Government of Saskatchewan

Clostridium difficile Infection (CDI)
Surveillance Protocol: Saskatchewan

Saskatchewan
Infection Prevention and Control Program

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Introduction

Clostridium difficile Infection (CDI), formerly referred to as *C. difficile*-associated disease (CDAD), is a virulent healthcare-associated infection that is easily spread among patients/residents. Its severe consequences for those who acquire it demand a reliable surveillance protocol in order to support outbreak investigations, monitor trends, and evaluate interventions aimed at reducing incidence.

This CDI surveillance protocol is intended to:

- establish standardized case definitions to allow for the consistent measurement of CDI within Saskatchewan;
- outline methods to establish baseline rates, and thereby also support the timely identification of CDI trends;
- allow identification of risk factors for CDI; and
- provide a mechanism for facilities to report and analyze data that will inform infection control departments of the success of their targeted prevention efforts.

Epidemiology

Clostridium difficile (*C. difficile*) is a gram positive, spore-forming anaerobic bacillus. It is the leading cause of healthcare-associated diarrhea in industrialized countries and has been responsible for a large number of outbreaks in Canadian hospitals (e.g. Greater Niagara General, St. Catharines General).[1]

According to a recent report prepared by the Public Health Agency of Canada through the Canadian Nosocomial Infection Surveillance Program (CNISP), the incidence of healthcare-associated CDI in Canada in 2012 was 4.82 per 1,000 admissions and 6.04 per 10,000 patient days. For the Western region (BC, Alberta and Saskatchewan), the rate of CDI in 2012 was 4.79 per 1,000 admissions and 5.70 per 10,000 patient days.[2] It is important to note, however, that these rates are not representative of all healthcare facilities, but only of those that participate in CNISP. These are, for the most part, large tertiary care hospitals.[3]

Presently, there is limited Canadian surveillance information about the risk of CDI in smaller community hospitals and long-term care facilities. This is a concern because most residents in long-term care facilities are older adults and many have been exposed to antibiotics, both important risk factors for CDI. This suggests that rates of disease and/or colonization in long-term care may be high.[4] Older adults are also at an increased risk of severe CDI complications, as patients 60-90 years of age are twice as likely to die of CDI or experience severe CDI.[5]

Perhaps the greatest risk factor for developing CDI is exposure to antibiotics. Almost all antibiotics are associated with an increased risk of developing CDI because antibiotics suppress normal bowel flora

[1] Provincial Infectious Disease Advisory Committee (PIDAC), "Annex C: Testing, Surveillance and Management of *Clostridium difficile*", 4.

[2] Public Health Agency of Canada, "*Antimicrobial Resistant Organisms (ARO) Surveillance: Surveillance Report for Data from January 1 2007 to December 31 2012";* released March 2014.

[3] Wilkinson, Gravel, Taylor, et al., 178.

[4] Cohen, Gerding, Johnson, et al., 435.

[5] Miller, Gravel, Mulvery, et al., 200.

providing *C. difficile* an ideal environment to grow.[6] However, some antimicrobial drug classes (particularly cephalosporins, clindamycin, and fluoroquinolones) have been associated with a much higher risk of CDI.[7]

Objectives

The objectives of surveillance are to:

- Determine the incidence and burden of illness associated with CDI.
- Describe the epidemiology of CDI in Saskatchewan.
- Identify incidence trends and potential outbreaks.
- Determine if CDI cases are primary or relapse.
- Identify CDI cases by exposure setting (i.e. healthcare- or community-associated).
- Identify risk factors for CDI, as well as trends in severity and complications related to infection (e.g. colectomy, ICU admissions, etc.).
- Provide feedback and interpretation:
  - from the provincial Infection Control Coordinator to health regions, and
  - from regional infection control departments to regional stakeholders including point of care staff, managers, directors and senior leadership.

Methodology

1. Surveillance Design

The Saskatchewan surveillance program provides a standardized method to collect and analyze data, and to report on *C. difficile* infections in the province. This depends on the identification of CDI cases through the use of positive laboratory reports and, to a lesser extent, histopathologic and surgical identification of CDI cases.

Identification using laboratory reports is by far the most common, but requires the infection control practitioner (ICP) to determine if the patient/resident meets the CDI case definition to be included for surveillance. This is important because "surveillance definitions are not necessarily the same as clinical definitions and may not be appropriate for clinical decision-making and treatment."[8] CDI cases are identified through active surveillance which involves reviewing the patient/resident file, notes or records, nurses' logs, and perhaps even interviewing the patient or resident.[9]

The *C. difficile* surveillance information collected by the ICP is used to complete the CDI Electronic Report Form. The CDI Electronic Report Form (Appendix A) is briefly summarized below by section heading.

[6] Cohen, Gerding, Johnson, et al., 437.

[7] APIC, 7

[8] APIC, "Guide to the Elimination of *Clostridium difficile* in Healthcare Settings", 18.

[9] CNISP, "2011 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 4.

Note: The term "patient" is used to refer to acute care patients and/or long-term care residents, unless otherwise specified.

1. Facility Information
   (a) Identifies where CDI cases are occurring within a health region by the type of care received (acute, long-term care or outpatient), and facility.
   (b) In instances where *C. difficile* cases are identified as part of a healthcare facility gastrointestinal outbreak investigation, the health region 'Outbreak Number' shall be recorded. The outbreak number is used to identify any CDI cases identified as part of the outbreak investigation. The outbreak number is obtained by the ICP from the regional Public Health Unit. An example of an outbreak number is: RQHR - YYYY - ###.
2. Lab and Clinical Information
   (a) Captures information about the patient/resident while admitted in the healthcare facility (e.g. symptom onset date, admission date, diagnosis date, specimen collection date, initial medical treatment following diagnosis, etc.).
   (b) The 'Diagnosis Date' is automatically determined by the CDI Electronic Report Form. The diagnosis date is based on the date of the patient's symptom onset, the laboratory specimen submission date, or the date of endoscopic/histopathologic findings, whichever occurs first.
3. Patient Information and History
   (a) A unique 'Patient Identification Number (PIN)' is assigned to each CDI case. The purpose of the PIN is to link the surveillance information collected to complete the CDI Electronic Report Form with the actual patient health record from which the surveillance information was acquired. The PIN will be useful in instances where a review of the patient's health record is needed to complete a CDI investigation. Each health region shall decide what unique consistent PIN is used (e.g. HSN, MRN). To be effective, the PIN should be used consistently by the ICPs within each respective health region. Only new CDI cases that meet the primary case definition are assigned a PIN. The PIN is not used by the provincial Infection Control Coordinator.
   (b) Captures patient information such as age and sex. Please note that it is only necessary to fill in the patient's date of birth **OR** age at time of diagnosis. If date of birth is provided, the CDI Electronic Report Form will automatically calculate age.
   (c) Provides information regarding previous antibiotic use that may be a contributing factor in the development of CDI. To obtain the patient's antibiotic history, ICPs may need to access the hospital pharmacy information system, the "Best Possible Medication History" (BPMH) on the patient's chart, or the Pharmaceutical Information Program (PIP).
   (d) Other factors that may increase the risk of developing CDI are also captured. These include bowel disease, chemotherapy, gastric acid suppressants, tube feeding, and exposure to other patients with CDI (transmission link).
   (e) Identifies patients admitted into a healthcare facility in the past 4 weeks.
   (f) Information captured in this section helps determine if the patient meets the primary case definition or if the patient has a relapse CDI case (i.e. has had a CDI diagnosis in the previous 8 weeks).

4. Complications and Patient Outcomes
   (a) Captures ICU admission, colectomy due to CDI, and death directly or indirectly related to CDI.
   (b) The CDI outcome is determined either when the patient is discharged from hospital **OR** 30 days after the CDI diagnosis, **whichever occurs first.** Patient outcome is categorized as: still in facility, discharged from facility, transferred from facility, transferred to another facility, or deceased. CDI patients who have been discharged and readmitted within the "30-day outcome window" are classified as discharged.

The CDI Electronic Report Form should be completed within one month of identifying a confirmed CDI case. The surveillance information should be submitted quarterly to the designated provincial Infection Control Coordinator within 45 days of the end of the reporting quarter (e.g. Q1 ends June 30; submission deadline is August 15). This takes into account the 30-day outcome follow-up information needed to complete each CDI case record (see Appendix J for quarterly data submission instructions).

The provincial Infection Control Coordinator reviews the surveillance information submitted by health regions, and may contact the health region ICPs to provide clarification. The provincial Infection Control Coordinator interprets the surveillance data to create a surveillance report. This report is shared with the regional infection control practitioners.

2. Population Under Surveillance

Only patients or residents admitted into a hospital or long-term care facility at the time the CDI diagnosis is made are included for surveillance.

Saskatchewan CDI surveillance inclusion criteria includes patients:[10]

- one year of age and older;
- admitted to an acute care unit (this includes patients awaiting placement on acute care units, patients admitted to your facility but who remain in the emergency room once admitted, and 'outpatients' in ER who have been there for more than 72 hours);
- in a psychiatry ward/unit; and
- residents in long-term care facilities.

Although the only patients counted for surveillance are those admitted at the time that the positive CDI diagnosis is made, this includes people who are discharged after the date of diagnosis, but before the laboratory results are received. In practice, this will seldom occur if test results are reported in a timely manner. Patients who were discharged in the previous 4 weeks and return to the emergency room or to an outpatient unit with a new onset of CDI without being readmitted are not included. [11]

Optional: Health regions may choose to conduct CDI surveillance for outpatient CDI cases (i.e. CDI cases not admitted into a healthcare facility). Appendix G outlines the reporting procedure for outpatient CDI cases.

