COMMUNICABLE DISEASE REPORT

Quarterly Report

Volume 30, Number 3 December 2013

Healthcare-associated Infections

In this quarter, healthcare-associated infections will be highlighted with an overview of the most common infections and the strategies used to prevent and control them such as infection prevention and control protocols and antibiotic stewardship.

Overview

Healthcare-associated infections (HAIs) are infections caused by a wide range of microorganisms often linked to complications of having received health care. It has been estimated that, in Canada, HAIs occur in one in nine hospitalized patients causing longer stays, great pain and even death.[1] In addition to the impact on patients, HAIs cause a reduction in patient flow, which results in overcrowded emergency rooms, over capacity crowding on in-patient units, increased workload, frustrated patients and families, and an increased financial burden.[2] The Public Health Agency of Canada reports an annual health care cost for HAIs as significant; for example, *Clostridium difficile* infections (CDIs) cost $46.1 million and methicillin-resistant *Staphylococcus aureus* (MRSA) cost $36.3 million per year.[3]

The organisms most responsible for causing most angst in health care systems include CDI, MRSA, and vancomycin-resistant enterococcus (VRE). Other organisms with the potential of causing severe havic to health care systems identified as being antimicrobial resistant are extended spectrum beta-lactamase (ESBL) producing bacteria and carbapenem-resistant *Enterobacteriaceae.*

The Public Health Agency of Canada, through the Canadain Nosocomial Infections Surveillance Program (CNISP), collects data on antimicrobial-resistant organisms (AROs) including CDI, MRSA and VRE from 57 hospitals in ten provinces. *Clostridium difficile* infection is the most frequent cause of health care-associated infectious diarrhea in industrialized countries.[5] In Canada, the deaths from CDI increased fourfold between 1997 and 2009 in selected Canadian hospitals.[5] The rate of CDI has been relatively stable in Canadian hospitals between 6.04 and 7.02 per 10,000 patient care days in the years 2007-2012 (Figure 1). Provincial Infection

Control-Newfoundland Labrador (PIC-NL) has been collecting data on HAIs including CDI, MRSA and VRE since 2009. The CDI rate in Newfoundland and Labrador (0.4 – 2.6 per 10,000 patient care days for acute care facilities) is much lower than the national rate and compares with the other CNISP hospitals in Eastern Canada (Figure 1 and Figure 2).

Staphyloccoccus aureus (SA) is a bacterium often found on the skin of healthy people but is commonly the cause of boils and other skin infections. When SA becomes resistant to certain antibiotics called beta-lactams, it is known as methicillin-resistant *Staphylococcus aureus* (MRSA). The increase in MRSA infections in Canadian hospitals has been ongoing since the early 80s. The CNISP report shows a decrease in the rate of MRSA in acute care facilities from 2008 through 2012 (Figure 3). In Newfoundland and Labrador, the rate of MRSA has been higher than the national rate over the four years of data collection; however the rate has shown a significant downward trend in the past two years (Figure 4).

Vancomycin-resistant enterococcus (VRE) rates have had an upward trend across Canadian hospitals (Figure 5). In Newfoundland and Labrador, there have been only a few cases reported in the past ten years.

Figure 1: Healthcare-associated *Clostridium difficile* infection cases incidence rate per 10,000 patient care days, by region of Canada and an overall Canadian rate for Canadian Nosocomial Infection Surveillance Program (CNISP) hospitals, 2007-2012.

