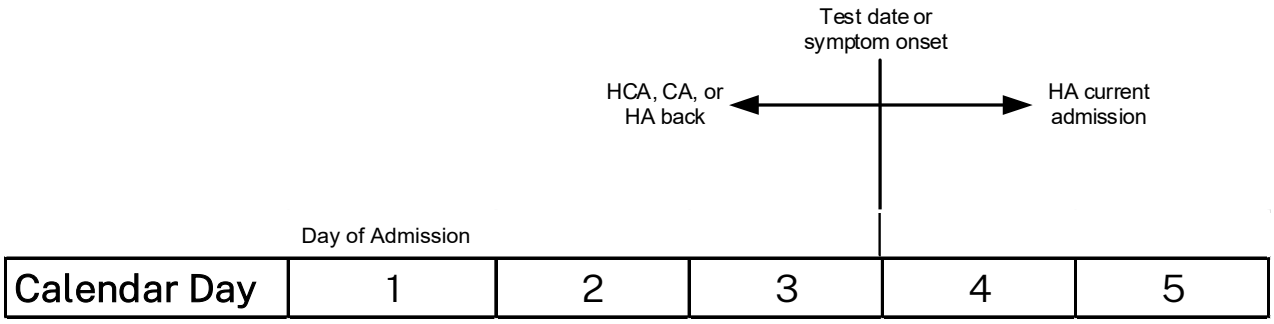
### Exclusion criteria

- Patients who met CDI case definition will be excluded as surveillance cases if they have had a primary CDI case in the last 8 weeks.
- Patients with laboratory confirmed *C. difficile* test who were not admitted at the time of specimen collection or were not subsequently admitted as an inpatient following their emergency department visit are not eligible to be a primary case.
- Patients with laboratory confirmed *C. difficile* test who were admitted at the time of specimen collection but did not have diarrhea (that met case definition – see Appendix A or other conditions that met Symptomatic case definition.

# Case classification

Since patients can have more than one primary CDI, the case classification of each *C. difficile* positive that meets case definitions to be a primary CDI case is independent of any previous positive *C. difficile* tests or primary CDI cases – e.g., a hospital-acquired case classification for a primary CDI case cannot be ruled out due to the presence of a prior positive *C. difficile* test or primary CDI case (see Appendix D.)

### Hospital-acquired



For a Primary, Symptomatic case:

- The patient's symptoms meeting CDI case definition occur in your hospital on or after the 4th calendar day of admission

**OR**

- A patient is readmitted to an AHS/Covenant Health facility under surveillance within 4 weeks of discharge from a facility where the admission was at least 4 calendar days

**AND**

- The patient's symptoms meeting CDI case definition occur in your hospital prior to the 4th calendar day of readmission.

For a Primary, Insufficient Info case:

- The positive *C. difficile* test date is on or after the 4th calendar day of admission

**OR**

- A patient is readmitted to an AHS/Covenant Health facility under surveillance within 4 weeks of discharge from a facility where the admission was at least 4 calendar days

**AND**

- The positive C. difficile test date is prior to the 4th calendar day of readmission.

NOTE: The primary CDI case is attributed to the AHS/Covenant Health facility under surveillance where patient was previously admitted if there are no other healthcare encounters (i.e. Continuing Care Home Type A resident or dialysis) between the hospitalizations.

## Healthcare-associated

- Does not meet the criteria for hospital-acquired

**AND**

- A resident of a Continuing Care Home Type A in the past 4 weeks (see Appendix B)

**OR**

- A patient with chronic renal insufficiency requiring dialysis (either hemodialysis or peritoneal dialysis)

**OR**

- There is one or multiple admissions in an AHS/Covenant Health facility under surveillance within the past 4 weeks with the most recent admission being <4 calendar days.

## Community-acquired

Any Primary CDI case not meeting the criteria for the hospital-acquired or healthcare-associated will be considered community-acquired.

## Other considerations for classification – delayed testing

To use the community-acquired, healthcare-associated, or "hospital-acquired to previous admission" (See "CDI protocol for attributing HA CDI to previous admission" located here: COMMON>Surveillance>Surv

Protocols>Additional Info) case classification in cases where *C. difficile* test is ≥ 4 calendar days after admission, the patient's symptoms meeting CDI case definition must have been present within 4 calendar days of admission and have been ongoing until the *C. difficile* test date.

