



**Healthcare-associated Infections
Annual Report
2011-2017**

December 2018

HAI Annual Report

TABLE OF CONTENTS

INTRODUCTION.....	1
METHICILLIN-RESISTANT <i>STAPHYLOCOCCUS AUREUS</i> INFECTIONS	2
MRSA SURVEILLANCE.....	3
<i>CLOSTRIDIUM DIFFICILE</i>-INFECTION	6
CDI SURVEILLANCE.....	7
APPENDIX A: MRSA DEFINITIONS.....	11
APPENDIX B: CDI DEFINITIONS	12
APPENDIX C: REFERENCES	13

List of Figures

Figure 1: Incidence rate of MRSA infections in acute care facilities, Newfoundland and Labrador, 2011 – 2017	3
Figure 2: Incidence rate of MRSA infections in long term care facilities, Newfoundland and Labrador, 2011 – 2017.....	4
Figure 3: Incidence rate of community and healthcare-associated (not hospitalized cases) MRSA infections, Newfoundland and Labrador, 2011 – 2017	5
Figure 4: Incidence rate of <i>Clostridium difficile</i> infections in acute care facilities, Newfoundland and Labrador, 2011 – 2017.....	7
Figure 5: Incidence rate of <i>Clostridium difficile</i> infections in long term care facilities, Newfoundland and Labrador, 2011 – 2017.....	8
Figure 6: Incidence rate of healthcare-associated (not hospitalized cases) <i>Clostridium difficile</i> infections, Newfoundland and Labrador, 2011 – 2017	9
Figure 7: Incidence rate of community-associated <i>Clostridium difficile</i> infections, Newfoundland and Labrador, 2011 – 2017.....	10

Introduction

Healthcare-associated infections (HAIs) are infections acquired while receiving health care whether the individual is in a hospital, long-term care facility, ambulatory care, or home. An estimated 8,000 Canadians die each year from HAIs while approximately 200,000 others get infected.¹

In Canada, two of the most common causes of HAIs are methicillin-resistant *Staphylococcus aureus* (MRSA) and *Clostridium difficile* bacteria. These are among the nine priority organisms that have shown resistance to antimicrobials that are being monitored under the Public Health Agency of Canada's surveillance systems.²

Surveillance of HAIs provides important information to help identify at risk populations, inform health departments on emerging resistance trends as well as to evaluate the effectiveness of infection prevention and control programs. Since 2010, Provincial Infection Control Newfoundland and Labrador (PIC-NL) identified surveillance for HAIs as a priority initiative and established a protocol for MRSA infections and colonizations and for *Clostridium difficile* infections (CDIs) surveillance.^{3,4} Regional statistics are reported to the Provincial Department of Health and Community Services by the Regional Health Authorities (RHAs).

This report presents an overview of the annual incidence of MRSA infections and CDIs in acute care and long-term care facilities in Newfoundland and Labrador from January 01, 2011 to December 31, 2017. MRSA infections and CDIs identified in out-patient settings and in the community are also provided. Definitions are included in Appendix A and B.

Methicillin-resistant *Staphylococcus aureus* Infections

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a strain of *Staphylococcus aureus* resistant to all the beta-lactam classes of antibiotics including commonly-used products such as penicillin, amoxicillin and oxacillin. While MRSA usually causes skin and soft tissue infections, bacterial pneumonia and blood stream infections are more serious illnesses that can occur. MRSA has historically been associated with hospitals and other healthcare settings; however, community-associated MRSA is increasingly common.