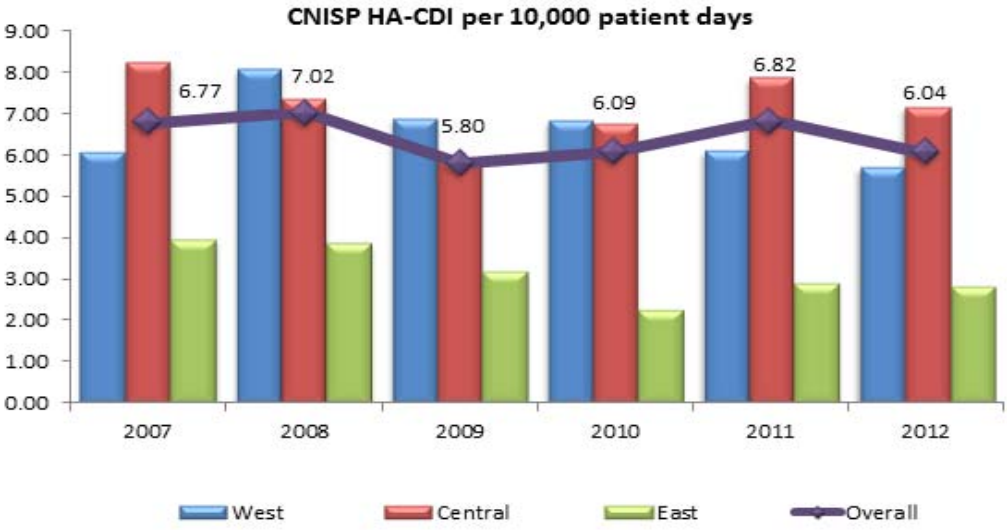


Figure 2: Healthcare-associated *Clostridum difficile* infection cases incidence rate per 10,000 patient care days in Newfoundland and Labrador, 2009-2012.

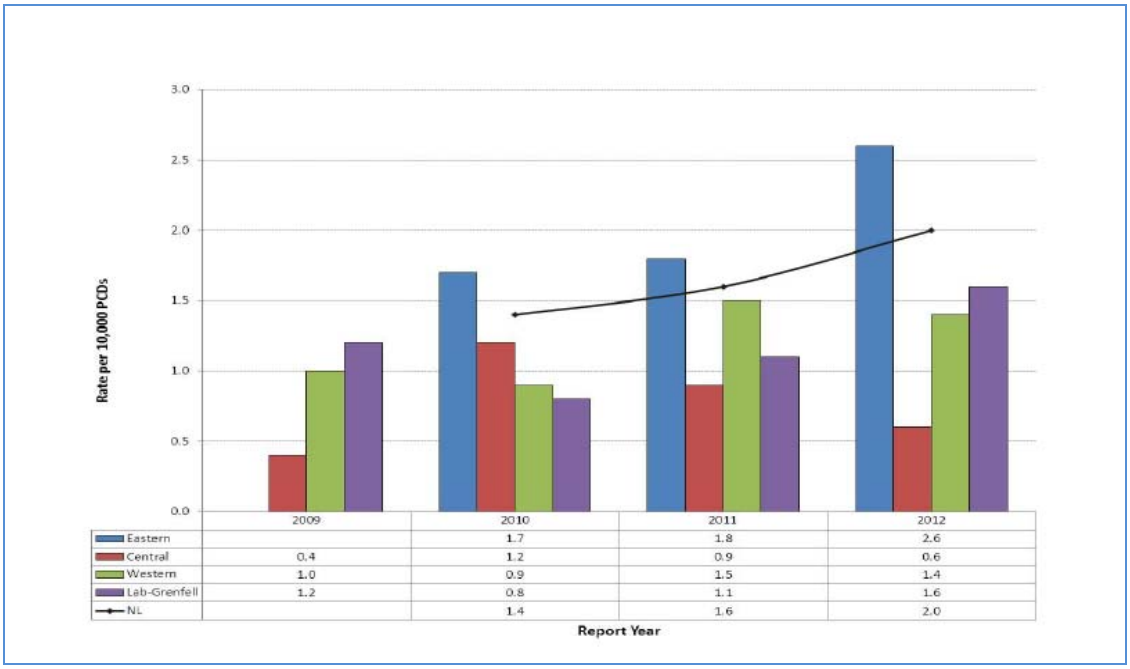


Figure 3: Healthcare-associated methicillin-resistant *Staphylococcus aureus* (MRSA) infection cases incidence rate per 10,000 patient care days by region of Canada and an overall Canadian rate for Canadian Nosocomial Infections Surveillance Program (CNISP) hospitals.

