

Diabetes in Manitoba: Trends among Children and Adolescents, 1-19 years of age

1989 - 2013

Epidemiology & Surveillance

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Acronyms

CCDSS	Canadian Chronic Disease Surveillance System
ICD	The International Statistical Classifications of Diseases and Related Health Problems
CDA	Canadian Diabetes Association
CPL	Cadham Provincial Laboratory
DPIN	Drug Programs Information Network
E&S	Epidemiology and Surveillance, unit of MHSAL
MHSAL	Manitoba Health, Seniors and Active Living
NDSS	National Diabetes Surveillance System
PHAC	Public Health Agency of Canada
PHIN	Personal Health Identification Number
RHA	Regional Health Authority
WHO	World Health Organization

Executive Summary

Incidence of Diabetes in Manitoba (ages 1-19 years)

Overall Incidence (new cases)

- Between 1989 and 2013, the number of new cases of diabetes diagnosed among children and adolescents in Manitoba each year almost tripled, from **74** new diabetes cases among individuals 1-19 years of age in 1989 to **217** in 2013.
- Overall, there was a small difference between the crude incidence rates of males and females with diabetes between 1989 and 2013. However, for the majority of the time period, the female incidence rate was higher than the male incidence rate.
- Over 70% of new diabetes cases in 2013 were diagnosed among individuals 10-19 years of age and less than 10% were diagnosed among individuals 1-4 years of age.
- In 2013, the number of females newly diagnosed with diabetes and males newly diagnosed with diabetes were similar in each age group, except individuals 5-9 years of age where the number of females newly diagnosed was double the number of males newly diagnosed.
- Winnipeg regional health authority had the largest number of newly diagnosed diabetes cases in 2013 (**88**, crude rate 53.0 per 100,000 persons, adjusted rate 51.7 per 100,000 persons) but Northern Health Region had the highest incidence rate of diabetes in 2013 (**48**, crude rate 175.5 per 100,000 persons, 186.0 per 100,000 persons)
- In 2013, the female crude prevalence rate was larger than or equal to the male crude prevalence rate in each regional health authority (RHA) with the exception of Southern Health-Santé Sud.

Trend changes

- Incidence rates in Manitoba among children and adolescent were relatively stable between 1989 and 1999, increased in 2000, were relatively stable again from 2000-2008 and increased from 2009-2013.
- The female crude incidence rate increased two and one-half times between 1989 and 2013 and the male crude incidence rate increased three and one-half times between 1989 and 2013.
- The largest increase in incidence rate among age groups between 1989 and 2013 was seen in the 10-14 year old age group which increased almost fourfold, followed by the 5-9 year old age group which almost tripled, the 15-19 year old age group which increased two and one-half times and the 1-4 year old age group which doubled.
- Slight increases of the number of newly diagnosed diabetes were observed in all RHAs between 2000 and 2013. Prairie Mountain Health showed the largest increase, where the number of children and adolescents newly diagnosed with diabetes in 2013 was double the number diagnosed in 2000. The number of newly diagnosed cases in Northern Health Region almost doubled between 2000 and 2013.
- The age adjusted incidence rates in four of the five RHAs were similar and clustered together from 2000-2013. The exception was Northern Health Region which consistently had a higher incidence rate.

Prevalence of Diabetes in Manitoba (ages 1-19 years)

Overall Prevalence (existing cases)

- Between 1989 and 2013, the number of children and adolescents in Manitoba with diagnosed diabetes more than doubled, from 1989 (**589** persons) to 2013 (**1,366** persons).
- The female and male crude prevalence rates were similar throughout the entire reporting period.
- The crude prevalence rate of diabetes increased with age. From 1989 to 2013, the youngest age group, 1-4 years of age had the smallest prevalence, while the largest age group 15-19 years of age had the largest prevalence.
- Winnipeg RHA had the largest number of people living with diabetes in 2013 (**602**, crude rate 3.6 per 1,000 persons, adjusted rate 3.4 per 1,000 persons) but Northern Health Region had the highest prevalence rate of diabetes in 2013 (**238**, crude rate 8.6 per 1,000 persons, 9.3 per 1,000 persons)
- In 2013, the male crude prevalence rate was slightly larger than or equal to the female crude prevalence rate in Winnipeg RHA, Southern Health-Santé Sud and Prairie Mountain Health. The female crude prevalence rate was larger than the male crude prevalence rate in Interlake-Eastern RHA and Northern Health Region.

Trend changes

- The number of individuals 1-19 years of age with diagnosed diabetes doubled between 1989 and 2013 in Winnipeg RHA, Southern Health-Santé Sud and Prairie Mountain Health, tripled in Interlake-Eastern RHA and increased almost fourfold in Northern Health Region.
- From 1989 to 2013, increasing prevalence rates were seen in both males and females, and across all age groups. The largest increase was seen among those 10-19 years of age, where the prevalence rates increased two and one-half times; the rates less than doubled among the younger age groups.

Introduction

Diabetes is the fastest growing chronic disease worldwide¹ and one of the most common chronic disorders found in children². Characterized as a defect in insulin secretion, insulin action, or both^{3,4}, diabetes occurs when the body does not produce enough insulin or cannot use what it does produce effectively. Insulin is a hormone produced by the pancreas that assists with the conversion of glucose (sugar) into stored energy⁴. High levels of glucose in the blood can lead to the damage of organs, blood vessels and nerves⁵.

The majority of children with diabetes have type 1 diabetes^{2,6,7} and the number of new cases being diagnosed each year among the youth population is increasing globally⁸⁻¹¹. United Kingdom, United States and Australia have the largest incidence of type 1 diabetes, with more than 20 cases per 100,000 children per year being newly diagnosed². Considered a disease of adulthood, type 2 diabetes on the other hand, was rarely diagnosed in children until recently¹²⁻¹⁴. Rapidly increasing among children^{13,15-18} type 2 diabetes is most often diagnosed after the onset of puberty^{2,14,19,20}. In Japan, 80% of childhood diabetes cases are of type 2⁶.

The increasing trends of both type 1 and type 2 diabetes are attributed to the increasing rate of diabetes among the adult population as well as the increasing amount of overweight and obese youth^{2,17,19,21-23}. Individuals with type 1 diabetes and early-onset type 2 diabetes are at a higher risk of morbidity and mortality^{21,23} than the general population. They also have an increased risk of developing complications⁶ such as retinopathy, neuropathy, cardiovascular disease and renal disease¹⁴.

According to the Canadian Chronic Disease Surveillance System (CCDSS), in 2008/2009, over 3,000 new cases of diabetes were diagnosed in Canada among children 1-19 years of age⁷. Because CCDSS is based on the provincial administrative database in which diabetes diagnosis was partially based on 3 digits of international clinical diagnosis – 9 (ICD-9), it is not feasible to distinguish type 1 and type 2 diabetes. High rates of type 2 diabetes have specifically been reported in Canadian First Nations Communities and the majority of these communities reside in Southwestern Quebec, Southwestern Ontario, Southern Alberta and Manitoba¹⁷. It has been reported that within Canada, the province that has the highest incidence of type 2 diabetes is Manitoba²⁴.

Objective

The main objective of this report is to describe the prevalence and incidence of diabetes among children and adolescents, 1-19 years of age, in Manitoba between 1989 and 2013. The overarching goal of this report is to provide information on diabetes epidemiology and trends in Manitoba's young population. This report is aimed to provide a baseline for future comparisons, and an overview of current diabetes epidemiology by

- describing the burden and trend changes of diabetes at the provincial and regional levels, and
- describing incidence and trend changes of newly diagnosed diabetes at the provincial and regional levels

Methods

This report is based on the methodology and infrastructure of the Canadian Chronic Disease Surveillance System (CCDSS). CCDSS is a collaborative network of provincial and territorial surveillance systems, supported by the Public Health Agency of Canada (PHAC)²⁵. This system uses administrative health data that is available in all provinces and territories.

The case definition of diabetes, under the CCDSS methodology, is based on the assumption that it is possible to track diabetes prevalence by following the clinical path of diabetes (from detection to treatment and management of complications) through various client interactions (health insurance registry, physician visits, and hospitalizations) within the provincial and territorial health care systems. Using administrative data to track the burden, health outcomes, and health care utilizations of chronic diseases has been practiced extensively²⁶⁻³¹. The data needed for identifying and tracking diabetes patients are routinely collected in the provision of publicly funded, insured health services and stored in several major provincial administrative databases.

Data sources

The CCDSS uses three administrative data sources that exist in all provinces and territories:

1. the health insurance registry file,
In all provinces and territories, each individual is assigned a unique personal health insurance number (PHIN) that must be provided upon receipt of health services. If a person has a PHIN he/she are recorded in his/her province's or territory's health insurance registry file. This publicly funded health insurance, administered by the provinces and territories, covers almost the entire Canadian population. The exceptions are people covered by Federal jurisdiction such as those in the Canadian Armed Forces, the Royal Canadian Mounted Police (RCMP), or in federal correctional facilities.
2. the physician claim database, and
When a person visits a physician, the ICD-9 code(s) associated with the visit and the client's PHIN are sent to the province or territory that person's health insurance is registered under. The physician is then reimbursed for the visit, and the claim is recorded in the physician claim database.
3. the hospital discharge abstract database.
The hospital discharge abstract database includes the PHIN, dates of admission and discharge and up to 25 discharge diagnoses listed using ICD-10-CA codes. Before 2004, discharge diagnoses were recorded using 5-digit ICD-9 codes.

To protect personal information and personal health information, a secure methodology, such as an encrypted PHIN, was used to link records between these three databases. The data are linked by the government, or designated agent, of each province and territory and maintained according to jurisdictional custodial obligations.

In the physician claim database and the hospital discharge abstract database 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.

There have been different versions of the ICD system. The 9th revision of ICD, or ICD-9, was published by the World Health Organization (WHO). *Classification of Diseases, Clinical Modification* (ICD-9-CM) is an adaptation created by the National Center for Health Statistics (NCHS) in the United States. ICD-10 is the 10th revision of the ICD and ICD-10-CA is an adaptation of ICD-10 developed by the Canadian Institute for Health Information (CIHI). In Manitoba, ICD-9-CM is used in the physician claim database and used in the hospital discharge abstract database until 2004. In 2004, ICD-10-CA replaced ICD-9-CM in the hospital abstract database.

Diabetes Case Definition

The CCDSS diabetes case criteria for diagnosed diabetes are based on studies of diabetes using administrative databases^{32,33}. To meet the case criteria, an insured individual aged **1 year** and older must have:

EITHER

One or more hospitalizations with an ICD-9 or ICD-9-CM code of 250 (diabetes mellitus) or equivalent ICD-10-CA codes: E10 to E14, selected from all available diagnostic codes in the hospital file,

OR

Two or more physician claims with the relevant ICD-9 code of 250, **within two years**, selected from the **first** diagnostic code available on the claim.

Once a person meets one of these criteria they are defined as a case for all subsequent years they have a valid PHIN within the same province or territory they met the criterion in. Note that the CCDSS does not track individuals as they move between provinces and territories. Therefore, if a person moves to a different province or territory the criteria must be re-met for the person to be defined as a case in the new jurisdiction.

The Case Date

The diabetes case date was defined either as the date of hospital admission, or the first of the two physician claims that contributed to the individual meeting the CCDSS case criteria, for the first time, in the selected province or territory.

Note that the CCDSS definition for the case date and run-in period selection has changed since the report, "Responding to the Challenge of Diabetes in Canada", was released in 2003³⁴. For NDSS reports released since 2003, the NDSS used last date method (the most recent date of the medical claim) instead of first date method (the first date of the medical claim).

Type 1 and Type 2 Diabetes

Over the reporting period the CCDSS did not distinguish between type 1 and type 2 diabetes due to limitations of the physician claim database. In the ICD-9-CM system (used in the physician claim database), the broad category of diabetes was coded as the 3-digit code, 250. The last two digits (to make up a 5-digit code which can distinguish between the two types of diabetes) were only coded as of 2015. In the ICD-10-CA system (used in the

hospital discharge abstract database), codes for type 1 and type 2 diabetes, using separate alpha-numeric codes (E10 and E11, respectively), are available.

Type 1 diabetes was formerly called insulin-dependent or juvenile-onset diabetes and is believed to be caused by a combination of genetic factors and environmental stressors.

Type 2 diabetes was formerly called non-insulin-dependent or adult-onset diabetes and obese individuals over 40 years old are at highest risk. For the complete definitions of type 1 and type 2 diabetes please see Appendix C.