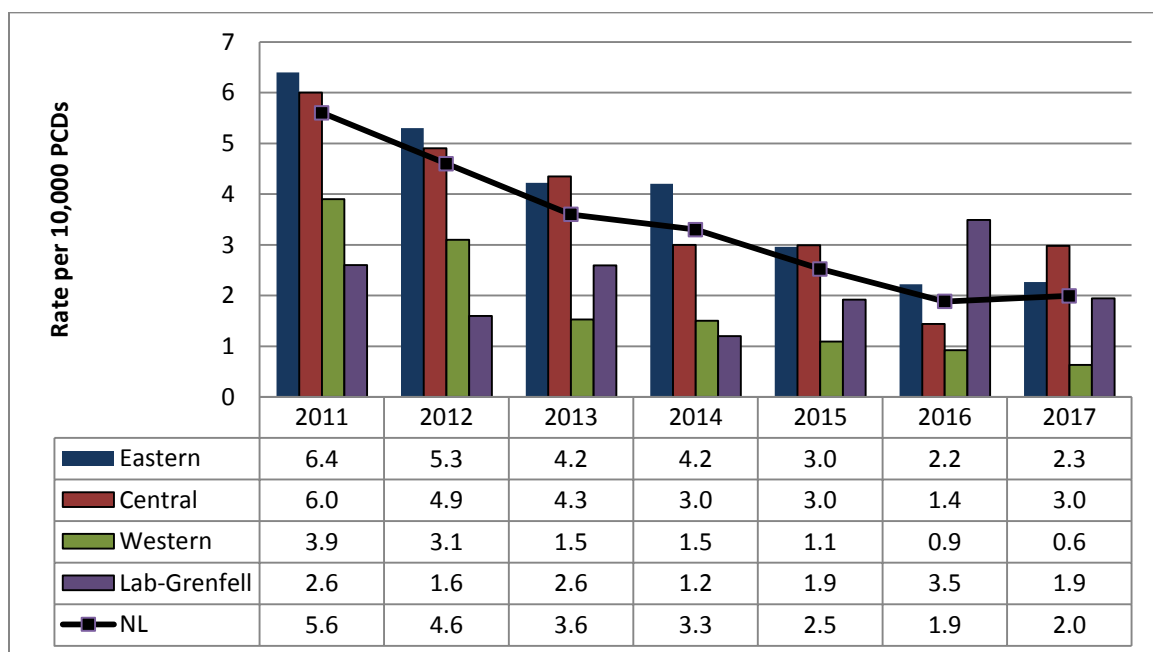
The Public Health Agency of Canada reported a steady decrease in healthcare-associated MRSA infection rates across Canada from 2013 to 2017. During the same time period, community-associated MRSA infection rates increased.⁵

The Provincial MRSA Surveillance Protocol includes standard case definitions for MRSA infections and colonizations.³ In Newfoundland and Labrador, MRSA is reportable to the provincial Department of Health and Community Services. RHAs monitor and report on MRSA using standard definitions (Appendix A). MRSA infection occurs when micro-organisms are able to multiply within the body and cause a response from the host's immune defenses. Symptomatic or clinical infection is one resulting in clinical signs and symptoms (disease). MRSA colonization is the presence of micro-organisms in or on a host with growth and multiplication but without tissue invasion or cellular injury. The MRSA colonization rates for the RHAs will not be reported in this report due to the differences in the screening protocols in the RHAs. It is important to note that colonization rates are reflective of screening procedures in each health authority.

MRSA Surveillance

The incidence rate of MRSA infections in acute care facilities has been decreasing over time in NL (Figure 1). The rate in Eastern Health decreased from 6.4 per 10,000 patient care days (PCDs) in 2011 to 2.2 per 10,000 PCDs in 2016. Both Central Health and Western Health showed a similar trend, however, the rate in Central Health increased from 1.4 per 10,000 PCDs in 2016 to 3.0 per 10,000 PCDs in 2017. Incidence rates in Labrador-Grenfell Health varied over the same time period which was primarily driven by the low case counts.

Figure 1: Incidence rate of MRSA infections in acute care facilities, Newfoundland and Labrador, 2011 – 2017



HAI Annual Report

The incidence rate of MRSA infections in long term care facilities is much lower than infection rates in acute care facilities. In NL, the incidence rate of MRSA infections in long term care facilities decreased over time from 1.0 per 10,000 resident care days (RCDs) in 2011 to 0.3 per 10,000 RCDs in 2017 (Figure 2). Eastern Health shows a similar trend, while rates in Western Health and Labrador-Grenfell Health varied during the same period. Rates in Central Health have also varied over time, but have decreased in recent years from 1.1 per 10,000 RCDs in 2015 to 0.4 per 10,000 RCDs in 2017.