[10] CNISP, "2011 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 2.
[11] CNISP, "2011 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 2.

3. Confirmatory Diagnostic Testing

Diagnostic testing for *C. difficile* is performed by health regions using either a two-step assay quick test or polymerase chain reaction (PCR) testing. Both tests have a turnaround time of less than 24 hours. Health regions that do not have the capability to conduct onsite confirmatory testing must send specimens to the Saskatchewan Disease Control Laboratory (SDCL) or to another accredited laboratory.

4. Case Definition for Surveillance and Reporting CDI

A patient is identified as a CDI case if: [12]

- s/he has diarrhea, or fever, abdominal pain and/or ileus, **AND** a laboratory confirmation of a positive toxin assay or PCR positive for *C. difficile*; **OR**
- s/he has a diagnosis of pseudomembranes on sigmoidoscopy or colonoscopy, or has a histological/pathological diagnosis of CDI; **OR**
- s/he has a diagnosis of toxic megacolon.

Diarrhea (watery or unformed stool that takes the shape of the specimen collection container) is defined as one of the following:

- 3 or more unformed stools in a 24-hour period for at least 1 day and new or unusual for the patient;
- 6 or more watery stools in a 36-hour period; or
- 8 or more unformed stools over 48 hours.

Note: If the information about the frequency and consistency of diarrhea is not available, a toxin-positive stool is considered as a case.

Primary Case: [13]

- A new CDI diagnosis **OR** a CDI diagnosis > 8 weeks after the first toxin-positive assay.

Relapse CDI: [14]

- A new CDI diagnosis that occurs > 2 weeks and ≤ 8 weeks after being diagnosed with CDI **AND** symptoms from the previous CDI episode completely resolved with or without therapy. [15]

Tracking relapse CDI cases is important for surveillance as approximately 20% of CDI patients will experience a relapse CDI infection. Relapse CDI can result from either the "re-ingestion of spores from the environment or from the persistence of spores in the gastrointestinal tract following antibiotic therapy." [16] The main reason for monitoring relapse CDI is to provide insight into the effectiveness of treatment. [17]

[12] CNISP, "2010 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 8-9.
[13] CNISP, "2010 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 9.
[14] Cohen, Gerding, Johnson et al., 437.
[15] McDonald, Coignard, Dubberke et al., 141.
[16] Maroo and Lamont, 1315.
[17] APIC, "Guide to the Elimination of *Clostridium difficile* in Healthcare Settings", 23.

Continuation of Existing *C. difficile* Infection

In some instances, healthcare providers may resample a CDI case less than 2 weeks after the initial diagnosis is made. Resampling of a confirmed CDI case is not considered best practice as the "toxin may remain at low levels in stool for several days or weeks and is therefore not helpful in determining further treatment options or discontinuation of contact precautions."[18] To deal with these cases, all specimen submissions that are taken less than 2 weeks after the initial diagnosis date are considered to be the continuation of the current CDI episode.[19]

Note: Continuing CDI cases do NOT need to be entered into the CDI Electronic Report Form. However, if entered, the CDI Case Definition will be displayed as "continuing", indicating that the current and previous diagnosis dates are less than 2 weeks apart.

5. Clostridium difficile Infection Defined by Exposure

The following CDI case definitions categorize CDI cases by where they occur.

Note: The term "healthcare" applies to both hospital (acute care) and long-term care facilities.

Healthcare-associated CDI YOUR Facility[20] (HA-CDI-Y):

A CDI case is considered "healthcare-associated, your facility" if it meets the following criteria:

- CDI symptoms began ≥ 72 hours after admission to YOUR healthcare facility; **OR**
- CDI symptoms began in the community (before admission) or < 72 hours after admission to YOUR healthcare facility, **AND** the patient was discharged from YOUR healthcare facility within the previous 4 weeks.

Healthcare-associated CDI ANOTHER Facility[21] (HA-CDI-AF):

- CDI symptoms began in the community or < 72 hours after admission to your healthcare facility, **AND** the patient was discharged from ANOTHER healthcare facility (acute care or long-term care) within the previous 4 weeks.

The purpose of capturing **HA-CDI-AF** is that hospitalization carries an independent risk of acquiring CDI. The use of this definition will help to distinguish true community onset cases from cases discharged from a healthcare facility in the previous 4 weeks.[22] **HA-CDI-AF** cases are attributed to the facility from which the patient was last discharged. This information is captured by the CDI Electronic Report Form (Appendix A) in the 'Patient Information and History' section.

The appropriate follow-up by the ICP with a potential **HA-CDI-AF** case is to contact the ICP from the previous healthcare facility and/or region where the patient was admitted. However, to prevent duplication, data entry into the CDI Electronic Report Form will be performed ONLY by the ICP in the facility/health region where the person was diagnosed.

[18] Saskatchewan Ministry of Health, "Guidelines for the Management of *Clostridium difficile* Infection (CDI) in all Healthcare Settings", 10.
[19] APIC, "Guide to the Elimination of *Clostridium difficile* in Healthcare Settings", 20.
[20] CNISP, "2011 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 3.
[21] Provincial Infection Control Network of British Columbia (PICNet), **"***Clostridium difficile* Infection (CDI) Surveillance Report, Fiscal year 2010/2011", 15.
[22] McDonald, Coignard, Dubberke et al., 144.

Community-associated CDI (CA-CDI): [23]

- CDI symptoms begin in the community or < 72 hours after admission to a healthcare facility, provided that symptom onset was > 4 weeks after the last discharge from a healthcare facility.

Patients seen in an outpatient unit or in the emergency room, but not admitted, are not included.

6. Outbreak Identification

The Saskatchewan surveillance program will provide baseline rates to monitor the incidence of CDI provincially, regionally, and by healthcare facility. Knowledge of CDI baseline rates will assist ICPs to better anticipate and manage potential outbreaks in a timely manner. Ontario's Provincial Infectious Diseases Advisory Committee (PIDAC) defines a CDI outbreak as: "CDI occurring at a rate exceeding the normally expected baseline rate for the health care setting (or unit, floor, ward) during a specified period of time."[24]

The Saskatchewan Ministry of Health "Communicable Disease Manual" enteric outbreak definition will continue to be used to define potential *C. difficile* outbreaks, with an enteric outbreak defined as "two (2) or more residents/clients and/or staff members that are exhibiting signs and symptoms of gastrointestinal illness over a twenty-four (24) hour period."[25] Sections 9-50 to 9-55 of this manual provide detailed information for the management of an outbreak of enteric illness, including CDI.

7. Complications and Patient Outcomes

Complications and adverse outcomes may include ICU admission, colectomy due to CDI, or death directly or indirectly related to CDI. This information is collected 30 days after the positive diagnosis, or at the time of discharge, if within 30 days. Discharged patients are lost to further follow-up.[26]

CDI Attributable Death[27]

Cases in which a patient died within 30 days of the CDI diagnosis should be assessed by a pathologist or delegate to determine if the death was attributable to CDI. The cause of death may be categorized using the following criteria:

- CDI **directly** related to patient's death if the patient had no other underlying condition that would have caused death during this hospitalization.
- CDI **indirectly** related to the patient's death if CDI contributed to the death, but was not its primary cause (i.e. CDI exacerbated an existing disease condition that led to the patient's death).
- CDI **not** related to the patient's death if the patient died from causes unrelated to CDI.

Information may be obtained from patient charts, nurses' logs, laboratory reports, nursing/medical staff, etc. ICPs are encouraged to participate in medical rounds to facilitate data collection.

[23] PICNet, **"***Clostridium difficile* Infection (CDI) Surveillance Report, Fiscal year 2010/2011", 14.
[24] PIDAC, "Annex C: Testing, Surveillance and Management of *Clostridium difficile*", 11.
[25] Saskatchewan Ministry of Health, "Communicable Disease Manual, Section 9: Outbreaks in Long Term Care and Integrated Facilities", Section 9-52, 1.
[26] CNISP, "2010 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 10.
[27] CNISP, "2010 Surveillance for *Clostridium difficile*-associated infection (CDI) within healthcare institutions", 10-11.

8. Rate Calculation

Healthcare-associated CDI incidence rates are expressed as the number of new cases per 10,000 patient days,[28] as increased length of stay in hospital is directly related to an increased risk of CDI. If CDI rates are high compared to other facilities, or if an outbreak is discovered, it would be beneficial to stratify rates by patient location to target control measures.[29]

Numerator Data

- The total number of **new** HA-CDI cases identified during the surveillance quarter. This number will be pulled from the EpiData database that is exported to an Excel spreadsheet and sent to the Infection Control Coordinators at the end of each quarter. It includes cases that were defined as HA-CDI-Y as well as any HA-CDI-AF cases that were attributed to a facility in your region.

Denominator Data

- The appropriate denominator used to determine CDI rates is 'patient/resident days'. Denominator data (estimated from other provincial data sources) is provided to regional ICPs (see Appendix F). ICPs may change these numbers if they are not reflective of the current situation (e.g. due to bed closures), or if the ICP is able to refine the estimate provided.
- Newborns are excluded from the denominator data.

9. Data Analysis

Provincial and health region CDI rates are calculated by reporting quarter and year. An example of how rates are calculated is shown below.