Inclusion Criteria

Included in this report were, children and adolescents in Manitoba, 1-19 years of age between 1989 and 2013, who had type 1 or type 2 diabetes recorded in the CCDSS database.

If the number of diabetes cases in any of the following tables and graphs was between one and five, that number, and the corresponding rates and confidence intervals, were suppressed. Suppressed numbers are marked with an "S" in tables. In graphs suppressed counts and rates were not included and therefore a gap will appear for these points.

When incident cases were reported by regional health authority (RHA), many counts were suppressed between 1989 and 1999. For this reason, graphs were created only for the years 2000 to 2013. However, counts and rates not suppressed are included in the tables in Appendix B.

Gestational Diabetes Excluded

Gestational diabetes occurs during pregnancy in women not known to have had diabetes before pregnancy. It is more common in certain ethnic groups, for example First Nation women. Gestational diabetes is usually managed by changes in food intake and physical activity but may require insulin by injection. Blood sugar levels usually return to normal after delivery of the baby, but both the mother and baby are at increased risk of developing type 2 diabetes in the future.

Although gestational diabetes occurs in about 4% of all pregnancies, and there is evidence this condition increases the risk of developing type 2 diabetes later in life, the current focus of the CCDSS is to track type 1 and 2 diabetes only. The CCDSS does not capture women with gestational diabetes because it is a temporary condition.

The ICD systems allow for coding gestational diabetes separately from other diabetes codes (ICD-9: 648, ICD-10-CA: P70, ICD-9: 250 or ICD-10-CA: E10-14). However, evidence suggests more stringent criteria are necessary. Therefore, the CCDSS case criteria excluded females diagnosed with diabetes 120 days before, or 180 days after, any pregnancy-related visit. The case criteria also restricted the exclusions to females aged 10 to 54. The diagnostic ICD codes for pregnancy are:

- ICD-9: 641-676, V27
- ICD-10 and ICD-10-CA: O1, O21-95, O98, O99, Z37

Fiscal Year

Unless otherwise specified, each year from 1989 to 2013 in this report refers to the fiscal year which starts on April 1 of the current year and ends on March 31 of the following year. For example, the 1989 fiscal year is April 1, 1989 to March 31, 1990.

Incidence and Incidence Rate

Incidence is defined as the number of *new cases* of diabetes diagnosed during a specific period in a specified population. In this report, an incident case is an individual in the insured population in Manitoba who has met the case criteria for the first time at any time in the selected fiscal year.

Incidence rate measures the probability of occurrence of diabetes in the population within a specified period of time. The incidence rate in a fiscal year is calculated as:

$$\text{Incidence rate (per 100,000 persons)} = \frac{\text{Total Number of Incident Cases}}{\text{Total Number of Insured Population} - [\text{Prevalent Cases} + \text{Incident Cases}]} \times 100,000$$

The denominator represents the number of insured individuals at risk for diabetes in the entire year rather than the mid-year estimate. It includes people who migrate or die during the year, since they are included in the numerator.

Prevalence and Prevalence Rate

The burden of diabetes among children and adolescents, ages 1-19 years, in Manitoba is measured by prevalence and prevalence rate.

Prevalence is the *total number* of people living with diagnosed diabetes, during a specific period, in a specified population. It provides an estimate of the burden of the disease at a given time, and is widely used in public health monitoring and planning. In this report, the yearly prevalence of diabetes is defined as the number of people living with diagnosed diabetes in each fiscal year. A prevalent case is an individual, among the insured population, who has met the case criteria prior to, or during, a fiscal year.

The **prevalence rate** in a fiscal year is calculated as:

$$\text{Prevalence rate (per 1,000 persons)} = \frac{\text{Total Number of Prevalent Cases}}{\text{Total insured population}} \times 1,000$$

The total insured population includes people who lived in Manitoba within a fiscal year, regardless of whether they migrated or died at a certain point during the fiscal year.

Age Adjusted Rate

Age adjustment allows comparisons to be made between regions that have populations with different age distributions and allows comparisons over time to be made by accounting for an aging population. To adjust for differences in population age distributions across regions, and the resulting effect on rates, the rates are age adjusted using the 1991 Canadian Census population estimates as a reference population. This standard population is chosen to make our report data comparable to the data in the national report by PHAC. Adjustment is done via the direct method, using five-year age groups, from ages one to four to ages 85 and over. See Appendix A for the 1991 Canadian Standard Population Weights.

Rate Ratio

The rate ratio (RR) is the ratio of two rates. It is a relative difference measure used to compare the rates of events occurring at any given point in time for the same disease among two different, but comparable populations. One example is the ratio of the diabetes rate in the female population to the diabetes rate in the male population. When the rate ratio is used in tables throughout the report, the male rate is taken as rate 1, and the female rate is taken as rate 2. In this report, the second decimal place was kept for all rate ratios to illustrate small changes over the years.

$$\text{Rate ratio (RR)} = \frac{\text{Rate 1}}{\text{Rate 2}}$$

Confidence Intervals

Any measurement and estimate of a population has certain variability due to chance. Therefore, we cannot be 100% sure if any difference in the observations represents a statistically significant difference among different populations. To facilitate comparisons, in this report, the 95% confidence intervals of all crude and age adjusted rates were calculated using an inverse gamma distribution when the rate was greater than zero. The 95% confidence intervals provide an estimated range of values that are likely to include the true value at a rate of 19 times out of 20.

Limitations

There are important limitations in this report due to the use of administrative databases. First, the CCDSS data cannot differentiate between type 1 and type 2 diabetes. The physician claim database, which supplies data to the CCDSS, uses the ICD-9 coding system which does not distinguish between the two types. This might have implications in terms of diabetes care planning, where there is a need to differentiate between type 1 and type 2 diabetes.

Second, some cases of diabetes may not be included in the CCDSS if they did not have contact with the health system, or if a claim for their visit was not submitted to the physician claim database. A claim may not be submitted if they received care from a salaried physician, whose payment is not directly linked to reporting the services they provided. Cases with diabetes are also excluded from the CCDSS if they are covered by Federal jurisdiction, such as those in the Canadian Armed Forces, Royal Canadian Mounted Police (RCMP) and Federal correctional facilities.

Third, this report starts in 1989 after a four-year run-in period. In 1984 claim data started being collected but, the reporting period did not start until 1989. The reason for this was to leave a catch up period to insure that the newly diagnosed cases of diabetes were captured correctly. However, it is possible that newly defined cases are actually prevalent, or old, cases that were not identified previously due to lack of data.

Fourth, the CCDSS sometimes captures false positive diabetes cases. False positives occur when people who meet the case definition criteria do not actually have diabetes. Any system that tracks a life-long disease, such as diabetes, over a long period of time, on an individual basis, tends to accumulate false positives. The literature suggests that false positives for this case definition of diabetes might be caused by, "coding errors or cases where diabetes was clinically suspected and subsequent laboratory tests did not confirm the

diagnosis^{32,33} or simply due to the physician's billing practice³⁵. Once cases are identified, they become permanent, prevalent cases and are carried forward from year to year. As a result, false positives will inevitably comprise an increasing proportion of the reported cases over time.

Results

Prevalence of Diabetes

Prevalence Trends in Manitoba, 1989–2013

As shown in Figure 1, the number of children and adolescents in Manitoba living with diagnosed diabetes, also known as ‘prevalence’, more than doubled from 1989 (N=589 persons) to 2013 (N=1,366 persons) (Table 1). Between 1993 and 1999 the prevalence of diabetes in children and adolescents was relatively stable and increased by less than 100 cases. However, over the rest of the reporting period, the prevalence of diabetes increased consistently. Both the number of males with diagnosed diabetes and the number of females with diagnosed diabetes increased twofold between 1989 and 2013. The number of males with diabetes rose from 302 to 689 between 1989 and 2013 and the number of females with diagnosed diabetes rose from 287 to 677 between 1989 and 2013 (Table 2).

The crude prevalence rate of diabetes in Manitoba more than doubled from 1.8 per 1,000 persons in 1989 to 4.3 per 1,000 persons in 2013. The age adjusted prevalence rate also doubled. The age adjusted rate was equal to the crude rate from 1989 to 1996 the age adjusted rate was slightly smaller than the crude rate from 1997 to 2013.

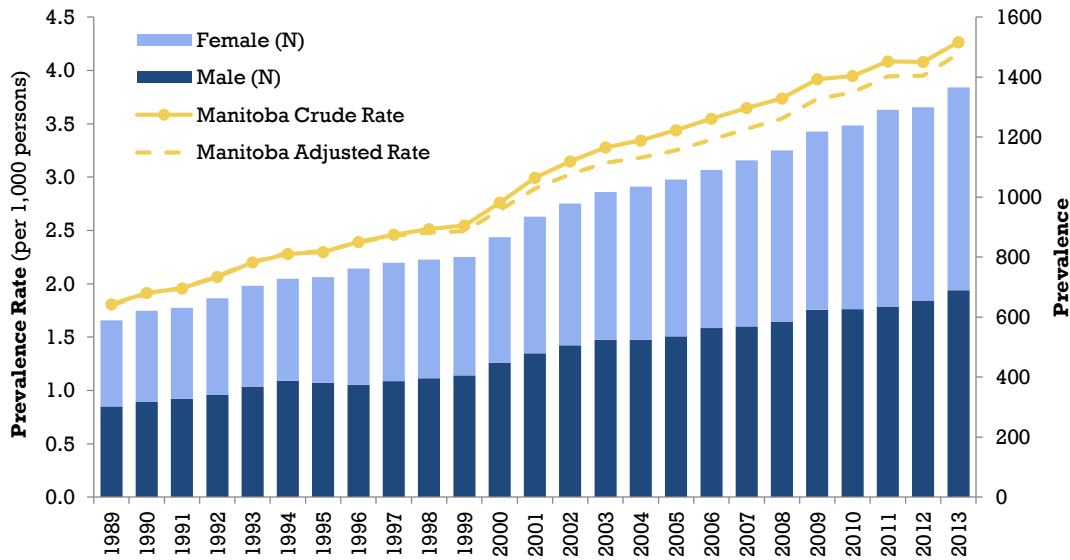


Figure 1: Number of males and females living with diagnosed diabetes and the total prevalence rate (per 1,000 persons) of diabetes in Manitoba, 1989-2013

Table 1: Number, crude prevalence rate (per 1,000 persons), and adjusted prevalence rate (per 1,000 persons) of children and adolescents in Manitoba living with diagnosed diabetes, 1989-2013

Manitoba					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	589	1.8	(1.7 - 2.0)	1.8	(1.7 - 1.9)
1990	621	1.9	(1.8 - 2.1)	1.9	(1.8 - 2.1)
1991	631	2.0	(1.8 - 2.1)	2.0	(1.8 - 2.1)
1992	663	2.1	(1.9 - 2.2)	2.1	(1.9 - 2.2)
1993	704	2.2	(2.0 - 2.4)	2.2	(2.0 - 2.4)
1994	728	2.3	(2.1 - 2.5)	2.3	(2.1 - 2.5)
1995	733	2.3	(2.1 - 2.5)	2.3	(2.1 - 2.5)
1996	762	2.4	(2.2 - 2.6)	2.4	(2.2 - 2.6)
1997	781	2.5	(2.3 - 2.6)	2.4	(2.3 - 2.6)
1998	792	2.5	(2.3 - 2.7)	2.5	(2.3 - 2.7)
1999	800	2.5	(2.4 - 2.7)	2.5	(2.3 - 2.7)
2000	866	2.8	(2.6 - 3.0)	2.7	(2.5 - 2.9)
2001	935	3.0	(2.8 - 3.2)	2.9	(2.7 - 3.1)
2002	978	3.1	(3.0 - 3.4)	3.0	(2.8 - 3.2)
2003	1017	3.3	(3.1 - 3.5)	3.1	(2.9 - 3.3)
2004	1035	3.3	(3.1 - 3.6)	3.2	(3.0 - 3.4)
2005	1059	3.4	(3.2 - 3.7)	3.3	(3.1 - 3.5)
2006	1090	3.5	(3.3 - 3.8)	3.4	(3.2 - 3.6)
2007	1122	3.6	(3.4 - 3.9)	3.5	(3.3 - 3.7)
2008	1156	3.7	(3.5 - 4.0)	3.5	(3.3 - 3.8)
2009	1218	3.9	(3.7 - 4.1)	3.7	(3.5 - 3.9)
2010	1239	3.9	(3.7 - 4.2)	3.8	(3.6 - 4.0)
2011	1291	4.1	(3.9 - 4.3)	3.9	(3.7 - 4.2)
2012	1300	4.1	(3.9 - 4.3)	4.0	(3.7 - 4.2)
2013	1366	4.3	(4.0 - 4.5)	4.2	(3.9 - 4.4)