# Data collection and data entry

## Mandatory data entry

All mandatory cases are recorded in the provincial surveillance platform. Only Primary CDI cases are counted for surveillance. Mandatory data entry includes:

- All *Primary (Symptomatic* or *Insufficient Info)* cases
- Inpatient positive *C. difficile* test classified as *Symptoms Not Meeting Definition* that occurs > 8 weeks from a Primary case must be entered as a **For Info.**

## Minimum case information

Basic demographic, facility and microbiological data will be collected on all Primary cases and must include:

- Name (first, middle, last)
- Date of birth
- Gender
- Alberta Personal Healthcare Number (PHN) or Unique Lifetime Identifier (ULI)
- Connect Care Medical Record Number (MRN)
- Record Type (Primary or For Info), Symptom Status (Symptomatic, Insufficient Info, or Symptoms Not Meeting Definition) and case classification (i.e., hospital-acquired, healthcare-associated, community-acquired)
- Admission date to reporting facility
- Reporting zone and facility name
- Encounter service and area (or Acquired in Area for hospital-acquired cases)
- Evidence related to CDI diagnosis – if using *Insufficient Info*, provide rationale for use in Comments
- Culture date or date of endoscopy, laboratory name (if appropriate) and accession number (if appropriate)
- Adverse outcomes: admission to intensive care unit due to CDI; colectomy due to CDI; death.

## Other considerations for data entry

Each ICP or IPC designate will be responsible for timely entry of the surveillance data into the provincial surveillance platform. It is expected that the minimum data set is collected and entered in a timely manner after factoring in time of collection, to time to reach laboratory, work-up and distribution to ICPs and/or IPC offices. As a recommendation, data entry should be completed within 1-2 weeks of receiving the laboratory report by an ICP or an IPC designate.

## Adverse outcomes

All adverse outcomes that occur in an AHS or Covenant Health Acute Care Facility within 30 days of diagnosis of a Primary CDI case will be assessed for CDI attribution. This assessment is typically conducted at the hospital where the primary CDI case was initially diagnosed. However, if the patient is transferred to another site, the transferring site's ICP can notify the receiving site's ICP to review the case and determine if the adverse outcome is related to CDI. Deaths will be assessed by a designated IPC physician or medical officer

of health, while other adverse outcomes will be assessed by site ICPs. The *Tool for Sharing Information with IPC Physicians* may be used – see Appendix E.

To ensure complete capture of adverse outcomes, an administrative data linkage will be performed to identify all CDI deaths and ICU admissions within 30 days of diagnosis of a Primary CDI case, regardless of where this occurred. ICU admissions and deaths that occur in hospital, even a different hospital than where the Primary CDI first occurred, will be sent back to ICPs and their designated IPC physician or medical officer of health for assessment if death and/or ICU admission was attributable to CDI.

**Cause of death will be determined by the following criteria:**

| Criteria | Outcome |
|---|---|
| **Directly related** | CDI was the cause of death. The patient had no other condition that would have caused death during this admission. |
| **Contributed to death** | CDI exacerbated an existing disease condition that led to the patient's death. |
| **Not related to death** | The patient died but death was not related to CDI. |
| **Unable to determine** | Causality between CDI and death cannot be determined. |

### CDI colectomy and/or intensive care unit admission

Information on intensive care unit admission and colectomy due to CDI is collected for 30 days after the positive *C. difficile* test date or at the time of discharge, if less than 30 days.

| Criteria | Outcome |
|---|---|
| Intensive care unit admission | Patient admitted to intensive care unit for complications of CDI. |
| Colectomy | Patient had surgical removal of part or entire colon as a complication of CDI. |

# Denominator data

Denominators (numbers of inpatient admission and inpatient days) are provided by AHS Analytics.

The data is abstracted from Admission, Discharge and Transfer (ADT) Data using a standard methodology and is provided to IPC. Inpatient admissions and inpatient days cannot be excluded for inpatients <1 year of age; therefore, as a proxy the Neonatal Intensive Care Unit denominators and newborn denominators in maternal or labor and delivery units are excluded.

Denominators are presented by month, which are aggregated for the fiscal quarter of the report. Denominators used for reporting can be accessed on Tableau Workbooks.