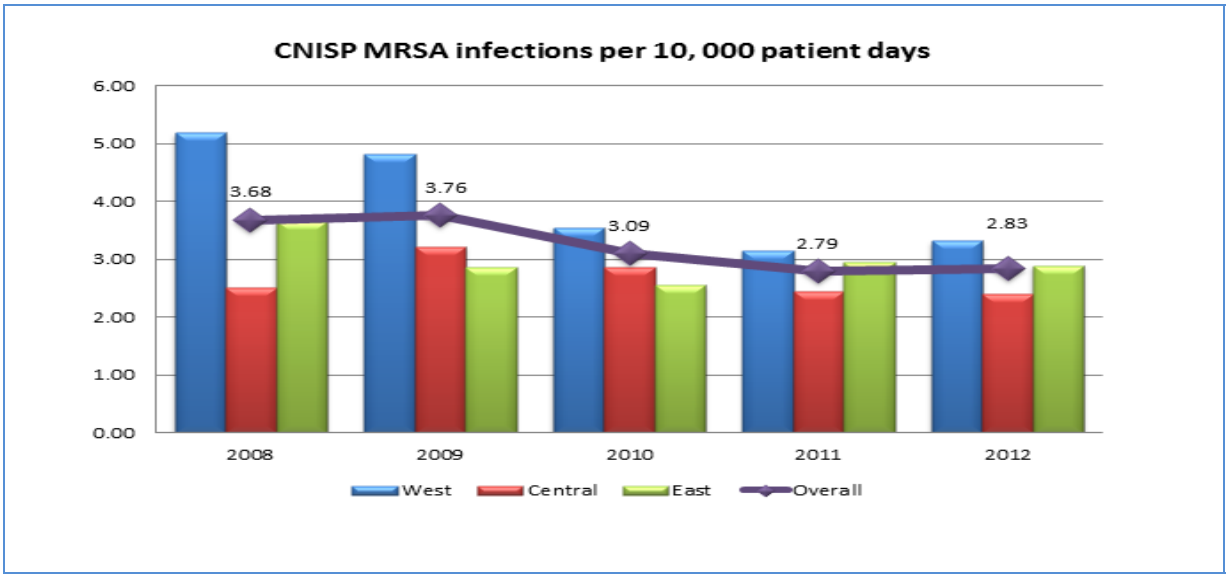


Figure 4: Healthcare-associated methicillin-resistant *Staphylococcus aureus* (MRSA) infection cases incidence rate per 10,000 patient care days, by Regional Health Authority, Newfoundland and Labrador, 2009–2012.

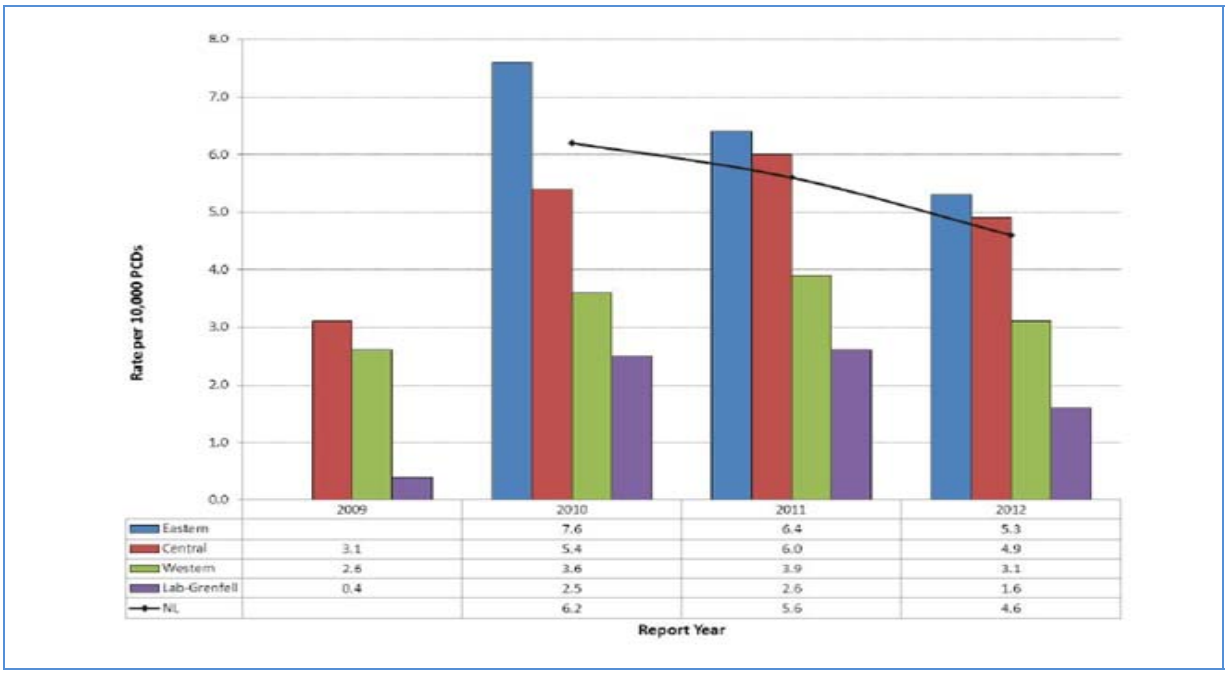
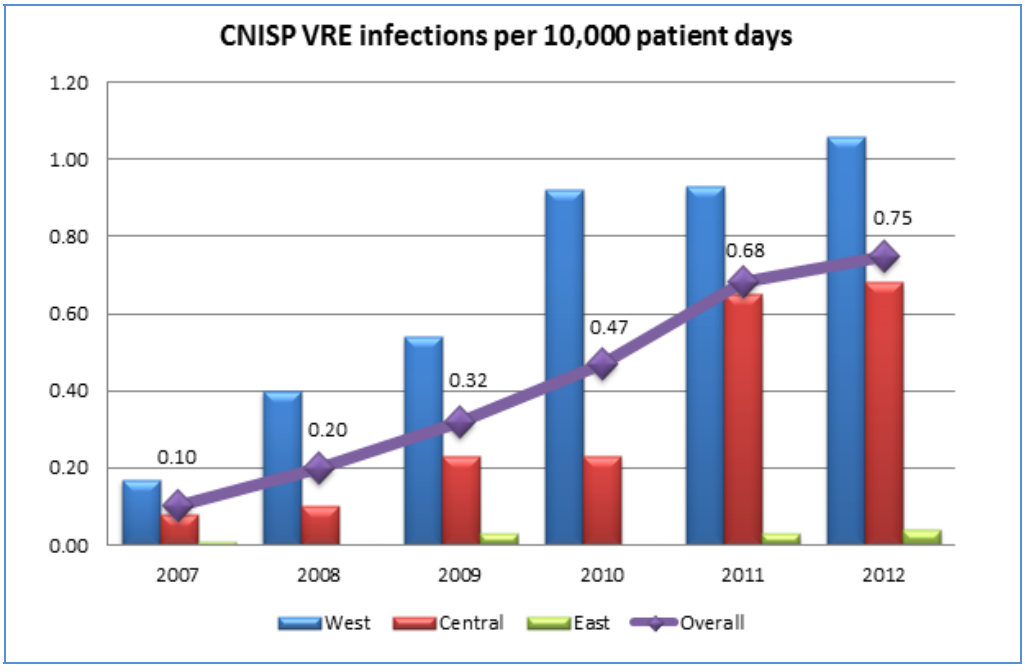