Table 2: Number, crude prevalence rates (per 1,000 persons), and adjusted prevalence rates (per 1,000 persons) of females and males living with diagnosed diabetes, 1989-2013

Year	Female					Male					RR
	n	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	n	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	287	1.8	(1.6 - 2.0)	1.8	(1.6 - 2.0)	302	1.8	(1.6 - 2.0)	1.8	(1.6 - 2.0)	1.00
1990	304	1.9	(1.7 - 2.2)	1.9	(1.7 - 2.1)	317	1.9	(1.7 - 2.1)	1.9	(1.7 - 2.1)	0.99
1991	303	1.9	(1.7 - 2.2)	1.9	(1.7 - 2.2)	328	2.0	(1.8 - 2.2)	2.0	(1.8 - 2.2)	1.03
1992	322	2.1	(1.8 - 2.3)	2.1	(1.8 - 2.3)	341	2.1	(1.9 - 2.3)	2.1	(1.9 - 2.3)	1.01
1993	336	2.2	(1.9 - 2.4)	2.2	(1.9 - 2.4)	368	2.2	(2.0 - 2.5)	2.2	(2.0 - 2.5)	1.04
1994	340	2.2	(2.0 - 2.4)	2.2	(2.0 - 2.4)	388	2.4	(2.1 - 2.6)	2.4	(2.1 - 2.6)	1.09
1995	352	2.3	(2.0 - 2.5)	2.3	(2.0 - 2.5)	381	2.3	(2.1 - 2.6)	2.3	(2.1 - 2.6)	1.03
1996	387	2.5	(2.2 - 2.8)	2.5	(2.3 - 2.8)	375	2.3	(2.1 - 2.5)	2.3	(2.1 - 2.5)	0.92
1997	395	2.6	(2.3 - 2.8)	2.5	(2.3 - 2.8)	386	2.4	(2.1 - 2.6)	2.4	(2.1 - 2.6)	0.93
1998	396	2.6	(2.3 - 2.8)	2.6	(2.3 - 2.8)	396	2.4	(2.2 - 2.7)	2.4	(2.2 - 2.7)	0.95
1999	394	2.6	(2.3 - 2.8)	2.5	(2.3 - 2.8)	406	2.5	(2.3 - 2.8)	2.5	(2.2 - 2.7)	0.98
2000	419	2.7	(2.5 - 3.0)	2.7	(2.4 - 2.9)	447	2.8	(2.5 - 3.0)	2.7	(2.5 - 3.0)	1.01
2001	456	3.0	(2.7 - 3.3)	2.9	(2.6 - 3.2)	479	3.0	(2.7 - 3.3)	2.9	(2.6 - 3.2)	1.00
2002	472	3.1	(2.8 - 3.4)	3.0	(2.7 - 3.3)	506	3.2	(2.9 - 3.5)	3.1	(2.8 - 3.3)	1.02
2003	493	3.3	(3.0 - 3.6)	3.1	(2.8 - 3.4)	524	3.3	(3.0 - 3.6)	3.2	(2.9 - 3.4)	1.01
2004	511	3.4	(3.1 - 3.7)	3.2	(2.9 - 3.5)	524	3.3	(3.0 - 3.6)	3.2	(2.9 - 3.4)	0.98
2005	523	3.5	(3.2 - 3.8)	3.3	(3.0 - 3.6)	536	3.4	(3.1 - 3.7)	3.2	(3.0 - 3.5)	0.98
2006	527	3.5	(3.2 - 3.8)	3.3	(3.0 - 3.6)	563	3.6	(3.3 - 3.9)	3.4	(3.1 - 3.7)	1.02
2007	553	3.7	(3.4 - 4.0)	3.5	(3.2 - 3.8)	569	3.6	(3.3 - 3.9)	3.4	(3.1 - 3.7)	0.98
2008	571	3.8	(3.5 - 4.1)	3.6	(3.3 - 3.9)	585	3.7	(3.4 - 4.0)	3.5	(3.2 - 3.8)	0.98
2009	594	3.9	(3.6 - 4.2)	3.7	(3.4 - 4.0)	624	3.9	(3.6 - 4.2)	3.7	(3.5 - 4.0)	1.00
2010	613	4.0	(3.7 - 4.3)	3.8	(3.5 - 4.2)	626	3.9	(3.6 - 4.2)	3.8	(3.5 - 4.1)	0.97
2011	656	4.3	(3.9 - 4.6)	4.1	(3.8 - 4.4)	635	3.9	(3.6 - 4.2)	3.8	(3.5 - 4.1)	0.92
2012	645	4.2	(3.8 - 4.5)	4.0	(3.7 - 4.4)	655	4.0	(3.7 - 4.3)	3.9	(3.6 - 4.2)	0.96
2013	677	4.3	(4.0 - 4.7)	4.2	(3.9 - 4.6)	689	4.2	(3.9 - 4.5)	4.1	(3.8 - 4.4)	0.97

Prevalence Rates by Sex, 1989–2013

The crude prevalence rates and age adjusted prevalence rates of children and adolescents in Manitoba increased twofold over the reporting period for both males and females (Figure 2). Both male and female crude prevalence rates began at 1.8 per 1,000 persons in 1989 and both increased to over 4 per 1,000 persons in 2013 (male rate increased to 4.2 per 1,000 persons, female rate increased to 4.3 per 1,000 persons) (Table 2). From 1989-1997 the male crude and age adjusted prevalence rates were equal and the female crude and age adjusted prevalence rates were equal. However, after 1997 the age adjusted rates were slightly smaller than the crude rates for both sexes.

The male and female prevalence rates were similar, if not equal, for the majority of the reporting period. However, in the most recent years, from 2010-2013, the female prevalence rate (both crude and adjusted) has remained higher than the male prevalence rate.

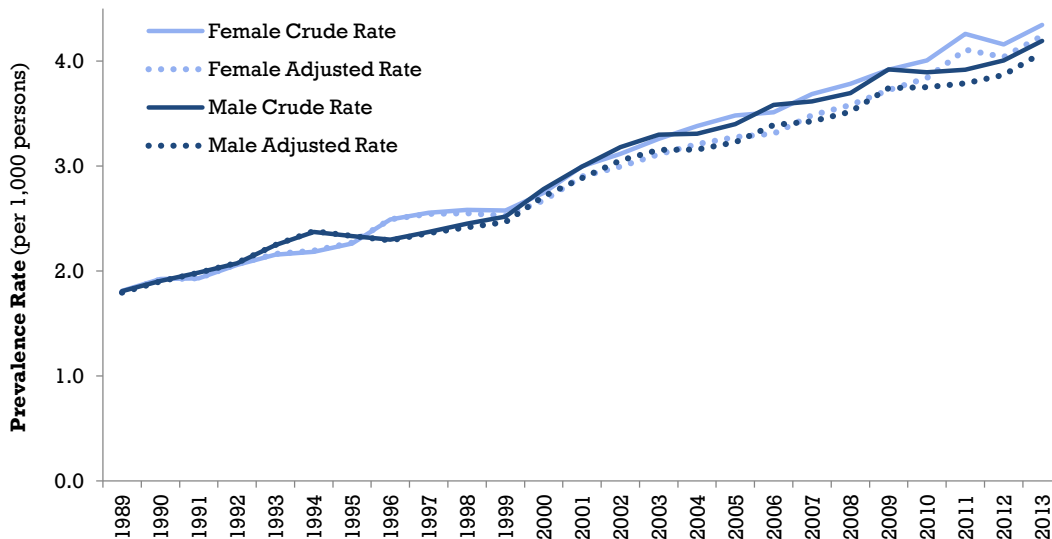


Figure 2: Crude prevalence rates (per 1,000 persons) and adjusted prevalence rates (per 1,000 persons) of diabetes by sex, Manitoba, 1989- 2013

Prevalence by Age

Prevalence Rates by Sex and Age Group, 2013

In 2013, the prevalence rate of diabetes increased with age (Figure 3 and Table 3). Among every 1,000 children 1-4 years of age, less than one had diabetes (0.8 per 1,000 persons). Among every 1,000 adolescents 15-19 years of age, just over 8 had diabetes (8.2 per 1,000 persons). The male prevalence rate was slightly higher than the female prevalence rate in the youngest age group, 1-4 years of age. However, the female prevalence rate was slightly higher than the male prevalence rate in the other three age groups.

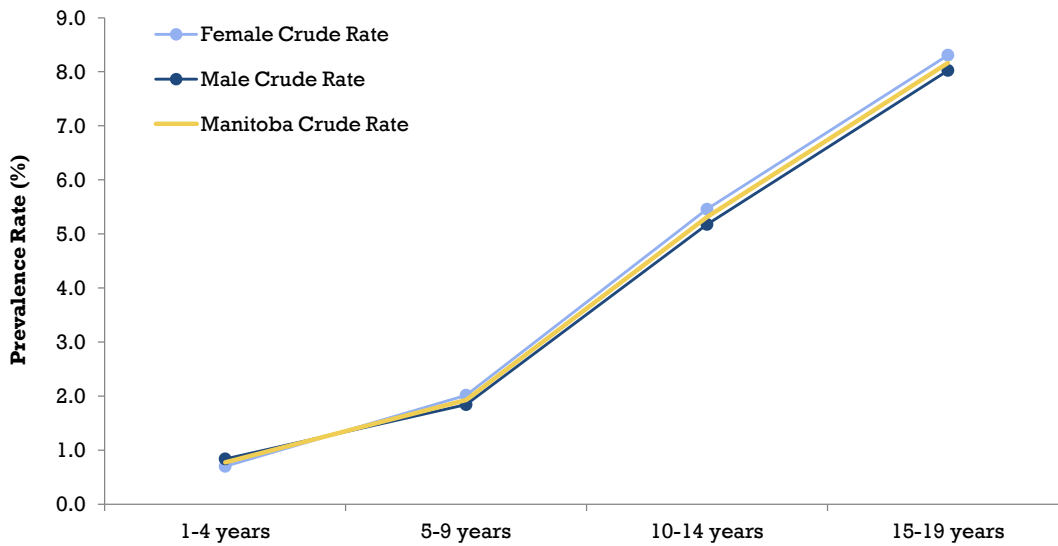


Figure 3: Crude prevalence rates (per 1,000 persons) of diabetes by age group and sex, Manitoba, ages 1-19 years, 2013

Table 3: Prevalence and prevalence rates (per 1,000 persons) of diabetes by age group and sex, Manitoba, 2013

Age Group	Manitoba			Female			Male			RR
	N	Crude Rate	(95% CIs)	n	Crude Rate	(95% CIs)	n	Crude Rate	(95% CIs)	M/F
1-4	52	0.8	(0.6 - 1.0)	23	0.7	(0.4 - 1.1)	29	0.8	(0.6 - 1.2)	1.20
5-9	160	1.9	(1.6 - 2.3)	82	2.0	(1.6 - 2.5)	78	1.8	(1.5 - 2.3)	0.91
10-14	432	5.3	(4.8 - 5.8)	215	5.5	(4.8 - 6.2)	217	5.2	(4.5 - 5.9)	0.95
15-19	722	8.2	(7.6 - 8.8)	357	8.3	(7.5 - 9.2)	365	8.0	(7.2 - 8.9)	0.97
TOTAL	1366	4.3	(4.0 - 4.5)	677	4.3	(4.0 - 4.7)	689	4.2	(3.9 - 4.5)	0.97

Prevalence Rates by Age Group, 1989–2013

The prevalence rate of diabetes in Manitoba increased from 1989 to 2013 among all age groups. However, the increase in prevalence rate among the two older age groups was much steeper than the increase in prevalence rate among the two younger age groups. Consistent with the prevalence rates in 2013 (shown in Figure 3), Figure 4 shows that over the entire reporting period the prevalence of diabetes increased with age. The prevalence rate increased over two and one-half times among individuals 10-14 years of age and 15-19 years of age. Among children 1-4 years of age, the prevalence rate increased from 0.5 per 1,000 persons in 1989 to 0.8 per 1,000 persons in 2013 and among children 5-9 years of age, the prevalence rate increased from 1.4 per 1,000 persons in 1989 to 1.9 per 1,000 persons. Refer to Table 5 in Appendix B for detailed prevalence rate numbers.