Healthcare-associated CDI incidence rate (per 10,000 patient/resident days):

HA-CDI = ([# of new HA-CDI-Y cases + # of new HA-CDI-AF cases that have been attributed to your facility] ÷ [# of patient/resident days in your facility]) x 10,000

NOTE: The number of HA-CDI-AF cases, as well as their risk factors, will be counted in the facility/region to which the case is attributed. However, the treatment and outcomes for the HA-CDI-AF cases will be assumed to have occurred, and will therefore be counted, in the region/facility in which the case was diagnosed (unless otherwise indicated).

Example: A patient is diagnosed in an acute care facility in Sun Country Health Region (SCHR) but is deemed to have developed the infection in a facility in Regina Qu'Appelle Health Region (RQHR).

- The case will be included in the HA-CDI incidence rate for RQHR, and the risk factors will be incorporated into the RQHR descriptive statistics.
- The information on treatment following diagnosis, as well as patient outcomes, will be incorporated into the descriptive statistics for SCHR (assuming this care took place following diagnosis).

[28] Cohen, Gerding, Johnson et al., 431.
[29] Cohen, Gerding, Johnson et al., 431.

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[http://www.health.gov.on.ca/patient_safety/pro/cdad/toolkit_ricn/rep_pidac_hai_best_prac.pdf - retrieved November 2011]

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Saskatchewan Ministry of Health, "Guidelines for the Management of *Clostridium difficile* Infection (CDI) in all Healthcare Settings" (Regina, SK: Saskatchewan Ministry of Health, November 2011).

Appendix A: CDI Electronic Report Form

EpiData Entry software is used to collect data for the Saskatchewan surveillance program. Below is a summary of the dataset captured by the EpiData Entry CDI Electronic Report Form.

FACILITY INFORMATION	
Health Region	Values listed in Appendix C.
Type of Patient Care Received	1 Acute care 2 Long-term care 3 Outpatient
Acute Care and Long-Term Care Facility Code	Values listed in Appendix D. Select 999 for all outpatient services or if an acute or long-term care facility does not appear in Appendix D.
Other Facility	Free text. Only available if 999 is selected above (e.g. Dr. Smith's office).
Outbreak Number	Free text. Obtained from the region's Public Health Unit if the CDI case is associated with an outbreak (e.g. RQHR - YYYY - ###).
LAB AND CLINICAL INFORMATION	
Admission Date	dd/mm/yyyy **Note:** For outpatient, use date of outpatient service.
Underlying/Admitting Diagnosis	Free text.
Symptom Onset Date	dd/mm/yyyy
How was diagnosis made?	1 Laboratory confirmed (+ toxin or culture) 2 Surgical Diagnosis (e.g. colectomy) 3 Histology/pathology (e.g. biopsy)
Specimen Collection Date	dd/mm/yyyy **Note:** For surgical diagnosis or histology/pathology, use date of procedure.
Date specimen results received	dd/mm/yyyy
Diagnosis (Dx) Date	dd/mm/yyyy **Note:** Autofilled with Symptom Onset Date **OR** Specimen Collection Date, whichever occurs first.
Patient Care Unit when CDI diagnosis made	1 Medical Unit 2 Surgical Unit 3 Combined Medical/Surgical 4 ICU 5 Maternity 6 Women's Health 7 Pediatrics 8 Psychiatric Unit 9 Rehabilitation Unit 10 Oncology 50 Long-term Care 99 Other **Note:** This is the unit the patient was on when diagnosed with CDI.

Description of Other Unit (if applicable)	Free text (e.g. Emergency Department). Available only if 99 is selected above.
Name of Patient Care Unit/Wing	Free text (e.g. Unit 5A).
Was there initial medical treatment after CDI diagnosis?	(Y)es (N)o (U)nable to determine
Sub question: If yes, indicate (Y)es, (N)o **OR** (U)nable to determine for each treatment. **NOTE:** If patient was given anti-diarrheal medication following diagnosis, enter the medication name in "Other".	• Discontinued previous antibiotic treatment • Vancomycin • Oral Metronidazole (Flagyl) • IV Metronidazole (Flagyl) • Other (free text)
PATIENT INFORMATION AND HISTORY	
Patient Identification Number (PIN)	Number selected by ICPs to represent patient (e.g. MRN, HSN, etc.).
Date of Birth **OR** Age (in years) on diagnosis date	dd/mm/yyyy Free text.
Age at Diagnosis	**Note:** This field is autofilled.
Sex (M/F)	M Male F Female
Were antibiotics taken within 6 weeks of diagnosis date?	(Y)es (N)o (U)nable to determine **Note:** To obtain the patient's antibiotic history, ICPs may need to access the hospital pharmacy information system, the "Best Possible Medication History" (BPMH) on the patient's chart, or the Pharmaceutical Information Program (PIP).
Sub question: If yes, indicate (Y)es, (N)o, **OR** (U)nable to determine for each antibiotic class.	• Cephalosporins (e.g. cefazolin, cefepime, cefixime, cefotaxime, ceftazidime, ceftriaxone) • Penicillins (e.g. ampicillin, amoxicillin) • Clindamycin • Fluoroquinolones (e.g. ciprofloxacin, levofloxacin, moxifloxacin) • Other (free text)
Were Other Risk Factors identified?	(Y)es (N)o (U)nable to determine

Sub question: If yes, indicate (Y)es, (N)o, **OR** (U)nable to determine for each risk factor. **NOTE:** Only enter those risk factors felt to be clinically relevant to the current CDI episode in "Other".	• Bowel disease • Chemotherapy • GI surgery • Proton Pump Inhibitors (e.g. esomeprazole, lansoprazole, omeprazole, pantoprazole, rabeprazole) • Tube feeding • Transmission link • Other (free text)
Was patient previously discharged within 4 weeks of Dx date?	(Y)es (N)o (U)nable to determine
Sub-question: Previous discharge date	dd/mm/yyyy
Sub-question: Previous admission date	dd/mm/yyyy
Sub-question: Previously discharged from?	1 Previously discharged from **your** facility 2 Previously discharged from **another** facility **Note:** If "your facility" is selected, the next three fields autofill with the values from the 'Facility Information' section. However, you can still make changes (e.g. if the type of patient care is different).
Sub-question: Health Region of previous discharge	Values listed in Appendix C.
Sub-question: Type of patient care received during previous admission	1 Acute care 2 Long-term care 3 Outpatient
Sub-question: Acute Care and Long-Term Care Facility Code	Values listed in Appendix D. Select 999 for all outpatient services or if an acute or long-term care facility does not appear in Appendix D.
Sub-question: Name of Previous Facility (if applicable)	Free text. Only available if 999 is selected above.
Was the patient previously diagnosed with CDI within 8 weeks of Dx Date?	(Y)es (N)o (U)nable to determine
Sub-question: If yes, date patient was previously diagnosed with CDI.	dd/mm/yyyy **Note:** Previous diagnosis date is the previous symptom onset date or specimen collection / procedure date, whichever occurred first.
Sub-question: Date previous symptoms resolved	dd/mm/yyyy
Sub-question: Was patient treated for previous CDI episode?	(Y)es (N)o (U)nable to determine

Sub question: If yes, indicate (Y)es, (N)o **OR** (U)nable to determine for each treatment. **NOTE:** If patient was given anti-diarrheal medication following diagnosis, enter the medication name in "Other".	• Discontinued previous antibiotic treatment • Vancomycin • Oral Metronidazole (Flagyl) • IV Metronidazole (Flagyl) • Other (free text)
Saskatchewan CDI Identification Number	Autofilled as follows: Health Region ID number – Year – CDI case number
CDI Exposure Definition	Autofilled based on data already entered.
CDI Case Definition	Autofilled based on data already entered.
COMPLICATIONS AND PATIENT OUTCOMES WITHIN 30 DAYS OF DIAGNOSIS	
Did patient require ICU admission?	• No • No, already in ICU • Yes, admitted to ICU for complications of CDI • Yes, admitted to ICU, but for reasons other than CDI • Unable to determine reason for ICU admission
Did the patient require colectomy due to CDI?	(Y)es (N)o (U)nable to determine
Outcome 30 days after diagnosis **OR** at the time of discharge, whichever comes first?	1 Still in Hospital 2 Discharged from Facility 3 Transferred to Another Facility 4 Deceased 9 Unable to determine
Name of facility patient transferred to:	Free text.
If patient died, what was the date of death?	dd/mm/yyyy
If patient died, was CDI the cause **OR** contributing factor?	1 CDI directly related to death 2 CDI indirectly related to death 3 CDI not related to death 9 Unable to determine
DATA ENTRY INFORMATION	
Name of data entry person	Please provide first and last name of data entry person.
Today's Date	dd/mm/yyyy (autofilled)

Appendix B: Sample Data Collection Tool

NOTE: Y = Yes, N = No, U = Unable to Determine

FACILITY INFORMATION

- Health Region: _____
- Type of Patient Care Received: **1.** Acute Care **2.** LTC **3.** Outpatient
- Acute Care and Long-term Care Facility: _____
- Other Facility (**if applicable**): _____
- Outbreak Number (if applicable): _____

LAB AND CLINICAL INFORMATION

- Admission Date: (dd/mm/yyyy) ___ /____ /_____
- Underlying/ Admitting Diagnosis: _____
- Symptom Onset Date: (dd/mm/yyyy) ___ /____/_____
- How was diagnosis made: **1.** Laboratory **2.** Surgery **3.** Histology/Pathology
  Specimen Collection Date: (dd/mm/yyyy) ___ /____ /_____
- Specimen Results Received Date: (dd/mm/yyyy) ___ /____ /_____
- Type of Patient care unit when CDI diagnosis made (i.e. medical, oncology, ICU, etc.):
  _____
- Other unit type (**if applicable**): _____
- Name of Patient Care Unit/Wing (e.g. RGH-6A): _____