Figure 2: Incidence rate of MRSA infections in long term care facilities, Newfoundland and Labrador, 2011 – 2017

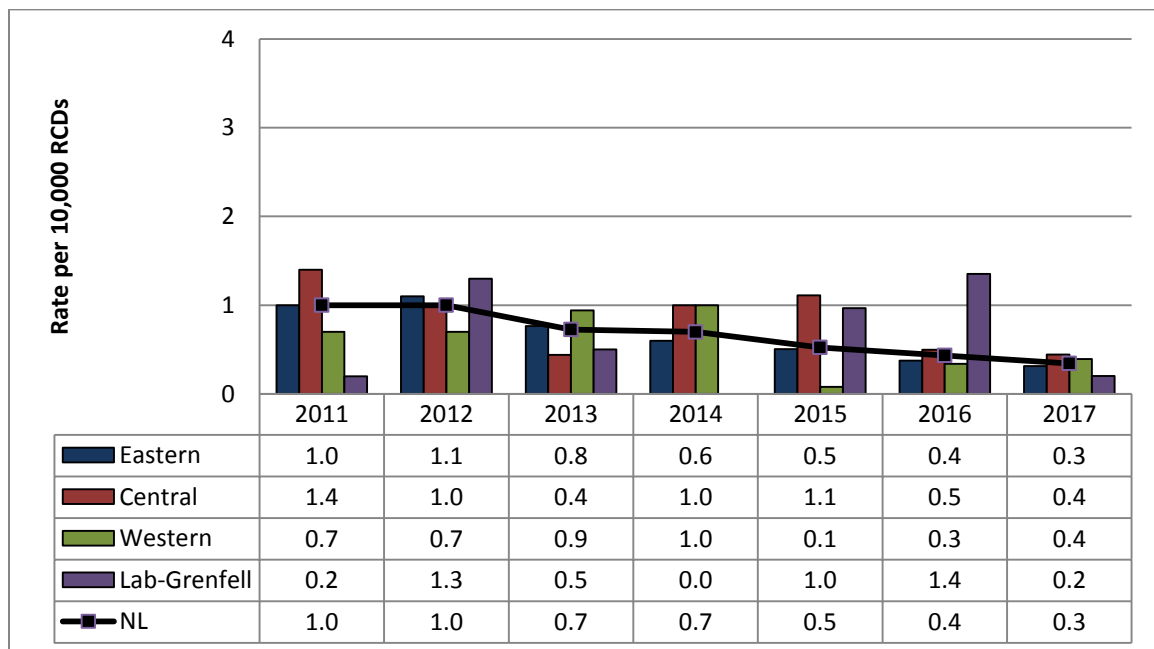
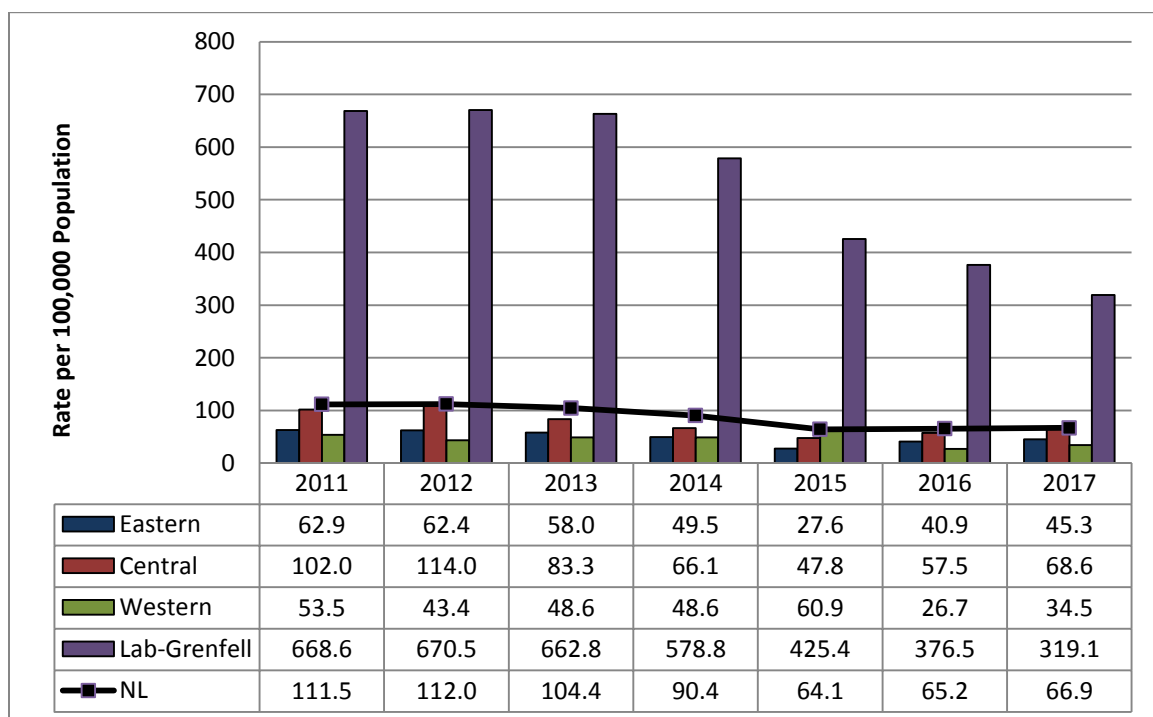


