

MANITOBA ANNUAL SUMMARY OF COMMUNICABLE DISEASES 2015



HEALTHY MANITOBANS THROUGH AN APPROPRIATE BALANCE OF PREVENTION AND CARE.

TO MEET THE HEALTH NEEDS OF INDIVIDUALS, FAMILIES AND THEIR COMMUNITIES BY LEADING A SUSTAINABLE, PUBLICLY ADMINISTERED HEALTH SYSTEM THAT PROMOTES WELL-BEING AND PROVIDES THE RIGHT CARE, IN THE RIGHT PLACE, AT THE RIGHT TIME.

— MANITOBA HEALTH, SENIORS AND ACTIVE LIVING

Epidemiology & Surveillance

Active Living, Population and Public Health Branch

Active Living, Indigenous Relations, Population and Public Health Division

Manitoba Health, Seniors, and Active Living

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ABBREVIATIONS & REGIONAL HEALTH AUTHORITIES

ABBREVIATIONS

CDI	Clostridium Difficile Infection
CJD	Creutzfeldt-Jakob Disease
IMD	Invasive Meningococcal Disease
IPD	Invasive Pneumococcal Disease
IQR	Interquartile Range
MHSAL	Manitoba Health, Seniors and Active Living
RHA	Regional Health Authority
VTEC	Verotoxigenic Escherichia coli

REGIONAL HEALTH AUTHORITIES

Winnipeg RHA	Winnipeg Regional Health Authority (includes Churchill)
Southern Health-Santé Sud	Southern Health – Santé Sud
Interlake-Eastern RHA	Interlake-Eastern Regional Health Authority
Prairie Mountain Health	Prairie Mountain Health
Northern Health Region	Northern Regional Health Authority

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EXECUTIVE SUMMARY

ANTIBIOTIC RESISTANT ORGANISMS (AROS)

- The only ARO which is reportable to Manitoba Health, Seniors, and Active Living (MHSAL) in 2015 was clostridium difficile infection (CDI). The incidence rate of CDI in 2015 (38.9 cases per 100,000 population) was lower than the 5-year average incidence rate (50.7 cases per 100,000 population). Over half of the cases reported were in females as compared to males (323 cases compared to 191 cases).

ENTERIC DISEASES

- Salmonellosis had 212 laboratory-confirmed cases in 2015; the most reported cases of all the enteric diseases. This was slightly higher than 5-year average of 203 cases.
- Verotoxigenic *Escherichia coli* (VTEC) had lower than expected case counts in all of the health regions, with exception of Southern Health-Santé Sud, which had almost two times the expected amount.

NON-VACCINE PREVENTABLE DISEASES (NON-VPDS)

- There were 215 laboratory-confirmed cases that were non-VPDs in 2015. The majority of these cases were streptococcal invasive disease (group A), which accounted for 208 cases of the 215 total. Due to changes in the ICD9 coding practices, we are not able to have an expected count of this disease (see Changes in ICD9 Coding Practices, page 13).

VACCINE PREVENTABLE DISEASES (VPDS)

- Invasive pneumococcal disease was the most reported vaccine preventable disease in 2015. There were 119 laboratory-confirmed cases, which was lower than the expected number of cases. Most of the health regions had consistent incidence rates over the last six years, with the exception of Northern Health Region which has been fluctuating.

ZOOBOTIC AND ENVIRONMENTAL DISEASES

- The two most commonly reported diseases in this category were malaria (17 cases) and blastomycosis (16 cases)
- The number of malaria cases was close to the expected number (16.4 cases). The majority of the cases were in males (15 cases), and with Winnipeg RHA having the most cases of the health regions (15 cases).

INTRODUCTION

The *Manitoba Annual Summary of Communicable Diseases (2015)* provides a summary of laboratory-confirmed, communicable diseases in Manitoba for the year 2015. It focuses specifically on those infectious diseases listed as "reportable" under The Public Health Act with the exception of influenza, tuberculosis, West Nile virus, tick-borne diseases, and the sexually transmitted and blood-borne infections - these diseases appear in other annual reports produced by Manitoba Health, Seniors and Active Living (MHSAL). For a list of all diseases that were reportable in Manitoba, in 2015, see Appendix A.

The goal of this report is to provide a summary of laboratory-confirmed, reportable, communicable diseases in Manitoba for the year 2015. The information in this report can be used to identify potential emerging issues and evaluate the effect of policies and programs. It can also be used by the regional health authorities (RHAs) to better understand the burden of disease in their jurisdictions.

It is important to note the data in this report is *surveillance data*, which has certain limitations. These limitations are covered in more detail in the Methods section.

The diseases in this report are divided into five main categories:

1. antibiotic resistant organisms
2. enteric diseases
3. non-vaccine preventable diseases
4. vaccine preventable diseases
5. zoonotic and environmental diseases

Case counts and incidence rates for each disease with **greater than 5** cases in 2015 are presented in tables by:

- sex, with age analysis (2015 and the 5-year average [2010-2014]),
- age group and sex (2015), and
- RHA (2015 and the 5-year average [2010-2014])

Diseases with case counts **greater than 15** also had the above information presented in figures, and a figure of incidence rates by RHA from 2010 to 2014.

METHODS

Only those laboratory-confirmed communicable diseases which occurred in individuals between January 1, 2010 and December 31, 2015, and were reported to MHSAL before the date of data extraction, will be included in this report. Throughout the report, the 2015 data were compared to the data of the previous 5 years (in the form of the 5-year average [2010-2014] or year-by-year from 2010 to 2015), when the comparison was deemed valuable.

Incidence rates were calculated using the MHSAL population files which provide the mid-year population count as of June 1 of that year. All rates are crude incidence rates calculated as:

$$\text{Incidence rate} = \frac{\text{Number of cases}}{\text{Population of specified group}} \times 100,000$$

which produces the number of reported cases per 100,000 population. That is, the number of cases per 100,000 individuals in that population.

Average incidence rates were calculated with a numerator of the *average* number of cases from 2010-2015, and a denominator of the *average* population of the specified group, from 2010-2015

For example, the incidence rate for males in the 15-19 age group in 2015 would be calculated with a numerator of the number of males aged 15-19 who had laboratory-confirmed cases of the specific disease, and a denominator of the total number of males in Manitoba aged 15-19 years old in June, 2015.

For the diseases that had an age analysis performed, the standard deviation, and the values that make up the interquartile range (IQR) are given within the analysis. The standard deviation measures the amount of variation in a given set of data. A low standard deviation indicates the data values are close to the average, while a larger standard deviation indicates the data values are more spread out. The age analysis indicates the first and third quartile, respectively, associated with the median. These quartiles can be used to determine the interquartile range, which is the difference between the third and first quartile. The first quartile is the value that has 25% of the data fall below it, and the third quartile is the value that has 75% of the data fall below it. The interquartile range is used to identify outliers; the data points that are further away from the median than expected. It also shows how the data is distributed around the median. If the first and third quartiles are close together, this indicates the data values are falling close to the median, while quartiles that are further apart indicate the data is spread out.

When comparing incidence rates, and especially when comparing case counts between RHAs, it is important to keep in mind that the differing population counts between regions can contribute to an incidence rate that looks conspicuously large even when there are only a few cases, or an incidence rate that appears small even when there are many cases. For example, Northern RHA may experience large changes in incidence when there are small changes in the case count, due to its small population; the opposite goes for the Winnipeg RHA. The same

concept applies for the age groups, a small change in case counts in the <1 and 1-4 age groups (that have small populations) makes a larger difference than the same change in case counts in the 50-59 and over 60 age groups (that have large populations).

Regional comparisons were created based on the case's region of residence, not on the region in which the case was tested and/or diagnosed. Thus, data for those individuals who were tested in Manitoba, but lived outside of the province, were not included in this report.

Notes:

- Any disease with less than or equal to 5 cases in 2015 did not have a detailed analysis performed. Information for these diseases was only included in the comparison tables both at the beginning of the report, and in the disease category to which the disease belongs.
- Any disease with less than or equal to 15 cases in 2015 did not have a graphical analysis performed. Graphical analysis of such small numbers is not meaningful and therefore was not included.
- The surveillance data used in this report were extracted on March 17, 2017 from the Communicable Disease Control Surveillance Database housed by MHSAL.

In many areas of this report, rates were calculated for case counts less than and equal to five. It is important to remember that these rates are not statistically robust due to the unpredictable nature of small numbers. For example, all it takes to go from usually having 0 cases of a disease in one year to having 4 cases the next year is one family coming home from a holiday outside of Manitoba having contracted the disease. For this reason, case counts equal to and less than five are reported for informational purposes but they should not be used for policy planning or other decision making purposes.

ABOUT SURVEILLANCE DATA

Surveillance data in Manitoba are routinely collected under *The Public Health Act* and are subject to certain limitations. Often, the number of reported cases of any disease is a fraction of the actual count. Individuals may not seek medical care for "mild" symptoms; if they do, the doctor may not order a lab test to confirm the disease. In addition, surveillance data results can be skewed as doctors may be more likely to order tests for severe diseases or those diseases which pose a danger to public health. The amount of testing and reporting performed can be influenced by many factors (e.g., outbreaks, policy changes). Increased reporting can make it appear as though there has been an increase in the number of cases in a community, while the actual number of cases remains constant (and vice versa).

Surveillance data are also influenced by changes in testing practices (e.g., universal screening for an organism upon admission to health facilities), laboratory capacity (e.g., only testing a certain proportion of influenza cases during a known outbreak) and changes in lab technology (e.g., more sensitive diagnosis). All of these factors must be considered when drawing conclusions about surveillance data.

It is especially important to consider these limitations in two situations:

- When comparing RHA incidence rates and case counts. It is not uncommon for there to be variation in the number of cases tested and sent for laboratory confirmation between the RHAs; and/or
- When identifying increasing or decreasing trends in a disease. It is important to remember this may not be a true reflection of increasing or decreasing case counts and incidence rates. Further investigation and evidence collection is required to determine whether the increase or decrease is caused by a "true" change in disease incidence, or by a change in reporting practices.

CHANGES IN ICD9 CODING PRACTICES

Manitoba's *Public Health Act* came into effect on April 1, 2009. The Act provides a legislative framework that helps the province anticipate and respond to public health emergencies and creates a framework for the other provincial public health functions, such as health surveillance, disease and injury prevention, and population health assessments [1]. The Reporting of Diseases and Conditions Regulation under *The Public Health Act* also came into effect at that time.

The Reporting of Diseases and Conditions Regulation outlines the responsibilities of laboratories and health professionals with regard to reporting the diseases outlined in Schedule B to the chief provincial public health officer and performing contact notification for those diseases in Schedule A.

The Reporting of Diseases and Conditions Regulation remained unchanged from April 1, 2009 to December 31, 2014; on January 1, 2015 an amendment to Schedules A and B of the regulation was introduced [2] which created the version of the Regulation used in this report [3]. The amendments to Schedules A and B of the regulation included the removal of some diseases, the addition of others, and re-classification of some ICD9 codes (this means that one ICD9 code may have a different meaning prior to January 1, 2015 than it does after January 1, 2015). These changes have had an effect on our ability to do a comparative analysis for some diseases.

For example, for diseases added to the Regulation as of January 1, 2015 (i.e. those for which a new ICD9 code was given), there are no prior-years data available in the surveillance databases housed at MHSAL with which to perform a 5-year comparison. For diseases for which the definition of their ICD9 code changed as of January 1, 2015, we also cannot perform a 5-year comparison because, in simple terms, it would be like comparing apples to oranges. Even though it may be the same ICD9 code, the comparison is not valuable if the meaning has changed. For diseases removed from the Regulation as of January 1, 2015, they simply will not be included in this report going forward.

Going forward, as data becomes available we will perform one-year comparisons, then two-year average comparisons, and so on, for the diseases affected by these ICD9 changes. But, in the 2015 Annual Summary of Communicable Diseases, the following diseases will not have a 5-year comparison performed:

- Haemophilus influenza (serotype B): ICD9 code is new as of January 1, 2015 so there is no data available for comparison.
- Haemophilus influenza (non-serotype B): ICD9 code changed as of January 1, 2015 so comparison is not valuable
- Streptococcal Invasive Disease (Group A): ICD9 code(s) changed as of January 1, 2015 so comparison is not valuable

- Streptococcal Invasive Disease of the Newborn (Group B): ICD9 code is new as of January 1, 2015 so there is no data available for comparison.

As of January 1, 2015 the ICD9 code, A41.3, was created to capture *Haemophilus influenzae* (serotype B). This includes all *Haemophilus influenzae* cases with serotype B.

Making a comparison is not possible in these situations because the code did not exist during the years we are comparing the data to. While it would be possible to manually go through existing cases and update their ICD9 codes based on their serotype, this will not give us reliable data. For example, when the case is reported, the serotype is may not be included, meaning there is no valid way of identifying what the updated ICD9 code should be. Additionally, manually changing the code leaves lots of room for human error. For the purposes of the report, the decision was made to report only the cases that we are confident are correct.

The changes for the other three diseases are detailed in their specific disease section.

REPORTABLE DISEASES IN MANITOBA

TABLE 1: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CASES IN MANITOBA, BY DISEASE, 2015 AND 5-YEAR AVERAGE (2010-2014)

Disease name	Count		Incidence Rate (95% CI)	
	2015	2010-2014 Average	2015	2010-2014 Average
Antibiotic Resistant Organisms				
Clostridium difficile infection (CDI)	514	662.8	38.9 (35.6, 42.4)	50.7 (46.9, 54.8)
Enteric Diseases				
Amebiasis	24	29.8	1.8 (1.2, 2.7)	2.3 (1.5, 3.3)
Campylobacteriosis	142	228.8	10.8 (9.1, 12.7)	17.5 (15.3, 19.9)
Cholera	0	0.2	0 (0, 0.3)	0 (0, 0.3)
Cryptosporidiosis	36	46.8	2.7 (1.9, 3.8)	3.6 (2.6, 4.8)
Cyclosporiasis	4	2.0	0.3 (0.1, 0.8)	0.2 (0, 0.6)
Giardiasis	97	104.0	7.3 (6.0, 9.0)	8.0 (6.5, 9.6)
Hepatitis A	4	5.2	0.3 (0.1, 0.8)	0.4 (0.1, 0.9)
Listeriosis	3	3.4	0.2 (0, 0.7)	0.3 (0.1, 0.7)
Paratyphoid fever	3	5.2	0.2 (0, 0.7)	0.4 (0.1, 0.9)
Salmonellosis	212	203.0	16.1 (14.0, 18.4)	15.5 (13.5, 17.8)
Shigellosis	18	41.2	1.4 (0.8, 2.2)	3.2 (2.3, 4.3)
Verotoxigenic Escherichia coli (VTEC)	41	46.2	3.1 (2.2, 4.2)	3.5 (2.6, 4.7)
Non-Vaccine Preventable Diseases				
Leprosy	0	0.2	0 (0, 0.3)	0 (0, 0.3)
Streptococcal invasive disease (Group A)	208	-	15.8 (13.7, 18.0)	-
Streptococcal invasive disease of the newborn (Group B)	7	-	0.5 (0.2, 1.1)	-
Vaccine Preventable Diseases				
Congenital rubella syndrome	0	0.2	0 (0, 0.3)	0 (0, 0.3)
Diphtheria	0	0.4	0 (0, 0.3)	0 (0, 0.3)
Haemophilus influenzae (non-serotype B)	34	-	2.6 (1.8, 3.6)	-
Haemophilus influenzae (serotype B)	3	-	0.2 (0, 0.7)	-

Invasive meningococcal disease	3	5	0.2 (0, 0.7)	0.4 (0.1, 0.9)
Invasive pneumococcal disease	119	143.6	9.0 (7.5, 10.8)	11.0 (9.3, 12.9)
Measles	1	1.4	0.1 (0, 0.4)	0.1 (0, 0.5)
Mumps	7	3.0	0.5 (0.2, 1.1)	0.2 (0, 0.7)
Pertussis	56	43.2	4.2 (3.2, 5.5)	3.3 (2.4, 4.5)
Rubella	0	0.6	0 (0, 0.3)	0 (0, 0.4)
Typhoid fever	5	4.6	0.4 (0.1, 0.9)	0.4 (0.1, 0.8)
Zoonotic and Environmental Diseases				
Blastomycosis	16	11.2	1.2 (0.7, 2.0)	0.9 (0.4, 1.5)
Brucellosis	0	1.4	0 (0, 0.3)	0.1 (0, 0.5)
Creutzfeldt-Jakob Disease (CJD)	1	1.2	0.1 (0, 0.4)	0.1 (0, 0.5)
Hantavirus infection	1	0.2	0.1 (0, 0.4)	0 (0, 0.3)
Legionellosis	1	3.0	0.1 (0, 0.4)	0.2 (0, 0.7)
Malaria	17	16.4	1.3 (0.8, 2.1)	1.3 (0.7, 2.0)
Q fever	0	0.2	0 (0, 0.3)	0 (0, 0.3)
Tularemia	1	1.6	0.1 (0, 0.4)	0.1 (0, 0.5)

ANTIBIOTIC RESISTANT ORGANISMS

Antibiotic resistant organisms (AROs) are organisms that have developed resistance to one or more antibiotics. The only organism in this category that is reportable under surveillance in Manitoba: *Clostridium Difficile* infection (CDI). AROs accounted for 32.57% of all reportable disease cases in this report (Appendix C).

CLOSTRIDIUM DIFFICILE INFECTION (CDI)

The incidence rate of *Clostridium difficile* infection in 2015 (38.9 cases per 100,000 population) decreased by almost 12 cases from the 5 year average (50.7 cases per 100,000 population) (Table 2). *Clostridium difficile* infection was most commonly seen in those over the age of 60. Females carried the majority of the burden of *Clostridium difficile*, accounting for 62.8% of the cases in 2015 (323 cases of 514 total cases). Of the diseases included in this report, *Clostridium difficile* infection had the highest incidence rate in 2015, and accounted for 32.57% of the total cases in this report (514 cases of 1,578 total cases) (Appendix C).

The average age in 2015 was 60.6 years (with standard deviation 22.1 years). The average age in 2010 - 2014 was 64.4 years (with standard deviation 21.1 years). The median age in 2015 was 64 years (with IQR 47 - 77 years). The median age in 2010 - 2014 was 69 years (with IQR 52 - 81 years).