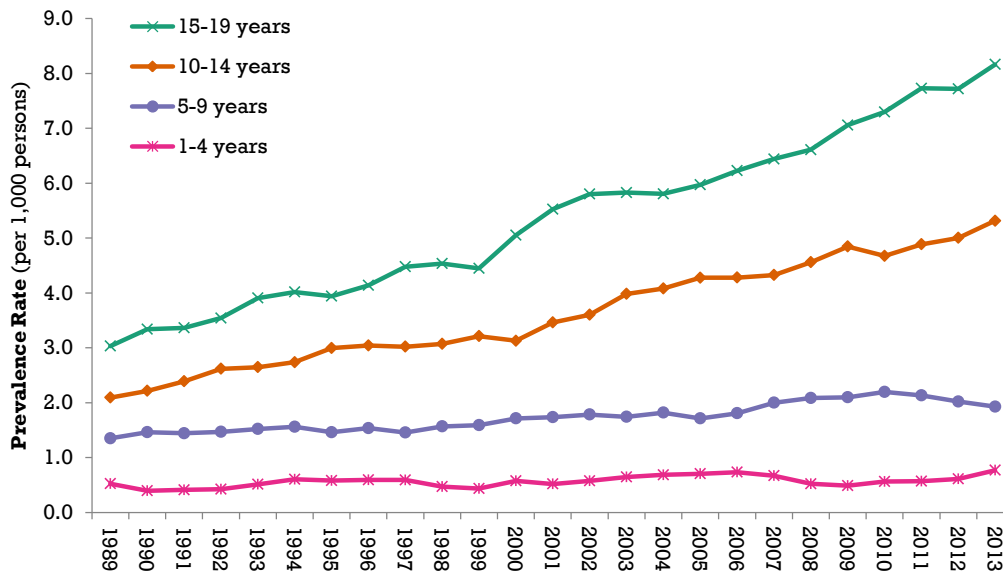


Figure 4: Prevalence rates (per 1,000 persons) of diabetes by age group, Manitoba, 1989 - 2013

Prevalence Rates by Sex and Age Group, 1989–2013

Among each age group, the male and female prevalence rates followed similar trends while increasing between 1989 and 2013. Females had a higher prevalence rate than males over the majority of the reporting period among the oldest age group, 15-19 years of age. This was the case most consistently, between 2003 and 2013. The opposite was seen among individuals 5-9 years of age as males had a slightly higher prevalence rate over the majority of the reporting period. In the other two age groups the male and female prevalence rates were fairly equal and fluctuated between 1989 and 2013. Refer to Table 6 and Table 7 in Appendix B for detailed prevalence rate numbers.

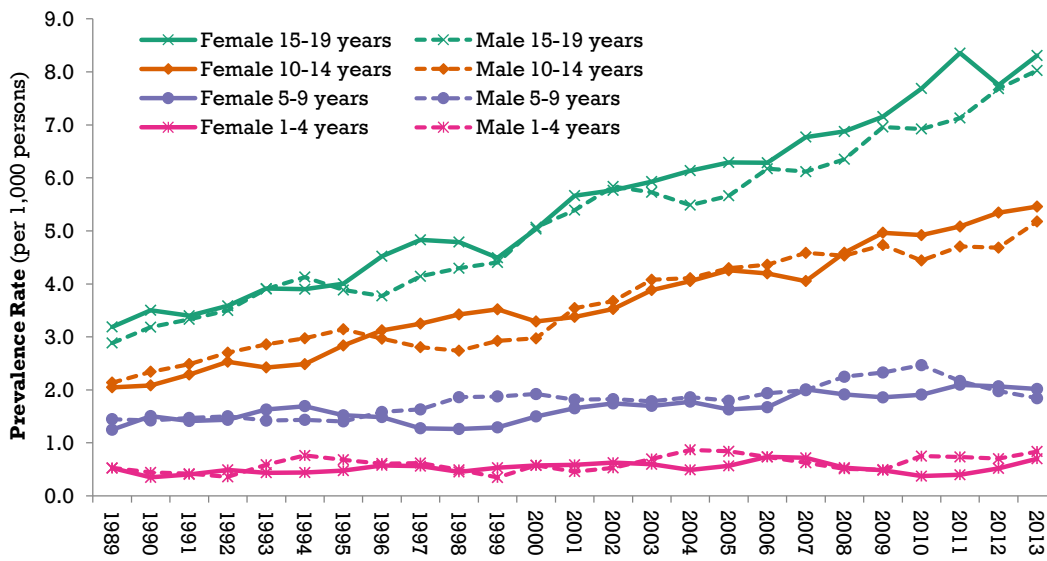


Figure 5: Prevalence rates (per 1,000 persons) of diabetes by age group and sex, Manitoba, 1989-2013

Prevalence by Regional Health Authority (RHA)

Prevalence and Prevalence Rates by RHA, 2013

Accounting for over half of the cases in Manitoba (602 of 1,366), Winnipeg RHA had the largest number of diabetes cases among children and adolescents in 2013 (Figure 6). Northern Health Region had the second largest number of cases (238 persons) followed by Prairie Mountain Health (200 persons), Southern Health-Santé Sud (171 persons) and Interlake-Eastern RHA (155 persons). Alternatively, Figure 6 shows Northern Health Region had the highest crude prevalence rate (8.6 per 1,000 persons) and Southern Health-Santé Sud had the lowest (3.1 per 1,000 persons). The female crude prevalence rate was larger in Northern Health Region and Interlake-Eastern RHA while the male rate was slightly larger in the other three RHAs. Refer to Table 8 in Appendix B for detailed prevalence numbers and prevalence rates by RHA in 2013.

Figure 6 shows that the age adjusted prevalence rates followed the same trends as the crude rates in 2013 (see Figure 6), further confirming the differences seen in prevalence rates among the RHAs. However, the age adjusted rates were lower than or equal to the crude rates in every RHA except Northern Health Region. In 2013 Northern Health Region crude rate was 8.6 per 1,000 persons while the age adjusted rate was 9.3 per 1,000 persons. Refer to Table 8 in Appendix B for detailed prevalence rates by RHA in 2013.

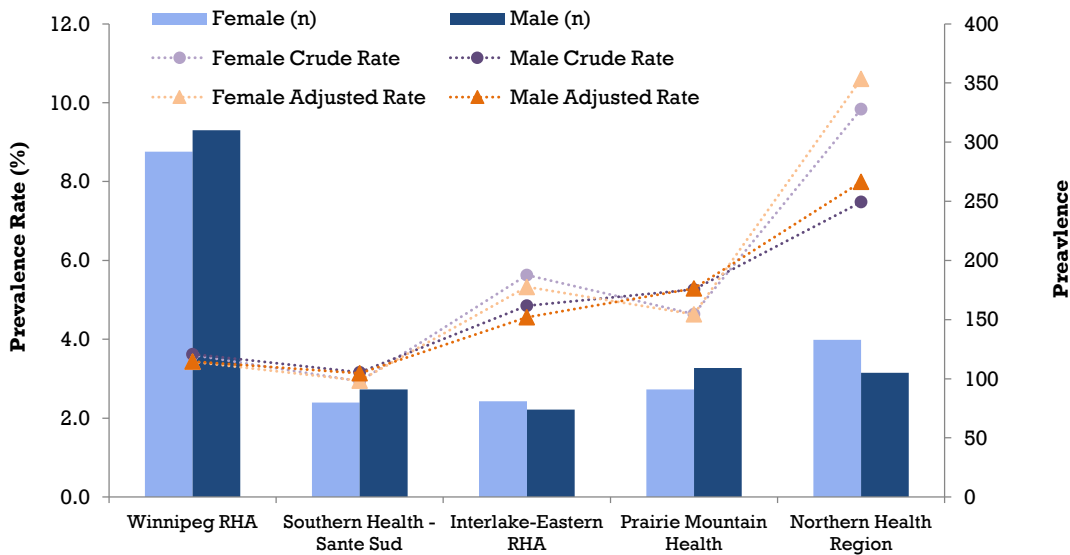


Figure 6: Prevalence, crude prevalence rates (per 1,000 persons) and age adjusted prevalence rates (per 1,000 persons) of diabetes by Regional Health Authority (RHA) and sex, Manitoba, 2013

Prevalence and Prevalence Rates in Winnipeg RHA, 1989-2013

In Winnipeg RHA the number of children and adolescents living with diagnosed diabetes doubled between 1989 and 2013 (Figure 7). For the majority of the reporting period, the number of males with diagnosed diabetes was larger than the number of females with diagnosed diabetes, specifically between 1998 and 2004. The largest gap occurred in 2001, with 51 more males living with diagnosed diabetes in Winnipeg RHA than females. In recent years, however, the gap in prevalence between sexes has decreased.

The prevalence rates of males and females in Winnipeg RHA fluctuated over the reporting period. For the majority of the time between 1989 and 2006, the male prevalence rate was higher than the female prevalence rate. However, in the following years from 2007-2013, the female prevalence rate was higher than, or equal to, the male prevalence rate. Refer to Table 9 and Table 14 in Appendix B for detailed prevalence numbers and prevalence rates for Winnipeg RHA.

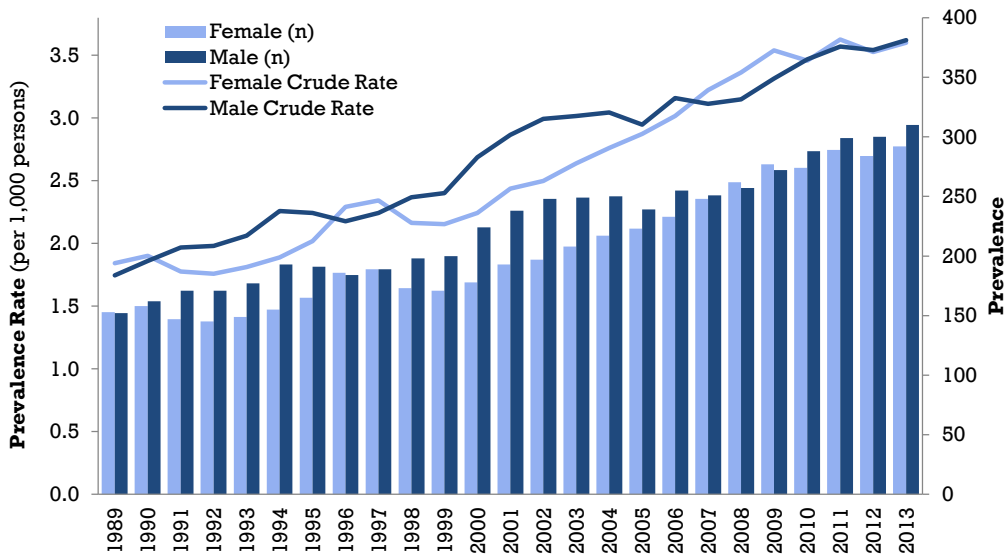


Figure 7: Prevalence and prevalence rates (per 1,000 persons) of diabetes by sex, Winnipeg Regional Health Authority, 1989-2013

Prevalence and Prevalence Rates in Southern Health-Santé Sud, 1989-2013

The number of children and adolescents living with diagnosed diabetes doubled between 1989 and 2013 in Southern Health-Santé Sud (Figure 8). Between 1989 and 2006 the male and female prevalence of diabetes followed a similar trend. The number of diabetes cases among males and females was relatively stable between 1989 and 1999, increased between 1999 and 2003 and then stabilized until 2006. The male prevalence of diabetes increased between 2006 and 2008, then remained stable until 2013. The female prevalence of diabetes on the other hand, remained stable until 2008, increased in 2009 and then decreased slightly until 2013. This decrease in prevalence among females may be the result of small fluctuations that naturally occur over time.

The female prevalence rate increased twofold over the reporting period and the male prevalence rate increased more than one and one-half times. The male and female prevalence rates followed the same trends as the male and female prevalence. The female prevalence rate was higher than the male prevalence rate in the middle of the reporting period, from 1996-2006. However, for the majority of the first seven years and last seven years of the reporting period (1989-1995 and 2007-2013) the male prevalence rate was higher than the female prevalence rate. Refer to Table 10 and Table 15 Appendix B for detailed prevalence numbers and prevalence rates, by sex, for Southern Health-Santé Sud.