Figure 3 presents the incidence rate of community and healthcare-associated (not hospitalized cases) MRSA infections. Provincially, rates have decreased over time from 112.0 per 100, 000 population in 2012 to 64.1 per 100, 000 population in 2015, with small increases reported in 2016 and 2017 (65.2 per 100, 000 and 66.9 per 100, 000, respectively). Eastern and Central Health show a similar trend to that of the province. Labrador-Grenfell Health continues to report higher rates of community and healthcare-associated (not hospitalized) MRSA infections, however, the rates have decreased from 670.5 per 100, 000 in 2012 to 319.1 per 100, 000 in 2017.

Figure 3: Incidence rate of community and healthcare-associated (not hospitalized cases) MRSA infections, Newfoundland and Labrador, 2011 – 2017



***Clostridium difficile*-Infection**

Clostridium difficile is a bacterium that causes mild to severe diarrhea and intestinal conditions like pseudomembranous colitis (inflammation of the colon). *Clostridium difficile* infection (CDI) has been reported as the most frequent cause of healthcare-associated infectious diarrhea in Canada.⁶ A major risk factor for the development of CDI is the use of antibiotics for unrelated infections; 85% of CDI cases have an antibiotic history.⁷ Certain antibiotics have been more strongly associated with CDIs; clindamycin, broad spectrum cephalosporins and fluoroquinolones.⁷

The Public Health Agency of Canada reported a significant decrease in healthcare-associated CDI infection rates across Canada from 2013 to 2017. Community-associated CDI infection rates decreased from 2015 to 2017.⁵

The Provincial CDI Surveillance Protocol includes standard case definitions.⁴ In Newfoundland and Labrador, CDI is reportable to the provincial Department of Health and Community Services. RHAs monitors and reports on CDI using standard definitions (Appendix B).