Figure 5: Healthcare-associated vancomycin-resistant entrococcus (VRE) infection cases incidence rate per 10,000 patient care days by region of Canada and an overall Canadian rate for Canadian Nosocomial Infection Surveillance Program (CNISP) hospitals.



Preventing HAIs

It has been reported that the potential to prevent HAIs has ranged from 10 per cent to as high as 70 per cent depending on the setting, the baseline infection rate and the type of infection.[6] According to the 2013 Report on the State of Public Health in Canada, as many as 70 per cent of some types of HAIs could reasonably be prevented if infection prevention and control strategies are followed.[7] The advent of the patient safety movement has also identified the prevention of HAIs as a top priority. In Canada, the Canadain Patient Safety Institute (CPSI) through its flagship program *Safer Healthcare Now!,* has provided a number of resources for health care providers to improve patient safety.

Infection prevention and control

Safer Healthcare Now!, has advocated the following five evidenced-based infection control strategies as priorities for the fight against superbugs:

- Establishing an aggressive hand hygiene program;
- Implementing a comprehensive program for cleaning and decontaminating the environment and equipment;
- Placing patients infected or colonized with a antibiotic-resistant organism on isolation precautions;
- Performing surveillance for MRSA and VRE; and
- Reporting infection rates to frontline and hospital leaders.