TABLE 2: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	514	662.8	38.9	50.7
Female	323	386.2	48.6	58.7
Male	191	276.6	29.1	42.7

FIGURE 1: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

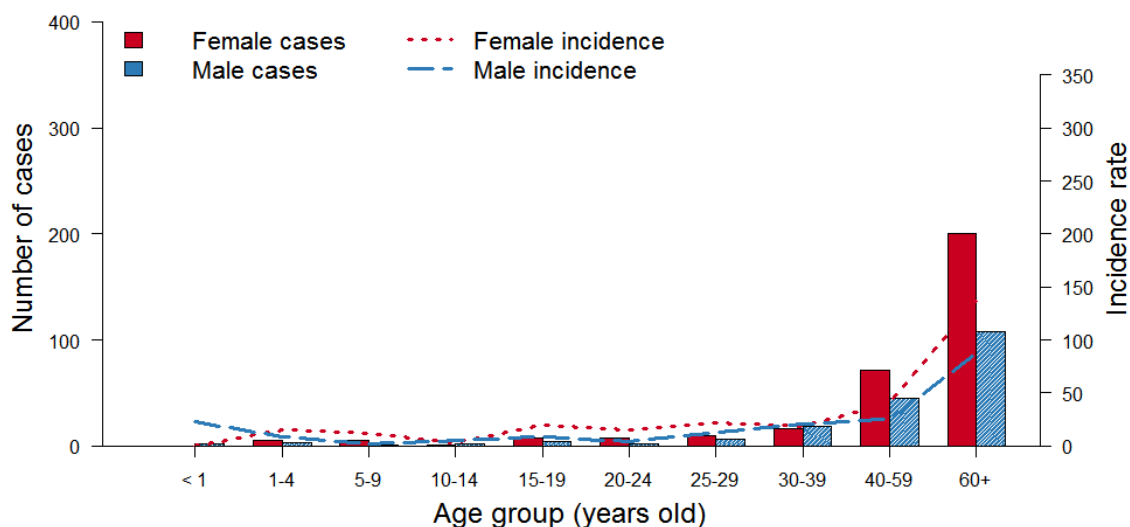


TABLE 3: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	2	0	2	12.0	0	23.3
1-4	8	5	3	11.9	15.4	8.7
5-9	6	5	1	7.1	12.1	2.3
10-14	3	1	2	3.8	2.6	4.9
15-19	12	8	4	13.9	19.1	9.0
20-24	9	7	2	9.3	14.8	4.0
25-29	16	10	6	17.2	21.5	12.9
30-39	34	16	18	19.4	18.2	20.7
40-59	116	71	45	33.1	40.7	25.6
60+	308	200	108	113.9	137.0	86.8

In 2015, Winnipeg Regional Health Authority (RHA) had the highest incidence rate in 2015 (43.6 per 100,000 population), but Prairie Mountain Health had the highest 5-year average incidence rate (67.7 per 100,000 population), as shown in Table 4. Southern Health-Santé Sud had the lowest incidence rate of *Clostridium difficile* infection in 2015 with a rate of 26.8 per 100,000 population, while Northern Health Region had the smallest number of cases (N=26) (Table 4).

FIGURE 2: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

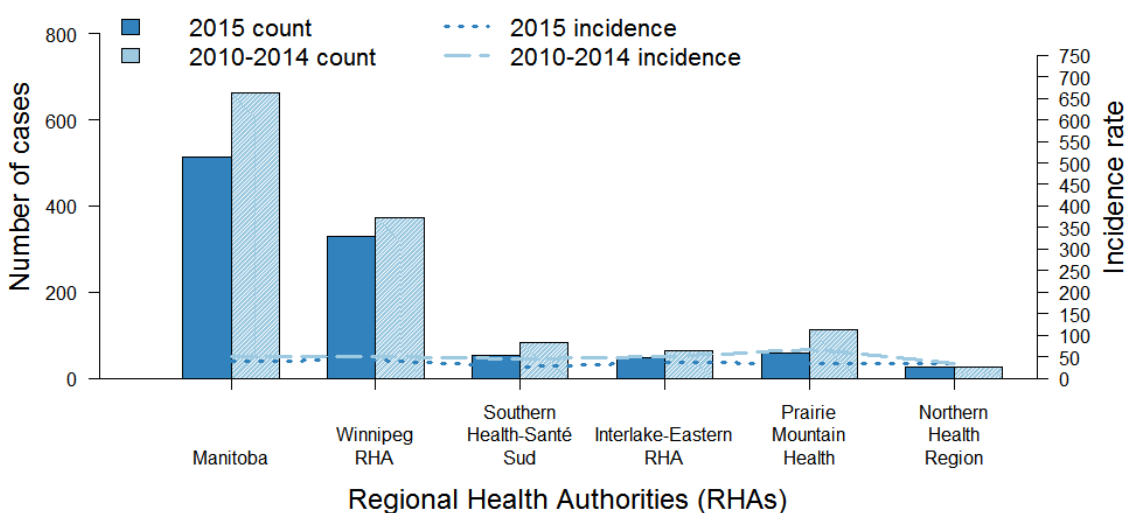
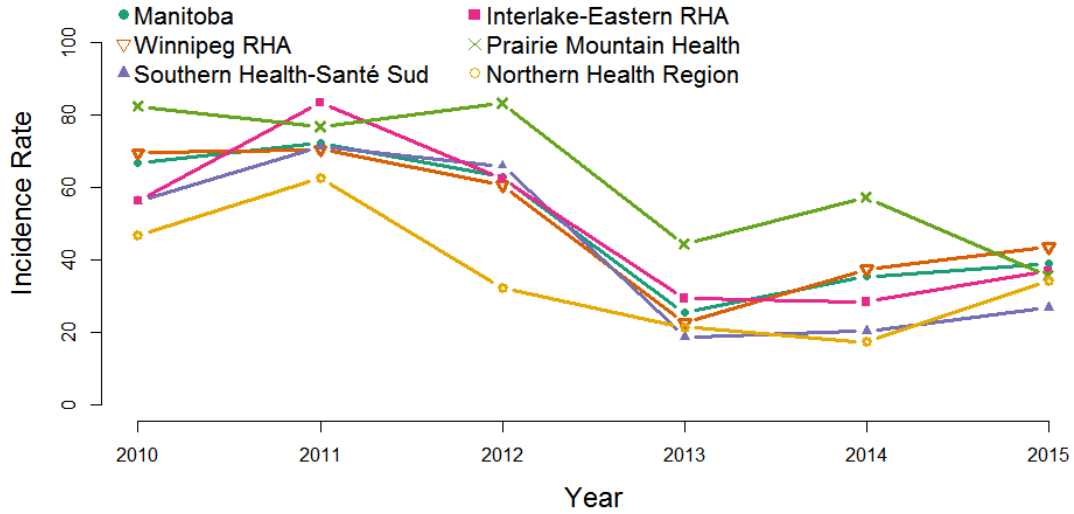


TABLE 4: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	514	662.8	38.9	50.7
Winnipeg RHA	329	374.0	43.6	50.2
Southern Health-Santé Sud	52	84.4	26.8	44.2
Interlake-Eastern RHA	47	64.2	36.9	50.7
Prairie Mountain Health	60	113.6	35.6	67.7
Northern Health Region	26	26.6	34.2	35.3

FIGURE 3: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CLOSTRIDIUM DIFFICILE INFECTION (CDI) CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



ENTERIC DISEASES

An enteric disease (or illness) is defined as a gastrointestinal infection or intoxication. Enteric disease may be caused by chemicals or biological agents and/or their toxins including bacteria, viruses, protozoans, algae, fungi and parasites. Enteric diseases are widely under-reported due to no or mild symptoms, short duration, lack of physician visit, and absence of a laboratory diagnosis even when attending a physician [4]. In 2015, there were 12 different enteric diseases reportable under *The Public Health Act*. Enteric diseases were the most commonly reported diseases, making up 37% (584 enteric cases of 1578 total cases) of all reported cases (Table 52).

AMEBIASIS

Table 5 shows the burden of amebiasis was split relatively equally between females and males (11 female cases and 13 male cases). Three-quarters of the cases in 2015 occurred in those ages 20-59 years (18 cases out of 24 total cases) (Table 6).

The average age in 2015 was 29.7 years (with standard deviation 16 years). The average age in 2010 - 2014 was 30.2 years (with standard deviation 17.2 years). The median age in 2015 was 28.5 years (with IQR 19.75 - 41 years). The median age in 2010 - 2014 was 30 years (with IQR 17 - 41 years).

TABLE 5: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	24	29.8	1.8	2.3
Female	11	12.2	1.7	1.9
Male	13	17.6	2.0	2.7

FIGURE 4: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

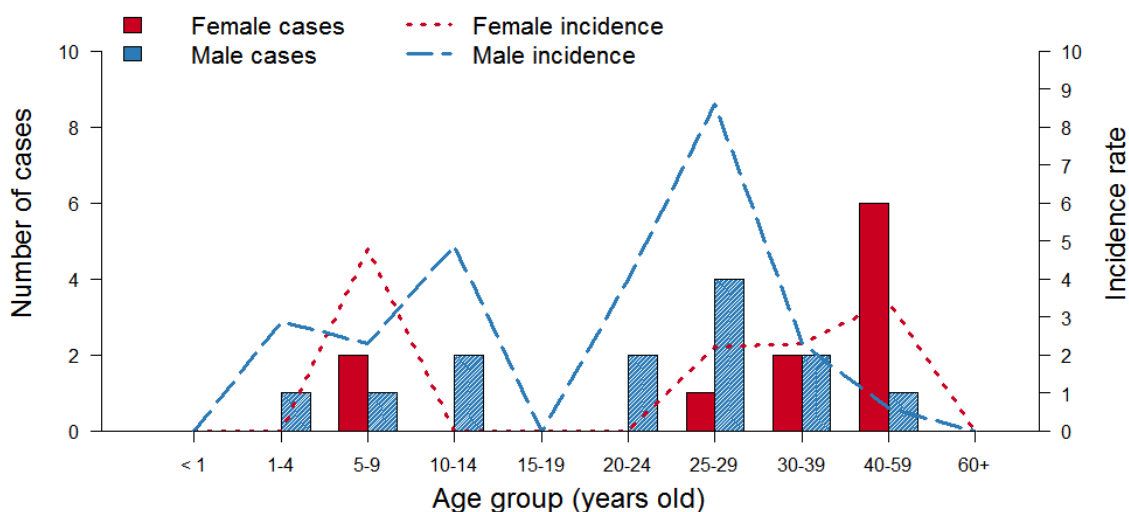


TABLE 6: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	1	0	1	1.5	0	2.9
5-9	3	2	1	3.6	4.8	2.3
10-14	2	0	2	2.5	0	4.9
15-19	0	0	0	0	0	0
20-24	2	0	2	2.1	0	4.0
25-29	5	1	4	5.4	2.2	8.6
30-39	4	2	2	2.3	2.3	2.3
40-59	7	6	1	2.0	3.4	0.6
60+	0	0	0	0	0	0

Winnipeg RHA had the highest number of cases as of 2015, accounting for almost 80% of the cases in Manitoba (19 cases of 24 total cases) (Table 7). Winnipeg RHA and Northern Health Region had similar incidence rates, which were the two highest rates in Manitoba (2.5 per 100,000 population and 2.6 per 100,000 population respectively).

FIGURE 5: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

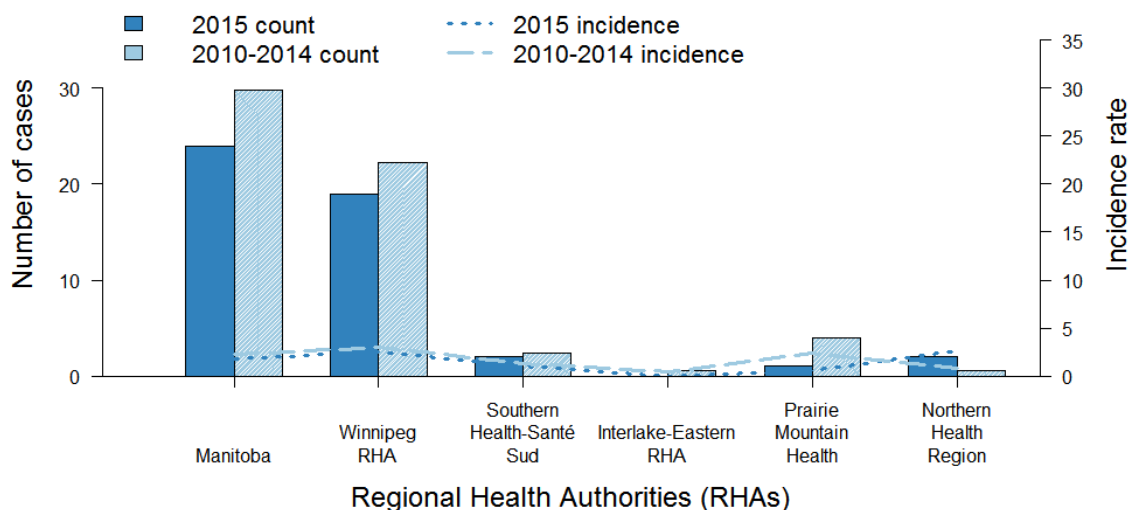
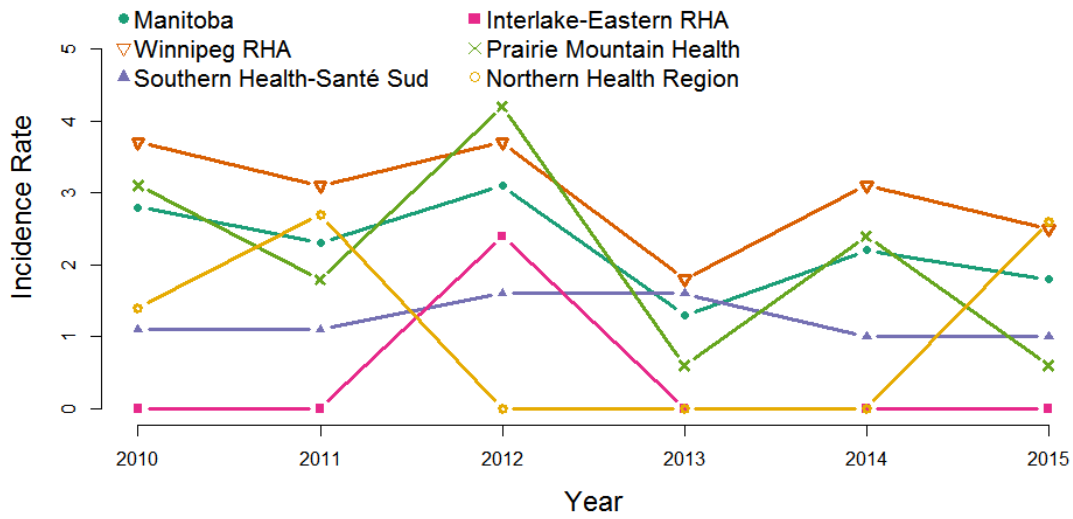


TABLE 7: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	24	29.8	1.8	2.3
Winnipeg RHA	19	22.2	2.5	3.0
Southern Health-Santé Sud	2	2.4	1.0	1.3
Interlake-Eastern RHA	0	0.6	0	0.5
Prairie Mountain Health	1	4.0	0.6	2.4
Northern Health Region	2	0.6	2.6	0.8

FIGURE 6: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED AMEBIASIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



CAMPYLOBACTERIOSIS

The incidence rate and case count of campylobacteriosis in Manitoba was lower than the 5-year average incidence rate and case count – this difference was experienced by both females and males. In 2015, the female incidence rate was 10.2 cases per 100,000 population compared to 15.6 cases per 100,000 population; the male incidence rate was 11.3 cases per 100,000 population compared to 19.5 cases per 100,000 population. This results in a difference of approximately five cases per 100,000 females and eight cases per 100,000 males. Manitoba as a whole saw a decrease from the 5-year average incidence rate of 17.5 cases per 100,000 population to 10.8 cases per 100,000 population in 2015 (Table 8).

The average age in 2015 was 35 years (with standard deviation 21.8 years). The average age in 2010 - 2014 was 35.1 years (with standard deviation 23.8 years). The median age in 2015 was 34 years (with IQR 20 - 50.75 years). The median age in 2010 - 2014 was 31 years (with IQR 17 - 55 years).

TABLE 8: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	142	228.8	10.8	17.5
Female	68	102.4	10.2	15.6
Male	74	126.4	11.3	19.5

FIGURE 7: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

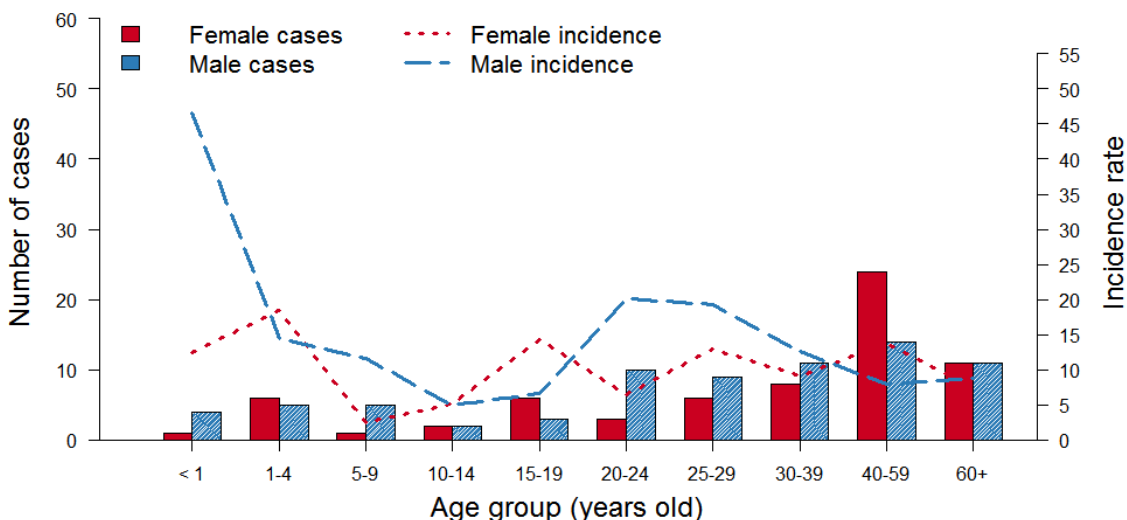


TABLE 9: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	5	1	4	30.0	12.4	46.5
1-4	11	6	5	16.4	18.5	14.5
5-9	6	1	5	7.1	2.4	11.6
10-14	4	2	2	5.0	5.2	4.9
15-19	9	6	3	10.4	14.3	6.7
20-24	13	3	10	13.4	6.4	20.1
25-29	15	6	9	16.1	12.9	19.3
30-39	19	8	11	10.8	9.1	12.6
40-59	38	24	14	10.9	13.7	8.0
60+	22	11	11	8.1	7.5	8.8

Winnipeg RHA had the highest number of cases in Manitoba (n=44), but the lowest incidence rate of 5.8 cases per 100,000 population. Manitoba saw a decrease in incidence rate from a 5-year average of 17.5 cases per 100,000 population to 10.8 cases per 100,000 – a difference of almost 7 cases per 100,000 (Table 10).