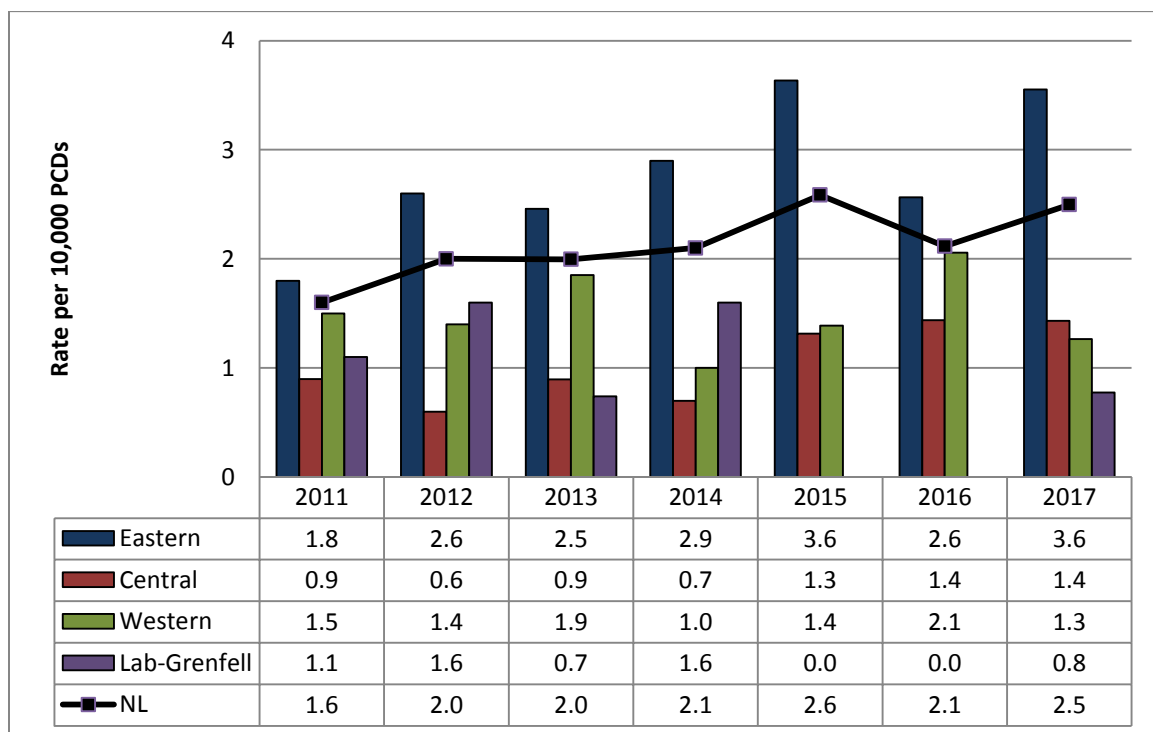
HAI Annual Report

CDI Surveillance

It is important to note that a more sensitive test for CDI was implemented between 2012 and 2013 in NL. Eastern Health began using this test in September 2012, Western in December 2012, Central in October 2013, and Labrador-Grenfell in February 2013.

From 2011 to 2017, the provincial incidence rate of CDI in acute care facilities increased from 1.6 per 10,000 patient care days (PCDs) to 2.5 per 10,000 PCDs (Figure 4). The incidence rate in Eastern Health is consistently higher than the other RHAs; the rate in this region increased from 2014 to 2015 and was variable through to 2017. Central Health saw an increase from 2014 to 2015, and the rate remained stable through to 2017. In Western Health, the incidence rate increased from 2014 to 2016, and decreased in 2017. The incidence rate in Labrador-Grenfell Health has varied over time which was primarily driven by the low case counts.

Figure 4: Incidence rate of *Clostridium difficile* infections in acute care facilities, Newfoundland and Labrador, 2011 – 2017