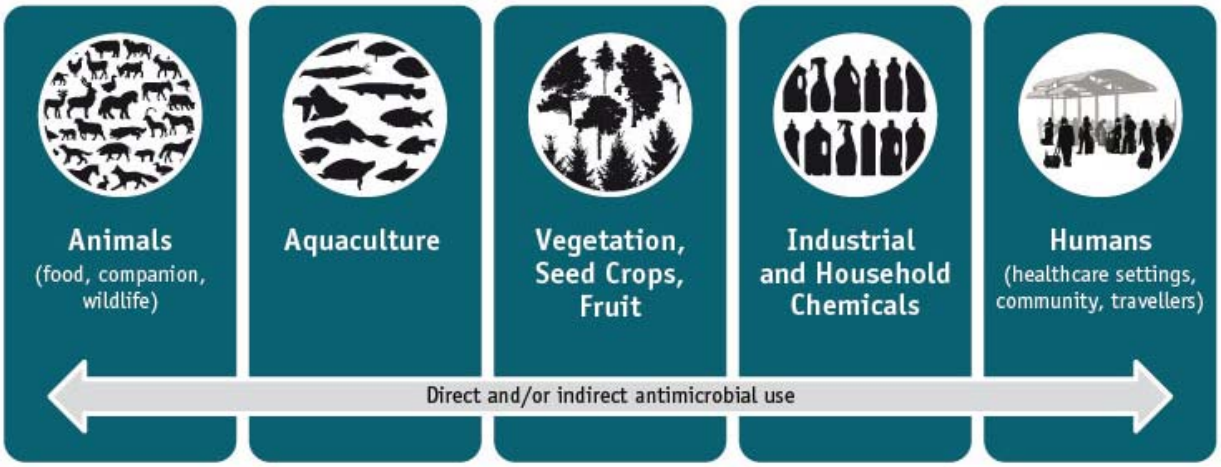
In Newfoundland and Labrador, infection prevention and control programs within the regional health authorities have implemented a number of successful approaches to combat healthcare-associated infections including hand hygiene programs, education for healthcare workers and reporting of infection rates. Additionallly, antibiotic stewardship has been advocated for the prevention of HAIs.

Antimicrobial stewardship

Antimicrobial stewardship has been defined as coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents.

The dramatic increase in the resistance of bacteria to antibiotics commonly used to treat infections has raised alarm in the medical community. The actions taken to improve the use of antibiotics and to reduce resistance to antibiotics has been called antimicrobial stewardship. Antimicobial stewardship programs (ASPs) have been developed in many health care facilities across Canada. The goals of ASPs are: to optimize patient safety by using the right drug, at the right time, using the right dose and for the right duration; to decrease toxcity and adverse events related to antibiotics use; and to reduce resistance. Antimicrobial agents are widely used in many sectors of society as indicated by Figure 6.

Figure 6: Sectors impacted by antimcirobial use. Source: PHAC[7]



All sectors must be cognisant of the efforts aimed at the appropriate use of antibiotics. In 2013, Accredititation Canada introduced antimicrobial stewardship as a required organization practice for health care facilities seeking accreditation. The interventions proposed for an ASP can include:

- Education;
- Antibiotic order forms;
- Guidelines for use of antimicrobials;
- Parental to oral conversions;
- Audits and feedback; and
- A formulary of targeted antimicrobials and approved indications.

However, antimicrobial stewardship is not just for hospitals, it is a shared responsibility.[7] In the community, both health professionals and the public have a role to play in reducing the misuse of antibiotics. A program that has gained national and international attention for its community focus is the *Do Bugs Need Drugs?* program[8] developed in Alberta by Dr. Edith Blondel-Hill. Materials are available for different groups, for example: daycares, preschools, schools, workplaces, parents, children and the public. The emphasis is on why antibiotic resistance is an issue, and steps to prevent antibiotic resistance from developing. Hand hygiene education is a key component of the program because attention to clean hands prevents infections and the need for treatment.

References

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3. Public Health Agency of Canada.(June, 2013). Howard Njoo presents the Public Health Agency Update at the CHICA-Canada National Conference, Ottawa, June 2013. Retrieved December 12, 2013, from http://www.chica.org/conf/13_presentations/tuesday_njoo_phacupdateFre.pdf

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8. Blondel-Hill, E. Do Bugs Need Drugs. (1999). Retrieved December 20, 2013, from http://www.dobugsneeddrugs.org/

Newfoundland and Labrador Communicable Disease Surveillance
Monthly Disease Report: September 2013