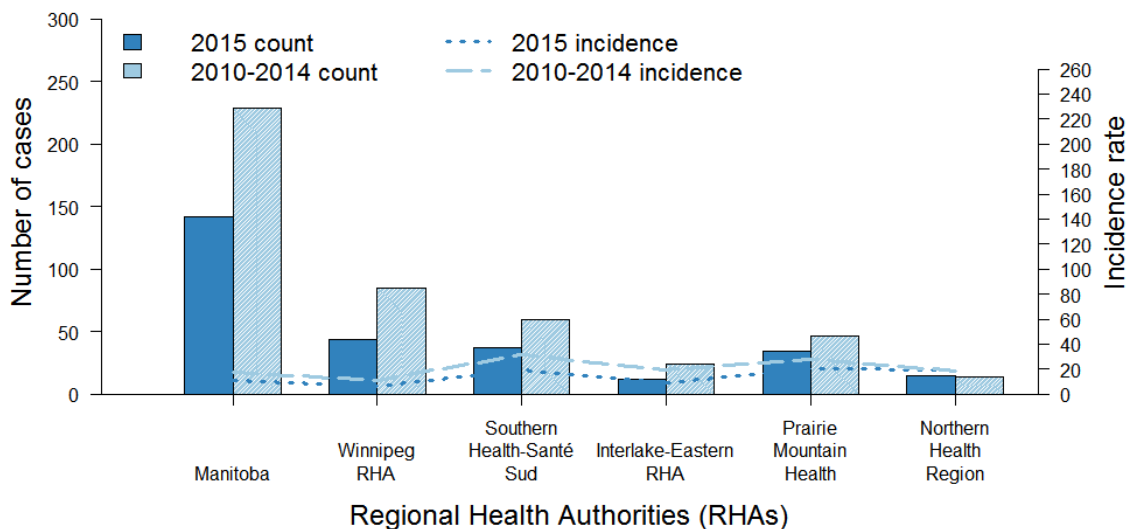
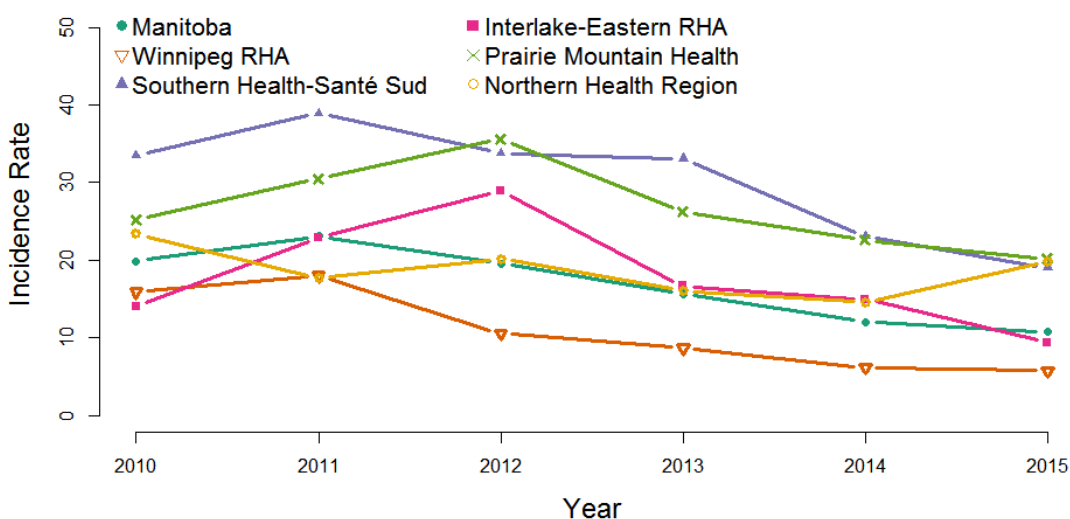
FIGURE 8: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 10: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	142	228.8	10.8	17.5
Winnipeg RHA	44	85.2	5.8	11.4
Southern Health-Santé Sud	37	59.4	19.0	31.1
Interlake-Eastern RHA	12	24.2	9.4	19.1
Prairie Mountain Health	34	46.4	20.2	27.6
Northern Health Region	15	13.6	19.8	18.0

FIGURE 9: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CAMPYLOBACTERIOSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



CRYPTOSPORIDIOSIS

Table 11 shows the incidence rate of cryptosporidiosis was slightly lower in 2015 than expected. Cryptosporidiosis was more commonly seen in females, making up approximately three-fifths of all cases in 2015 (61.1%; 22 cases of 36 total cases) (Table 11).

The average age in 2015 was 23.8 years (with standard deviation 16.5 years). The average age in 2010 - 2014 was 20.6 years (with standard deviation 17 years). The median age in 2015 was 26.5 years (with IQR 9.75 - 34.25 years). The median age in 2010 - 2014 was 18.5 years (with IQR 6 - 31 years).

TABLE 11: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	36	46.8	2.7	3.6
Female	22	26.8	3.3	4.1
Male	14	20.0	2.1	3.1

FIGURE 10: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

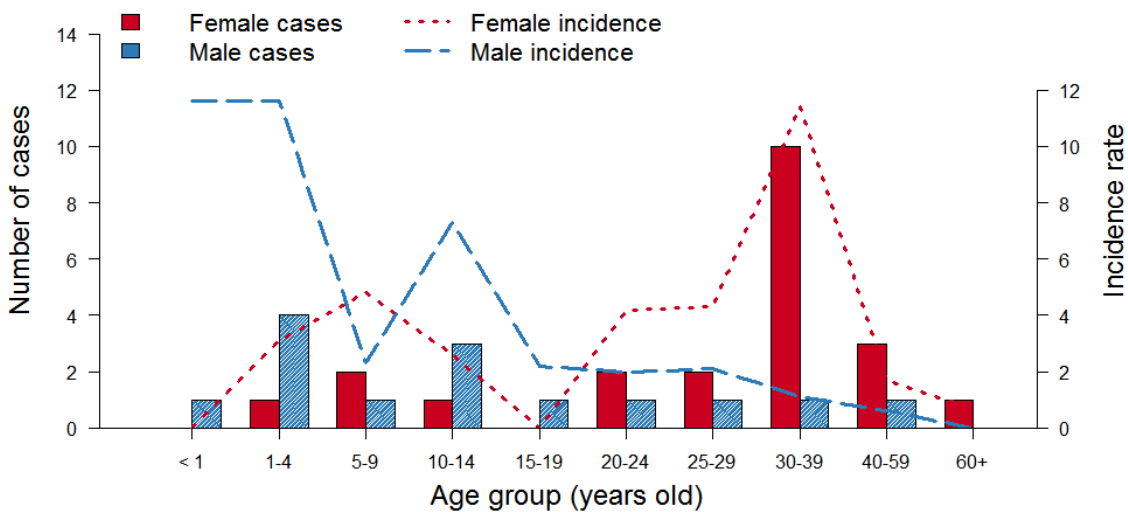


TABLE 12: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	1	0	1	6.0	0	11.6
1-4	5	1	4	7.5	3.1	11.6
5-9	3	2	1	3.6	4.8	2.3
10-14	4	1	3	5.0	2.6	7.3
15-19	1	0	1	1.2	0	2.2
20-24	3	2	1	3.1	4.2	2.0
25-29	3	2	1	3.2	4.3	2.1
30-39	11	10	1	6.3	11.4	1.1
40-59	4	3	1	1.1	1.7	0.6
60+	1	1	0	0.4	0.7	0

Northern Health Region had the highest incidence rate in 2015, followed by Southern Health-Santé Sud, with rates of 7.9 cases per 100,000 population and 6.7 cases per 100,000 population respectively. These are the only two regions that saw an incidence rate higher than their 5-year averages. The incidence rates of the other regions (Winnipeg RHA, Interlake-Eastern RHA and Prairie Mountain Health) were all lower than expected. Southern Health-Santé Sud had the highest case count, accounting for approximately one-third of the cases in Manitoba (13 cases of 36 total cases) (Table 13).

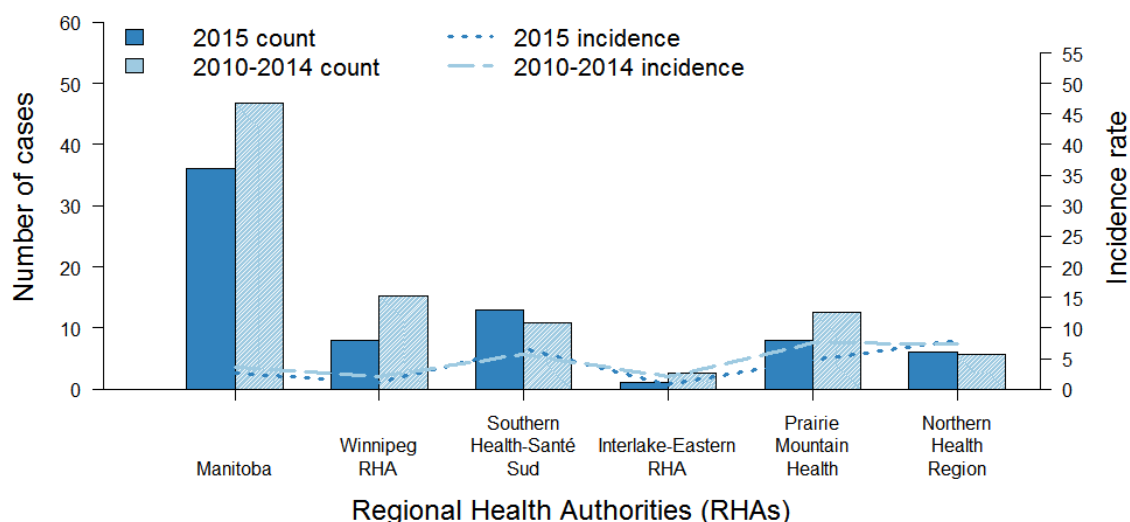
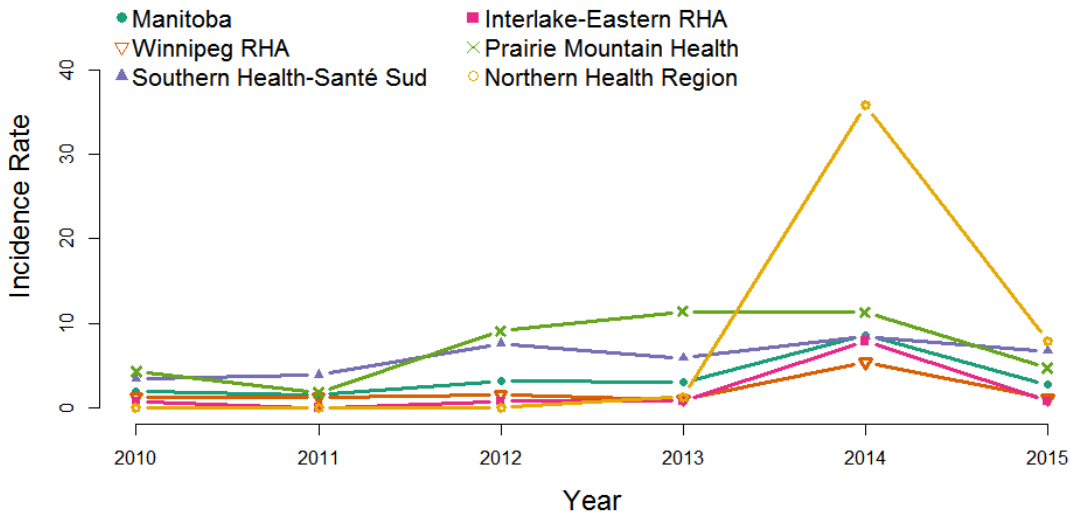
FIGURE 11: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 13: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	36	46.8	2.7	3.6
Winnipeg RHA	8	15.2	1.1	2.0
Southern Health-Santé Sud	13	10.8	6.7	5.7
Interlake-Eastern RHA	1	2.6	0.8	2.1
Prairie Mountain Health	8	12.6	4.7	7.5
Northern Health Region	6	5.6	7.9	7.4

FIGURE 12: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED CRYPTOSPORIDIOSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



GIARDIASIS

Table 14 shows the incidence rate of giardiasis for females in 2015 decreased by 1.8 cases per 100,000 population compared to the 5-year average, while the male incidence rate increased by 0.6 cases per 100,000 population from the 5-year average. Manitoba as a whole saw a slight decrease from the 5-year average to 2015 (8 cases per 100,000 population to 7.3 cases per 100,000 population) (Table 14). The incidence rates for 2015 were highest in those aged 1-4 and 5-9 (Table 15).

The average age in 2015 was 28.6 years (with standard deviation 23.8 years). The average age in 2010 - 2014 was 22.8 years (with standard deviation 20.9 years). The median age in 2015 was 27 years (with IQR 5 - 43 years). The median age in 2010 - 2014 was 16 years (with IQR 4 - 40 years).

TABLE 14: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	97	104.0	7.3	8.0
Female	35	46.6	5.3	7.1
Male	62	57.4	9.5	8.9

FIGURE 13: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

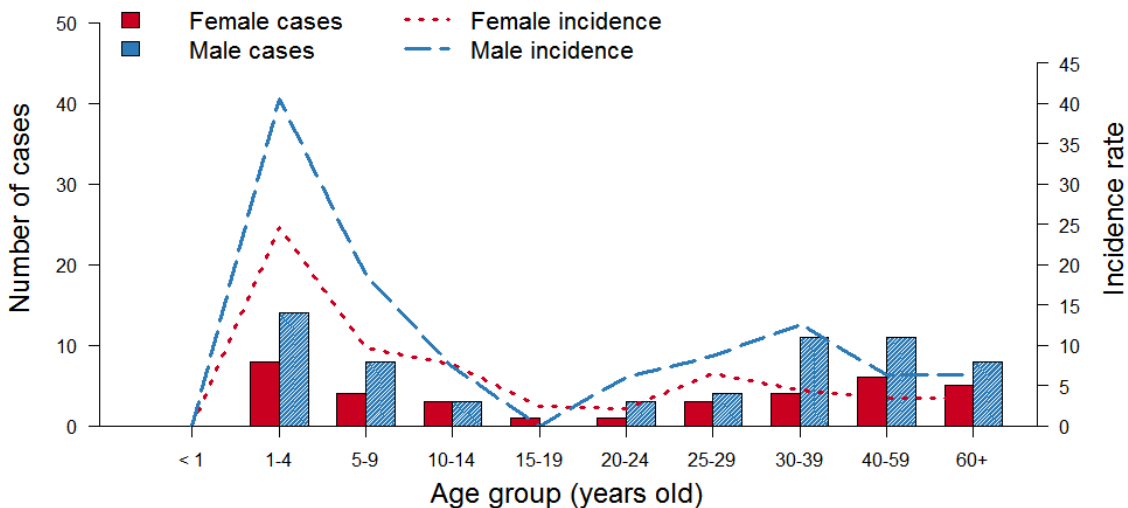


TABLE 15: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	22	8	14	32.8	24.6	40.5
5-9	12	4	8	14.2	9.7	18.6
10-14	6	3	3	7.5	7.7	7.3
15-19	1	1	0	1.2	2.4	0
20-24	4	1	3	4.1	2.1	6.0
25-29	7	3	4	7.5	6.5	8.6
30-39	15	4	11	8.6	4.5	12.6
40-59	17	6	11	4.9	3.4	6.3
60+	13	5	8	4.8	3.4	6.4

Northern Health Region had the highest incidence rate in 2015, with 9.2 cases per 100,000 population. The second and third highest were found in Prairie Mountain Health with 8.3 cases per 100,000 population, and the Winnipeg RHA with 8.2 cases per 100,000 population respectively. Winnipeg RHA had the highest case count, accounting for 63.9% of all Manitoba cases (62 cases of 97 total cases) (Table 16).