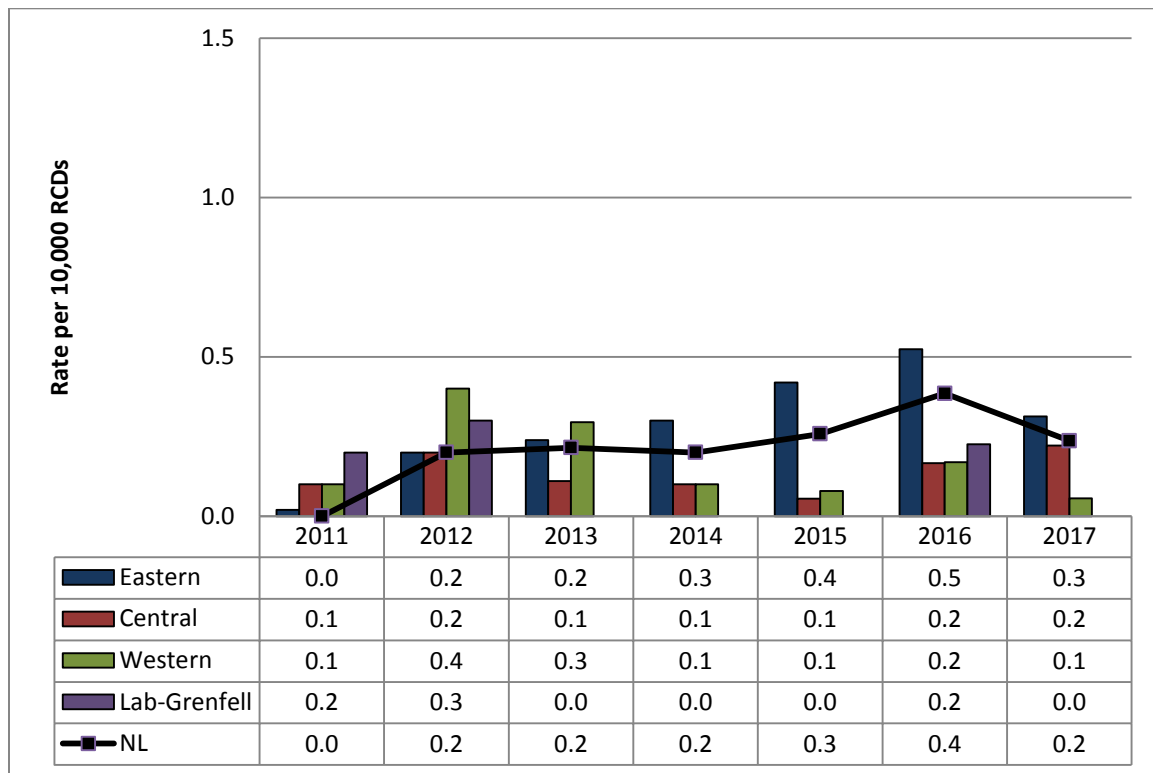


Note: A more sensitive test was used in the regions as follows. Eastern Health in September 2012, Western in December 2012, Central in October 2013, and Labrador-Grenfell in February 2013.

HAI Annual Report

Incidence rates of CDIs in long term care remain lower than that of acute care (Figure 5). In Eastern Health, the rate increased slightly from 2014 to 2016, with a small decrease in 2017. Incidence rates for Central, Western and Labrador-Grenfell Health have remained relatively stable over time.

Figure 5: Incidence rate of *Clostridium difficile* infections in long term care facilities, Newfoundland and Labrador, 2011 – 2017