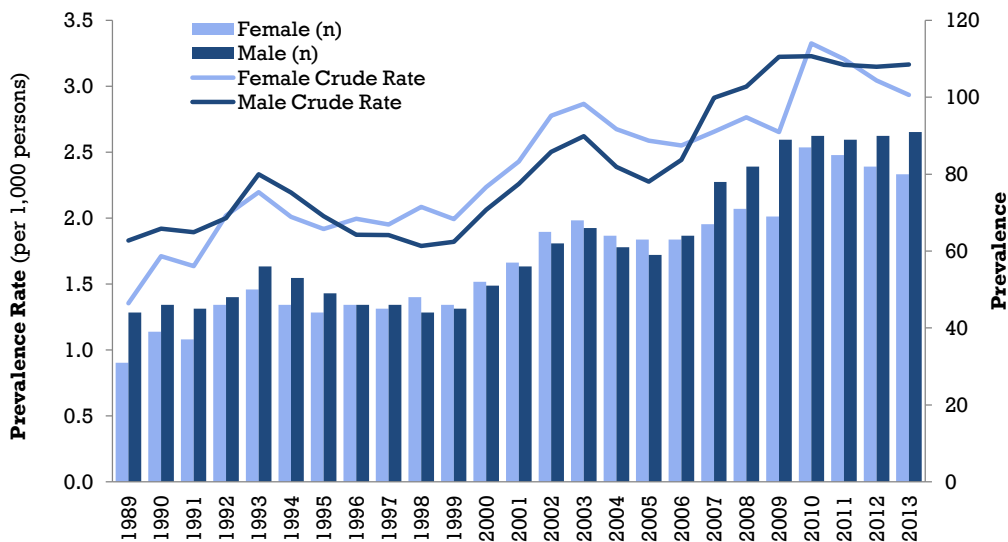


Figure 8: Prevalence and prevalence rates (per 1,000 persons) of diabetes by sex, Southern Health-Santé Sud, 1989-2013

Prevalence and Prevalence Rates in Interlake–Eastern RHA, 1989-2013

The number of children and adolescents with diabetes in Interlake–Eastern RHA almost tripled between 1989 and 2013 (Figure 9). The number of males living with diagnosed diabetes doubled over the reporting period, while the number of females living with diagnosed diabetes was almost four times larger in 2013 compared to 1989. Throughout the reporting period, the difference between the number of males and the number of females with diagnosed diabetes fluctuated.

The male crude prevalence rate increased twofold and the female crude prevalence rate increased fourfold between 1989 and 2013. The gap between the male prevalence rate and the female prevalence rate fluctuated over the time period. However, most recently, between 2010 and 2013, the female prevalence rate has remained stable at a higher rate than the male prevalence rate which slightly decreased.

Refer to Table 11 and Table 16 in Appendix B for detailed prevalence numbers and prevalence rates for Interlake–Eastern RHA.

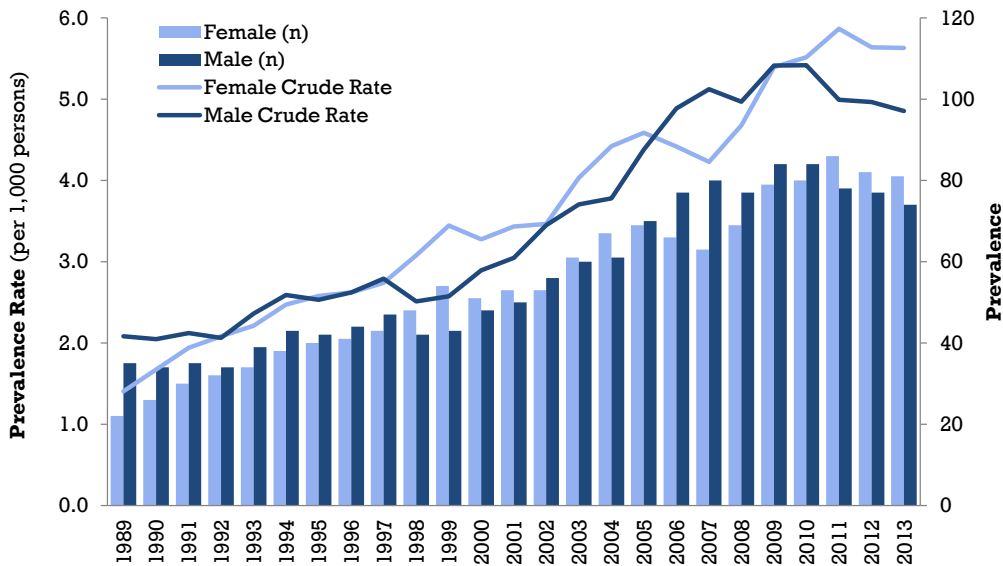


Figure 9: Prevalence and prevalence rates (per 1,000 persons) of diabetes by sex, Interlake–Eastern Regional Health Authority, 1989-2013

Prevalence and Prevalence Rates in Prairie Mountain Health, 1989-2013

The number of children and adolescents with diagnosed diabetes doubled in Prairie Mountain Health between 1989 and 2013 (Figure 10). Female prevalence almost doubled and male prevalence increased two and one-half times over the reporting period. There were more males than females with diagnosed diabetes over most of the reporting period. The exception was in the first five years of the reporting period, 1989-1993, when there were more female than male diabetes cases.

The female diabetes prevalence rate doubled over the reporting period while the male diabetes prevalence rate tripled. The female prevalence rate was higher than or equal to the male prevalence rate from 1989-2001. However, for the rest of the reporting period, from 2002-2013, the male prevalence rate was higher than the female prevalence rate. The gap between the two rates increased between 1989 and 2013. Refer to Table 12 and Table 17 in Appendix B for detailed prevalence numbers and prevalence rates for Prairie Mountain Health.

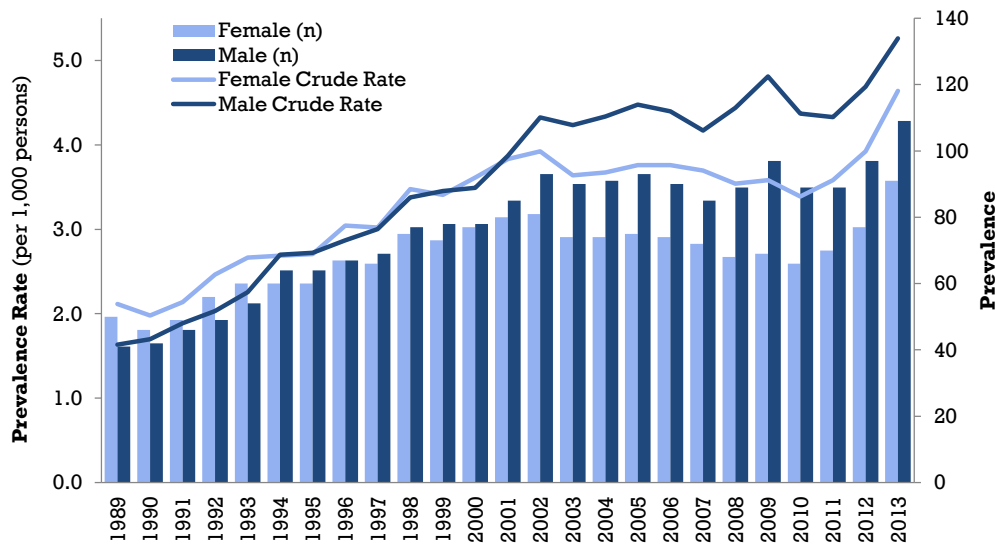


Figure 10: Prevalence and prevalence rates (per 1,000 persons) of diabetes by sex, Prairie Mountain Health, ages 1-19 years, 1989-2013

Prevalence and Prevalence Rates in Northern Health Region, 1989-2013

The number of children and adolescents living with diagnosed diabetes in Northern Health Region was almost four times larger in 2013 compared to 1989 (Figure 11). In the first eleven years, from 1989-1999, the male prevalence and female prevalence were fairly stable. However, from 2000-2013 the prevalence of diabetes consistently increased. Female prevalence was over four times larger, and male prevalence was three and one-half times larger in 2013 compared to 1989. There were more females living with diagnosed diabetes in the Northern Health Region than males living with diagnosed diabetes over the entire reporting period.

The male and female prevalence rates followed the same trend as the male and female prevalence. The female prevalence rate was higher than the male prevalence rate in every year between 1989 and 2013. The gap between the two rates also increased throughout the reporting period. Refer to Table 13 and Table 18 in Appendix B for detailed prevalence numbers and prevalence rates, by sex, for Northern Health Region.

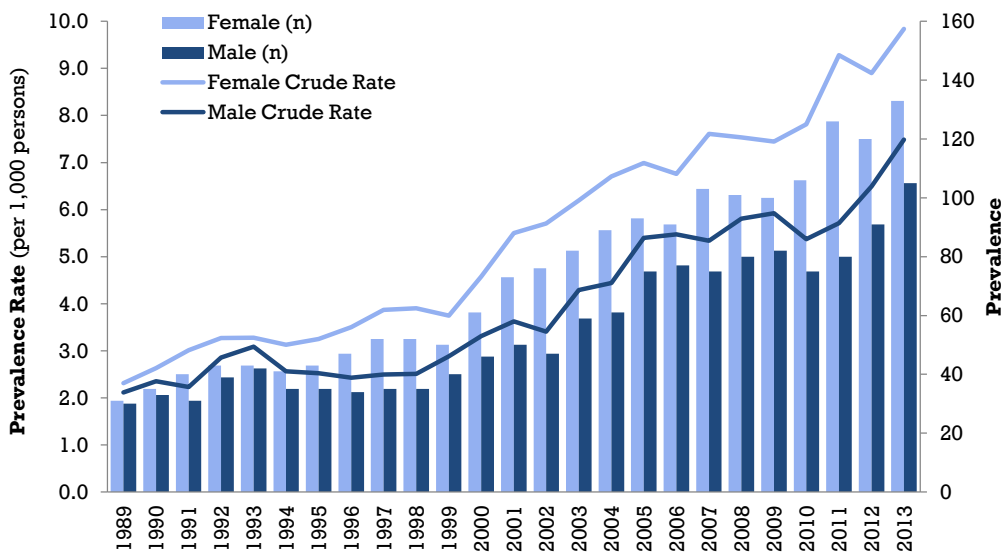


Figure 11: Prevalence and prevalence rates (per 1,000 persons) of diabetes by sex, Northern Health Region, ages 1-19 years, 1989-2013

Age Adjusted Prevalence Rates by RHA, 1989–2013

When comparing age adjusted prevalence rates in all of the RHAs, Figure 12 shows that Northern Health Region consistently had the highest prevalence rate over the reporting period. Northern Health Region also had the largest increase in prevalence rate compared to the other RHAs from 1989 (2.2 per 1,000 persons) to 2013 (9.3 per 1,000 persons). The other four RHAs were clustered together for the first four years of the reporting period. However, the age adjusted prevalence rates then spread out so that Interlake-Eastern and Prairie Mountain Health were consistently above the Manitoba average while Winnipeg RHA and Southern Health Santé-Sud consistently fell below the Manitoba average. Winnipeg RHA and Southern Health Santé Sud showed the smallest increase in prevalence rate from 1.8 and 1.6 per 1,000 persons in 1989 to 3.4 and 3.0 per 1,000 persons respectively. Southern Health Santé Sud consistently had the lowest prevalence rate from 1994-2013. Refer to Tables 9-13 in Appendix B for detailed age adjusted prevalence rates by RHA.

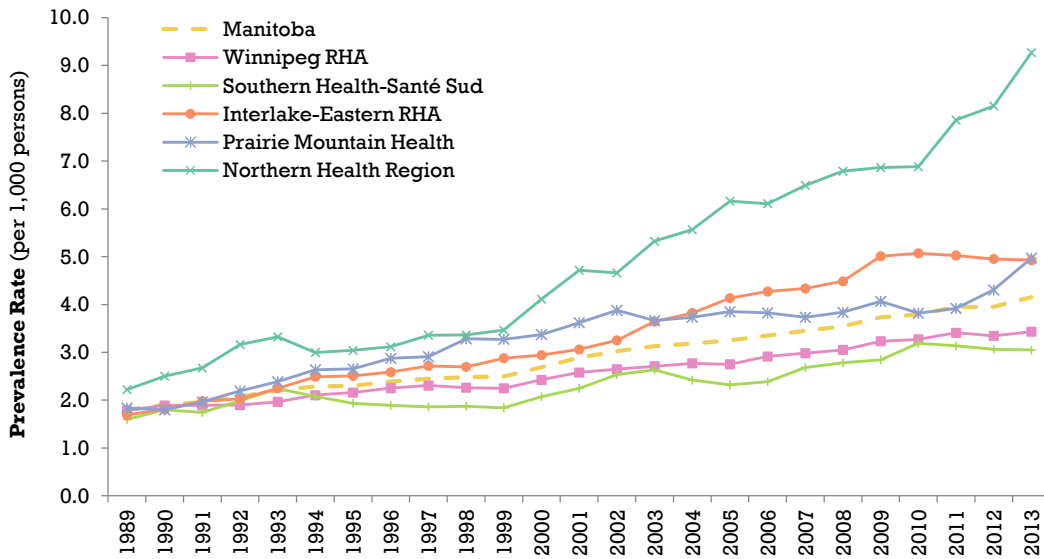


Figure 12: Age adjusted prevalence rates (per 1,000 persons) of diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 1989-2013

Age Adjusted Prevalence Rates by Sex and RHA, 1989–2013

Males

Figure 13 compares the male age adjusted prevalence rates in each RHA. From 1989-1994 the prevalence rates for four of the five RHAs were very similar and thus clustered together. The exception was Northern Health Region which had a slightly higher rate. Beginning in 1996 the rates started to increase at different paces. Prairie Mountain Health had the highest male prevalence rate for the majority of the period between 1996 and 2002. After that point, the prevalence rate in Northern Health Region surpassed it and continued to increase at a faster pace. Southern Health-Santé Sud had the lowest prevalence rate for the majority of the reporting period and the smallest increase in rate. Refer to Tables 14-18 in Appendix B for detailed male age adjusted prevalence rates by RHA.