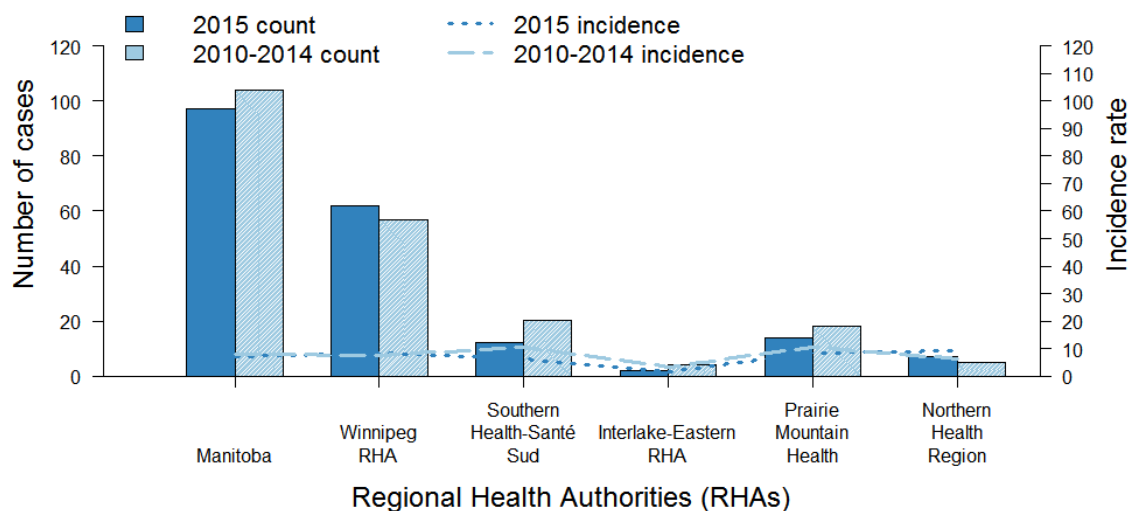
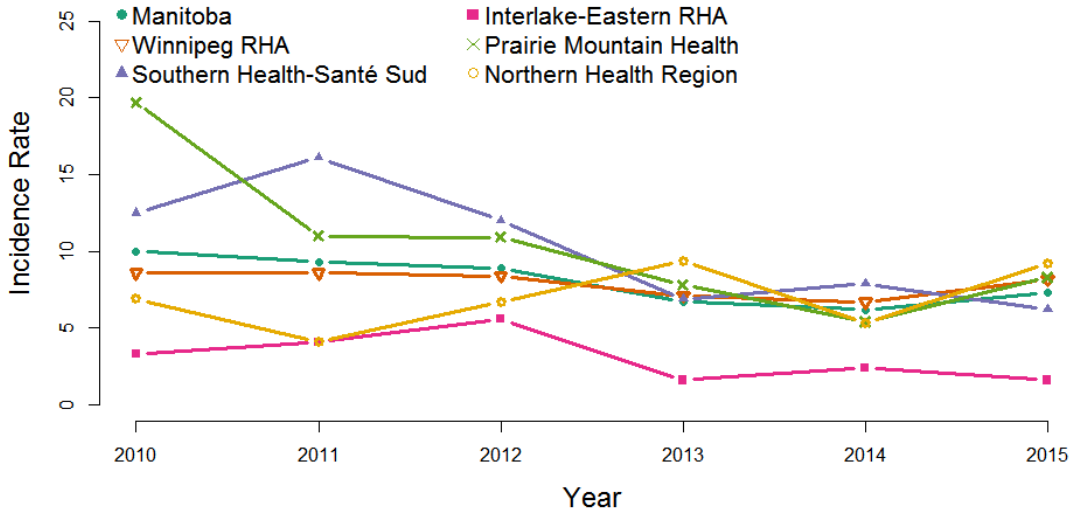
FIGURE 14: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 16: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	97	104.0	7.3	8.0
Winnipeg RHA	62	56.8	8.2	7.6
Southern Health-Santé Sud	12	20.2	6.2	10.6
Interlake-Eastern RHA	2	4.2	1.6	3.3
Prairie Mountain Health	14	18.0	8.3	10.7
Northern Health Region	7	4.8	9.2	6.4

FIGURE 15: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED GIARDIASIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



SALMONELLOSIS

Table 17 shows the incidence rate for salmonellosis increased slightly in 2015 from the 5-year average. The disease was most common in those aged 40+, which accounted for almost half of the Manitoba cases (46.7%; 99 cases of 212 total cases). Approximately 60% of the cases in Manitoba were diagnosed in females (59.4%; 126 cases of 212 total cases). Of the diseases included in this report, salmonellosis had the second highest incidence rate in 2015, and accounted for 13.43% of the total cases in this report (212 cases of 1,578 total cases) (Appendix C).

The average age in 2015 was 37.3 years (with standard deviation 25.2 years). The average age in 2010 - 2014 was 36.7 years (with standard deviation 24.2 years). The median age in 2015 was 34.5 years (with IQR 17 - 55 years). The median age in 2010 - 2014 was 34 years (with IQR 17 - 55 years).

TABLE 17: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	212	203.0	16.1	15.5
Female	126	105.4	19.0	16.0
Male	86	97.6	13.1	15.1

FIGURE 16: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

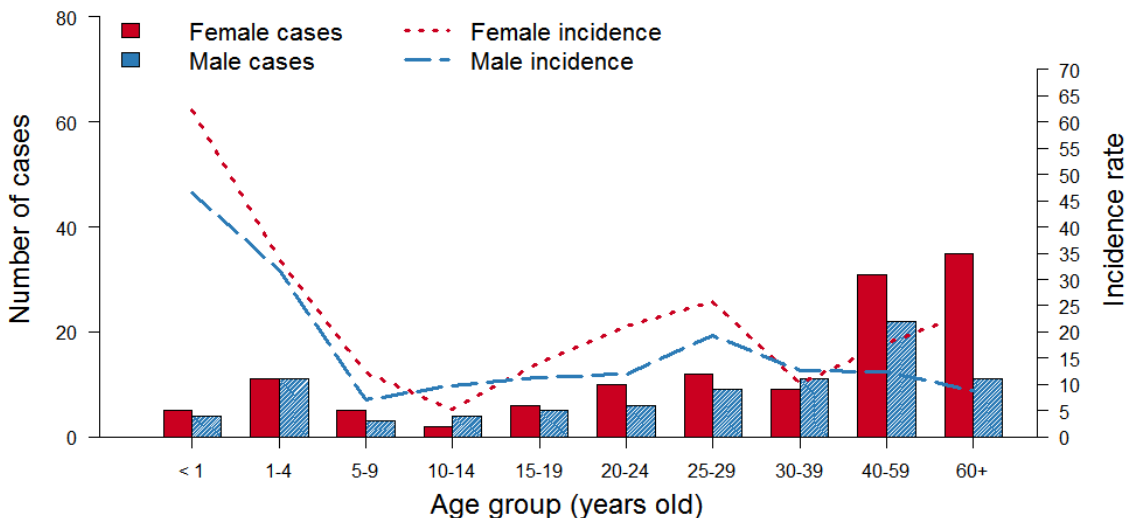


TABLE 18: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	9	5	4	54.1	62.2	46.5
1-4	22	11	11	32.8	33.8	31.8
5-9	8	5	3	9.5	12.1	7.0
10-14	6	2	4	7.5	5.2	9.7
15-19	11	6	5	12.7	14.3	11.2
20-24	16	10	6	16.5	21.2	12.0
25-29	21	12	9	22.6	25.8	19.3
30-39	20	9	11	11.4	10.2	12.6
40-59	53	31	22	15.1	17.8	12.5
60+	46	35	11	17.0	24.0	8.8

Prairie Mountain Health has had the highest incidence rate of all the regions since 2012 (Figure 18), and this trend continued in 2015 with an incidence rate of 23.1 cases per 100,000 population (Table 19). Winnipeg RHA had the majority of the cases in Manitoba, with a case count of 113 of the 212 total cases in Manitoba.

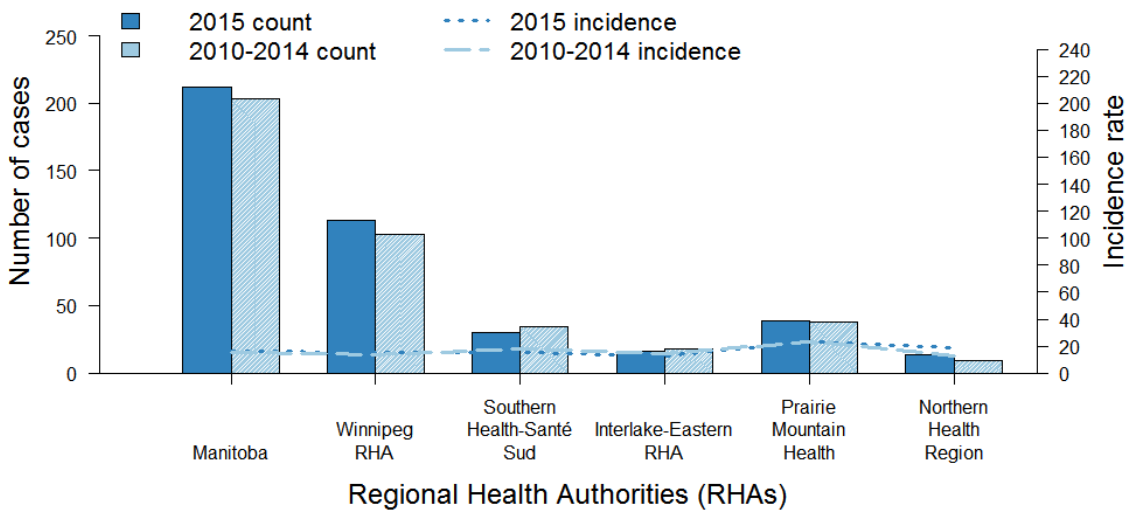
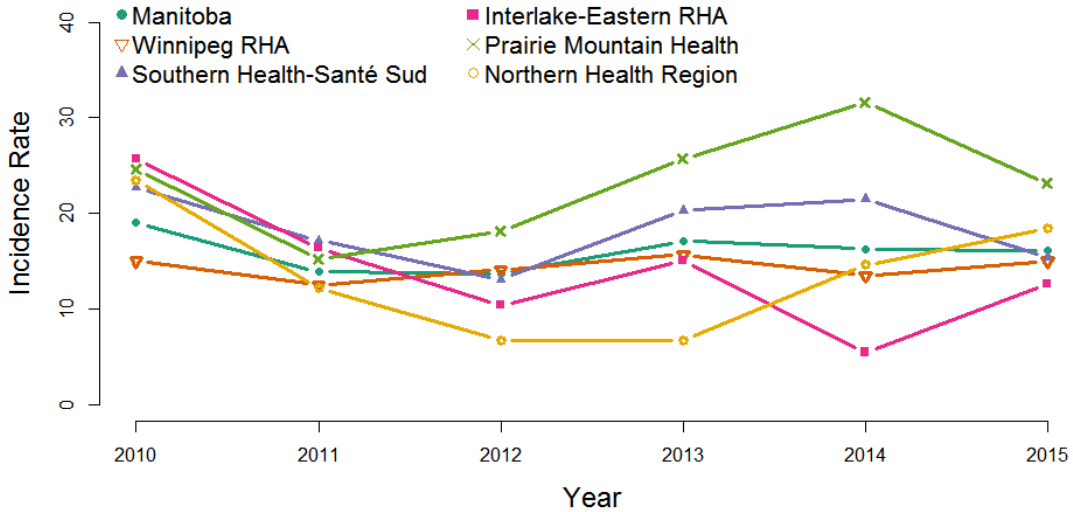
FIGURE 17: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 19: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	212	203.0	16.1	15.5
Winnipeg RHA	113	102.4	15.0	13.7
Southern Health-Santé Sud	30	34.8	15.4	18.2
Interlake-Eastern RHA	16	18.0	12.6	14.2
Prairie Mountain Health	39	38.2	23.1	22.8
Northern Health Region	14	9.4	18.4	12.5

FIGURE 18: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SALMONELLOSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



SHIGELLOSIS

The incidence rate of shigellosis declined slightly from the 5-year average of 3.2 cases per 100,000 population, to an incidence rate of 1.4 cases per 100,000 population in 2015. Shigellosis was seen most commonly in females, making up 72% (13 cases out of 18 total cases) of the case count in 2015. In 2015, the youngest individual to have a laboratory-confirmed case of shigellosis was in the age group 5-9 years; there were no confirmed cases in those newborns up to 4 years old. The age group with the most reported cases was those between 40-59 years of age, accounting for almost two-fifths (7 cases out of 18 total cases) of the cases in 2015 (Table 21).

The average age in 2015 was 34.3 years (with standard deviation 17.3 years). The average age in 2010 - 2014 was 22 years (with standard deviation 20.7 years). The median age in 2015 was 34.5 years (with IQR 19.5 - 49.25 years). The median age in 2010 - 2014 was 13 years (with IQR 5 - 34 years).

TABLE 20: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	18	41.2	1.4	3.2
Female	13	19.8	2.0	3.0
Male	5	21.4	0.8	3.3

FIGURE 19: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

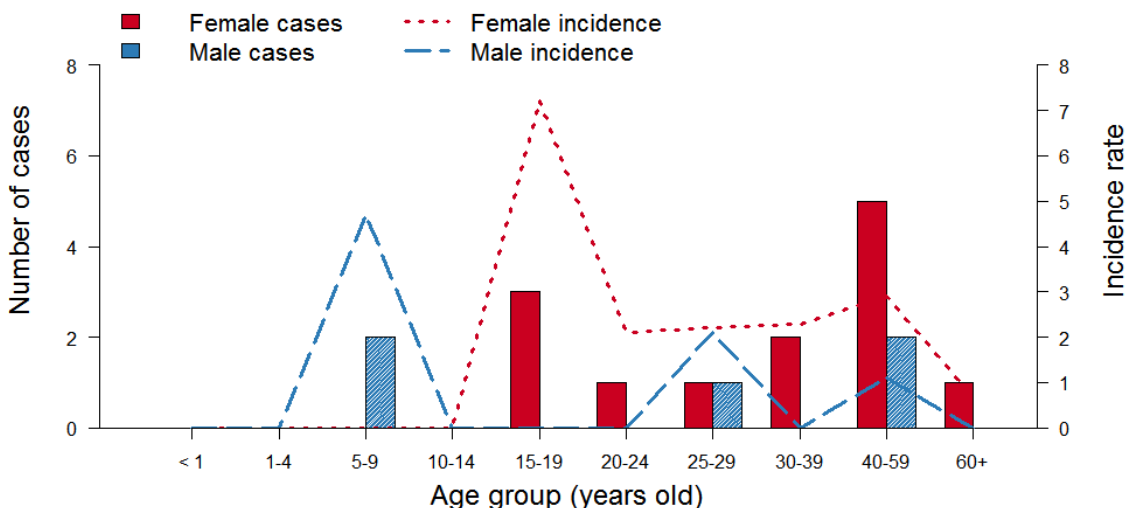


TABLE 21: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	0	0	0	0	0	0
5-9	2	0	2	2.4	0	4.7
10-14	0	0	0	0	0	0
15-19	3	3	0	3.5	7.2	0
20-24	1	1	0	1.0	2.1	0
25-29	2	1	1	2.1	2.2	2.1
30-39	2	2	0	1.1	2.3	0
40-59	7	5	2	2.0	2.9	1.1
60+	1	1	0	0.4	0.7	0

The incidence rate for Manitoba was 1.4 cases per 100,000 population, which was slightly lower than expected. Only two regions had incidence rates below the provincial incidence rate – Interlake-Eastern RHA and Prairie Mountain Health. Both the Winnipeg RHA and Southern Health-Santé Sud had incidence rates very similar to the provincial rate. Northern RHA had the highest incidence rate of all the regions in 2015 with 4 cases per 100,000 population. This however was a significant decline from the Northern Health Regions 5-year average incidence rate of 25.5 cases per 100,000 population. Throughout the last six years, Northern Health Region has continued to have the highest incidence rate of all the regional health authorities (Figure 21).

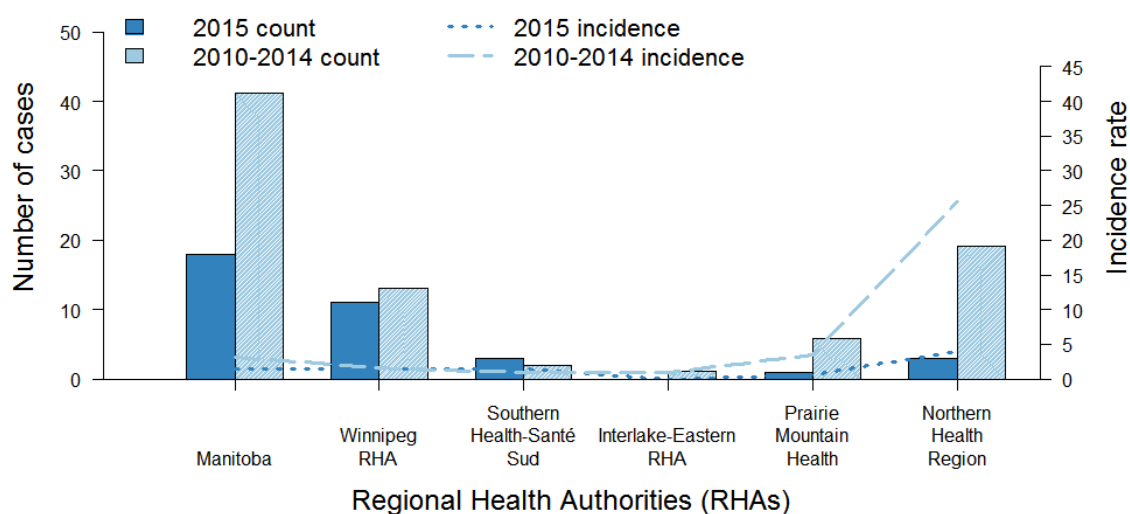
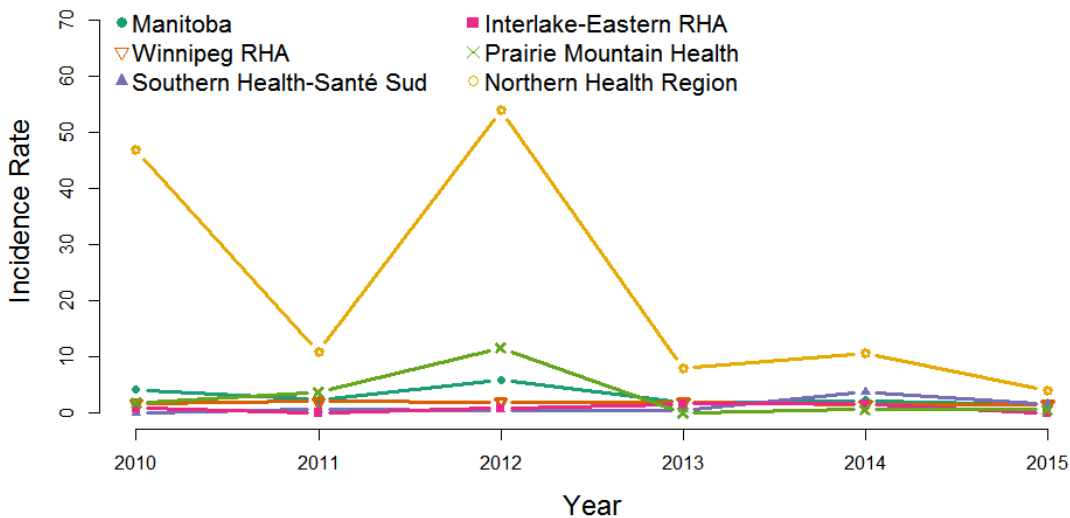
FIGURE 20: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 22: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	18	41.2	1.4	3.2
Winnipeg RHA	11	13.0	1.5	1.7
Southern Health-Santé Sud	3	2.0	1.5	1.0
Interlake-Eastern RHA	0	1.2	0	0.9
Prairie Mountain Health	1	5.8	0.6	3.5
Northern Health Region	3	19.2	4.0	25.5

FIGURE 21: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED SHIGELLOSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



VEROTOXIGENIC ESCHERICHIA COLI (VTEC)

The incidence rate for verotoxigenic *Escherichia coli* in 2015 was 3.1 cases per 100,000 population; this is similar to the 5-year average. The majority of the cases were diagnosed in females, accounting for 24 of 41 total cases. The incidence rate was the highest in those aged 1-4 years old, for both females and males.