# Rate calculations

| Incidence rates for AHS/Covenant Health hospitalized patients | Calculations |
|---|---|
| Hospital-acquired CDI | $\frac{\text{Number of hospital-acquired CDI cases}}{\text{Number of patient-days}} \times 10{,}000$ |
| Healthcare-associated CDI | $\frac{\text{Number of healthcare-associated CDI cases}}{\text{Number of admissions}} \times 1{,}000$ |
| Community-acquired CDI | $\frac{\text{Number of community-acquired CDI cases}}{\text{Number of admissions}} \times 1{,}000$ |
| Total CDI | $\frac{\text{Total number of CDI cases in AHS/Covenant Health}}{\text{Number of admissions}} \times 1{,}000$ |

# Comparator rates

Internal and external surveillance rates are used as comparators. The internal rates are the historical rates for the province or zone from the previous fiscal year. The external rates are provided by the Canadian Nosocomial Infection Surveillance Program (CNISP) which are created from data submitted by large and tertiary acute care facilities; therefore, may not provide appropriate comparison for smaller acute care facilities.

# Reporting

Communication and dissemination of surveillance reports is an integral part of surveillance to inform IPC practice within AHS and Covenant Health facilities and provide support for interventions that improve the quality of patient care delivered. Responsibility for compiling, reporting, and disseminating data and reports is shared between provincial IPC Surveillance and Standards and the provincial IPC program. Formal reports are generated quarterly using reconciled and validated data and are available on SharePoint. The reports contain Information on the facility, zone and provincial and are presented to the provincial IPC Surveillance, Evaluation, Quality Improvement and Research committee for approval (Alberta Health Services, 2023). Operational reports are created by local ICPs or their designate and may or may not consist of reconciled and validated data, as they are often created with real-time, as is, data. Additional CDI information can be accessed on IPC Tableau workbooks.

# Data quality

The purpose of evaluating the quality of data is to ensure that CDI-related events are monitored efficiently and effectively. The evaluation should involve the assessment of the program (i.e., the protocol, and reporting) and system (i.e., electronic data collection tool) attributes, including relevance, simplicity, flexibility, data quality, acceptability, consistency, representativeness, timeliness, and stability. Additionally, with increasing use of technology, informatics concerns for surveillance systems need to be addressed. These include evaluating hardware and software, using a standard user interface, applying standard data formatting and coding, performing quality checks and adhering to confidentiality and security standards.

A standardized approach is used to reconcile and validate the data, provincially. The first component of data reconciliation and validation of data in the provincial surveillance platform ensures that demographic data is valid and reliable. The second component entails ensuring that the CDI-related events are entered in a manner that is consistent with the protocol definitions. At this latter stage, outliers are identified, and requests are sent to the ICP to verify that the data was correctly entered, and definitions were consistently applied according to the provincial surveillance protocol. Final designation of cases is a collaborative effort between the facility-based ICPs and the epidemiologists/analysts of the IPC Surveillance and Standards team.

Further use of statistical software for validating records is still in development. Algorithms are continuously being updated and added to ensure capture of as many discrepancies as possible. In addition to this current process of data review, there will be data audits using external data sources to determine the validity and reliability of the data in the provincial surveillance platform. The data will also serve to inform decisions made by the IPC Surveillance and Standards team to improve surveillance processes and methodologies.

**Data quality working group**

The IPC Surveillance Data Quality Working Group reports to the IPC Surveillance, Evaluation, Quality Improvement and Research committee and is responsible to develop, review and update indicator protocols to include the precise methodology for data collection to ensure consistency. Decisions from the Data Quality Working Group on specific protocol questions are communicated to provincial infection control professionals through the Data Quality Forum and are included in the protocol User Guide. These decisions will be supplemental to the protocol and will be incorporated into the protocol, when revised.