DISEASE CLASS	DISEASE NAME	TOTAL			EASTERN			CENTRAL			WESTERN			LABRADOR GRENFELL		
		Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12
Enteric, Food and Waterborne	Amoebiasis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Botulism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Campylobacteriosis	**3**	**35**	**30**	**1**	**17**	**15**	**2**	**9**	**5**	0	**9**	**10**	0	0	0
	Cryptosporidiosis	0	**2**	**5**	0	0	0	0	0	0	0	**2**	**4**	0	0	**1**
	Cyclosporiasis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cytomegalovirus	**2**	**18**	**4**	**2**	**14**	**2**	0	**2**	**1**	0	0	**1**	0	**2**	0
	Giardiasis	**3**	**24**	**26**	0	**2**	**3**	0	**1**	**2**	**2**	**19**	**19**	**1**	**2**	**2**
	Hepatitis A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Listeriosis	0	**1**	**1**	0	**1**	**1**	0	0	0	0	0	0	0	0	0
	Norovirus Infection	0	**86**	**95**	0	**38**	**18**	0	**24**	**9**	0	**21**	**51**	0	**3**	**17**
	Salmonellosis	**4**	**46**	**62**	0	**23**	**31**	**1**	**8**	**13**	**1**	**7**	**7**	**2**	**8**	**11**
	Shigellosis	0	**2**	0	0	**2**	0	0	0	0	0	0	0	0	0	0
	Typhoid/Paratyphoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Verotoxigenic Escherichia coli	**1**	**4**	**1**	**1**	**4**	**1**	0	0	0	0	0	0	0	0	0
	Yersiniosis	0	**1**	**1**	0	0	0	0	0	0	0	**1**	**1**	0	0	0
Diseases Transmitted by Direct Contact and Respiratory Route	Creutzfeldt-Jakob Disease (CJD)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Group B Streptococcal Disease of Newborn	0	**1**	0	0	0	0	0	0	0	0	0	0	0	**1**	0
	Influenza Virus of a Novel Strain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Influenza A, Laboratory Confirmed	0	**583**	**116**	0	**226**	**25**	0	**130**	**37**	0	**190**	**9**	0	**37**	**45**
	Influenza B, Laboratory Confirmed	0	**18**	**208**	0	**7**	**81**	0	**2**	**34**	0	**8**	**51**	0	**1**	**42**
	Invasive Group A Streptococcal Disease	0	**4**	**3**	0	**1**	**1**	0	**1**	**2**	0	**1**	0	0	**1**	0
	Invasive Haemophilus Influenza non-type B	0	**1**	0	0	0	0	0	0	0	0	**1**	0	0	0	0
	Invasive Meningococcal Disease (IMD), Conf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Invasive Meningococcal Disease (IMD), Prob	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Invasive Pneumococcal Disease (IPD)	0	**10**	**14**	0	**4**	**6**	0	0	**2**	0	**5**	**5**	0	**1**	**1**
	Legionellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Meningitis, Bacterial (other than Hib, IMD or IPD)	0	0	**2**	0	0	0	0	0	0	0	0	**1**	0	0	**1**
	Meningitis, Viral	0	**1**	**1**	0	**1**	**1**	0	0	0	0	0	0	0	0	0
	Nontuberculosis Mycobacterial Disease	0	**2**	**6**	0	**1**	**6**	0	0	0	0	**1**	0	0	0	0
	Severe Respiratory Illness, unknown origin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tuberculosis, non-respiratory	0	**2**	0	0	0	0	0	0	0	0	**1**	0	0	**1**	0

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DISEASE CLASS	DISEASE NAME	TOTAL			EASTERN			CENTRAL			WESTERN			LABRADOR GRENFELL		
		Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12	Sept	YTD 13	YTD 12
	Tuberculosis, respiratory	0	6	2	0	1	0	0	0	0	0	0	1	0	5	1
Sexually Transmitted and Bloodborne Pathogens	Chlamydia	72	602	663	55	372	368	1	38	45	7	92	93	9	100	157
	Gonorrhoea	3	24	12	3	24	4	0	0	1	0	0	0	0	0	7
	Hepatitis C	4	77	52	3	57	41	0	6	2	1	12	9	0	2	0
	HIV Infection	0	1	3	0	1	2	0	0	1	0	0	0	0	0	0
	Syphilis, infectious	1	6	5	0	4	4	1	1	1	0	1	0	0	0	0
	Syphilis, non-infectious	0	3	4	0	2	4	0	0	0	0	0	0	0	1	0
Vectorborne & Other Zoonotic Diseases	Lyme disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Malaria	0	1	2	0	0	2	0	0	0	0	1	0	0	0	0
	Q Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Toxoplasmosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trichinellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	West Nile Virus Infection	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vaccine Preventable	Chickenpox	8	124	352	4	67	75	2	45	171	0	6	98	2	6	8
	Congenital Rubella Syndrome	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Hepatitis B	3	20	9	0	10	8	1	4	0	0	1	1	2	5	0
	Invasive Haemophilus Influenza type B (Hib)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Pertussis	2	18	0	2	12	0	0	0	0	0	0	0	0	6	0
	Rubella	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tetanus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Communicalble Disease Control System, Department of Health and Community Services, Government of Newfoundland and Labrador

Date verified: 15-Oct-2013

Disclaimer: Data are subject to continuous updates; small variations in numbers may occur.

Note: Prior to January 2011, "Invasive Meningococcal Disease, Probable" was included under the heading "Invasive Meningococcal Disease"

The majority of chickenpox cases meet the probable case 'definition'