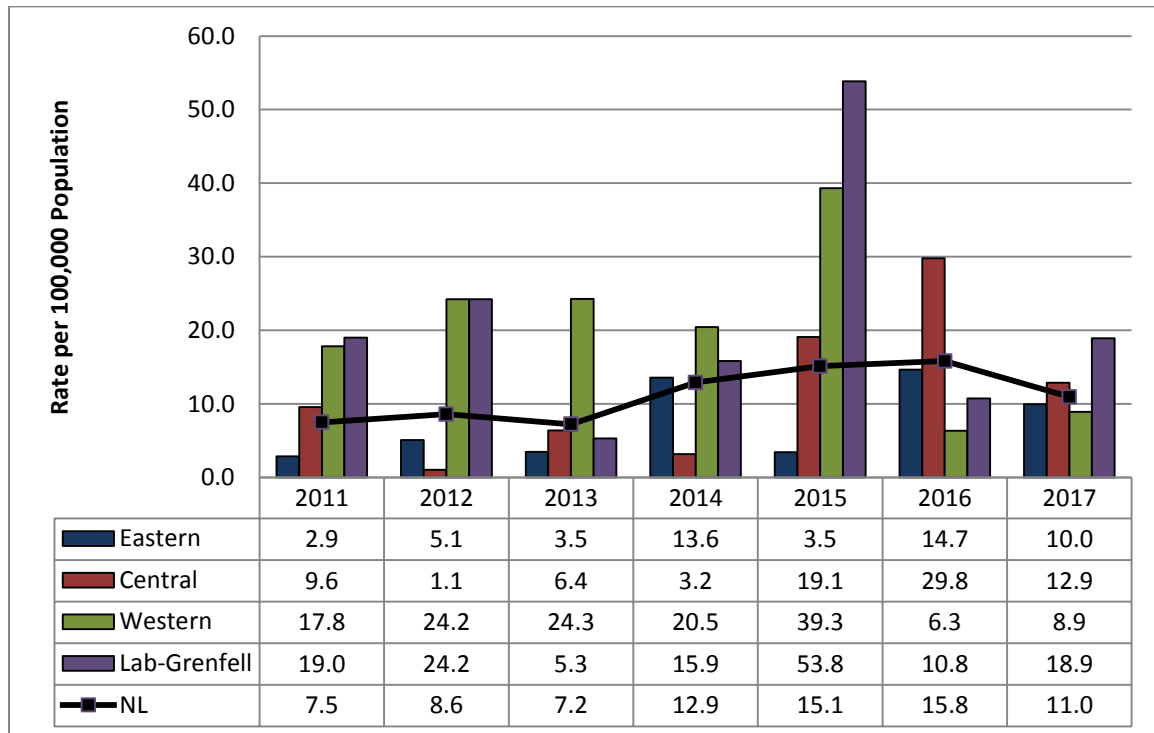


Note: A more sensitive test was used in the regions as follows. Eastern Health in September 2012, Western in December 2012, Central in October 2013, and Labrador-Grenfell in February 2013.

HAI Annual Report

The incidence rate of healthcare associated (not hospitalized) CDI cases in NL and the RHAs has been variable over time (Figure 6). The highest provincial rate was reported in 2016, 15.8 per 100,000 population, while the lowest rate was reported in 2013, 7.2 per 100,000 population.

Figure 6: Incidence rate of healthcare-associated (not hospitalized cases) *Clostridium difficile* infections, Newfoundland and Labrador, 2011 – 2017

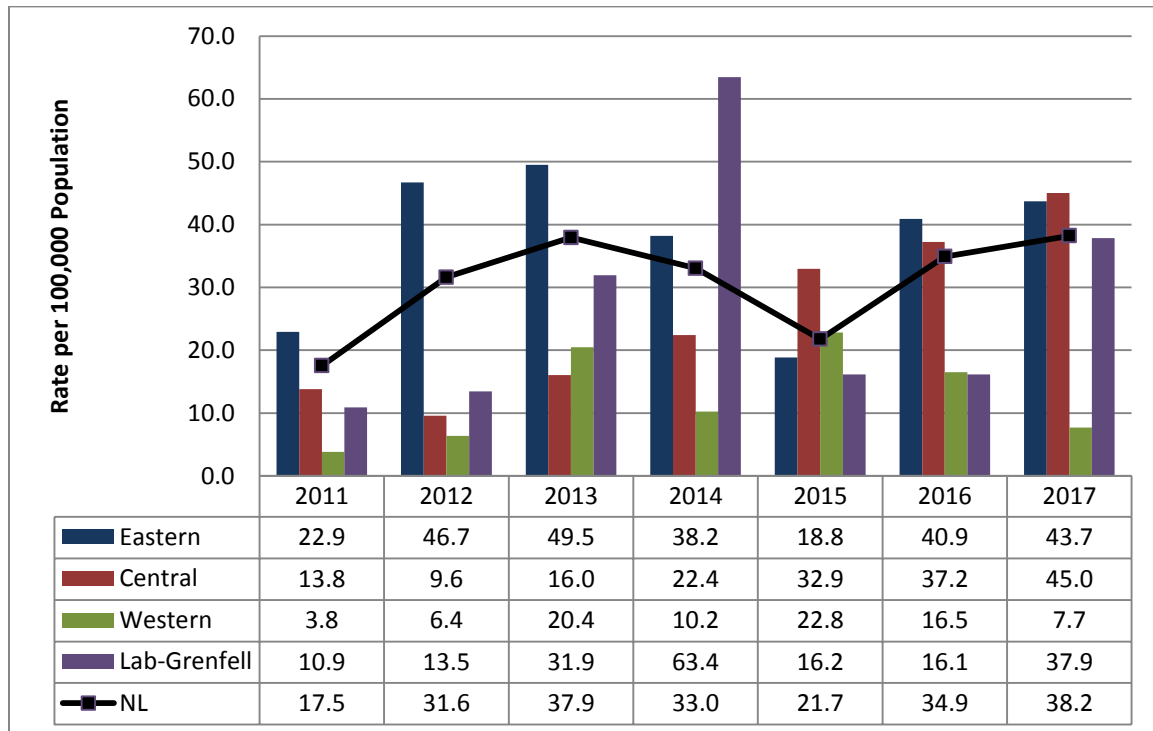


Note: A more sensitive test was used in the regions as follows. Eastern Health in September 2012, Western in December 2012, Central in October 2013, and Labrador-Grenfell in February 2013.