Was there medical treatment following the initial CDI diagnosis? **Y/N/U**

- **If Yes,** for each treatment option below, indicate **Y, N or U**
  Discontinue AB Treatment: _____ vancomycin: _____ metronidazole (oral): _____
  metronidazole (IV): _____ Other (e.g. anti-diarrheal medication): _____

PATIENT INFORMATION AND HISTORY

- Patient Identification Number (PIN): _____
- Date of Birth: (dd/mm/yyyy) ___ /____ /_____
  OR (only 1 required)
- Age, in years, at time of diagnosis: _____
- Sex: **M**ale/**F**emale _____

Were antibiotics taken within 6 weeks of diagnosis date? **Y/N/U**

- **IF Yes**, for each antibiotic class below, indicate **Y, N, or U**
  cephalosporins: e.g. cefazolin, cefixime, ceftazidime, ceftriaxone _____
  penicillins: e.g. ampicillin, amoxicillin _____
  clindamycin: _____
  fluoroquinolones: e.g. ciprofloxacin, levofloxacin, moxifloxacin _____
  other (specify): _____

Were other potential risk factors identified within 6 weeks of diagnosis date? **Y/N/U**

- **IF Yes**, for each risk factor below, indicate **Y, N or U**
  Bowel disease: _____ Chemotherapy: _____ GI surgery: _____
  Proton Pump Inhibitors: _____ (e.g. esomeprazole, lansoprazole, omeprazole, etc.)
  Tube feed: _____ Transmission link: _____ Other clinically relevant risk factor: _____

Was patient **previously discharged** within 4 weeks of diagnosis date? **Y/N/U**

- **IF Yes**: Previous Discharge Date: (dd/mm/yyyy) ___ /____ /_____
  Previous Admission Date: (dd/mm/yyyy) ___ /____ /_____
- Where was patient previously discharged from?
  1. Previously discharged from **your facility**
  2. Previously discharged from **another facility**

If from **another facility**:

- Health Region: _____
- Type of care patient received: **1.** Acute Care **2.** LTC **3.** Outpatient
- Acute care and long-term care facility: _____
- Other Facility (e.g. if outpatient): _____

Was there a previous diagnosis of CDI within 8 weeks of current diagnosis date? **Y/N/U**

- **IF YES**: Date of previous CDI diagnosis (dd/mm/yyyy): ___ /____ /_____
  Note: Previous diagnosis date is determined by date of previous symptom onset, laboratory specimen submission **OR** surgical/ histopathology results, **whichever occurred first**.
- Date previous symptoms resolved, if known (dd/mm/yyyy): ___ /____ /_____

Was patient treated for previous CDI episode? **Y/N/U**

- **If Yes**, for treatment indicated below, indicate **Y, N or U**
  Discontinued antibiotics: ____ vancomycin: _____ metronidazole (oral): ____
  metronidazole (IV): ___ Other (e.g. anti-diarrheal medication): _____

COMPLICATIONS AND PATIENT OUTCOMES WITHIN 30 DAYS OF DIAGNOSIS

- Did the patient require ICU admission? **Check one option below**
  1. No ____ **2.** No, already in ICU ____ **3.** Yes, due to CDI complications ____
  4. Yes, admitted but for reason other than CDI ____ **9.** Unable to determine reason ____
- Was colectomy required due to CDI? **Y/N/U**
- What was patient outcome 30 days after diagnosis **OR** at the time of discharge, whichever occurred first? **Check one option below**
  1. Still in facility ____ **2.** Discharged from facility ____
  3. Transferred to another facility ____ **4.** Deceased ____ **9.** Unable to determine ____
- Facility patient transferred to (**if applicable**): _____
- If patient died, what was the date of death? (dd/mm/yyyy): ___ /____ /_____
- If patient died, was CDI the cause or a contributing factor? **Check one option below**
  1. CDI directly related ____ **2.** CDI indirectly related ____ **3.** CDI not related ____
  9. Unable to judge ___

Name of data entry person: _____

Appendix C: Health Regions

1. Sun Country
2. Five Hills
3. Cypress
4. Regina Qu'Appelle
5. Sunrise
6. Saskatoon
7. Heartland
8. Kelsey Trail
9. Prince Albert Parkland
10. Prairie North
11. Mamawetan Churchill River
12. Keewatin Yatthé
13. Athabasca Health Authority

99. Out of Province

Appendix D: Acute Care and Long-Term Care Facility Codes

HOSPITALS

RHA	Community Name	Facility Name	Facility #
Sun Country	Arcola	Arcola Health Centre	002
	Estevan	St. Joseph's Hospital	036
	Kipling	Kipling Memorial Health Centre	068
	Weyburn	Weyburn General Hospital	168
Five Hills	Assiniboia	Assiniboia Union Hospital	003
	Central Butte	Central Butte Regency Hospital	018
	Gravelbourg	St. Joseph's Hospital	046
	Moose Jaw	Moose Jaw Union Hospital	096
Cypress	Herbert	Herbert & District Integrated Healthcare Facility	051
	Leader	Leader Hospital	076
	Maple Creek	Maple Creek Hospital	088
	Shaunavon	Shaunavon Hospital & Care Centre	144
	Swift Current	Cypress Regional Hospital	149
Regina Qu'Appelle	Balcarres	Balcarres Integrated Care Centre	005
	Broadview	Broadview Hospital	013
	Fort Qu'Appelle	All Nations Healing Hospital	401
	Indian Head	Indian Head Hospital	058
	Moosomin	Southeast Integrated Care Centre	099
	Regina	Pasqua Hospital	130
		Regina General Hospital	129
		Wascana Rehabilitation Centre [REHAB]	501
	Wolseley	Wolseley Memorial Hospital	173
Sunrise	Canora	Canora Hospital	016
	Esterhazy	St. Anthony's Hospital	035
	Kamsack	Kamsack Hospital	062
	Melville	St. Peter's Hospital	092
	Preeceville	Preeceville & District Health Centre	117
	Yorkton	Yorkton Regional Health Centre	176
Saskatoon	Humboldt	Humboldt District Health Complex	054
	Lanigan	Lanigan Hospital	074
	Rosthern	Rosthern Hospital	135
	Saskatoon	Royal University Hospital	142
		Saskatoon City Hospital	140
		St. Paul's Hospital	141
	Wadena	Wadena Hospital	162
	Watrous	Watrous Hospital	165
	Wynyard	Wynyard Hospital	174
Heartland	Biggar	Biggar Hospital	009
	Davidson	Davidson Health Centre	026
	Kerrobert	Kerrobert Health Centre	064
	Kindersley	Kindersley & District Health Centre	066
	Outlook	Outlook & District Health Centre	110
	Rosetown	Rosetown & District Health Centre	133
	Unity	Unity & District Health Centre	156

RHA	Community Name	Facility Name	Facility #
Kelsey Trail	Hudson Bay	Hudson Bay Health Care Facility	053
	Kelvington	Kelvington Hospital	063
	Melfort	Melfort Hospital	091
	Nipawin	Nipawin Hospital	104
	Porcupine Plain	Porcupine Carragana Hospital	116
	Tisdale	Tisdale Hospital	153
Prince Albert Parkland	Prince Albert	Victoria Hospital	120
	Shellbrook	Shellbrook Hospital	145
Prairie North	Lloydminster	Lloydminster Hospital	080
	Maidstone	Maidstone Health Complex	086
	Meadow Lake	Northwest Health Facility	090
	North Battleford	Battlefords Union Hospital	107
		Saskatchewan Hospital North Battleford (SHNB) [MENTAL HEALTH]	995
	Turtleford	Riverside Health Complex	154
Mamawetan Churchill River	La Ronge	La Ronge Health Centre	083
Keewatin Yatthé	Ile a la Crosse	St. Joseph's Health Centre	056
	La Loche	La Loche Health Centre	301
Athabasca Health Authority	Black Lake	Yutthe Dene Nakohodi Health Centre (Athabasca Health Centre)	213

LONG-TERM CARE FACILITIES

[special care homes (SCHs), and hospitals with designated institutional supportive care (ISC) beds]

RHA	Community Name	Facility Name	Facility #
Sun Country	Bengough	Bengough Health Centre [SCH]	526
	Carlyle	Moose Mountain Lodge [SCH]	535
	Carnduff	Sunset Haven [SCH]	534
	Coronach	Coronach & District Health Centre [SCH]	020
	Estevan	Estevan Regional Nursing Home [SCH]	533
		St. Joseph's Hospital [ISC beds]	036
	Fillmore	Fillmore Health Centre [SCH]	040
	Gainsborough	Gainsborough Health Centre [SCH]	044
	Kipling	Willowdale Lodge [SCH]	545
	Lampman	Lampman Health Centre [SCH]	072
	Midale	Mainprize Manor & Health Centre [SCH]	530
	Oxbow	Galloway Health Centre [SCH]	111
	Radville	Radville Marian Health Centre [SCH]	527
	Redvers	Redvers Health Centre [SCH]	536
	Stoughton	Newhope Pioneer Lodge [SCH]	537
	Wawota	Wawota Memorial Health Centre [SCH]	538
	Weyburn	Tatagwa View [SCH]	531
		Weyburn Special Care Home [SCH]	528