# Protocol revision history

| Date | Details |
|---|---|
| April 2011 | Protocol approved by Surveillance Committee. |
| April 2012 | |
| December 2014 | |
| March 2017 | |
| March 2018 | |
| March 2019 | Updated reference style changed to APA. |
| Spring 2020 | Updated definitions and flowcharts for clarity.<br>Updated to new template and reposted to web page. |
| April 2021 | Changed all except first occurrence of *Clostridium difficile* to *C. difficile; updated references.* |
| April 2022 | Updated references. |
| April 2023 | • Added administrative linkage process that validates death/ICU occurrence<br>• Clarified that deciding whether charting is accurate and complete is to be performed at the time of testing<br>• For clarity – Symptomatic definition changed from “Laboratory confirmation of a positive toxin for *C. difficile* (toxin assay, PCR) ...” to “Laboratory confirmation of a positive toxin assay or positive polymerase chain reaction (PCR) for *C. difficile* toxin gene(s)...” – see Appendix A for examples of positive tests<br>• Reordered case definition so it was clear that 2 and 3 were not a part of insufficient information<br>• Reworded symptomatic definition from “Fever and abdominal pain and/or ileus” to “Fever and abdominal pain or fever and ileus”<br>• Clarified what is meant by inpatient CDI test in inclusion criteria<br>• Fixed bullets in hospital-acquired definition |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| | |
|---|---|
| | • Changed reporting process from IPC Surveillance Committee to IPC Surveillance, Evaluation, Quality Improvement and Research Committee<br>• Updated Long-term care definition<br>• Updated references. |
| April/May 2024 | • Reference to supporting documentation in the "Introduction" changed to a bulleted list<br>• Removed reference to ProvSurv – used "provincial surveillance platform"<br>• Clarified relevant encounter types in Appendix B<br>• Moved these two statements out of the "insufficient info" definition and into a box below the primary CDI definition "Documentation of antibiotic treatment of CDI cannot be used as a proxy for physician diagnosis or symptom documentation. Also, the use of stool softeners/laxatives/enemas by a patient does not alter the case definition for CDI and cannot be used as a reason to discount CDI as the cause of diarrhea"<br>• Changed insufficient info language from "In other words, there is a belief that the patient meets definition for infection at the time of testing, but there is a lack of evidence in the chart to support the call." To "In other words, based on ICP investigation (discussions with frontline staff, review of physician notes and other documentation), there is evidence the patient was symptomatic, but this was not properly charted"<br>• Provided an example of what could be assessed for ostomy bags<br>• Added "and discussions with frontline staff," to part of the for info SNMD definition<br>• Changed the introductory statement in the case classification section from "Each primary CDI case is classified independently from previous Primary CDI cases. Positive C. difficile tests not meeting CDI case definition are not used to classify Primary CDI cases" to "The case classification of a primary CDI is independent of any previous positive C. difficile tests or Primary CDI cases – e.g., a hospital-acquired case classification for a Primary CDI case cannot be ruled out due to the presence of a prior positive C. difficile test or Primary CDI case (see Appendix D)<br>• Added reference to Appendix B for long-term care definition in HCA case classification<br>• In minimum case information clarified what to include for evidence related to CDI<br>• Clarified how adverse outcomes are followed and moved administrative linkage process to follow the table on adverse outcomes<br>• Updated references. |
| Spring 2025 | • Updates to background for clarity<br>• Added back in definition for hospital-acquired – missing from previous protocol<br>• Formatting changes to Symptomatic definition to make it less misleading - keep all together in the same page, numbering<br>• Updated Insufficient Info definition for clarity<br>• Clarified that included Primary cases may occur in patient transferred from one emergency department to another emergency department who are subsequently admitted<br>• Removed hours from case classification algorithm<br>• Added the file location of the document that refers to the process for entering HA back cases<br>• Adverse outcome section revised for clarity |

| | |
|---|---|
| | • Removed reference to LTC and replaced with Continuing Care Home Type A – updated definition and added link to continuing care website for source of truth<br>• Updated definition for patient admissions denominator. |

# References

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# Appendix A: CDI protocol-specific definitions