HAI Annual Report

Overall, CDI rates in the community have increased from 2015 to 2017 (Figure 7). Eastern and Central Health have reported a similar trend to that of the province. Rates in Western and Labrador-Grenfell Health have been more variable over time.

Figure 7: Incidence rate of community-associated *Clostridium difficile* infections, Newfoundland and Labrador, 2011 – 2017



Note: A more sensitive test was used in the regions as follows. Eastern Health in September 2012, Western in December 2012, Central in October 2013, and Labrador-Grenfell in February 2013.

Appendix A: MRSA Definitions

MRSA case: Laboratory-reported isolation of *Staphylococcus aureus* from any body site and resistance of the isolate to oxacillin.

MRSA infection: The organism is present in or on the body and is causing symptomatic illness.

MRSA colonization: The organism is present on the body but no cellular injury is occurring and there are no signs or symptoms of infection present. The infection or colonization must be related to identification of *Staphylococcus aureus* from any body site and is a newly identified MRSA case.

Infected cases

Healthcare-associated – (hospitalized) case: The infection was not present on admission with onset of symptoms \geq 48 hours after admission to the acute care facility OR the infection was present at the time of admission but is related to a previous admission to the same facility within the last 12 months.

Healthcare-associated – (long-term care) case: The infection was not present on admission, with onset of symptoms \geq 48 hours after admission to the long-term care facility. If the infection is identified in a resident who has transferred from acute care within the last 48 hours, the infection would be attributed to that acute care facility.

Healthcare-associated – Other (previous definition 2009-2011): Healthcare-associated – refers to infections that occur as a result of contact with the health care system for care provided in any of the following locations: emergency room, ambulatory clinics, personal care homes, doctor's offices, nursing clinics, or care provided in the home within the past 12 months. This definition proved to be problematic for the collection of the data on cases not identified in the hospital or long-term care facility. An updated definition was provided in 2012 see below.

Healthcare-associated - Other (current definition): A case that does not meet the definition for healthcare-associated (hospitalized), healthcare-associated (long-term care) or community-associated infection.

Community-associated case: A case must meet all of the following criteria:

- If admitted, MRSA identified <48 hours after hospital admission.
- No previous history of MRSA.
- No history of hospitalization, surgery or dialysis within one year of MRSA culture.
- Not in residence at a long-term care facility within one year of MRSA culture.
- No indwelling catheter or medical devices (e.g., Foley catheter, IV line, tracheotomy, feeding tube) within one year of MRSA culture

Appendix B: CDI Definitions

CDI case: Clinical illness* and laboratory confirmation of infection:

- a positive *C. difficile* toxin assay (enzyme immunoassay, nucleic acid amplification test or toxigenic cell culture assay) or
- Diagnosis of pseudomembranes on sigmoidoscopy or colonoscopy, or histological/pathological diagnosis of *C. difficile* infection

*Clinical illness consists of diarrhea or fever, abdominal pain and/or ileus. Diarrhea is defined as one of the following: ²¹

- Six, watery stools in past 36 hours;
- Three, unformed stools in 24 hours for at least 1 day; or,
- Eight unformed stools over 48 hours.

Healthcare-associated nosocomial (hospital) acquired: A case in which symptoms occur at least 72 hours or more after the current admission OR symptoms occur in a patient who has been hospitalized at your hospital and discharged within the previous four weeks.

Long-Term Care acquired: A case in which symptoms occur at least 72 hours after the admission and the resident has not had a hospital admission within the last four weeks.

Recurrent CDI: Recurrence of diarrhea within four weeks of a previous *C. difficile* infection episode. A recurrent infection is to be considered a continuation of the previous episode and not a new infection.

Reinfection: A case in which symptoms started more than four weeks from a previous *C. difficile* infection episode.

Episode: The time from the start to the end of symptoms.

Healthcare-associated - Other:

A case that does not meet the definition for healthcare-associated (hospitalized), healthcare-associated (long-term care) or community-associated infection.

Community-associated CDI: A case with symptom onset in the community or three calendar days or less after admission to a healthcare facility, provided that symptom onset was more than four weeks after the last discharge from a healthcare facility.

Appendix C: References

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