RHA	Community Name	Facility Name	Facility #
Five Hills	Assiniboia	Assiniboia Union Hospital [SCH]	505
	Assiniboia	Ross Payant Centennial Home [SCH]	525
	Central Butte	Central Butte Regency Hospital [SCH]	522
	Craik	Craik & District Health Centre [SCH]	021
	Gravelbourg	Foyer D'Youville Home [SCH]	517
	Lafleche	Lafleche & District Health Centre [SCH]	071
	Moose Jaw	Extendicare Moose Jaw [SCH]	518
		Pioneer Lodge [SCH]	520
		Providence Place [SCH]	523
	Rockglen	Grasslands Health Centre [SCH]	132
Cypress	Cabri	Prairie Health Care Centre [SCH]	015
	Eastend	Eastend Wolf Willow Health Centre [SCH]	511
	Gull Lake	Gull Lake Special Care Centre [SCH]	503
	Herbert	Herbert & District Integrated Healthcare Facility [SCH]	507
	Leader	Western Senior Citizens Home [SCH]	502
	Mankota	Prairie View Health Centre [SCH]	087
	Maple Creek	Cypress Lodge Nursing Home [SCH]	504
	Ponteix	Foyer St. Joseph Nursing Home [SCH]	512
	Shaunavon	Shaunavon Hospital & Care Centre [SCH]	516
	Swift Current	Palliser Regional Care Centre [SCH]	510
		Prairie Pioneers Lodge [SCH]	509
		Swift Current Care Centre [SCH]	508
Regina Qu'Appelle	Balcarres	Balcarres Integrated Care Centre [SCH]	781
	Broadview	Broadview Centennial Lodge [SCH]	543
	Cupar	Cupar and District Nursing Home [SCH]	783
	Fort Qu'Appelle	Echo Lodge [SCH]	782
	Grenfell	Grenfell & District Pioneer Home [SCH]	544
	Imperial	Long Lake Valley Integrated Facility [SCH]	057
	Indian Head	Golden Prairie Home [SCH]	549
	Lestock	St. Joseph's Integrated Care Centre [SCH]	079
	Lumsden	Lumsden Heritage Home [SCH]	560
	Montmartre	Montmartre Integrated Health Centre [SCH]	095
	Moosomin	Southeast Integrated Care Centre [SCH]	542
	Raymore	Silver Heights Special Care Home [SCH]	785
	Regina	Extendicare Elmview [SCH]	551
		Extendicare Parkside [SCH]	550
		Extendicare Sunset [SCH]	552
		Qu'Appelle House [SCH]	555
		Regina Lutheran Home [SCH]	556
		Regina Pioneer Village [SCH]	557
		Santa Maria Senior Citizens Home [SCH]	559
		Wascana Rehabilitation Centre [ISC beds]	501
		William Booth Special Care Home [SCH]	558
	Whitewood	Whitewood Community Health Centre [SCH]	547
	Wolseley	Lakeside Home [SCH]	546

RHA	Community Name	Facility Name	Facility #
Sunrise	Canora	Canora Gateway Lodge [SCH]	772
		Canora Hospital [ISC beds]	016
	Esterhazy	Centennial Special Care Home [SCH]	778
	Foam Lake	Foam Lake Jubilee Home [SCH]	786
	Invermay	Invermay Health Centre (Invermay Lodge) [SCH]	773
	Ituna	Ituna Pioneer Health Care Complex [SCH]	784
	Kamsack	Kamsack & District Nursing Home [SCH]; Kamsack Hospital [ISC beds]	769; 062
	Langenburg	Centennial Special Care Home [SCH]	779
	Melville	St. Paul Lutheran Home [SCH]	780
	Norquay	Norquay Health Centre [SCH]	771
	Preeceville	Preeceville & District Health Centre [SCH]	774
	Saltcoats	Lakeside Manor Care Home [SCH]	777
	Theodore	Theodore Health Centre [SCH]	152
	Yorkton	Yorkton & District Nursing Home [SCH]	776
Saskatoon	Cudworth	Cudworth Nursing Home [SCH]	753
	Dalmeny	Spruce Manor Special Care Home [SCH]	797
	Duck Lake	Goodwill Manor [SCH]	751
	Humboldt	St. Mary's Villa [SCH]	793
	Langham	Langham Senior Citizens Home [SCH]	798
	Lanigan	Central Parkland Lodge [SCH]	791
		Lanigan Hospital [ISC beds]	074
	Middle Lake	Bethany Pioneer Village [SCH]	795
	Nokomis	Nokomis Health Centre [SCH]	105
	Rosthern	Mennonite Nursing Home [SCH]	599
	Saskatoon	Central Haven Special Care Home [SCH]	799
		Circle Drive Special Care Home [SCH]	817
		Lutheran Sunset Home [SCH]	806
		Oliver Lodge [SCH]	809
		Parkridge Centre [SCH]	818
		Porteous Lodge [SCH]	807
		Samaritan Place [SCH]	821
		Saskatoon Convalescent Home [SCH]	813
		Saskatoon Extendicare [SCH]	803
		Sherbrooke Community Centre [SCH]	814
		Sherbrooke Community Centre-Veteran's Unit [SCH]	819
		St. Ann's Senior Citizens' Village [SCH]	810
		St. Joseph's Home [SCH]	811
		Stensrud Lodge [SCH]	808
		Sunnyside Adventist Care Home [SCH]	815
	Strasbourg	Last Mountain Pioneer Home [SCH]	792
	Wadena	Pleasant View Care Home [SCH]	789
		Wadena Hospital [ISC beds]	162
	Wakaw	Lakeview Pioneer Lodge [SCH]	754
	Warman	Warman Mennonite Special Care Home [SCH]	816
	Watrous	Manitou Lodge [SCH]; Watrous Hospital [ISC beds]	563; 165
	Watson	Quill Plains Centennial Lodge [SCH]	790
	Wynyard	Golden Acres [SCH]	787

RHA	Community Name	Facility Name	Facility #
Heartland	Biggar	Biggar Diamond Lodge [SCH]	574
		Biggar Hospital [ISC beds]	009
	Davidson	Davidson Health Centre [SCH & ISC beds]	562
	Dinsmore	Dinsmore Health Centre [SCH]	028
	Elrose	Elrose Health Centre [SCH]	565
	Eston	Eston Health Centre [SCH]	566
	Kerrobert	Kerrobert Health Centre [SCH & ISC beds]	573
	Kindersley	Kindersley & District Health Centre (Heritage Manor) [SCH & ISC beds]	572
	Kyle	Kyle Health Centre [SCH]	069
	Lucky Lake	Lucky Lake Health Centre [SCH]	082
	Macklin	St. Joseph's Health Centre [SCH]	085
	Outlook	Outlook & District Health Centre [SCH]	110
	Rosetown	Rosetown & District Health Centre [SCH & ISC beds]; Wheatbelt Centennial Lodge [SCH]	567; 568
	Unity	Unity & District Health Centre [SCH]	576
	Wilkie	Wilkie & District Health Center [SCH]	577
Kelsey Trail	Arborfield	Arborfield & District Health Care Centre [SCH]	767
	Carrot River	Carrot River Health Centre [SCH]	755
	Hudson Bay	Hudson Bay Health Care Facility [SCH]	764
	Kelvington	Kelvindell Lodge [SCH]	788
	Melfort	Parkland Place [SCH]	761
	Nipawin	Pineview Lodge [SCH]	756
	Porcupine Plain	Porcupine Carragana Hospital [ISC beds]	116
		Red Deer Lodge [SCH]	765
	St. Brieux	Chateau Providence [SCH]	762
	Tisdale	Newmarket Place [SCH]	768
		Sasko Park Lodge [SCH]	766
Prince Albert Parkland	Big River	Big River Health Centre [SCH]	590
	Birch Hills	Birchview Nursing Home [SCH]	593
	Canwood	Whispering Pine Place [SCH]	591
	Hafford	Hafford Special Care Centre [SCH]	597
	Kinistino	Jubilee Lodge [SCH]	758
	Leask	Wheatland Lodge [SCH]	592
	Leoville	Evergreen Health Centre [SCH]	077
	Prince Albert	Herb Bassett Home [SCH]	594
		Mont St. Joseph Home [SCH]	595
		Pineview Terrace Lodge [SCH]	596
	Shellbrook	Parkland Terrace [SCH]	588
	Spiritwood	Spiritwood Health Complex [SCH]	589

RHA	Community Name	Facility Name	Facility #
Prairie North	Battleford	Battleford District Care Centre [SCH]	578
	Cut Knife	Cut Knife Health Complex [SCH]	586
	Edam	Lady Minto Health Care Centre [SCH]	033
	Goodsoil	L. Gervais Memorial Health Centre [SCH]	045
	Lloydminster	Dr. Cooke Extended Care Centre [ISC beds]	87418
		Jubilee Home [SCH]	582
	Loon Lake	Loon Lake Health Centre & Special Care Home [SCH]	081
	Maidstone	Maidstone Health Complex (Pine Island Lodge) [SCH]	583
	Meadow Lake	Northland Pioneers Lodge [SCH]	587
	North Battleford	River Heights Lodge [SCH]	579
		Villa Pascal [SCH]	580
	St. Walburg	St. Walburg Health Complex [SCH]	584
	Turtleford	Riverside Health Complex [SCH]	585
Mamawetan Churchill River	La Ronge	La Ronge Health Centre [SCH & ISC beds]	757
Keewatin Yatthé	Ile a la Crosse	St. Joseph's Health Centre [ISC beds]	056
	La Loche	La Loche Health Centre [SCH]	301
Athabasca Health Authority	Black Lake	Yutthe Dene Nakohodi Health Centre (Athabasca Health Centre) [ISC beds]	548

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Appendix E: EpiData Entry

EpiData Entry, Getting Started

The following information is intended to help users start using EpiData Entry and includes how to install and how to use the software.