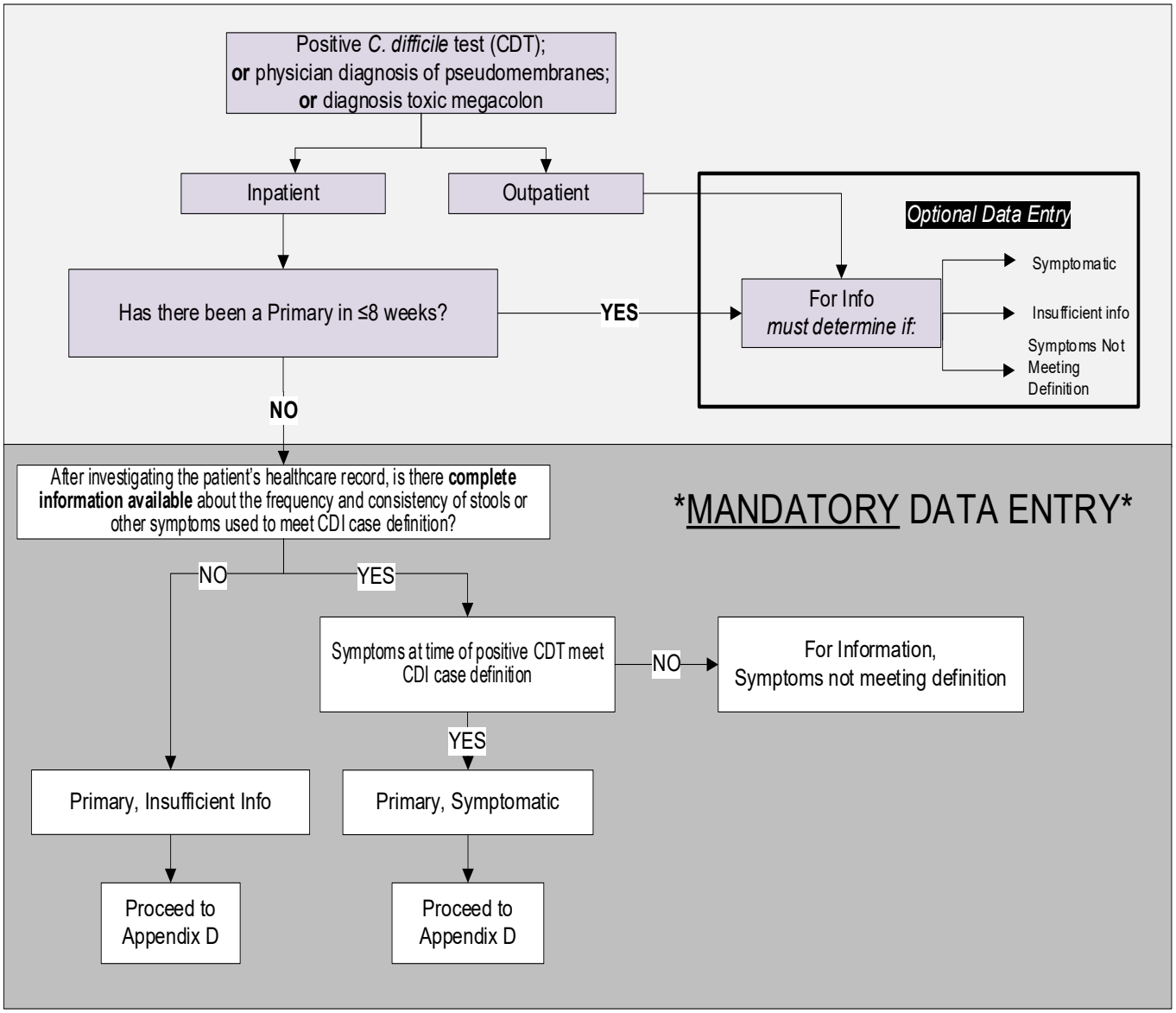
| Terms | Definitions |
|---|---|
| Dialysis | Hemodialysis patients require a vascular access, which can be a catheter or a graft or enlarged blood vessel that can be punctured to remove and replace blood. Peritoneal dialysis works on the same principle as hemodialysis, but the blood is cleaned while still inside the patient's body, rather than in a machine. A catheter is surgically inserted in the abdomen, usually below and to one side of the navel. Because of frequent hospitalizations and receipt of antimicrobial drugs, dialysis patients are also at high risk for infection with antimicrobial-resistant bacteria (Centers for Disease Control and Prevention, 2025; The Kidney Foundation of Canada, n.d.). |
| Diarrhea | Public Health Agency of Canada [PHAC], 2014; PHAC 2024):<br>• 6 or more watery/unformed stools in a 36-hour period or<br>• 3 or more watery/unformed stools in a 24-hour period and this is new or unusual for the patient<br>• Patients with ostomy bags will be assessed on an individual basis. |
| Positive *C. difficile* tests | A person will be considered to have a positive *C. difficile* test if any of the following are reported:<br>• Toxin assay positive<br>• Positive. Testing performed with C. DIFF QUIK CHEK COMPLETE* (Enzyme Immunoassay)<br>• Positive. Testing performed with C. DIFF QUIK CHEK COMPLETE* (Enzyme Immunoassay) and polymerase chain reaction (PCR)<br>• Positive. Test for *C. difficile* toxin gene POSITIVE by polymerase chain reaction (PCR)<br>• Positive. (Toxin production was not detected). Screened for *C. difficile* by toxin gene polymerase chain reaction (PCR)<br>• PCR CONFIRMATORY TESTING: PCR test for *C. difficile* toxin B gene **POSITIVE**<br>• Inconclusive. Unable to confirm presence of *C. difficile* toxin. Sample referred for Toxin PCR testing. PCR test for *C. difficile* toxin B gene ***POSITIVE*** (Abnormal)<br>• *Clostridioides difficile* (Abnormal). |