The average age in 2015 was 28.6 years (with standard deviation 23.8 years). The average age in 2010 - 2014 was 29 years (with standard deviation 22.6 years). The median age in 2015 was 25 years (with IQR 5 - 43 years). The median age in 2010 - 2014 was 23 years (with IQR 10.5 - 45.5 years).

TABLE 23: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	41	46.2	3.1	3.5
Female	24	22.8	3.6	3.5
Male	17	23.4	2.6	3.6

FIGURE 22: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

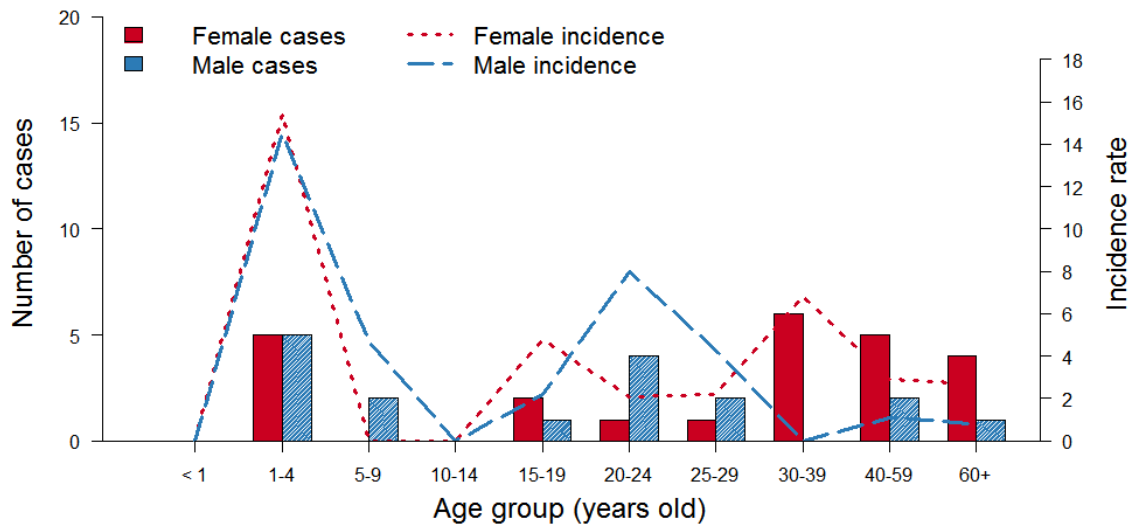


TABLE 24: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	10	5	5	14.9	15.4	14.5
5-9	2	0	2	2.4	0	4.7
10-14	0	0	0	0	0	0
15-19	3	2	1	3.5	4.8	2.2
20-24	5	1	4	5.2	2.1	8.0
25-29	3	1	2	3.2	2.2	4.3
30-39	6	6	0	3.4	6.8	0
40-59	7	5	2	2.0	2.9	1.1
60+	5	4	1	1.8	2.7	0.8

The incidence rate in Manitoba was slightly lower from the 5-year average of 3.5 cases per 100,000 population to 3.1 cases per 100,000 population in 2015. Almost all of the health regions had an incidence rate below the provincial rate; Southern Health-Santé Sud was the only health region which was higher than the provincial rate, with an incidence rate of 11.3 cases per 100,000 population (Table 25).

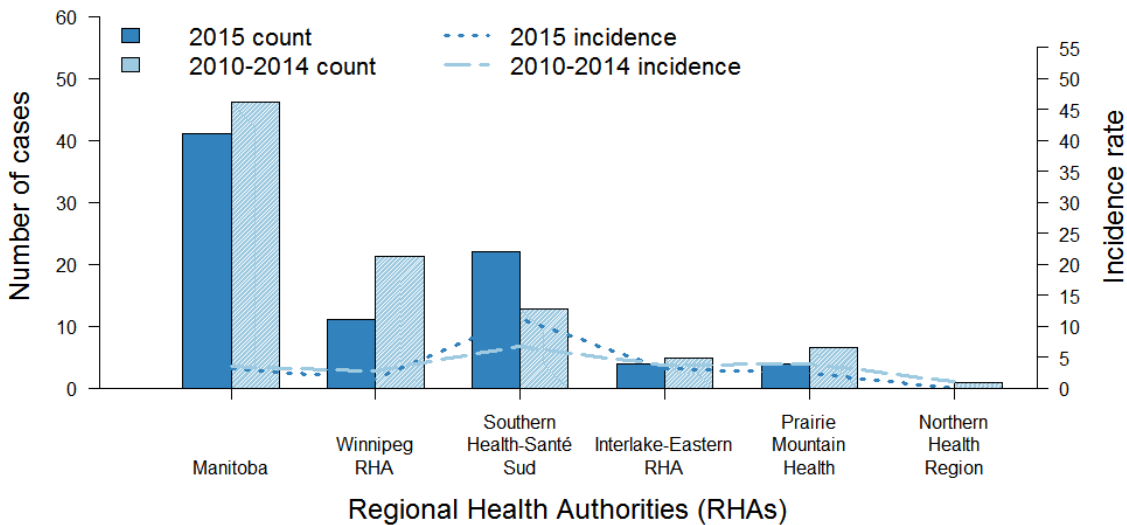
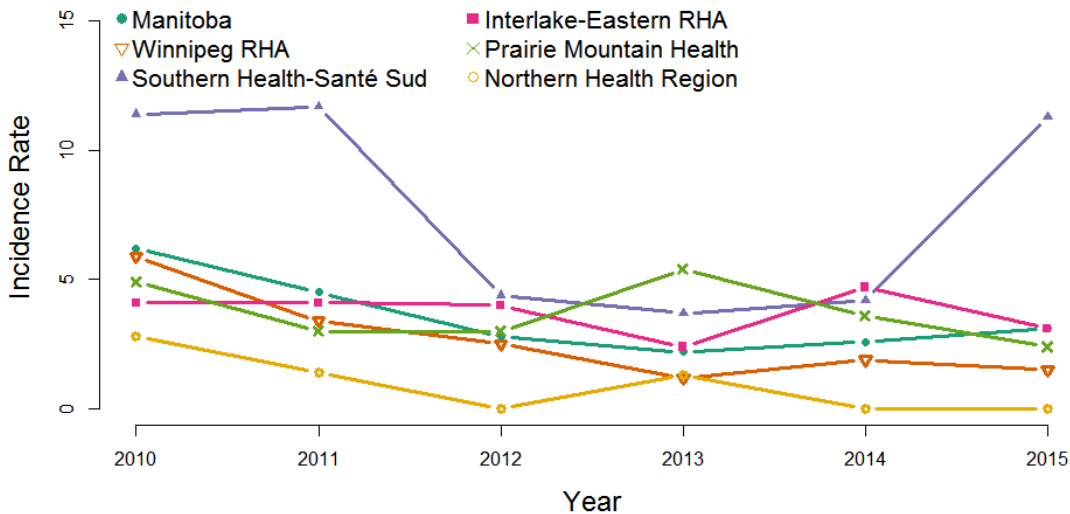
FIGURE 23: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY RHA (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 25: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	41	46.2	3.1	3.5
Winnipeg RHA	11	21.2	1.5	2.8
Southern Health-Santé Sud	22	12.8	11.3	6.7
Interlake-Eastern RHA	4	4.8	3.1	3.8
Prairie Mountain Health	4	6.6	2.4	3.9
Northern Health Region	0	0.8	0	1.1

FIGURE 24: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED VEROTOXIGENIC ESCHERICHIA COLI (VTEC) CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



NON-VACCINE PREVENTABLE DISEASES

Non-vaccine preventable diseases (non-VPDs) are communicable diseases that cannot be prevented through immunization. Only two non-VPDs were reported in Manitoba in 2015: streptococcal invasive disease (Group A) and streptococcal invasive disease of the newborn (Group B). These two diseases combined was 215 cases, which made non-VPDs make up 13.62% (215 cases of 1578 total cases) of this report (Table 53).

STREPTOCOCCAL INVASIVE DISEASE (GROUP A)

Prior to January 1, 2015, the following ICD9 codes were used to classify Streptococcus

- 038.0 - Streptococcus Beta-hemolytic in blood (all groups A-G)
- 320.2 - Streptococcus Beta-hemolytic in CSF (all groups A-G)
- 041.1 - Streptococcus Beta-hemolytic in other sterile sites (all groups A-G).

As of January 1, 2015, the ICD9 codes 038.0, 320.2 and 041.1 were re-classified to only include Group A; Groups B-G are no longer captured in these codes. These ICD9 codes are reported together as Streptococcal invasive disease (Group A), as they are all caused by the same infection agent, *Streptococcus pyogenes*, in different sources.

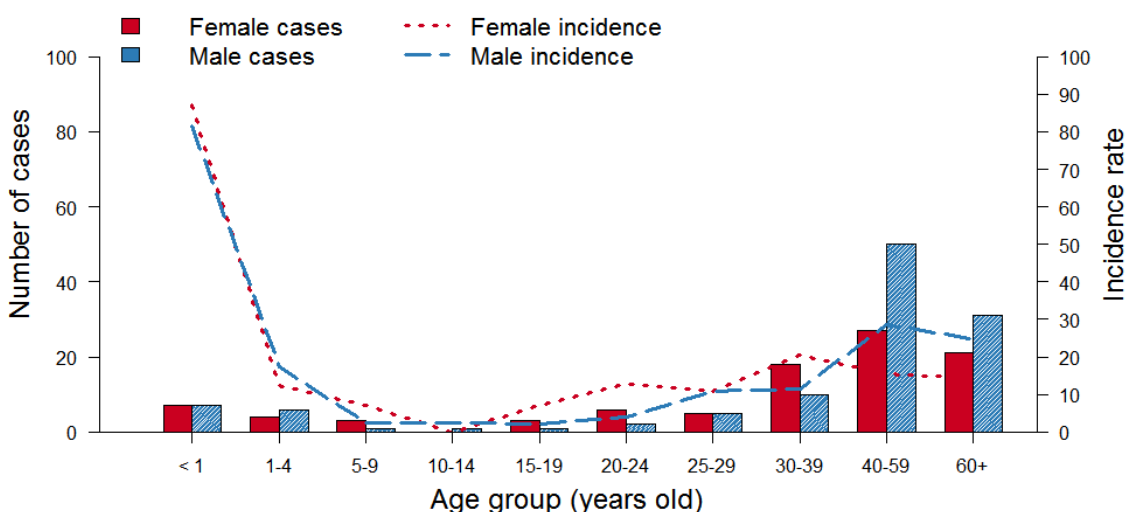
Making a comparison is not valuable in these situations because the meaning of the codes have changed. While it would be possible to manually go through existing cases and update their ICD9 codes based on their serotype, this will not give us reliable data. For example, when the case is reported, the serotype is may not be included, so there is no valid way of identifying what the updated ICD9 code should be. Additionally, manually changing the code leaves lots of room for human error. For the purposes of the report, the decision was made to report only the cases that occurred after January 1, 2015.

Of the diseases included in this report, streptococcal invasive disease (group A) had the third highest incidence rate in 2015, and accounted for 13.18 % of the total cases in this report (208 cases of 1,578 total cases) (Appendix C). There were a similar amount of cases of streptococcal invasive disease (group A) in males as there was in females, with just over half of these cases (54.8%; 114 cases of 208 total cases) occurred in males, and just under half of cases (45.2%; 94 cases of 208 total cases) occurred in females. Table 27 shows that three-quarters (75.4%; 157 cases of 208 total cases) of the cases were found in adults aged 30 years or older.

The average age in 2015 was 43.7 years (with standard deviation 23.2 years). The median age in 2015 was 45 years (with IQR 30 - 59.25 years).

TABLE 26: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE (GROUP A) CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	208	-	15.8	-
Female	94	-	14.1	-
Male	114	-	17.4	-

**FIGURE 25:** NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE (GROUP A) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015**TABLE 27:** NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE (GROUP A) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	14	7	7	84.1	87.0	81.4
1-4	10	4	6	14.9	12.3	17.4
5-9	4	3	1	4.7	7.2	2.3
10-14	1	0	1	1.3	0	2.4
15-19	4	3	1	4.6	7.2	2.2
20-24	8	6	2	8.2	12.7	4.0
25-29	10	5	5	10.7	10.8	10.7
30-39	28	18	10	16.0	20.4	11.5
40-59	77	27	50	22.0	15.5	28.5
60+	52	21	31	19.2	14.4	24.9

The majority of the cases of streptococcal invasive disease occurred in Winnipeg RHA, with 118 cases of 208 total cases. Interlake-Eastern RHA and Southern Health-Santé Sud had the lowest number of cases with 13 cases and 15 cases, respectively. The incidence rate was highest in Northern Health Region, with 48.7 cases per 100,000 population. This was the only region that experienced an incidence rate higher than the provincial incidence rate of 15.8 cases per 100,000 population.

FIGURE 26: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE (GROUP A) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

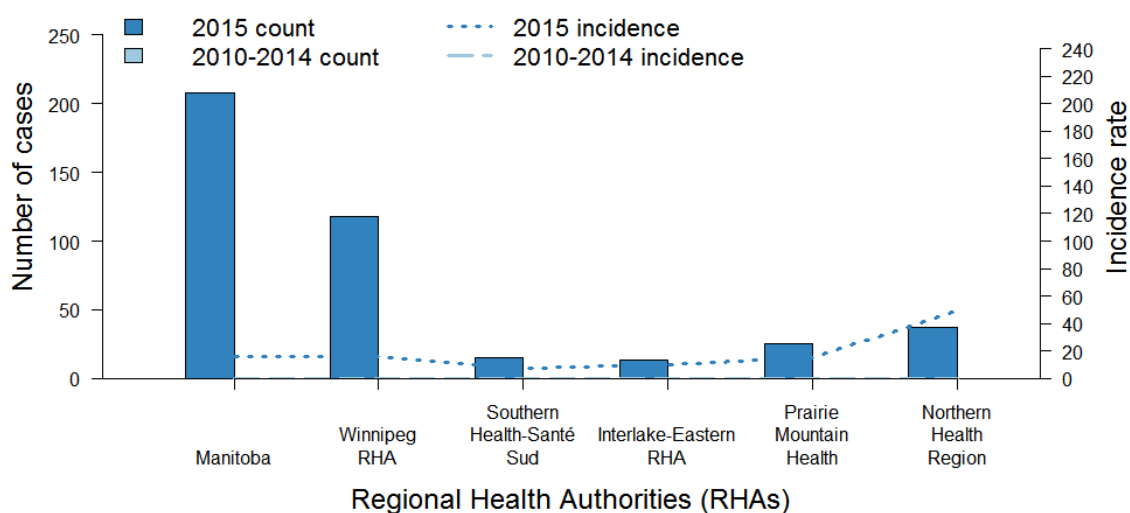


TABLE 28: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE (GROUP A) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	208	-	15.8	-
Winnipeg RHA	118	-	15.6	-
Southern Health-Santé Sud	15	-	7.7	-
Interlake-Eastern RHA	13	-	10.2	-
Prairie Mountain Health	25	-	14.8	-
Northern Health Region	37	-	48.7	-

STREPTOCOCCAL INVASIVE DISEASE OF THE NEWBORN (GROUP B)

As of January 1, 2015 a new ICD9 code, 041.02, was created to capture cases in which the infectious agent *Streptococcus agalactiae* infected a newborn (defined as an infant up to 28 days old). These cases are known as Streptococcal invasive disease of the newborn (group B).

Making a comparison is not possible in these situations because the code did not exist during the years we are comparing the data to. While it would be possible to manually go through existing cases and update their ICD9 codes based on their serotype, this will not give us reliable data. For example, when the case is reported, the serotype is may not be included, meaning there is no valid way of identifying what the updated ICD9 code should be. Additionally, manually changing the code leaves lots of room for human error. For the purposes of the report, the decision was made to report only the cases that occurred after January 1, 2015.

In 2015 there were 7 cases of streptococcal invasive disease of the newborn (group B). The cases were found equally in males (3 cases) and females (4 cases). As this disease is newborn specific (where newborn is defined as an infant from birth to 28 days), all the cases occurred in those less than one years old.

The average age in 2015 was 0 years (with standard deviation 0 years). The median age in 2015 was 0 years (with IQR 0 - 0 years).

TABLE 29: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE OF THE NEWBORN (GROUP B) CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	7	-	0.5	-
Female	4	-	0.6	-
Male	3	-	0.5	-

TABLE 30: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE OF THE NEWBORN (GROUP B) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	7	4	3	42.1	49.7	34.9
1-4	0	0	0	0	0	0
5-9	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-39	0	0	0	0	0	0
40-59	0	0	0	0	0	0
60+	0	0	0	0	0	0

The majority of the cases were from Winnipeg RHA (6 cases of 7 total cases). The one other case was found in Northern Health Region.

TABLE 31: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED STREPTOCOCCAL INVASIVE DISEASE OF THE NEWBORN (GROUP B) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	7	-	0.5	-
Winnipeg RHA	6	-	0.8	-
Southern Health-Santé Sud	0	-	0	-
Interlake-Eastern RHA	0	-	0	-
Prairie Mountain Health	0	-	0	-
Northern Health Region	1	-	1.3	-

VACCINE PREVENTABLE DISEASES

Vaccine preventable diseases (VPDs) are communicable diseases that may be prevented through immunization. Table 54 in Appendix B shows in 2015, 8 different VPDs were reported, with the three most common VPDs being invasive pneumococcal disease (199 cases), pertussis (56 cases) and haemophilus influenzae (non-serotype B) (34 cases). VPDs as a whole made up 14.45% (228 cases of 1578 total cases) of all reported cases.

HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B)

Prior to January 1, 2015 the ICD9 code 041.59 captured *Haemophilus influenzae* (not typable). As of January 1, 2015, this ICD9 code was re-classified to as *Haemophilus influenzae* (non-serotype B) which includes all *Haemophilus influenzae* cases that are non-serotype B, and those organisms that were not typable,

Making a comparison is not valuable in these situations because the meaning of the codes have changed. While it would be possible to manually go through existing cases and update their ICD9 codes based on their serotype, this will not give us reliable data. For example, when the case is reported, the serotype is may not be included, meaning there is no valid way of identifying what the updated ICD9 code should be. Additionally, manually changing the code leaves lots of room for human error. For the purposes of the report, the decision was made to report only the cases that occurred after January 1, 2015.

In 2015, 34 cases of *Haemophilus influenzae* (non-serotype B) were reported. Of these cases, exactly half of them were in females, and half were in males. The cases were most commonly diagnosed in those over 60 years of age (12 cases). The rest of the cases were found in those four years and younger, or twenty years and older.

The average age in 2015 was 39.1 years (with standard deviation 34 years). The median age in 2015 was 36.5 years (with IQR 1 - 71.5 years).

TABLE 32: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B) CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	34	-	2.6	-
Female	17	-	2.6	-
Male	17	-	2.6	-

FIGURE 27: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

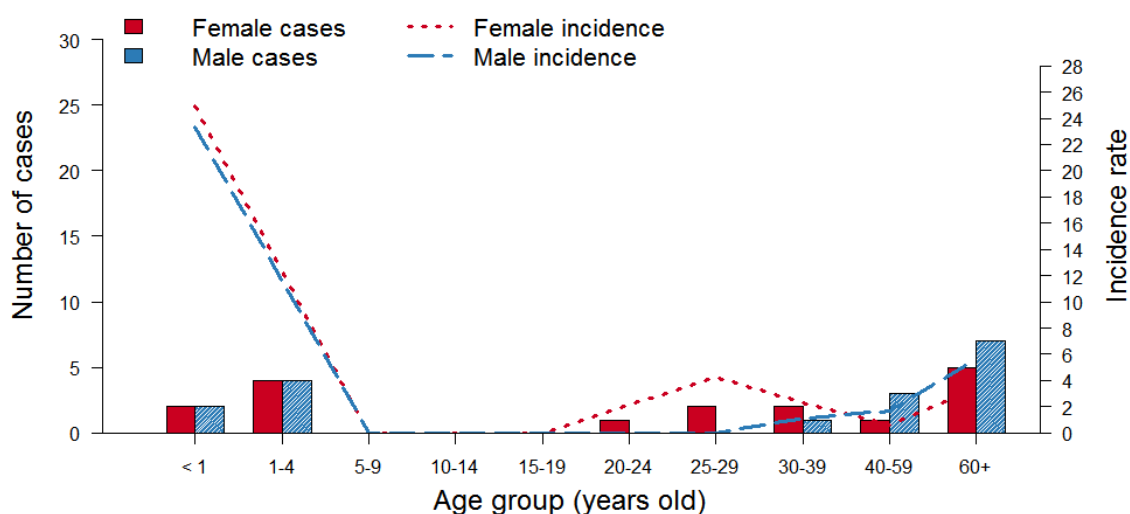


TABLE 33: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B) CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	4	2	2	24.0	24.9	23.3
1-4	8	4	4	11.9	12.3	11.6
5-9	0	0	0	0	0	0
10-14	0	0	0	0	0	0
15-19	0	0	0	0	0	0
20-24	1	1	0	1.0	2.1	0
25-29	2	2	0	2.1	4.3	0
30-39	3	2	1	1.7	2.3	1.1
40-59	4	1	3	1.1	0.6	1.7
60+	12	5	7	4.4	3.4	5.6

Northern Health Region had the highest incidence rate, with 15.8 cases per 100,000 population. The four remaining health regions had incidence rates similar to the provincial rate of 2.6 cases per 100,000

FIGURE 28: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

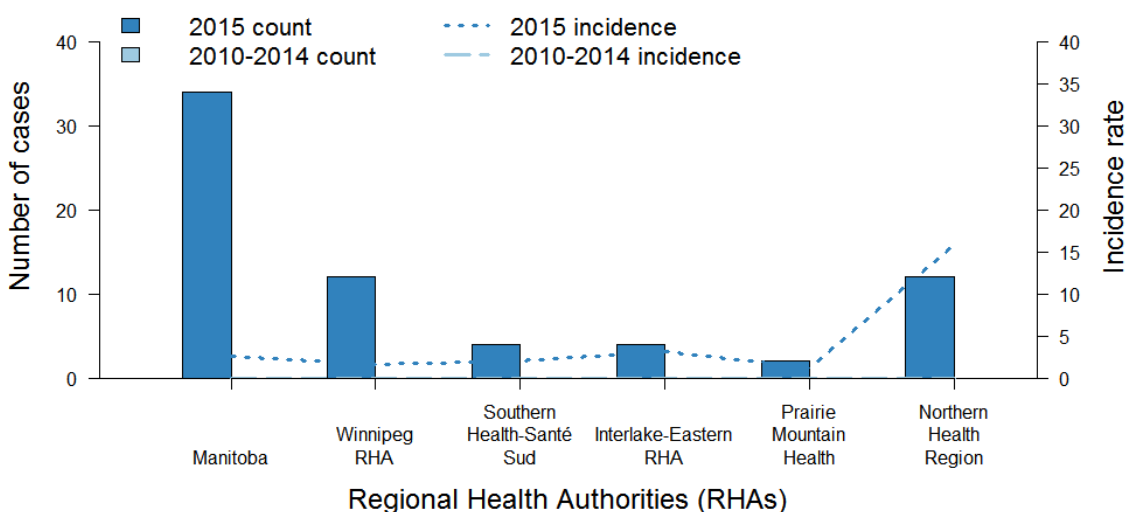


TABLE 34: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED HAEMOPHILUS INFLUENZAE (NON-SEROTYPE B) CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	34	-	2.6	-
Winnipeg RHA	12	-	1.6	-
Southern Health-Santé Sud	4	-	2.1	-
Interlake-Eastern RHA	4	-	3.1	-
Prairie Mountain Health	2	-	1.2	-
Northern Health Region	12	-	15.8	-

INVASIVE PNEUMOCOCCAL DISEASE

Table 35 shows the incidence rate of invasive pneumococcal disease in Manitoba was 9 cases per 100,000 population in 2015. This was slightly lower than the incidence rate of the 5-year average of 11 cases per 100,000 population. The decrease in incidence occurred in both the female and male population. The incidence rates were the highest in children under the age of five, or adults over 30 years of age.

The average age in 2015 was 49.9 years (with standard deviation 25 years). The average age in 2010 - 2014 was 48.7 years (with standard deviation 25.7 years). The median age in 2015 was 53 years (with IQR 35 - 70.5 years). The median age in 2010 - 2014 was 52 years (with IQR 34 - 67 years).

TABLE 35: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	119	143.6	9.0	11.0
Female	61	69.6	9.2	10.6
Male	58	74.0	8.8	11.4

FIGURE 29: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

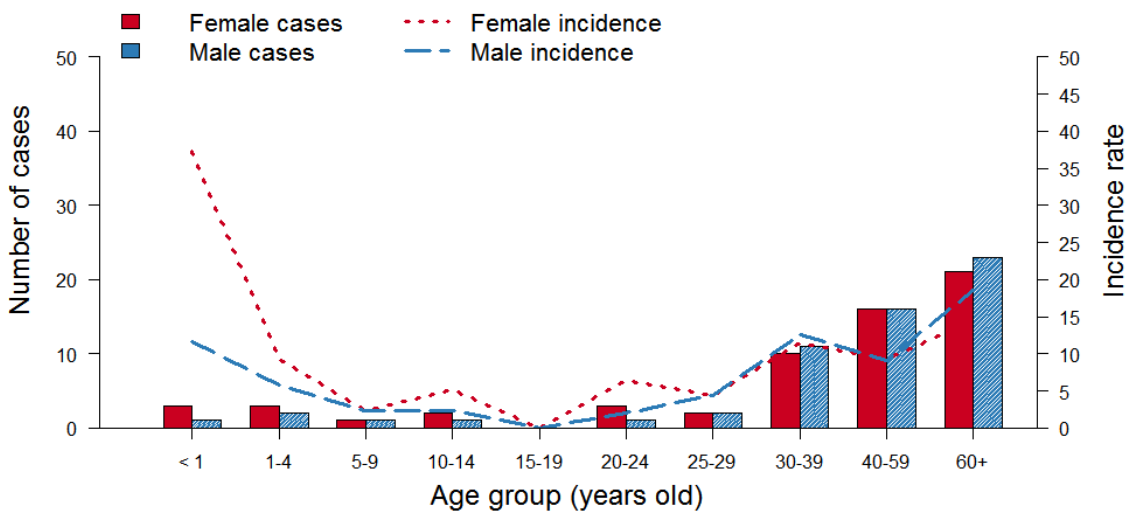


TABLE 36: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	4	3	1	24.0	37.3	11.6
1-4	5	3	2	7.5	9.2	5.8
5-9	2	1	1	2.4	2.4	2.3
10-14	3	2	1	3.8	5.2	2.4
15-19	0	0	0	0	0	0
20-24	4	3	1	4.1	6.4	2.0
25-29	4	2	2	4.3	4.3	4.3
30-39	21	10	11	12.0	11.4	12.6
40-59	32	16	16	9.1	9.2	9.1
60+	44	21	23	16.3	14.4	18.5

The incidence rate was the highest in the Northern Health Region, and increased slightly in 2015 compared to the 5-year average (36.9 cases per 100,000 population in 2015 compared to 33.2 cases per 100,000 population for the 5-year average). Figure 34 shows the Northern Health Region has historically been the RHA with the highest incidence rate over the last six years, with incidence rates varying over the years. The other four health regions, however, have remained relatively constant over the last six years.

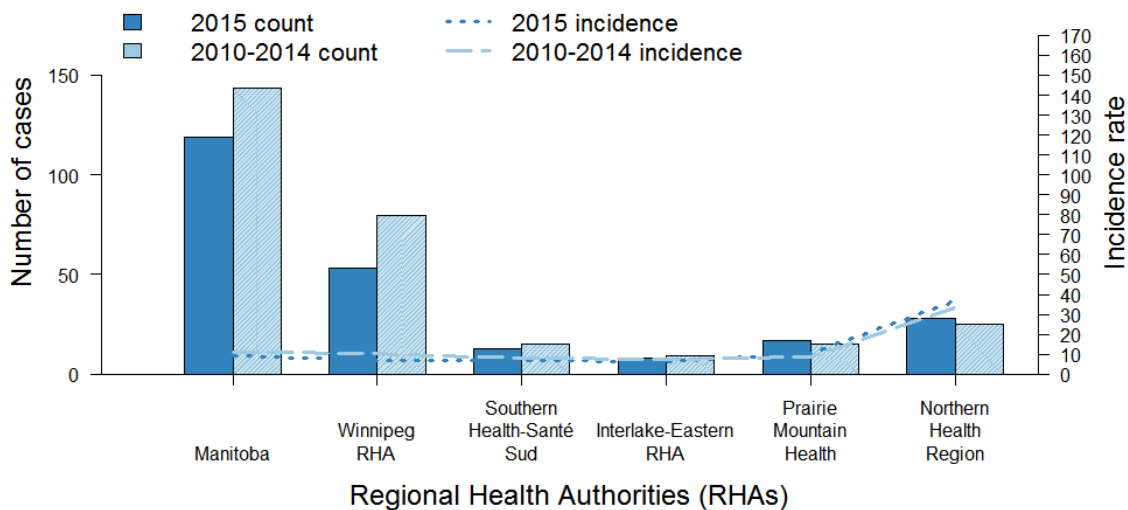
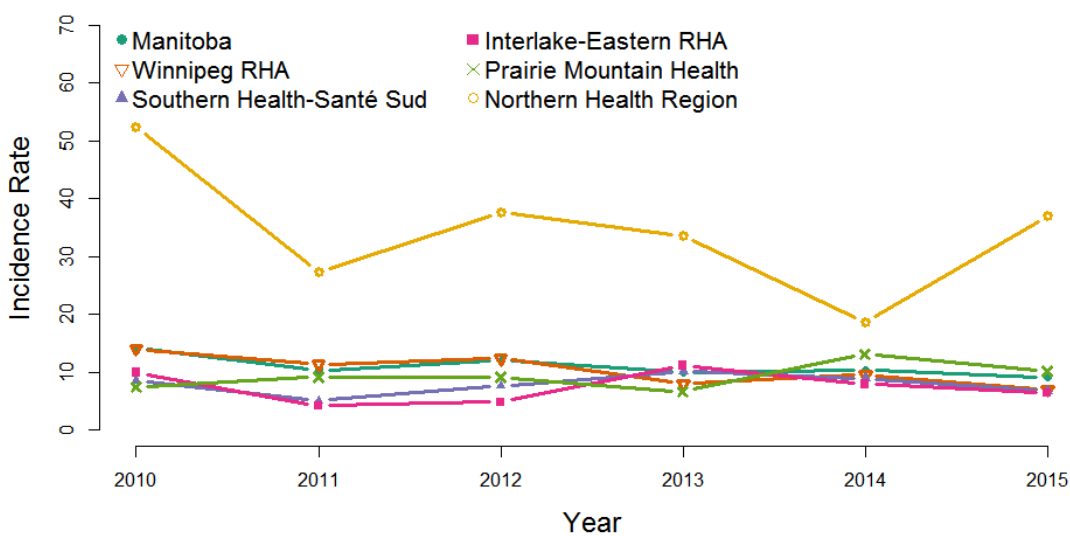
FIGURE 30: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 37: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	119	143.6	9.0	11.0
Winnipeg RHA	53	79.4	7.0	10.6
Southern Health-Santé Sud	13	14.8	6.7	7.8
Interlake-Eastern RHA	8	9.4	6.3	7.4
Prairie Mountain Health	17	15.0	10.1	8.9
Northern Health Region	28	25.0	36.9	33.2

FIGURE 31: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED INVASIVE PNEUMOCOCCAL DISEASE CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



MUMPS

The incidence rate of mumps in 2015 was slightly higher than what was expected. Seven cases were reported in the province; six of which were in adults aged 25 years and older. The incidence rates for males and females were similar to those of the provincial rate of 0.5 cases per 100,000 population (Table 38).

The average age in 2015 was 38.1 years (with standard deviation 21.1 years). The average age in 2010 - 2014 was 29.9 years (with standard deviation 19.5 years). The median age in 2015 was 30 years (with IQR 26.5 - 49.5 years). The median age in 2010 - 2014 was 39 years (with IQR 11 - 43.5 years).

TABLE 38: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MUMPS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	7	3.0	0.5	0.2
Female	4	1.2	0.6	0.2
Male	3	1.8	0.5	0.3

TABLE 39: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MUMPS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

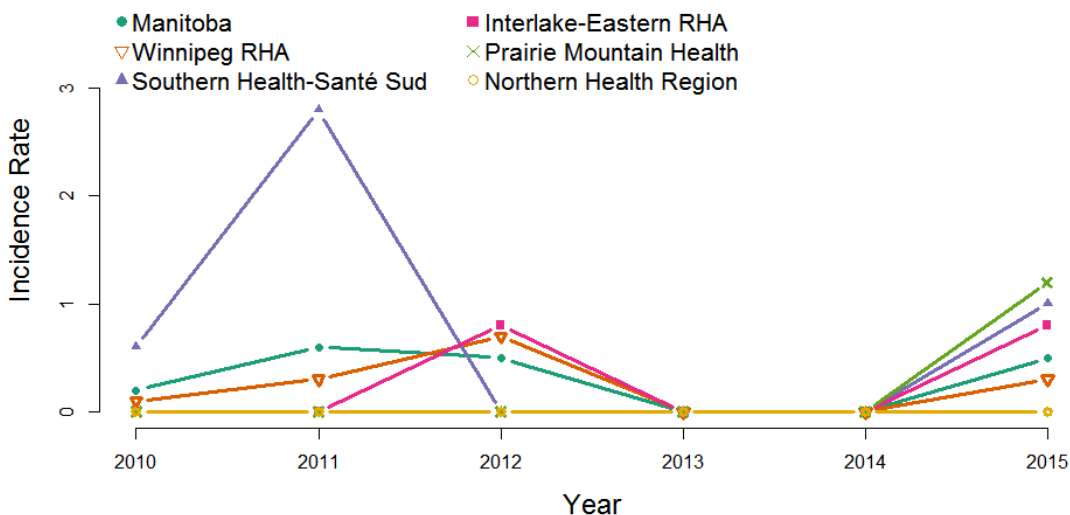
Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	0	0	0	0	0	0
5-9	0	0	0	0	0	0
10-14	1	1	0	1.3	2.6	0
15-19	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	2	2	0	2.1	4.3	0
30-39	1	0	1	0.6	0	1.1
40-59	2	1	1	0.6	0.6	0.6
60+	1	0	1	0.4	0	0.8

Figure 35 shows all health regions had higher incidence rates of mumps in 2015 compared to 2014. Comparing 2015 to the 5-year averages, Prairie Mountain Health had the largest increase in incidence rates (1.2 cases per 100,000 population in 2015 compared to 0 cases), while Winnipeg RHA remained had the smallest increase (0.3 cases per 100,000 population in 2015, compared to 0.2 cases per 100,000 population for the 5-year average), remaining relatively unchanged.

TABLE 40: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MUMPS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	7	3.0	0.5	0.2
Winnipeg RHA	2	1.6	0.3	0.2
Southern Health-Santé Sud	2	1.2	1	0.6
Interlake-Eastern RHA	1	0.2	0.8	0.2
Prairie Mountain Health	2	0	1.2	0
Northern Health Region	0	0	0	0

FIGURE 32: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MUMPS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



PERTUSSIS

The incidence rate of pertussis (also known as “whooping cough”) in 2015 was higher compared to the 5-year average. Females saw an increase of 1.5 cases per 100,000 population, while males saw an increase of 0.4 cases per 100,000 population (Table 41). In 2015, there were 56 cases reported in the province. Three-fifths (60.7%; 34 cases of 56 total cases) of these cases were in children aged four or younger (Table 42).