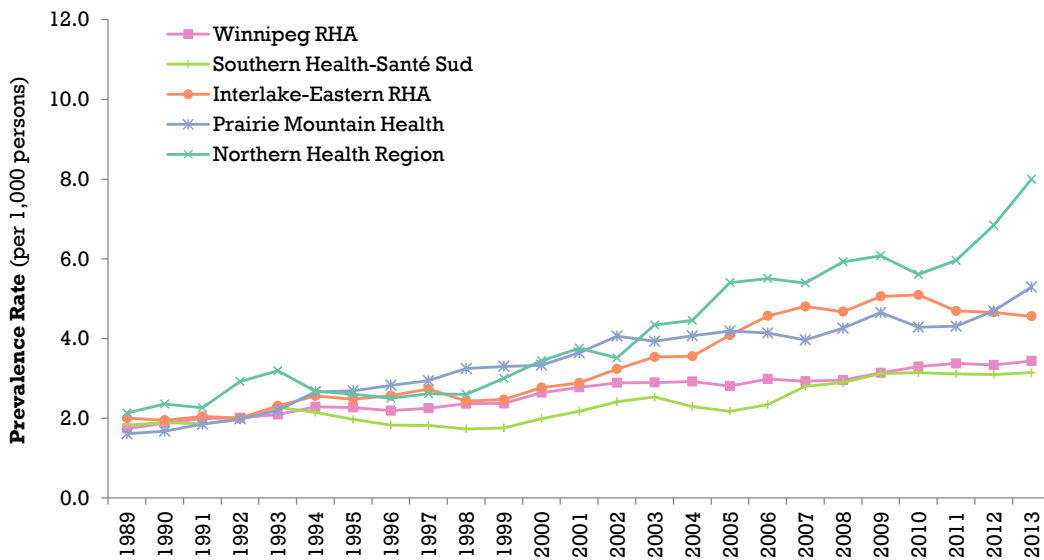


Figure 13: Age adjusted prevalence rates (per 1,000 persons) of males with diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 1989-2013

Females

Figure 14 compares the female age adjusted prevalence rates in each RHA. Northern Health Region had the highest female prevalence rate over the entire reporting period and it increased at a faster pace than the other female prevalence rates. The female prevalence rates in the other four RHAs were clustered together for the beginning of the reporting period until they began to increase at different paces in 1995. Interlake-Eastern RHA and Prairie Mountain Health had similar prevalence rates fluctuating below Northern Health Region. Winnipeg RHA and Southern Health-Santé Sud had similar prevalence rates and were the lowest of the female prevalence rates from 1989-2013. Refer to Tables 14-18 in Appendix B for detailed female age adjusted prevalence rates by RHA.

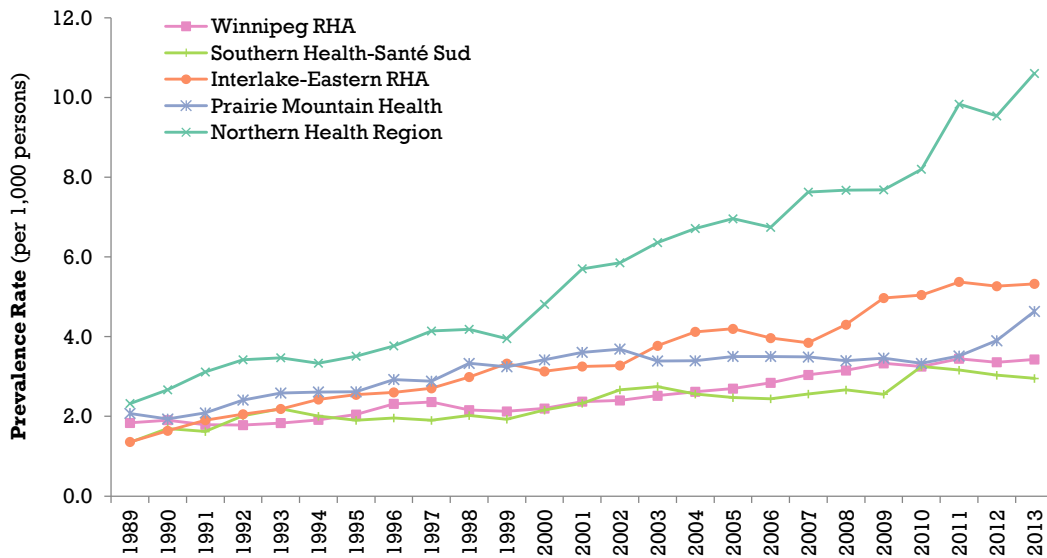


Figure 14: Age adjusted prevalence rates (per 1,000 persons) of females with diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 1989-2013

Diabetes Incidence

Incidence Trends in Manitoba, 1989–2013

The number of newly diagnosed cases of diabetes recorded each year among children and adolescents in almost tripled between 1989 and 2013, increasing from 74 new diabetes cases among individuals 1-19 years of age in 1989 to 217 in 2013 (Figure 15). In 1989, among every 100,000 persons 1-19 years of age, there were 23 new cases of diabetes. In 2013, among every 100,000 persons 1-19 years of age, there were 68 new cases of diabetes. Refer to Table 19 and Table 20 in Appendix B for detailed incident counts and incidence rates.

Incident rates in children and adolescents in Manitoba were relatively stable from 1989-1999. However, the crude incidence rate increased from 31.6 per 100,000 persons in 1999 to 47.0 per 100,000 persons in 2000. The incidence rates were then relatively stable again from 2000-2008 and from 2008-2013 the rates increased. The age adjusted incidence rate followed the same trend as the crude rate.

As Figure 15 shows, the number of males and females diagnosed with diabetes each year followed the same trend. In 1996, however, there were twice as many new cases of diabetes among females than males and in 2011 there were over 30 more newly diagnosed cases among females than males.

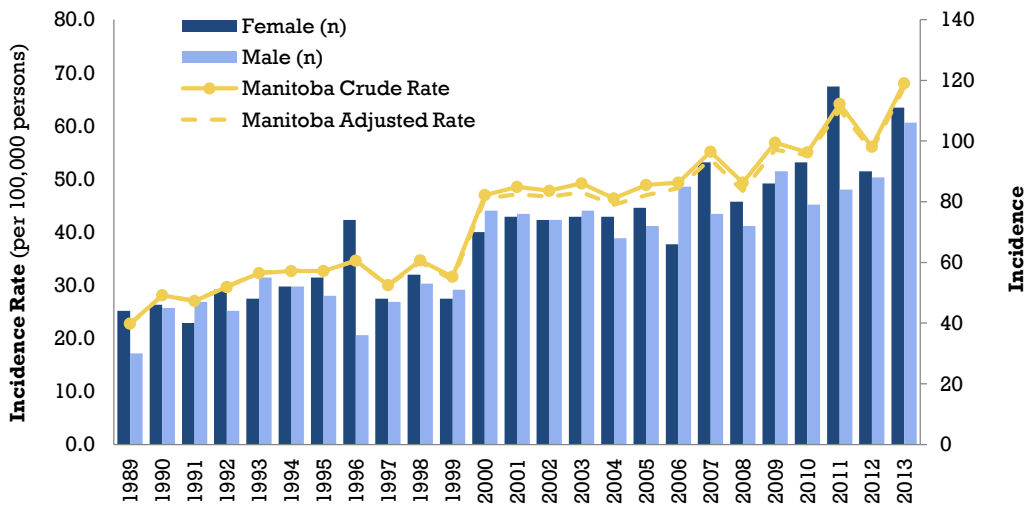


Figure 15: Number of males and females newly diagnosed with diabetes each year and total incidence rate (per 100,000 persons) of diabetes in Manitoba, ages 1-19 years, 1989-2013

Incidence Rates by Sex, 1989–2013

The male and female age adjusted incidence rates and crude incidence rates increased from 1989 to 2013 (Figure 16). The female incidence rate was higher than the male incidence rate for the majority of the reporting period. Male and female incidence rates were relatively stable from 1989-1999, increased from 1999-2000, stabilized from 2000-2005, and increased from 2005-2013. The female incidence rate peaked in 2011 when the crude incidence rate increased from 61.0 per 100,000 persons in 2010 to 76.9 per 100,000 persons in 2011.

The age adjusted incidence rates for both males and females were similar, if not equal, to the male and female crude incidence rates between 1989 and 1999. For the rest of the reporting period, from 2000-2013, the age adjusted incidence rates were slightly smaller than the crude incidence rates. Refer to Table 20 in Appendix B for detailed incident counts and incidence rates.

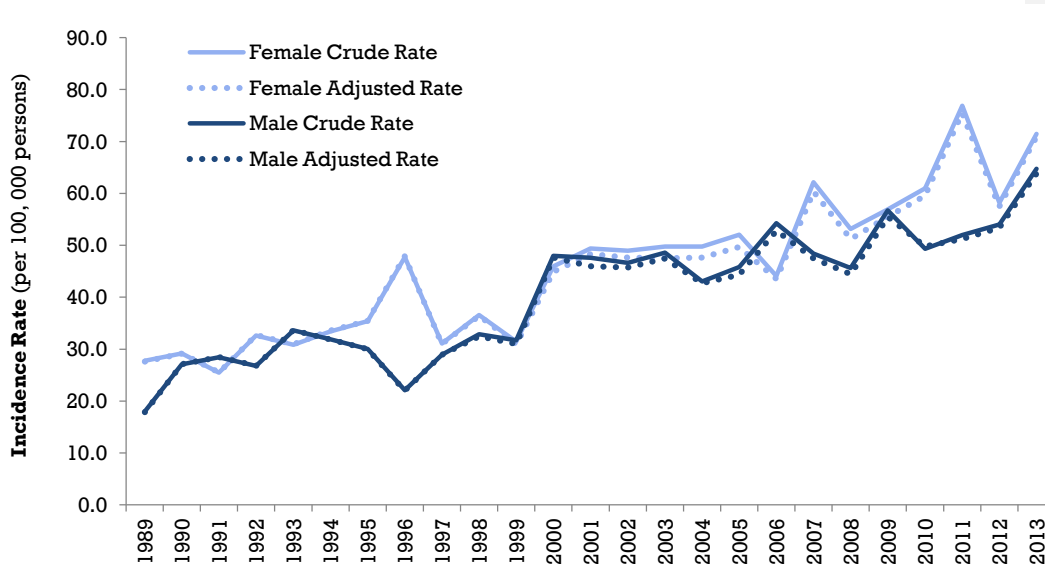


Figure 16: Crude incidence rates (per 100,000 persons) and adjusted incidence rates (per 100,000 persons) of diabetes by sex, Manitoba, ages 1-19 years, 1989-2013

Incidence by Age

Incidence Rates by Sex and Age Group, 2013

Figure 17 shows that the incidence rate of newly diagnosed diabetes cases varied across age groups in 2013. The female incidence rate was higher than the male incidence rate in the two middle age groups, individuals 5-9 and 10-14 years of age, while the male rate was slightly larger than the female rate among individuals 1-4 and 15-19 years of age. The gap between male and female rates was largest in the 5-9 age group, where the female incidence rate was twice as high as the male incidence rate (RR = 0.48). Overall, in 2013, the highest incidence rate was among individuals 10-14 years of age (98.8 per 100,000 persons), followed by individuals 15-19 years of age (90.0 per 100,000 persons), 5-9 years of age (47.0 per 100,000 persons) and the lowest rate was seen among the youngest age group, 1-4 years of age (28.2 per 100,000 persons) (Table 4).