# Appendix B: General surveillance definitions

| Terms | Definitions |
|---|---|
| **Encounter types** | Type of AHS/Covenant Health healthcare location or facility where the patient is located at the time of identification. The following encounter types are referred to in acute care surveillance protocols (Government of Alberta, 2008; Government of Alberta, 2025).<br>• **Inpatient acute care:** Refers to a General Hospital: According to the Hospitals Act, a general hospital is defined as a "hospital providing diagnostic services and facilities for medical or surgical treatment in the acute phase for adults and children and obstetrical care" (Government of Alberta, 2025). General hospitals have several functional centres. Each functional centre is associated with inpatient, outpatient, or diagnostic and therapeutic services.<br>• **Inpatient mental health/rehab**: A designated mental health facility providing diagnosis and treatment for mental illness and addiction in the acute phase for adults and children. Inpatient services refer to a person admitted to and assigned a bed in a facility by order of a physician for provision of diagnostic and/or treatment services. They would have a patient/group room in which inpatient services are provided within the patient's room or within a common group room within the designated mental health facility. AHS facility examples include Glenrose Rehabilitation Hospital, Centennial Centre for Mental Health and Brain Injury. |
| **Infection prevention and control baseline** | A comparator rate created for each acute care facility in the IPC Surveillance on-line dashboards and reporting modules, to guide efforts to reduce healthcare-associated infections. The IPC baseline is based on reported monthly rates for the previous fiscal year. The calculation excludes the monthly rates higher than 1 Standard Deviation above the 12-month average but includes all rates where the site had optimal performance. This calculation method biases the IPC baseline rate towards zero, to focus on the best patient safety outcomes. |
| **Continuing Care Home (CCH) Type A (formerly Long Term Care)** | This environment provides onsite RN and/or registered psychiatric nurse (RPN) care, assessment and/or treatment 24-hours a day. Licensed practical nurses (LPNs) may also be onsite in addition to onsite personal care and support provided by health care aides (HCAs). CCH Type A may also have a secure space. Some sites may have specialized programs and services available for residents with complex clinical or complex functional care requirements (e.g., rehabilitation) (Alberta Health Services, 2025). To identify if a facility has CCH Type A beds refer to this website: https://www.albertahealthservices.ca/cc/page15328.aspx where you can search by Name and identify what type of beds the facility has. |
| **Patient admission (aka inpatient admissions)** | A person admitted to and assigned a bed in a hospital by the order of a physician, for the provision of diagnostic or treatment services or both. Includes a person who spends any time in the emergency department if assigned a bed in hospital, regardless of whether the patient was transferred to an inpatient unit and patients who are directly admitted to an inpatient unit. This is the denominator used for non-hospital-acquired rates (see Rate Calculation Section) (Government of Alberta, 2025). |
| **Patient days (aka inpatient days)** | As defined by AHS, this is used to create the denominator for hospital-acquired or hospital-identified cases. The total is equal to midnight census with patients admitted and discharged on the same day counted as a one day stay. It includes patients out on a pass. Day of admission is counted but the day of separation (discharge, death or transfer out of hospital) is not counted. Patient-days are included for inpatient encounters where discharge date is not recorded in the |