The average age in 2015 was 9.9 years (with standard deviation 16.5 years). The average age in 2010 - 2014 was 7.7 years (with standard deviation 13.5 years). The median age in 2015 was 2.5 years (with IQR 0 - 11.25 years). The median age in 2010 - 2014 was 1 year (with IQR 0 - 11 years).

TABLE 41: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	56	43.2	4.2	3.3
Female	32	22.0	4.8	3.3
Male	24	21.2	3.7	3.3

FIGURE 33: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

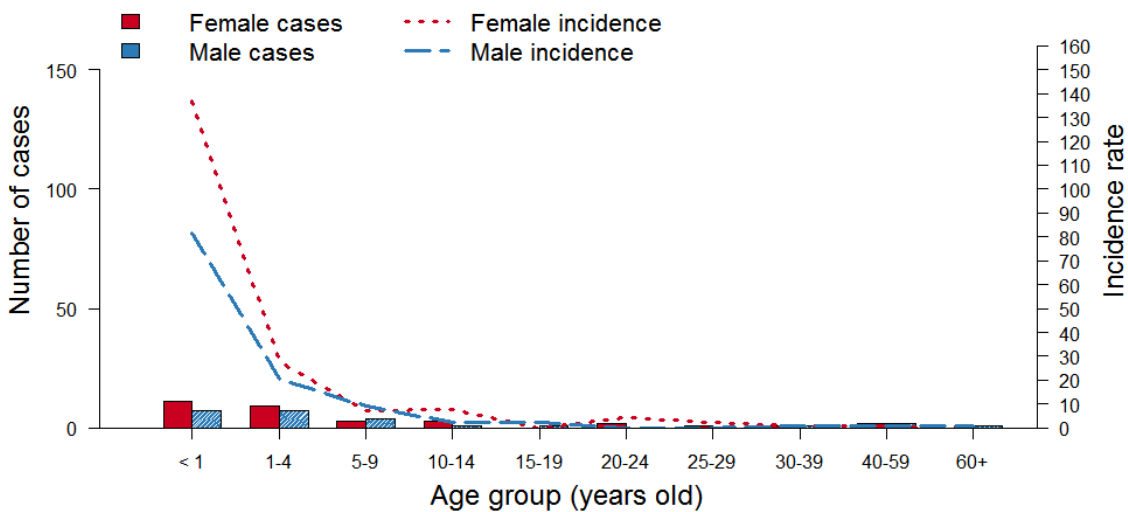


TABLE 42: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	18	11	7	108.2	136.7	81.4
1-4	16	9	7	23.9	27.7	20.3
5-9	7	3	4	8.3	7.2	9.3
10-14	4	3	1	5.0	7.7	2.4
15-19	1	0	1	1.2	0	2.2
20-24	2	2	0	2.1	4.2	0
25-29	1	1	0	1.1	2.2	0
30-39	2	1	1	1.1	1.1	1.1
40-59	4	2	2	1.1	1.1	1.1
60+	1	0	1	0.4	0	0.8

While three of the regional health authorities had incidence rates similar to their 5-year average (Winnipeg RHA, Interlake-Eastern RHA and Prairie Mountain Health), we can see from Table 43 that Northern Health Region had a lower incidence rate from their 5-year average (18.3 cases per 100,000 population in the 5-year average compared to 2.6 cases per 100,000 population in 2015). Southern Health-Santé Sud saw a rise in their incidence rate, from 8 cases per 100,000 population in the 5-year average compared to 24.2 cases per 100,000 population in 2015.

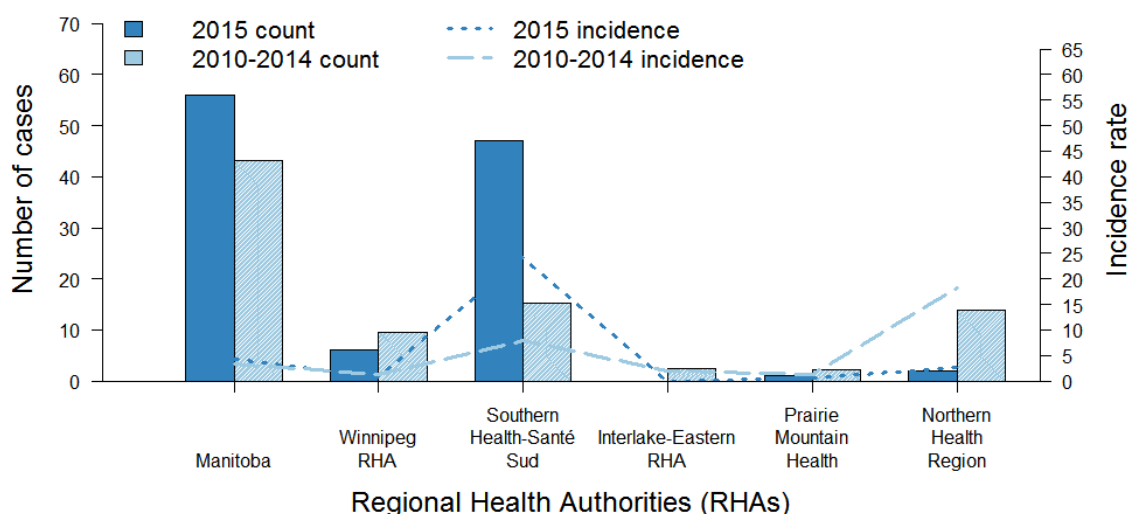
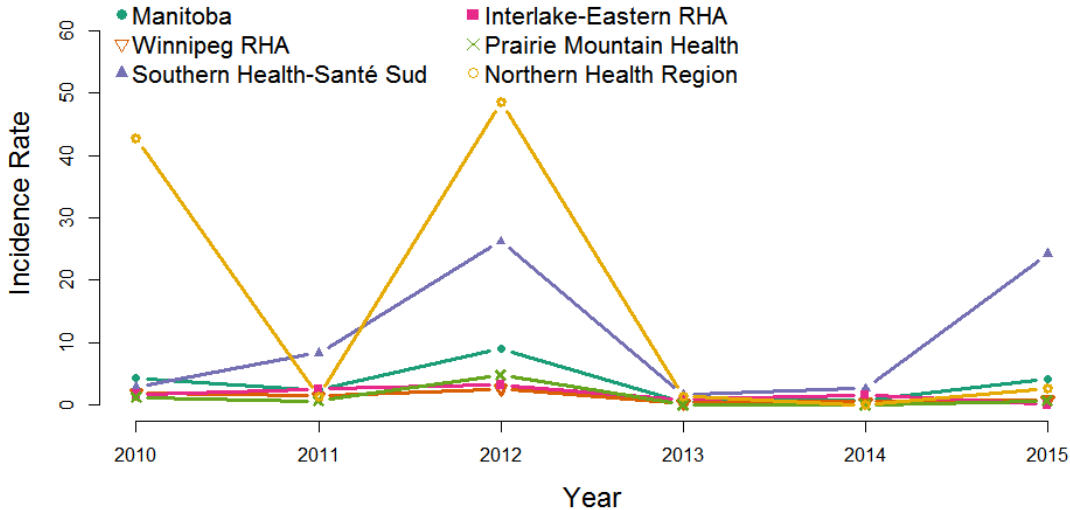
FIGURE 34: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 43: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	56	43.2	4.2	3.3
Winnipeg RHA	6	9.6	0.8	1.3
Southern Health-Santé Sud	47	15.2	24.2	8.0
Interlake-Eastern RHA	0	2.4	0	1.9
Prairie Mountain Health	1	2.2	0.6	1.3
Northern Health Region	2	13.8	2.6	18.3

FIGURE 35: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED PERTUSSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



ZOONOTIC AND ENVIRONMENTAL DISEASES

For the purposes of this report, zoonotic and environmental diseases are those communicable diseases which are, or are capable of being, transmitted to humans through animals, or from some aspect of the environment. Table 55 in Appendix B shows there were 6 zoonotic and/or environmental diseases reported to MHSAL in 2015.

BLASTOMYCOSIS

There were 16 cases of blastomycosis in 2015, which is slight increase from the 11.2 cases from the previous 5-year average. The number of cases were similar in females (7 cases) and males (9 cases). The female incidence rate was the highest in children less than one year old with 12.4 cases per 100,000 population, while the male incidence rate was highest among children between 10-14 years of age with 4.9 cases per 100,000 population.

The average age in 2015 was 38.4 years (with standard deviation 23.2 years). The average age in 2010 - 2014 was 41.2 years (with standard deviation 22.7 years). The median age in 2015 was 36 years (with IQR 20.25 - 57.75 years). The median age in 2010 - 2014 was 39.5 years (with IQR 22.75 - 57 years).

TABLE 44: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	16	11.2	1.2	0.9
Female	7	3.6	1.1	0.5
Male	9	7.6	1.4	1.2

FIGURE 36: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

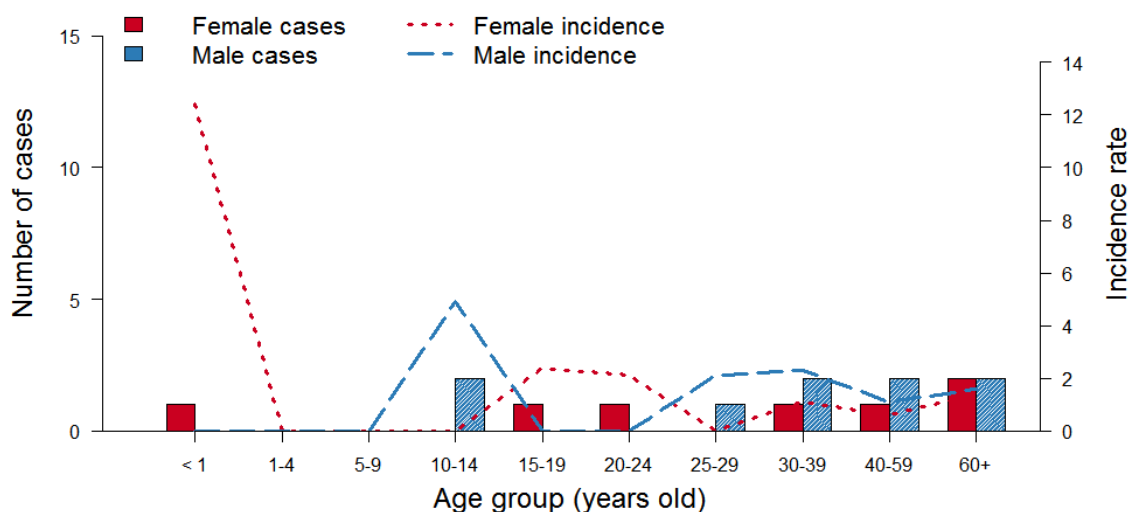


TABLE 45: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	1	1	0	6.0	12.4	0
1-4	0	0	0	0	0	0
5-9	0	0	0	0	0	0
10-14	2	0	2	2.5	0	4.9
15-19	1	1	0	1.2	2.4	0
20-24	1	1	0	1.0	2.1	0
25-29	1	0	1	1.1	0	2.1
30-39	3	1	2	1.7	1.1	2.3
40-59	3	1	2	0.9	0.6	1.1
60+	4	2	2	1.5	1.4	1.6

Table 46 shows that in 2015, two of the regional health authorities (Winnipeg RHA and Prairie Mountain Health) had incidence rates that were similar to their 5-year averages. Interlake-Eastern RHA had a slightly higher rate, and Northern Health Region had a more noticeable increase from the 5-year average. Southern Health-Santé Sud is the only health region that showed a decrease from their 5-year average, going from 0.7 cases per 100,000 population to no cases in 2015.

FIGURE 37: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

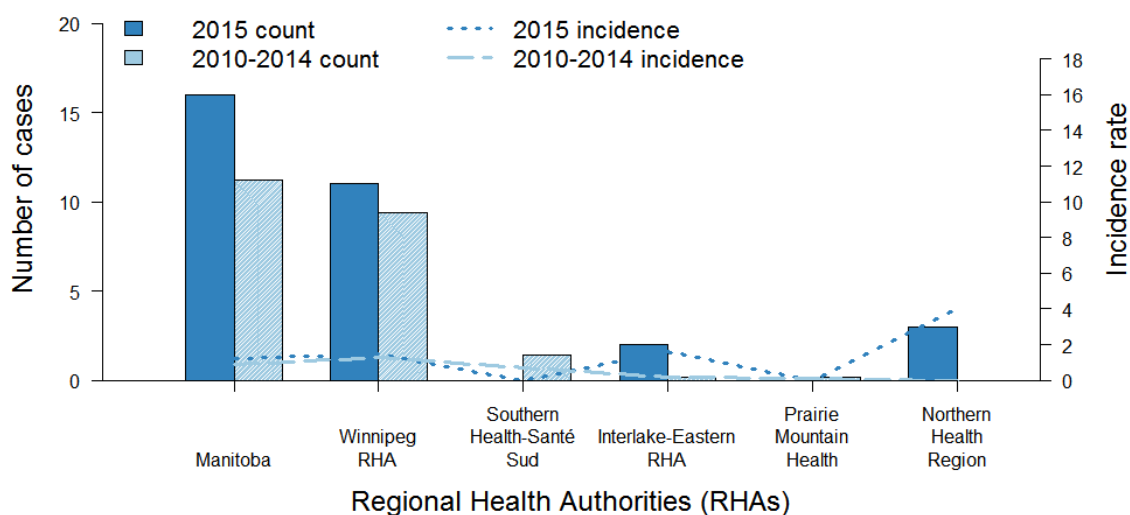
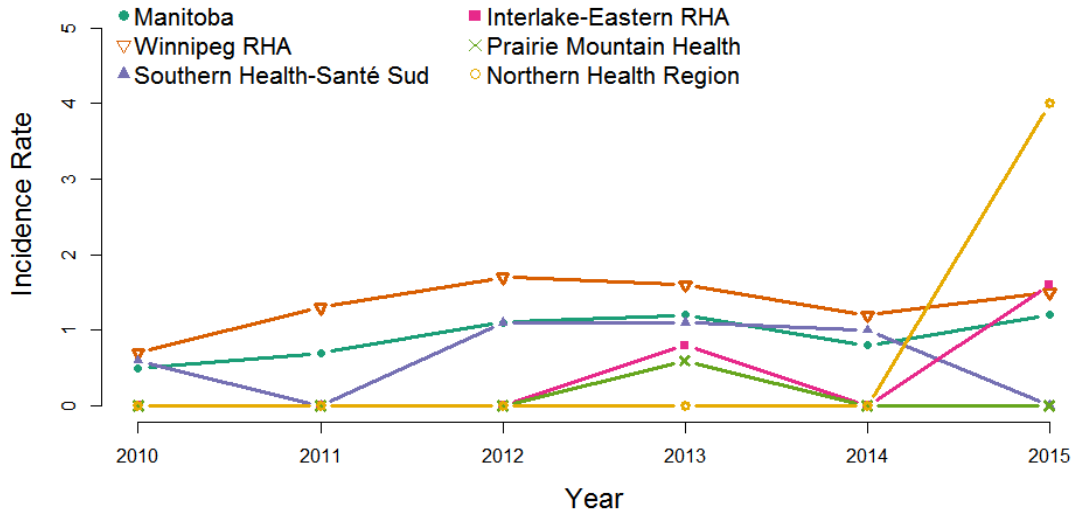


TABLE 46: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	16	11.2	1.2	0.9
Winnipeg RHA	11	9.4	1.5	1.3
Southern Health-Santé Sud	0	1.4	0	0.7
Interlake-Eastern RHA	2	0.2	1.6	0.2
Prairie Mountain Health	0	0.2	0	0.1
Northern Health Region	3	0	4.0	0

FIGURE 38: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED BLASTOMYCOSIS CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015



MALARIA

The incidence rate of malaria in 2015 was as expected. Nearly all of the cases in 2015 were found in males (15 cases of 17 total cases) (Table 47). The two female cases that occurred were in those aged 10-19 years. The male cases occurred at various different ages.

The average age in 2015 was 22.3 years (with standard deviation 18.3 years). The average age in 2010 - 2014 was 31.1 years (with standard deviation 18.5 years). The median age in 2015 was 16 years (with IQR 8 - 29 years). The median age in 2010 - 2014 was 30.5 years (with IQR 17.25 - 44 years).

TABLE 47: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY SEX, 2015 AND 5-YEAR AVERAGE (2010-2014)

	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Total	17	16.4	1.3	1.3
Female	2	5.2	0.3	0.8
Male	15	11.2	2.3	1.7

FIGURE 39: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

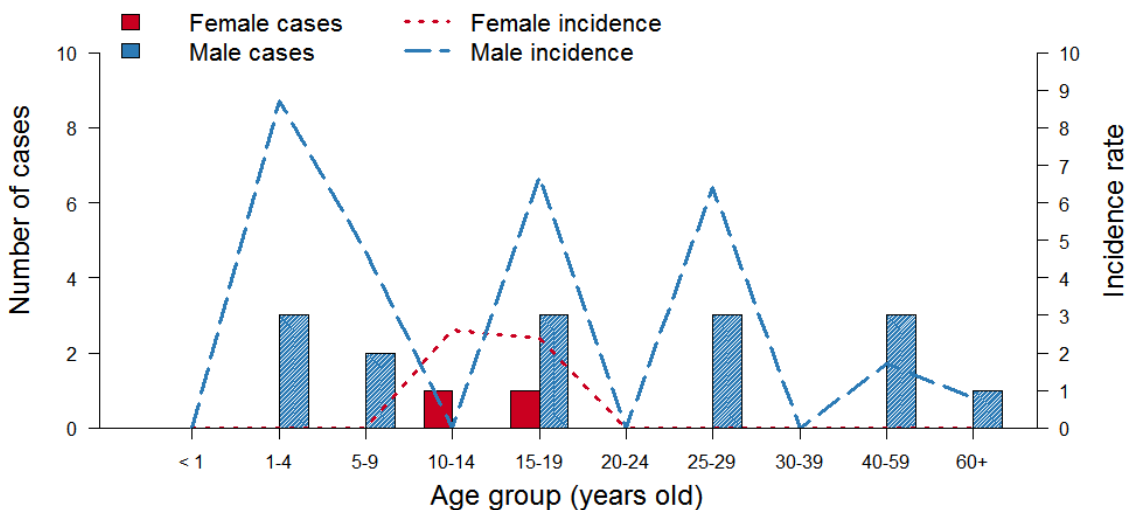


TABLE 48: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY AGE GROUP AND SEX, 2015

Age Group	Count			Incidence Rate		
	Total	Female	Male	Total	Female	Male
< 1	0	0	0	0	0	0
1-4	3	0	3	4.5	0	8.7
5-9	2	0	2	2.4	0	4.7
10-14	1	1	0	1.3	2.6	0
15-19	4	1	3	4.6	2.4	6.7
20-24	0	0	0	0	0	0
25-29	3	0	3	3.2	0	6.4
30-39	0	0	0	0	0	0
40-59	3	0	3	0.9	0	1.7
60+	1	0	1	0.4	0	0.8

Table 49 shows that out of the 17 cases reported in Manitoba, 15 of the cases occurred within the Winnipeg RHA. There were no cases reported in Southern Health-Santé Sud, or the Northern Health Region, and one case in each Interlake-Eastern RHA and Prairie Mountain Health.