EpiData Entry software

We are currently using EpiData Entry version: 3.1 Build: (27jan2008). The link to the EpiData website where EpiData Entry can be downloaded is http://www.epidata.dk/download.php#ee.

The EpiData Entry.exe file is found on the EpiData website under the 'EpiData Entry' heading in the English row, from here select the 'Complete Setup, 28 Jan 2008 (0.9Mb)' file.

Note: You will most likely need permission from your IT department to install the EpiData Entry software.

CDI Electronic Report Form

The provincial Infection Control Coordinator will email the CDI Electronic Report Form files to the health region ICPs when data entry is to begin. If there are no revisions to the files between quarters, ICPs may continue to enter data into the same files.

Once you receive the email with the CDI Electronic Report Form files, save each into a 'CDI Surveillance Folder' that you create for easy access. The 'CDI Surveillance Folder' should be located on your network drive so that the surveillance information can be routinely backed up by your IT department. The CDI Electronic Report Form is made up of 3 files that have the following generic format:

1. CDI_surv_dataentry_*[version#]*.qes → the questionnaire;
2. CDI_surv_dataentry_*[version#]*.chk → contains the defined report form checks; and
3. CDI_surv_dataentry_*[version#]*.rec → the surveillance data is stored here.

Again, save these files in the 'CDI Surveillance Folder.'

Display Setup

It is strongly recommended that data entry staff set up their EpiData Entry display before beginning to enter CDI cases. While this is not required, doing this will help the fields to line up properly, and creates a better print format. To adjust the way the CDI Electronic Report Form looks, please do the following:

- Open EpiData from the main screen and close the CDI Electronic Report Form. Click on 'File' (top left hand corner); select 'Options' from the menu.
- From 'Options', select the 'Show Data Form'; select the 'Calibri' font and the 12pt font size. You can also change the background colour (a grey background is recommended). Click 'OK' to save your changes.

Now, when you open the CDI Electronic Report Form, your view will be updated and the fields will align.

Shortcuts that may help with EpiData Entry

The following information can also be found in the EpiData Entry Help menu by selecting the 'Keyboard Short-cuts' option from the drop down menu. Useful keyboard short-cuts:

- **Control + P** (or from the File menu if you choose Print Data form) allows you to print the current view of the opened CDI Electronic Report Form.
- **F5 Key** is used to add additional patient notes for specific cases.
- **F9 Key** is used to bring back the drop down menu if it disappears during data entry.

To begin entry of data into EpiData

1. Run the EpiData Entry program (double click on icon from desktop).
2. When you run the EpiData Entry program you will see the main screen. At the top of the EpiData Entry screen there is a toolbar numbered from 1 to 6. Click on '**4. Enter Data'**, and an 'Open' window appears. Find where the **CDI_surv_dataentry*_[version#]*.rec** file is saved, and open it.

   Note: The **CDI_surv_dataentry*_[version#]*.rec** file cannot be directly opened by double clicking on the file.
3. Once you have opened the current **CDI_surv_dataentry*_[version#]*.rec** file, you should see the CDI Electronic Report Form. You can now start entering surveillance data.
4. It is important to enter surveillance data into the CDI Electronic Report Form in the order that the questions are laid out (i.e. top to bottom). If you need to move back and forth through the report form it is best to use the keyboard 'up arrow' and 'down arrow' keys or the Tab, (Shift Tab) key. Do not use the mouse, if possible, as using the mouse can lead to data entry errors. Controls built into the CDI Electronic Report Form file are NOT checked if you move to different fields using the mouse. If you use the mouse to move between fields during data entry you may produce invalid data.

   The only situation where using the mouse is recommended is if you wish to exit a field in which restrictions are made (e.g. a field where information must be entered). In these situations you may get caught in an endless loop (e.g. by having "must enter" in a field, and it turns out that the value was not possible for some patients/residents). This is the only situation where using the mouse is good practice during data entry.
5. When you have completed entering the required surveillance information for each CDI case, a 'Confirmation Box' will appear and ask you to save the record to the disk. Select 'Yes' to save it. Once you have saved the CDI case record, a new blank CDI Report Form will appear and you can then continue and enter the next CDI case information.

Appendix F: Sample Denominator Report Form

Below is a sample of the Denominator Report Form sent to each health region. The numbers provided are estimated from other provincial data sources. Region ICPs need only check that the numbers are reasonable. If there was a recent change (e.g. bed closures) that may have resulted in different values, enter the changes, and send back along with EpiData file (see Appendix J for how to submit quarterly data).

Flatland Health Region
2012-13 Denominator Form for CDI Surveillance

Patient / Resident Days

Facility ID	Community	Facility Name	Q1 [Apr - Jun]	Q2 [Jul - Sep]	Q3 [Oct - Dec]	Q4 [Jan - Mar]	2012-13
Hospitals							
900	Podunk	Podunk Hospital	30,000				30,000
904	Squareville	Edwin A. Abbott Memorial Hospital	1,500				1,500
							0
							0
		Sub-Total	*31,500*	*0*	*0*	*0*	*31,500*
Long-Term Care Facilities							
952	Pallukahville	Pallukah Seniors Care Centre	16,000				16,000
900	Podunk	Podunk Hospital	1,000				1,000
961	Podunk	St. Festivus Home for the Aged	6,700				6,700
969	Squareville	Squareville Flatlanders Special Care Home	2,250				2,250
913	Wysiwyg	Plainview Health Complex	3,600				3,600
							0
		Sub-Total	*29,550*	*0*	*0*	*0*	*29,550*
		Region Total	**61,050**	**0**	**0**	**0**	**61,050**

Estimates are based on days for all acute care inpatients, and for all residents in long-term care facilities. Days for newborns are excluded.

Appendix G: Optional Outpatient Reporting (CDI Cases Not Admitted)

The CDI Electronic Report Form allows outpatient CDI data to be collected by health regions. Optional outpatient reporting applies to patients who are not admitted to a facility, but who are diagnosed with CDI during a visit to their physician or treated in another outpatient setting. Patients who have frequent contact with the healthcare system may be at greater risk of developing CDI.[30] Outpatient units may include, but are not limited to, the following:

- cancer centre
- dialysis unit
- emergency room (not admitted)
- physician clinic or office.

To enter outpatient CDI case information into the CDI Electronic Report Form the 'Outpatient' option must be selected from the 'Type of Patient Care Received' field, which is located in the 'Facility Information' section. The optional outpatient surveillance does not capture information regarding the 30-day outcome, as this information would not be available to the ICP.

Community-Onset Healthcare-associated CDI YOUR Facility (CO-HA-CDI-Y)

- The patient's CDI symptoms begin in the community; **AND**
- the patient was diagnosed in YOUR healthcare facility but was not admitted (e.g. diagnosed in emergency room or outpatient unit), **AND** was an outpatient or discharged from YOUR healthcare facility within the previous 4 weeks.

Community-Onset Healthcare-associated CDI ANOTHER Facility (CO-HA-CDI-AF)

- The patient's CDI symptoms begin in the community; **AND**
- the patient was diagnosed in a community medical clinic or a healthcare facility, but was not admitted, **AND** was an outpatient or discharged from ANOTHER healthcare facility in the previous 4 weeks.

CO-HA-CDI-AF cases are attributed to the facility from which the patient was last discharged. This information is captured by the CDI Electronic Report Form (Appendix A) in the 'Patient Information and History' section.