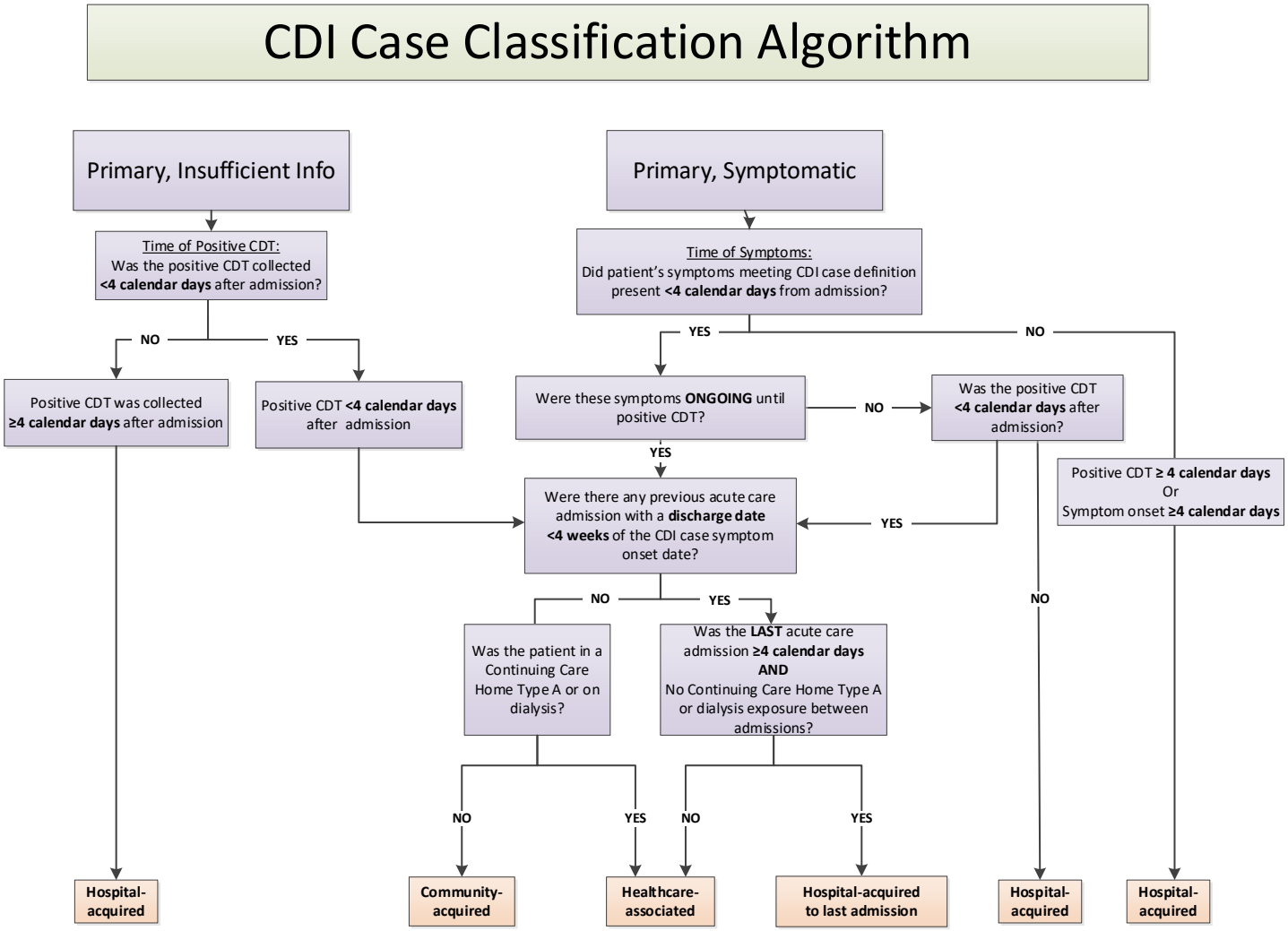
| Terms | Definitions |
|---|---|
| | data source. Inpatient totals exclude the time patients are waiting in the emergency department for an inpatient bed (time from decision to admit to discharge from emergency department). |
| **Emergency department inpatient days (EDIP)** | As defined by AHS, denominators for provincial surveillance modules include these figures in the total patient-days. Includes the number of acute care inpatient patient-days utilized in the emergency department during the reporting period. The figures reflect the time from emergency department discharge (i.e. decision to admit) to emergency department departure for patients admitted to an acute care hospital. It is calculated as [(emergency department departure date and time – emergency department discharge date and time) ÷ 60 ÷ 24]. Figures exclude cases where the emergency department discharge date and time or emergency department departure date and time were not provided, or the value has a negative number. |

# Appendix C: CDI surveillance primary case algorithm




NOTE: For patients with multiple *C. difficile* tests, a positive *C. difficile* test performed while the patient is hospitalized is eligible to be considered for a Primary CDI case every 8 weeks provided symptoms had resolved.

# Appendix D: CDI surveillance case classification algorithm




CDT : *C. difficile* test



Alberta Health Services
Infection Prevention & Control

# Appendix E: Tools for sharing information with infection control physicians (optional use)

All cases of death within 30 days of diagnosis of a Primary CDI case that occur in hospital where the Primary CDI case occurred will be assessed by a designated IPC physician or Medical Officer of Health (MOH) to determine if the death was attributable to CDI.

**Entry into Provincial Surveillance Platform**

- In the "Death" field, enter "Pending Review" until a physician has completed the chart review.
- In the "Death Date" field, enter the date as soon as it is known rather than waiting for completion of the chart review.