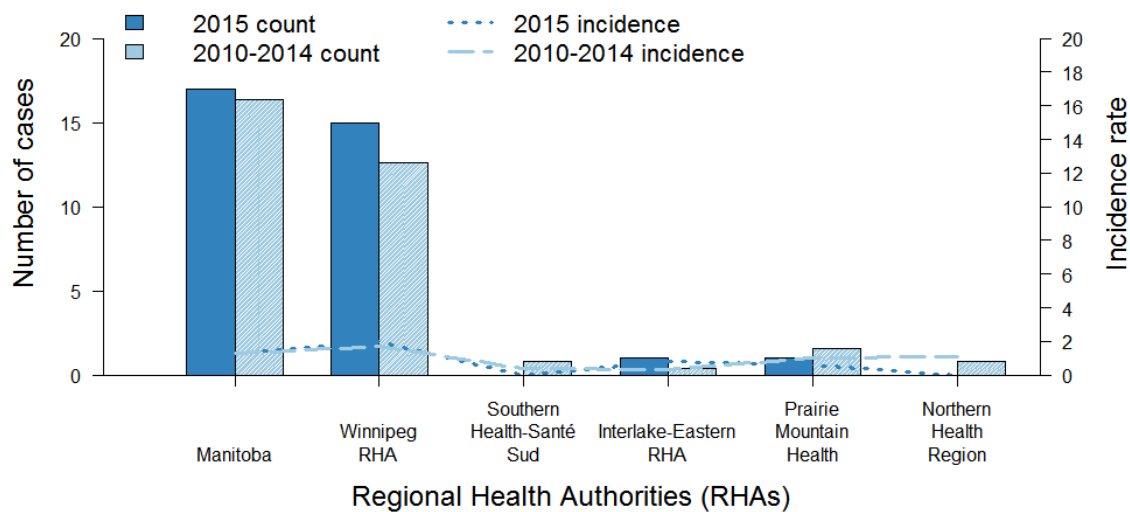
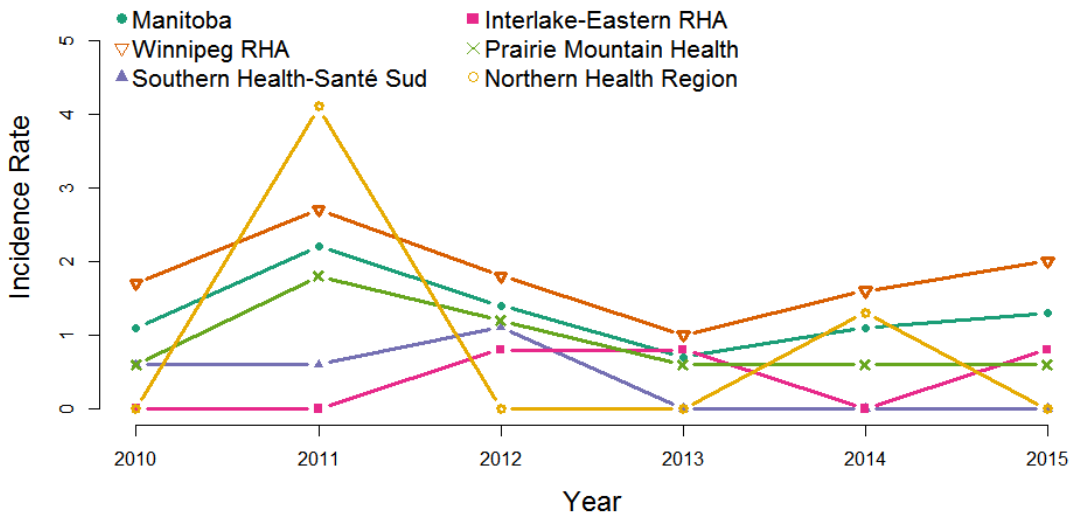
FIGURE 40: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

TABLE 49: NUMBER AND INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY REGIONAL HEALTH AUTHORITY (RHA), 2015 AND 5-YEAR AVERAGE (2010-2014)

RHA	Count		Incidence Rate	
	2015	2010-2014 Average	2015	2010-2014 Average
Manitoba	17	16.4	1.3	1.3
Winnipeg RHA	15	12.6	2.0	1.7
Southern Health-Santé Sud	0	0.8	0	0.4
Interlake-Eastern RHA	1	0.4	0.8	0.3
Prairie Mountain Health	1	1.6	0.6	1.0
Northern Health Region	0	0.8	0	1.1

FIGURE 41: INCIDENCE (PER 100,000 POPULATION) OF LABORATORY-CONFIRMED MALARIA CASES IN MANITOBA, BY YEAR AND REGIONAL HEALTH AUTHORITY (RHA), 2010-2015

APPENDIX

APPENDIX A– REPORTABLE DISEASES LIST, 2015

The following diseases and/or conditions are (human) reportable diseases in Manitoba for the year 2015, as prescribed by *The Reporting of Diseases and Conditions Regulation* [6] under *The Public Health Act*.

TABLE 50: REPORTABLE DISEASES LIST, 2015

Common name	Scientific or technical name of disease or its infectious agent
AIDS	Acquired Immunodeficiency Syndrome
Amebiasis	<i>Entamoeba histolytica</i>
Anaplasmosis (human granulocytic anaplasmosis)	<i>Anaplasma phagocytophilum</i>
Anthrax	<i>Bacillus anthracis</i>
Babesiosis	<i>Babesia</i> species
Blastomycosis	<i>Blastomyces dermatitidis</i>
Botulism	<i>Clostridium botulinum</i>
Brucellosis	<i>Brucella</i> species
Campylobacteriosis	<i>Campylobacter</i> species
Cancer or Malignant Neoplasm	Cancer or Malignant Neoplasm
Chancroid	<i>Haemophilus ducreyi</i>
Chlamydia	<i>Chlamydia trachomatis</i> (including <i>Lymphogranuloma venereum</i> (LGV) serovars)
Cholera	<i>Vibrio cholerae</i> , serogroup O1, O139 or other toxigenic only
<i>Clostridium difficile</i> associated diarrhea	<i>Clostridium difficile</i> toxin
Congenital Rubella Infection/Syndrome	Rubella virus
Creutzfeldt–Jakob Disease, Classic and Variant	Creutzfeldt–Jakob disease prion
Cryptosporidiosis	<i>Cryptosporidium</i> species
Cyclosporiasis	<i>Cyclospora cayetanensis</i>
Diphtheria	The following toxin-producing <i>Corynebacterium</i> species: <i>diphtheriae</i> , <i>ulcerans</i> , <i>pseudotuberculosis</i>
Giardiasis	<i>Giardia lamblia</i> , <i>intestinalis</i> , <i>duodenalis</i>

Common name	Scientific or technical name of disease or its infectious agent
Gonorrhoea	<i>Neisseria gonorrhoeae</i>
<i>Haemophilus influenzae</i> Serotype B Invasive Disease	<i>Haemophilus influenzae</i> (serotype B)
<i>Haemophilus influenzae</i> , non-Serotype B Invasive Disease	<i>Haemophilus influenzae</i> (non-serotype B)
Hantavirus Pulmonary Syndrome	Hantavirus
Hepatitis A	Hepatitis A virus
Hepatitis B	Hepatitis B virus
Hepatitis C	Hepatitis C virus
HIV	Human immunodeficiency virus
Influenza, Laboratory-Confirmed	Influenza virus
Legionellosis	<i>Legionella</i> species
Leprosy	<i>Mycobacterium leprae</i>
Listeriosis, invasive disease	<i>Listeria monocytogenes</i>
Lyme Disease	<i>Borrelia burgdorferi</i>
Malaria	<i>Plasmodium</i> species
Measles	Measles virus
Meningococcal Invasive Disease	<i>Neisseria meningitides</i>
Mumps	Mumps virus
Pertussis	<i>Bordetella pertussis</i>
Plague	<i>Yersinia pestis</i>
Pneumococcal Disease, Invasive	<i>Streptococcus pneumoniae</i>
Poliomyelitis	Poliovirus
Q fever	<i>Coxiella burnetii</i>
Rabies	Rabies virus
Rubella	Rubella virus
Salmonellosis	<i>Salmonella</i> species, excluding <i>S. typhi</i>
Severe Acute Respiratory Infection (SARI)	Severe Acute Respiratory Infection
Shigellosis	<i>Shigella</i> species
Smallpox	<i>Variola major</i> virus <i>Variola minor</i> virus

Common name	Scientific or technical name of disease or its infectious agent
Streptococcal Invasive Disease (Group A)	<i>Streptococcus pyogenes</i>
Streptococcal Invasive Disease of the Newborn (Group B)	<i>Streptococcus agalactiae</i>
Syphilis (All categories)	<i>Treponema pallidum</i> subspecies <i>pallidum</i>
Tetanus	<i>Clostridium tetani</i>
Tuberculosis	<i>Mycobacterium tuberculosis</i> <i>Mycobacterium africanum</i> <i>Mycobacterium canetti</i> <i>Mycobacterium caprae</i> <i>Mycobacterium microti</i> <i>Mycobacterium pinnipedi</i> <i>Mycobacterium bovis</i> (excluding <i>M. bovis</i> BCG strain)
Tularemia	<i>Francisella tularensis</i>
Typhoid Fever	<i>Salmonella typhi</i>
Verotoxigenic <i>Escherichia coli</i> Infection	Verotoxin-producing strains of <i>E. coli</i>
Viral Hemorrhagic Fever	Crimean Congo Lassa Ebola Marburg Rift Valley
West Nile Virus (WNV)	West Nile virus
Yellow Fever	Yellow fever virus

APPENDIX B – DISEASE SUMMARIES BY CATEGORY

TABLE 51: ANTIBIOTIC RESISTANT ORGANISMS SUMMARY BY YEAR

Disease name	Count						Incidence Rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Clostridium difficile infection (CDI)	820	903	800	328	463	514	66.7	72.2	62.9	25.4	35.4	38.9

TABLE 52: ENTERIC DISEASES SUMMARY BY YEAR

Disease name	Count						Incidence Rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Amebiasis	34	29	40	17	29	24	2.8	2.3	3.1	1.3	2.2	1.8
Campylobacteriosis	245	289	249	203	158	142	19.9	23.1	19.6	15.7	12.1	10.8
Cholera	0	1	0	0	0	0	0	0.1	0	0	0	0
Cryptosporidiosis	23	19	41	39	112	36	1.9	1.5	3.2	3.0	8.6	2.7
Cyclosporiasis	1	2	0	2	5	4	0.1	0.2	0	0.2	0.4	0.3
Giardiasis	123	116	113	87	81	97	10.0	9.3	8.9	6.7	6.2	7.3
Hepatitis A	8	7	4	4	3	4	0.7	0.6	0.3	0.3	0.2	0.3
Listeriosis	4	5	4	2	2	3	0.3	0.4	0.3	0.2	0.2	0.2
Paratyphoid fever	5	4	7	6	4	3	0.4	0.3	0.6	0.5	0.3	0.2
Salmonellosis	234	174	174	220	213	212	19.0	13.9	13.7	17.1	16.3	16.1
Shigellosis	50	29	75	23	29	18	4.1	2.3	5.9	1.8	2.2	1.4
Verotoxigenic Escherichia coli (VTEC)	76	56	36	29	34	41	6.2	4.5	2.8	2.2	2.6	3.1

TABLE 53: NON-VACCINE PREVENTABLE DISEASES SUMMARY BY YEAR

Disease name	Count						Incidence Rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Leprosy	0	0	0	0	1	0	0	0	0	0	0.1	0
Streptococcal invasive disease (Group A)	-	-	-	-	-	208	-	-	-	-	-	15.8
Streptococcal invasive disease of the newborn (Group B)	-	-	-	-	-	7	-	-	-	-	-	0.5

TABLE 54: VACCINE PREVENTABLE DISEASES SUMMARY BY YEAR

Disease name	Count						Incidence Rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Congenital rubella syndrome	0	1	0	0	0	0	0	0.1	0	0	0	0
Diphtheria	1	1	0	0	0	0	0.1	0.1	0	0	0	0
Haemophilus influenzae (non-serotype B)	-	-	-	-	-	34	-	-	-	-	-	2.6
Haemophilus influenzae (serotype B)	-	-	-	-	-	3	-	-	-	-	-	0.2
Invasive meningococcal disease	10	2	2	8	3	3	0.8	0.2	0.2	0.6	0.2	0.2
Invasive pneumococcal disease	175	129	152	128	134	119	14.2	10.3	12.0	9.9	10.3	9.0
Measles	1	0	0	0	6	1	0.1	0	0	0	0.5	0.1
Mumps	2	7	6	0	0	7	0.2	0.6	0.5	0	0	0.5
Pertussis	53	30	115	7	11	56	4.3	2.4	9.0	0.5	0.8	4.2
Rubella	2	0	1	0	0	0	0.2	0	0.1	0	0	0
Typhoid fever	6	8	6	2	1	5	0.5	0.6	0.5	0.2	0.1	0.4

TABLE 55: ZONOTIC AND ENVIRONMENTAL DISEASES SUMMARY BY YEAR

Disease name	Count						Incidence Rate					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015
Blastomycosis	6	9	14	16	11	16	0.5	0.7	1.1	1.2	0.8	1.2
Brucellosis	1	3	1	1	1	0	0.1	0.2	0.1	0.1	0.1	0
Creutzfeldt-Jakob Disease (CJD)	1	1	0	1	3	1	0.1	0.1	0	0.1	0.2	0.1
Hantavirus infection	0	0	1	0	0	1	0	0	0.1	0	0	0.1
Legionellosis	5	4	3	2	1	1	0.4	0.3	0.2	0.2	0.1	0.1
Malaria	14	27	18	9	14	17	1.1	2.2	1.4	0.7	1.1	1.3
Q fever	0	1	0	0	0	0	0	0.1	0	0	0	0
Tularemia	1	1	0	4	2	1	0.1	0.1	0	0.3	0.2	0.1

APPENDIX C – LABORATORY CONFIRMED, REPORTABLE DISEASES PRESENT IN MANITOBA IN 2015, RANKED BY CASE COUNT

Table 56 includes only those laboratory-confirmed, reportable diseases, present in Manitoba, in 2015. Any diseases that are within the scope of the report, but not shown in Table 56 had zero cases in 2015.

TABLE 56: NUMBER, INCIDENCE (PER 100,000 POPULATION), AND PROPORTION (% OF TOTAL) OF LABORATORY-CONFIRMED CASES IN MANITOBA, BY DISEASE, 2015

Rank	Disease Name	Case Count	Incidence Rate	Proportion of Total Cases
1	Clostridium difficile infection (CDI)	514	38.9	32.57%
2	Salmonellosis	212	16.1	13.43%
3	Streptococcal invasive disease (Group A)	208	15.8	13.18%
4	Campylobacteriosis	142	10.8	9.00%
5	Invasive pneumococcal disease	119	9.0	7.54%
6	Giardiasis	97	7.3	6.15%
7	Pertussis	56	4.2	3.55%
8	Verotoxigenic Escherichia coli (VTEC)	41	3.1	2.60%
9	Cryptosporidiosis	36	2.7	2.28%
10	Haemophilus influenzae (non-serotype B)	34	2.6	2.15%
11	Amebiasis	24	1.8	1.52%
12	Shigellosis	18	1.4	1.14%
13	Malaria	17	1.3	1.08%
14	Blastomycosis	16	1.2	1.01%
15	Mumps	7	0.5	0.44%
16	Streptococcal invasive disease of the newborn (Group B)	7	0.5	0.44%
17	Typhoid fever	5	0.4	0.32%
18	Cyclosporiasis	4	0.3	0.25%
19	Hepatitis A	4	0.3	0.25%
20	Haemophilus influenzae (serotype B)	3	0.2	0.19%
21	Invasive meningococcal disease	3	0.2	0.19%
22	Listeriosis	3	0.2	0.19%
23	Paratyphoid fever	3	0.2	0.19%
24	Creutzfeldt-Jakob Disease (CJD)	1	0.1	0.06%
25	Hantavirus infection	1	0.1	0.06%
26	Legionellosis	1	0.1	0.06%
27	Measles	1	0.1	0.06%
28	Tularemia	1	0.1	0.06%
	Total	1578		99.96

GLOSSARY

INTERNATIONAL CLASSIFICATIONS OF DISEASE (ICD)

The International Classifications of Disease (ICD) codes are used to classify and record diseases and health conditions. Standardized codes provide consistency among physicians with regard to recording patient symptoms and diagnoses for the purposes of claim reimbursements and clinical research

LABORATORY-CONFIRMED

Laboratory-confirmed means there was a valid laboratory test performed for the specific disease, as recommended in the MHHLS, Communicable Disease Control (CDC), Communicable Disease Management Protocols <http://www.gov.mb.ca/health/publichealth/cdc/protocol/index.html>, and a positive test result was obtained. That is, the case tested positive for the disease. Clinically diagnosed cases are not included in this report.

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