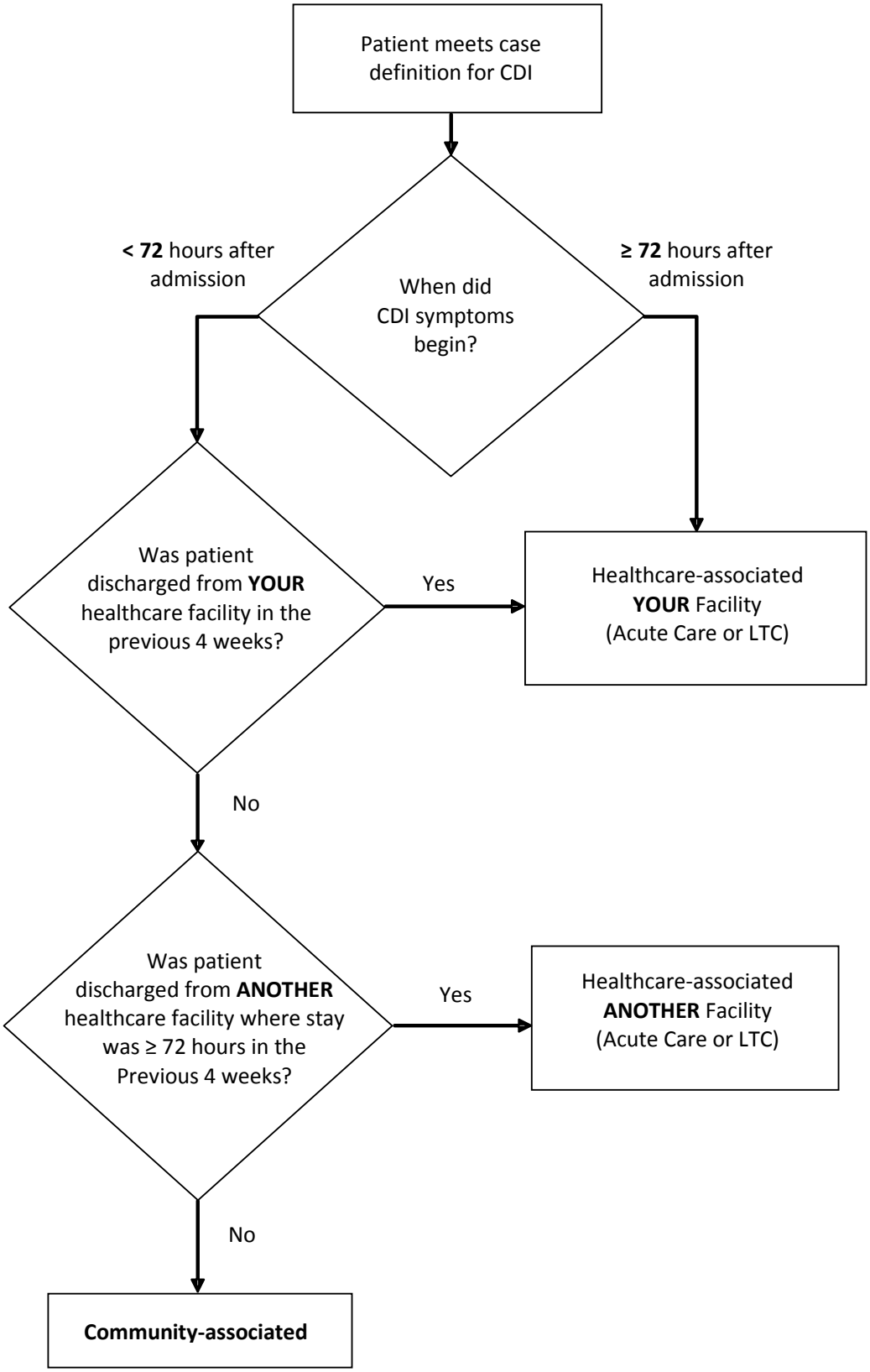
The appropriate follow-up by the ICP for a potential CO-HA-CDI-AF case is to contact the ICP from the healthcare facility where the patient was previously seen as an outpatient or admitted. However, data entry into the CDI electronic report form will be performed ONLY by the ICP in the facility/health region in which the patient was diagnosed.

Community-Onset Community-associated CDI (CO-CA-CDI)

- The patient's CDI symptoms begin in the community; **AND**
- the patient was diagnosed in a community clinic or a healthcare facility, but was not admitted, **AND** was <u>not</u> an outpatient or discharged from a healthcare facility in the previous 4 weeks.

[30] Chang, Krezolek, Johnson et al., 930.

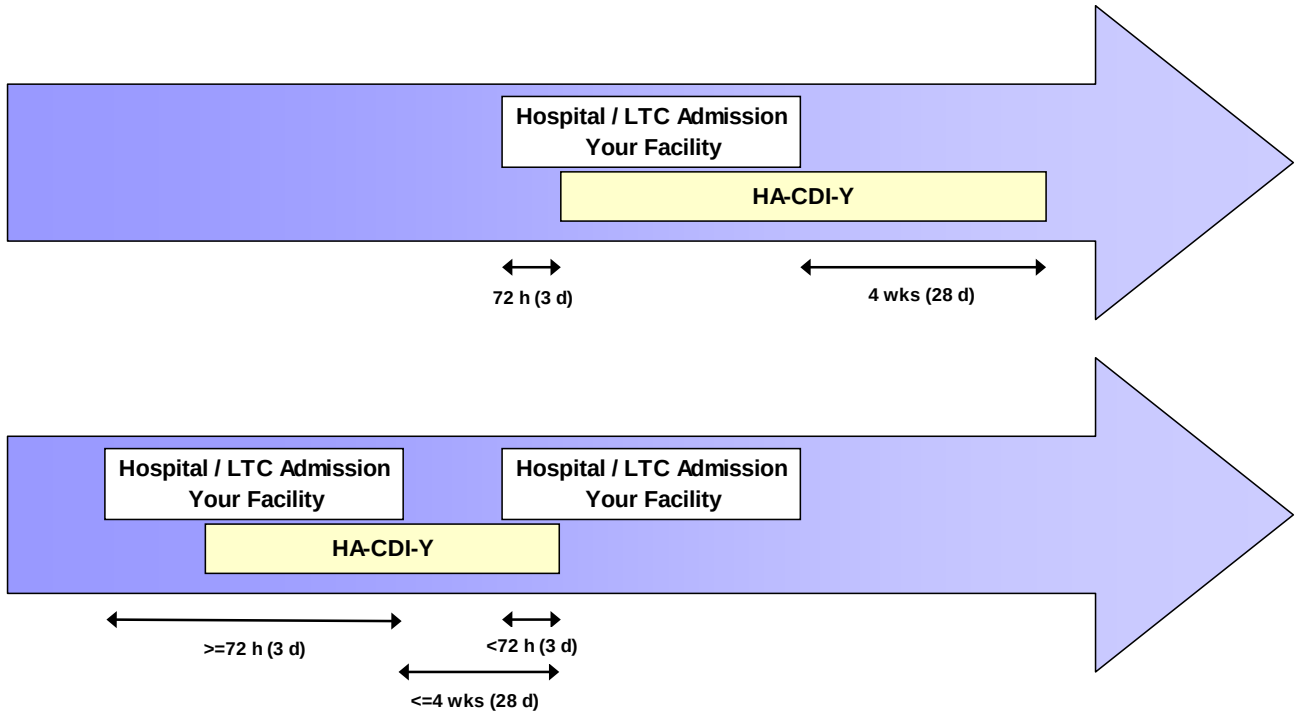
Appendix H: Flowchart for CDI Surveillance



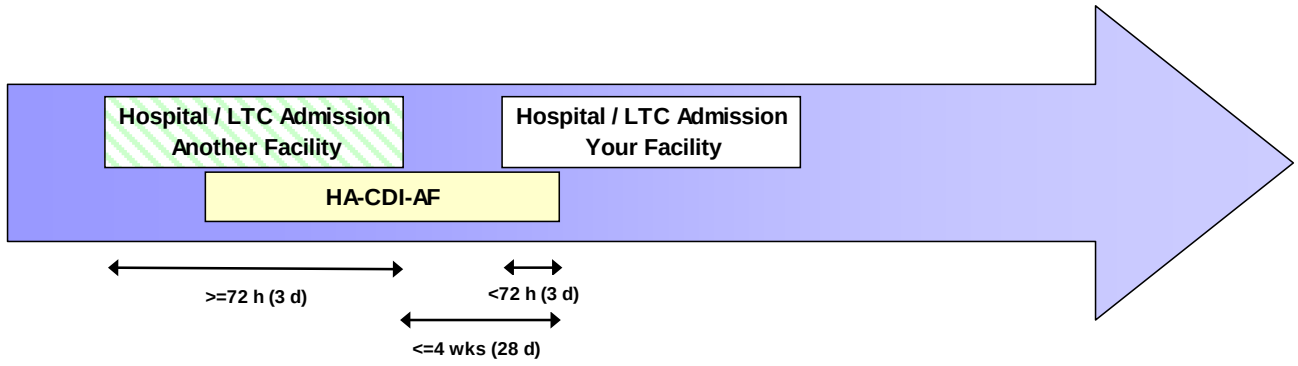
Appendix I: CDI Exposure and Case Definition Diagrams

Exposure Categories

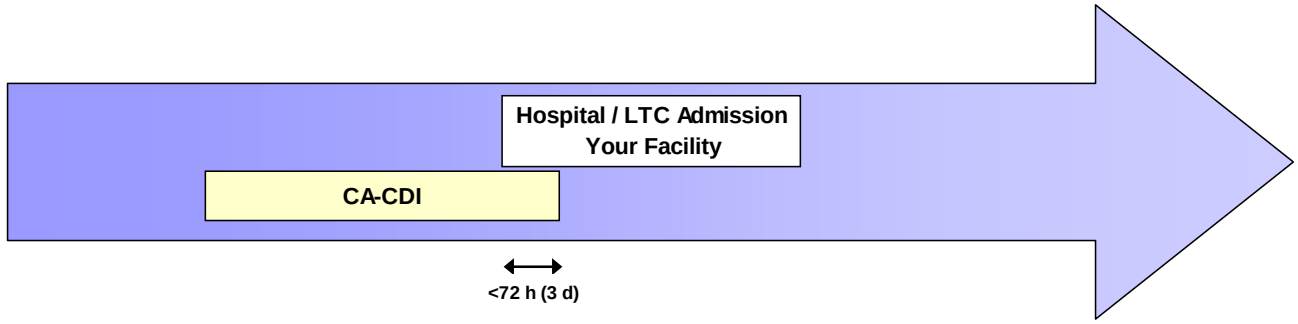
HA-CDI-Y: healthcare-associated, your facility