**Contacting designated reviewer**

At the time of writing (Dec. 2016), the responsible reviewers are:

| Location (zone) | Reviewer |
|---|---|
| North | Site designated MOH |
| Calgary and Edmonton | Site IPC Physicians |
| Central | Zone designated IPC Physician |
| Covenant Health | Zone designated IPC Physicians |
| South | Site designated MOH |

**What the IPC physician will want to know?**

- The basic demographic information you have entered into the provincial surveillance platform (name, DOB, PHN, etc.)
- The basic case information you have entered into the provincial surveillance platform (admission date, diagnosis date, symptoms, colectomy date, death date, etc.)
- Additional information
- Attending physician
- Narrative telling the story of what happened to the patient during hospitalization
- Sequence of health care access -- acute care, continuing care, home, readmissions
- Dates of significant events
- Any ICU stays
- Course of deterioration
- Any other information to give context
- Any underlying or coincident diseases (e.g., severe CVA, terminal palliative cancer)
- Any pre-existing medical conditions (e.g., Cardiomyopathy, cirrhosis)
- Any noted deteriorations of pre-existing medical conditions
- Any incidence of intra-abdominal sepsis, bowel perforation, septic shock, lower GI bleed
- Any metabolic abnormalities (e.g., Hypokalemia, hypovolemic shock, acute renal failure)
- At time of CDI diagnosis
- Duration of diarrhea in days
- Number of bowel movements per day
- WBC count, albumin, creatinine
- Presence of abdominal pain
- Initial treatment regimen and response
- If treatment changed to Vancomycin, when and what dosing
- If colectomy performed, any resulting complications.

- Any CT abdomen or flat plate abdomen showing ileus or bowel thickening
- At time of death, did patient have diarrhea or abdominal pain; indicate WBC count
- Primary cause of death indicated on death certificate and/or discharge summary
- Any other secondary, related, or contributing causes noted on death certificate and/or discharge summary.

**A tool for compiling additional information for the IPC physician follows this overview. After the IPC physician has completed review:**

- Update the “Death” field of the record in the provincial surveillance platform to reflect the decision: CDI directly related, contributed, not related, or unable to determine
- Name the physician who completed the death review in the comments section of record. If unable to determine selected, provide a rationale for this decision in the comments section.

**For ICP's reference:**

Patient name _____ Admission date _____

PHN _____ CDI diagnosis date _____

Local identifier _____ Death date _____

1. Attending physician's name

2. Presenting complaint on admission

3. Any known history of antibiotic use prior to admission (describe)

4. Underlying or coincident diseases (e.g., severe CVA, terminal palliative condition) or pre-existing medical conditions (e.g., cardiomyopathy, cirrhosis)

5. Any noted deteriorations in pre-existing medical conditions

| 6. Were there any: | | |
|---|---|---|
| ☐ Intra-abdominal sepsis | Date: _____ | Comment: _____ |
| ☐ Bowel perforation | Date: _____ | Comment: _____ |
| ☐ Septic shock | Date: _____ | Comment: _____ |
| ☐ Lower GI bleed | Date: _____ | Comment: _____ |

7. Metabolic abnormalities (e.g., hypokalemia, hypovolemic shock, acute renal failure)

8. **At** time of **CDI diagnosis, list or describe**

- ☐ Duration of diarrhea in days _____
- ☐ Number of bowel movements per day _____
- ☐ WBC count _____
- ☐ Albumin _____
- ☐ Creatinine _____
- ☐ Presence of abdominal pain _____
- ☐ Initial treatment regimen and response _____

**For ICP's reference:**

Patient name _____ Admission date _____

PHN _____ CDI diagnosis date _____

Local identifier _____ Death date _____

9. If treatment **changed** to vancomycin, when and what dosing _____

10. If colectomy performed, describe any resulting complications _____

11. If CT abdomen or flat plate abdomen showing ileus or bowel thickening, give date and description

12. At time of death, did patient have?
    - ☐ Diarrhea — Comment: _____
    - ☐ Abdominal pain — Comment: _____

13. At time of death, WBC count _____

14. Primary cause of death noon death certificate and/or discharge summary _____

15. Any secondary, related, or contributing causes noted on death certificate and/or discharge summary _____

16. Additional notes on death certificate and/or discharge summary_____

**For ICP's reference:**

Patient name _____ Admission date _____

PHN _____ CDI diagnosis date _____

Local identifier _____ Death date _____

17. Narrative – tell the patient's "story" – for example:
    - Sequence of healthcare access (acute care, continuing care, home, readmissions, etc.)
    - What happened over the course of admission - significant events and when, improvement and deterioration, transfers to ICU, etc.

**Decision:** ☐ CDI directly related ☐ CDI contributed ☐ Not related ☐ Unable to determine

**Rationale:**

Reviewed by: (MD) _____ Date: _____

Reviewed by: (ICP) _____ Date: _____

**Date decision entered in Prov Surveillance Platform:**