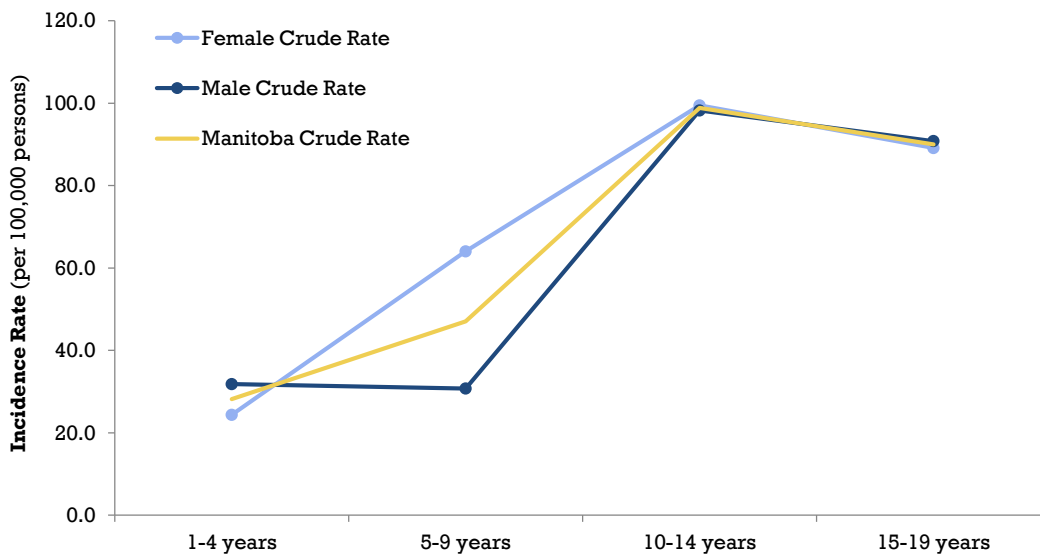


Figure 17: Crude incidence rates (per 100,000 persons) of diabetes by age group and sex, Manitoba, ages 1-19 years, 2013

Incidence Rates by Age Group, 1989–2013

Figure 18 shows the incidence rates of diabetes among each age group from 1989-2013. Over the entire reporting period, the incidence rate was highest in the two oldest age groups, 10-14 and 15-19 years of age. Both these rates fluctuated between 1989 and 2004. However, between 2005 and 2013, the incidence rate of those 10-14 years of age was consistently higher than the incidence rate of individuals 15-19 years of age. Among adolescents 10-14 years of age, the incidence rate was almost four times larger in 2013 compared to the incidence rate in 1989 and the incidence rate among those 15-19 years increased exactly two and one-half times over the reporting period.

The youngest age group, ages 1-4 years, had the smallest incidence rate over the entire reporting period. The incidence rate among children 1-4 years of age doubled between 1989 and 2013. The incident rate of children 5-9 years of age was consistently higher than the youngest age groups but lower than the oldest two age groups. However, the incident rate almost tripled between 1989 and 2013. This increase was seen specifically from 2005-2013 where the incident rate almost doubled in this time period. Refer to Table 21 in Appendix B for detailed incidence rates by age groups.

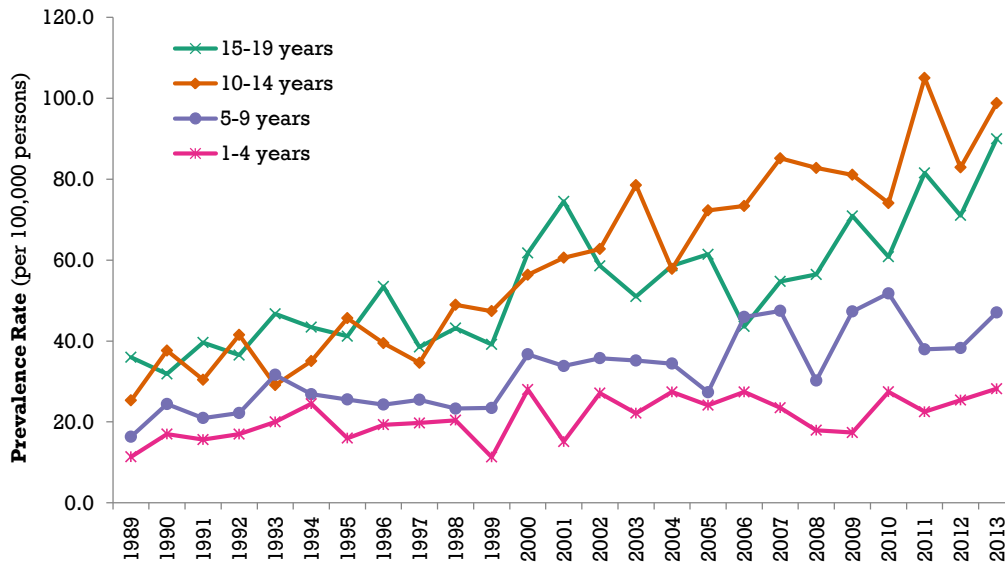


Figure 18: Incidence rates (per 100,000 persons) of diabetes by age group, Manitoba, ages 1-19 years, 1989-2013

Incidence Rates by Age Group (5 – 19 years) and Sex, 1989–2013

Figure 19 shows the incidence rates of diabetes among age groups and sex between 1989 and 2013. The incidence rates of males and females 1-4 years of age were not included in this figure. This is due to many counts between one and five that were suppressed. Their associated rates were also suppressed. Refer to Table 22 and Table 23 in Appendix B for the rates that are not suppressed.

The incident rates of males and females 5-19 years of age were relatively similar between 1989 and 1994 and therefore clustered together. In 1995 the female incident rate of adolescents 15-19 years of age spiked and remained the highest rate until 2002. In 2002, the female incidence rate of adolescents 10-14 years of age surpassed the other rates and remained the highest incident rate for the majority of the years between 2002 and 2013. There were small fluctuations in the male and female incident rates among children 5-9 years of age. However, both were lower than all incident rates of the other two age groups over the reporting period. For the two older age groups, the female incident rate was generally higher than the male incident rate. Refer to Table 22 and Table 23 in Appendix B for detailed incidence rates by age group and sex.

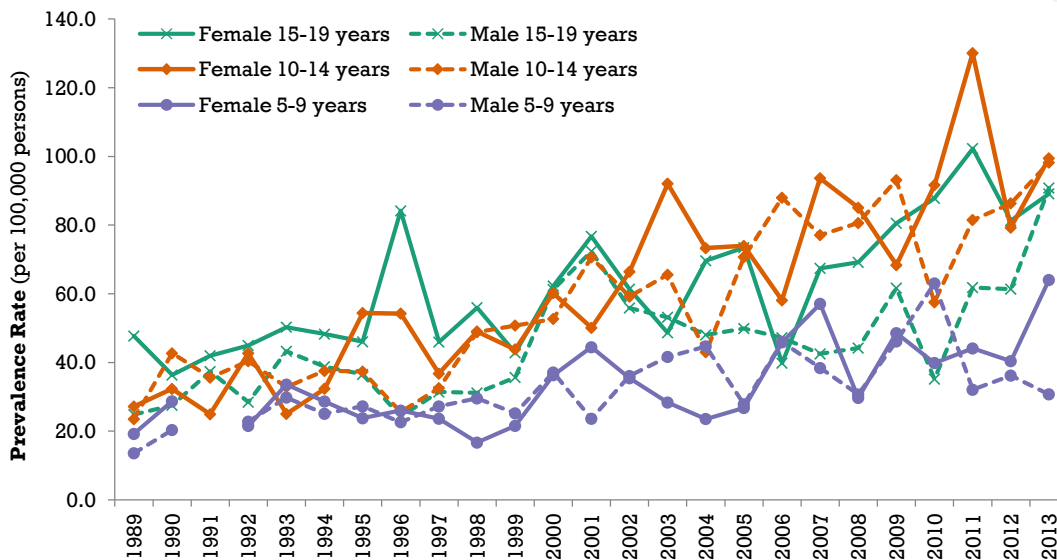


Figure 19: Incidence rates (per 100,000 persons) of diabetes by age group and sex, Manitoba, ages 5-19 years, 1989-2013

Table 4: Incidence and incidence rates (per 100,000 persons) of diabetes by age group and sex, ages 1-19 years, 2013

Age in years	Manitoba			Female			Male			RR
	N	Crude Rate	(95% CIs)	n	Crude Rate	(95% CIs)	n	Crude Rate	(95% CIs)	M/F
1-4	19	28.2	(17.0 – 44.0)	8	24.4	(10.5 – 48.0)	11	31.8	(15.9 - 56.9)	1.31
5-9	39	47.0	(33.5 - 64.3)	26	64.0	(41.8 - 93.8)	13	30.7	(16.4 - 52.6)	0.48
10-14	80	98.8	(78.4 – 123.0)	39	99.4	(70.7 – 136.0)	41	98.2	(70.5 - 133.2)	0.99
15-19	79	90.0	(71.2 - 112.1)	38	89.1	(63.1 - 122.3)	41	90.8	(65.2 - 123.2)	1.02

Incidence by RHA

Incidence and Incidence Rates by RHA, 2013

Figure 20 shows that in 2013 Winnipeg RHA had the largest number of newly diagnosed diabetes cases among children and adolescents (88 persons). Northern Health Region and Prairie Mountain Health had a similar number of new diabetes cases in 2013. However, Northern Health Region had a higher crude incidence rate than Prairie Mountain Health (175.5 per 100,000 persons compared to 109.5 per 100,000 persons, respectively) and the highest age-adjusted incidence rate than all other health regions (Figure 20).

As shown in Figure 20, Northern Health Region had the highest incidence rate, followed by Prairie Mountain Health, and Winnipeg RHA. The male and female incident rates followed this same trend with one exception; Interlake-Eastern RHA had the smallest male incidence rate. Refer to Table 24 in Appendix B for detailed incidence counts and rates by RHA.

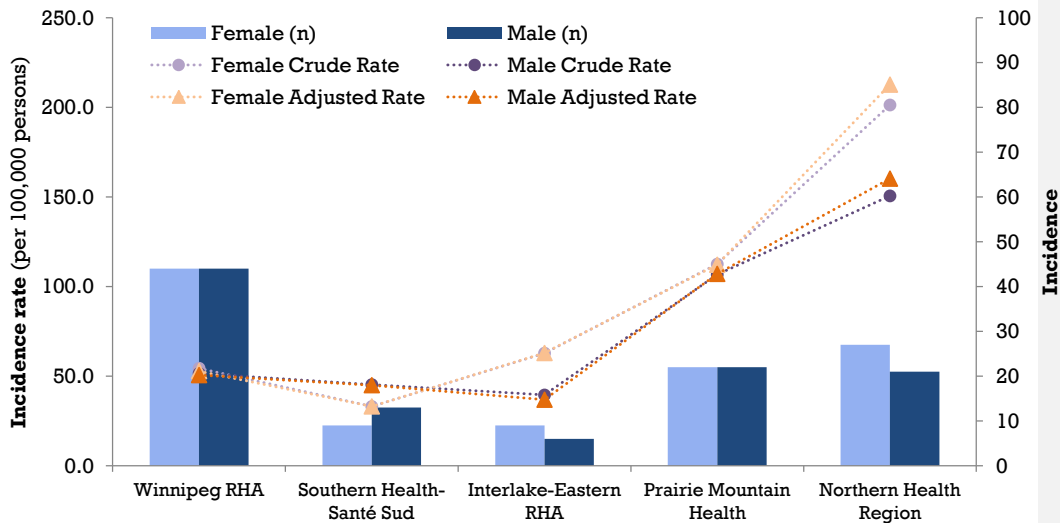


Figure 20: Number of incident cases, crude incidence rates (per 100,000 persons) and age-adjusted incidence rates (per 100,000 persons) of diabetes by Regional Health Authority (RHA) and sex, Manitoba, ages 1-19 years, 2013

Incidence and Incidence Rates in Winnipeg RHA, 2000-2013

Figure 21 shows the number of males and females newly diagnosed with diabetes between 2000 and 2013 in Winnipeg RHA, as well as the associated combined crude incidence rate. The number of males, 1-19 years of age, newly diagnosed with diabetes each year was relatively stable over this time period. There were the same number of male incident cases in 2000 (44 males) as there were in 2013. The number of females, 1-19 years of age, newly diagnosed with diabetes each year was also relatively stable in the beginning of this time period, from 2000-2006. However, in 2007, compared to 2006, there was an increase of 12 female incident cases. The number of female incident cases was then relatively stable again at this higher count from 2007-2013. The number of male incident cases and the number of female incident cases were similar in each year over this time period.