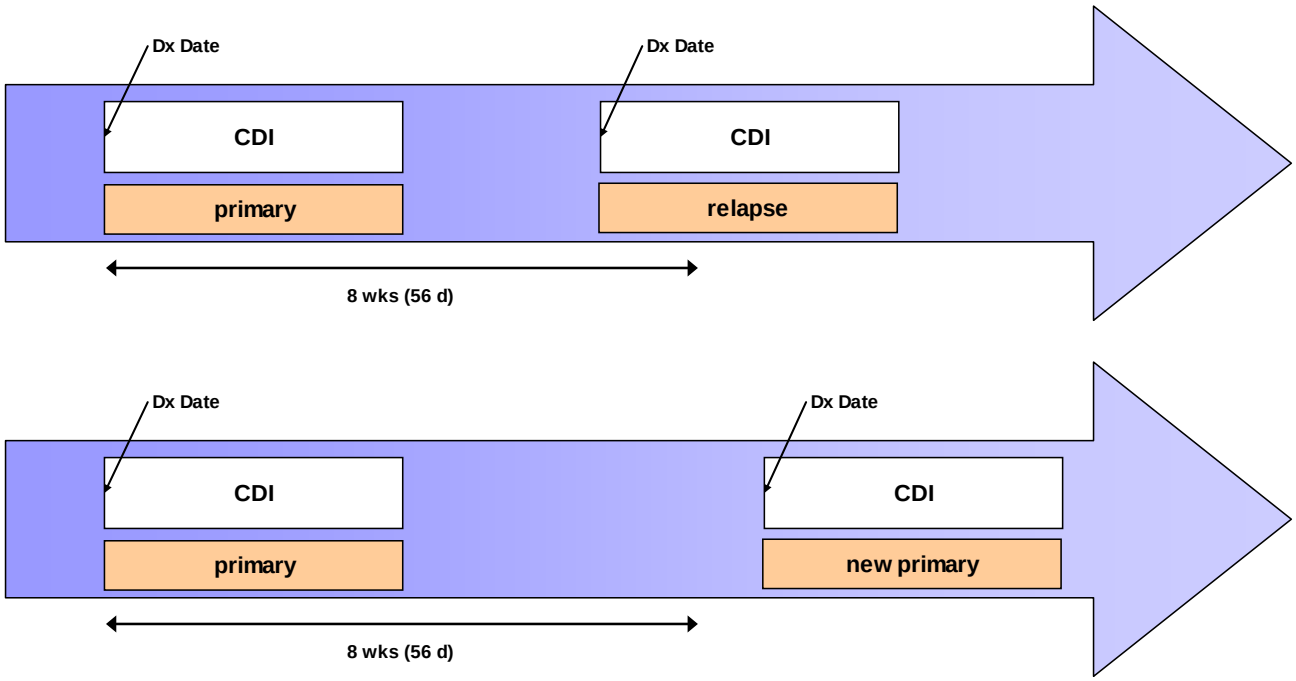
HA-CDI-AF: healthcare-associated, another facility



CA-CDI: community-associated



Case Definition: Primary Case vs. Relapse



Appendix J: Quarterly Data Submission

The CDI reporting periods are based on the fiscal year. The reporting quarters are defined as follows:

Reporting Period		**Data to be submitted by:**
First Quarter	April 1 – June 30	August 15
Second Quarter	July 1 – September 30	November 15
Third Quarter	October 1 – December 31	February 15
Fourth Quarter	January 1 – March 31	May 15

Check for Errors

Each quarter, before sending your compiled surveillance data to the provincial Infection Control Coordinator, it is recommended that you first check your surveillance data for accuracy and completion. EpiData Entry has some automatic checking capabilities built into the program. These checks help to ensure that no required fields have been missed during data entry into the CDI Electronic Report Form. You can also view a summary of all the surveillance information that you have collected.

To view the summary, the data entry window must be closed. From the EpiData main screen toolbar, click on **'5. Document'**, and then select 'View Data' from the drop down list. This will open up a spreadsheet displaying all the CDI case records allowing the ICP to review each record to determine if there are any missing data elements.

Data Submission

Compiled data must be sent **each quarter** to the provincial Infection Control Coordinator by the dates above. To export your surveillance data into Microsoft Excel:

1. Open EpiData, and close the data entry window.
2. From the main screen toolbar, select '6. Export Data'.
3. From the drop down list, select the 'Excel' option and ensure that 'all records' and 'skip deleted records' are both selected.
4. EpiData Entry will then create an Excel file of your data entry within the 'CDI Surveillance Folder'. Make note of the name of the file created.
5. Open your email program (e.g. Microsoft Outlook) and create a new email.
6. The email subject title should contain the following information: health region acronym, the reporting year, and reporting quarter (e.g. SCHR-2012-Q1).
7. Using your email program, find and attach the current excel file that contains the CDI surveillance information.
8. Email the excel file, as well as any changes in the denominator form (Appendix F), to the provincial Infection Control Coordinator: Lesley.mcleod@pophealthnorthsask.sk.ca

Appendix K: Antibiotic and Proton Pump Inhibitor Supplement for CDI Surveillance

Note: This list is comprehensive, but does not include every antibiotic and indication for use.

Class	Type and/or Common Indications for Use	Generic Name	Brand Name®
β-lactams	Inhibit cell wall synthesis		
Cephalosporins Action: bind to penicillin-binding proteins	1st generation • Mainly skin and soft tissue infections • Good gram pos+ and modest gram neg- activity	**cefazolin** **cephalexin**	generic generic
	2nd generation • Some respiratory and abdominal infections • Enhanced gram neg- activity	**cefuroxime sodium** **cefuroxime axet**il **cefaclor** **cefprozil** **cefoxitin**	generic Ceftin, generic Ceclor, generic Cefzil, generic generic
	3rd generation • Oral - broad range mild to moderate skin infections • Parenteral - serious infections like meningitis or HCAIs	**cefotaxime** **ceftazidime** **ceftriaxone**	Claforan, generic Fortaz, generic generic
	4th generation • Serious infections or resistant organisms • Broad spectrum against gram neg- bacteria	**cefepime**	Maxipime, generic
Penicillins Action: inhibit bacterial enzymes	penicillin • Aerobic gram pos+, some fastidious aerobic gram neg- activity	**penicillin G benzathine** **penicillin G sodium** **penicillin V**	Bicillin L-A Crystapen,generic generic
	aminopenicillins • Wider range of infections	**amoxicillin** **ampicillin**	generic generic
	penicillinase-stable penicillins • penicillinase-producing *Staphylococcus* spp. activity	**cloxacillin**	generic
β-lactam/ β-lactamase inhibitor combinations	Most gram pos+ and gram neg-	**amoxicillin-clavulanic acid** **piperacillin-tazobactam** **ticarcillin-clavulanic acid**	Clavulin, generic Tazocin Timentin
Monobactams	Aerobic gram neg- only	**aztreonam**	Cayston
Arbapenems	Carbapenems • Broad spectrum against non-carbapenemase producing aerobic and anaerobic gram pos+ and gram neg-	**doripenem** **ertapenem** **imipenem-cilastatin** **meropenem**	Doribax Invanz Primaxin, generic Merrem, generic

Class	Type and/or Common Indications for Use	Generic Name	Brand Name®
NON β-lactams			
Licosamines Action: inhibit protein synthesis	• Strep and Staph infections, respiratory infections and lung abscesses • Aerobic gram pos+ cocci and anaerobes	**clindamycin**	Dalacin C, generic
Fluoroquinolones Action: target DNA and cell division	• Sepsis, urinary tract infections, community acquired pneumonia, bacterial prostatitis, bacterial diarrhea • Effective against many gram pos+ and gram neg-	**ciprofloxacin** **levofloxacin** **moxifloxacin** **ofloxacin** **norfloxacin**	Cipro, Cipro XL, generic Levaquin, generic Avelox generic generic
Sulphonamides Action: inhibit folate pathways	• UTIs and some burns • Some gram pos+ and gram neg- activity	sulfamethoxazole-trimethoprim **trimethoprim**	Septra, generic (regular & double strength) generic
Macrolides Action: inhibit protein synthesis	• Fastidious gram pos+ and gram neg- bacteria	**azithromycin** **clarithromycin** **erythromycin**	Zithromax, Z-PAK, Zmax SR, generic Biaxin, Biaxin BID, Biaxin XL, generic Eryc, generic
Aminoglycosides Action: inhibit bacterial protein synthesis	• Aerobic gram neg- activity • Can be used at high doses in combination with other antibiotics against gram pos+	**amikacin** **gentamicin** **tobramycin**	generic generic TOBI, generic
Glycopeptides Action: inhibit cell wall synthesis	• Aerobic gram pos+ activity	**vancomycin**	Vancocin, generic
Tetracylines Action: inhibit protein synthesis	• Mycoplasmal infections, Lyme disease, Chlamydial infections • Gram pos+ and gram neg-	**doxycycline** **minocycline** **tetracycline**	Vibra-Tabs, Vibramycin, generic Minocin, generic generic
Glycylcyclines		**tigecycline**	Tygacil
Nitrofurans Action: bind ribosomal proteins	• Gram pos+ and gram neg- causing UTIs	**nitrofurantoin**	MacroBID, generic
Nitromidazoles Action: disrupt cell DNA	• Various anaerobic bacteria including *C. difficile*	**metronidazole**	Flagyl, generic
Ansamycins Action: interfere with nucleic acid synthesis	• Tuberculosis and leprosy	**rifabutin** **rifampin**	Mycobutin Rifadin, Rofact, Rifater
Oxazolidonones Action: inhibit protein synthesis	• Serious infections caused by resistant strains of gram pos+ bacteria	**linezolid**	Zyvoxam

Proton Pump Inhibitors reduce the production of gastric acid by blocking the enzyme in the wall of the stomach that produces acid. The reduction of acid is useful in the prevention and treatment of: ulcers, gastroesophageal reflux disease (GERD), Zollinger-Ellison syndrome and, in combination with antibiotics, to eradicate Helicobacter pylori.

Available proton pump inhibitors include:

- omeprazole (**Losec, generic brands**)
- lansoprazole (**Prevacid, generic brands**)
- rabeprazole (**Pariet, generic brands**)
- pantoprazole (**Pantaloc, Tecta, generic brands**)
- esomeprazole (**Nexium, generic brands**)

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