The combined crude incidence rate slightly increased between 2000 and 2013 and the highest incidence rate occurred in 2009 with 55 per 100,000 children and adolescents in Winnipeg RHA being newly diagnosed with diabetes. Refer to Table 25 and Table 30 in Appendix B for detailed incidence counts and rates for Winnipeg RHA.

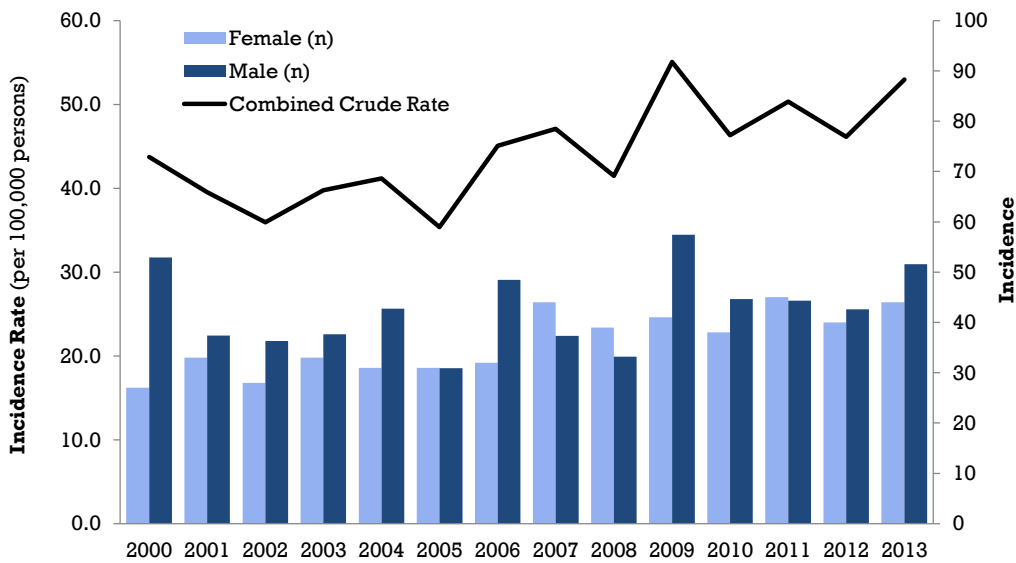


Figure 21: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, Winnipeg Regional Health Authority, ages 1-19 years, 2000-2013

Incidence and Incidence Rates in Southern Health-Santé Sud, 2000-2013

Figure 22 shows the number of males and females newly diagnosed with diabetes between 2000 and 2013 in Southern Health-Santé Sud, as well as the associated combined crude incidence rate. The number of males and females, 1-19 years of age, newly diagnosed with diabetes was relatively stable over this time period. The exception to this stability among males occurred in 2007 when there were 18 newly diagnosed cases compared to 8 in 2006. The exception to this stability in females occurred in 2010 when there were 16 newly diagnosed cases compared to 6 in 2009. These exceptions may be the result of small fluctuations that naturally occur over time. For the majority of this time period, there were more male incident cases than female incident cases. Note that the data from 2004 was suppressed due to a small data value.

Overall, the combined crude incidence rate was also relatively stable between 2000 and 2013. However, the incidence rate did fluctuate with high and low peaks. The lowest peak occurred in 2004 when for every 100,000 children and adolescents 22 were newly diagnosed with diabetes (note that in 2004, the number of incident cases was five or lower, therefore the data has been suppressed). This number increased to 54 per 100,000 children and adolescents newly diagnosed with diabetes by 2007. Refer to Table 26 and Table 31 in Appendix B for detailed incidence counts and rates for Southern Health-Santé Sud.

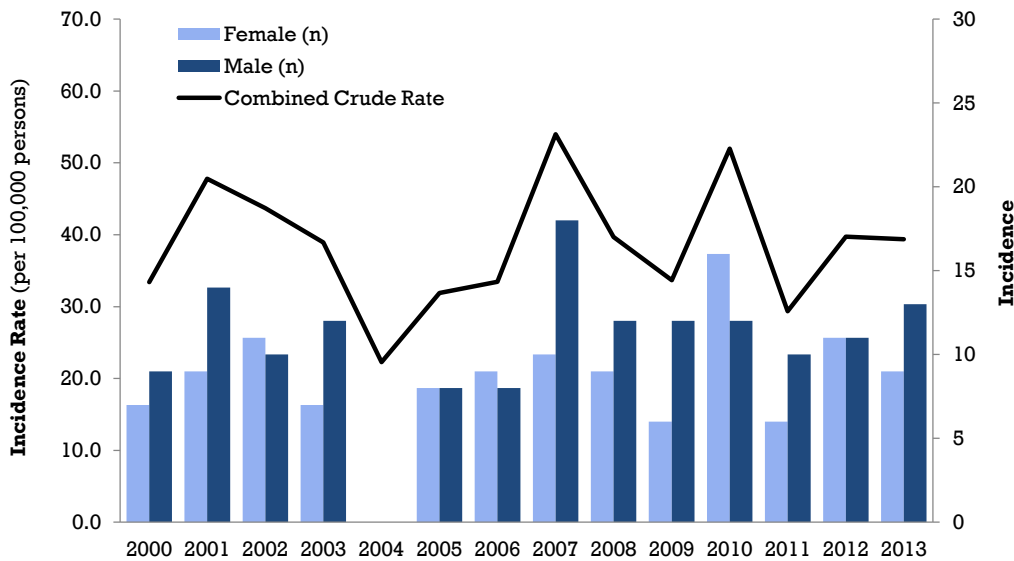


Figure 22: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, Southern Health-Santé Sud, ages 1-19 years, 2000-2013

Incidence and Incidence Rates in Interlake–Eastern RHA, 2000-2013

Figure 23 shows the number of males and females newly diagnosed with diabetes between 2000 and 2013 in Interlake-Eastern RHA, as well as the associated combined crude incidence rate. The number of males newly diagnosed with diabetes was relatively stable in Interlake-Eastern RHA between 2000 and 2013. The largest male incidence occurred in 2006, when there were 15 males newly diagnosed with diabetes, double the number of females. The number of females newly diagnosed with diabetes was relatively between 2000 and 2013. However, there was a large increase in 2009 and 2011, where the number of females newly diagnosed with diabetes was 16 and 17 compared to only 6 in 2010. This may be the result of fluctuations that naturally occur over time. For the majority of this time period, especially after 2002, the number of female incident cases was more than, or equal to, the number of male incident cases.

The combined crude incidence rate was relatively stable between 2000 and 2013. The largest fluctuations occurred between 2009 and 2011, when the crude incidence rate decreased from 83.3 per 100,000 persons in 2009 to 40.2 per 100,000 persons in 2010 and then increased back to 79.6 per 100,000 persons in 2011. Refer to Table 27 and Table 32 in Appendix B for detailed incidence counts and rates for Interlake-Eastern RHA.

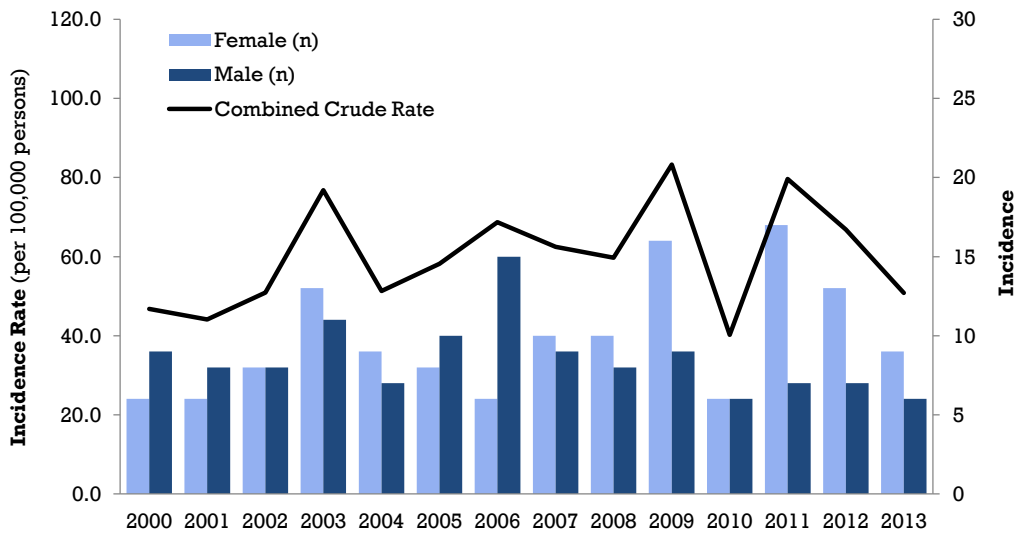


Figure 23: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, Interlake-Eastern Regional Health Authority, ages 1-19 years, 2000-2013

Incidence and Incidence Rates in Prairie Mountain Health, 2000-2013

Figure 24 shows both the number of males and females newly diagnosed with diabetes between 2000 and 2013 in Prairie Mountain Health, and the associated combined crude incidence rate. The number of newly diagnosed diabetes cases among males and females followed the same trend between 2000 and 2013. The number of male and female incident cases was relatively stable between 2000 and 2010. However, between 2010 and 2013, the number of males newly diagnosed with diabetes and the number of females newly diagnosed with diabetes doubled. The gap between the number of male incident cases and the number of female incident cases fluctuated over this time period.

The combined crude incidence rate more than doubled between 2000 and 2013. The incidence rate was relatively stable 2000 and 2010 and doubled between 2010 (52.9 per 100,000 persons) and 2013 (109.4 per 100,000 persons). Refer to Table 28 and Table 33 in Appendix B for detailed incidence counts and rates for Prairie Mountain Health.

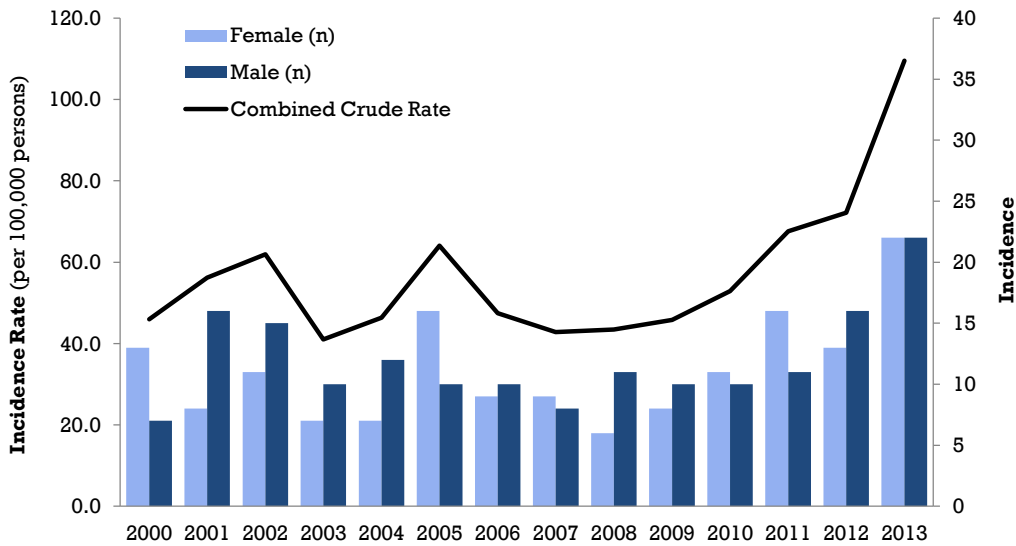


Figure 24: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, Prairie Mountain Health, ages 1-19 years, 2000-2013

Incidence and Incidence Rates in Northern Health Region, 2000-2013

Figure 25 shows the number of males and females newly diagnosed with diabetes between 2000 and 2013 in Northern Health Region, as well as the associated combined crude incidence rate. Over the majority of the time period, there were more female incident cases than male incident cases. However, the number of newly diagnosed cases among females was relatively stable between 2000 and 2013 while the number of newly diagnosed cases among males more than doubled between 2000 (8 males) and 2013 (21 males). The number of female incident cases peaked in 2011 when there were 34 females, aged 1-19, newly diagnosed with diabetes in Northern Health Region.

The combined crude incidence rate was relatively stable between 2000 and 2009. However, between 2009 and 2013 the crude incidence rate increased. In 2009 for every 100,000 children and adolescents in Northern Health Region almost 100 were newly diagnosed with diabetes. In 2013, for every 100,000 children and adolescents in Northern Health Region 175 were newly diagnosed with diabetes. Refer to Table 29 and Table 34 in Appendix B for detailed incidence counts and rates for Northern Health Region.

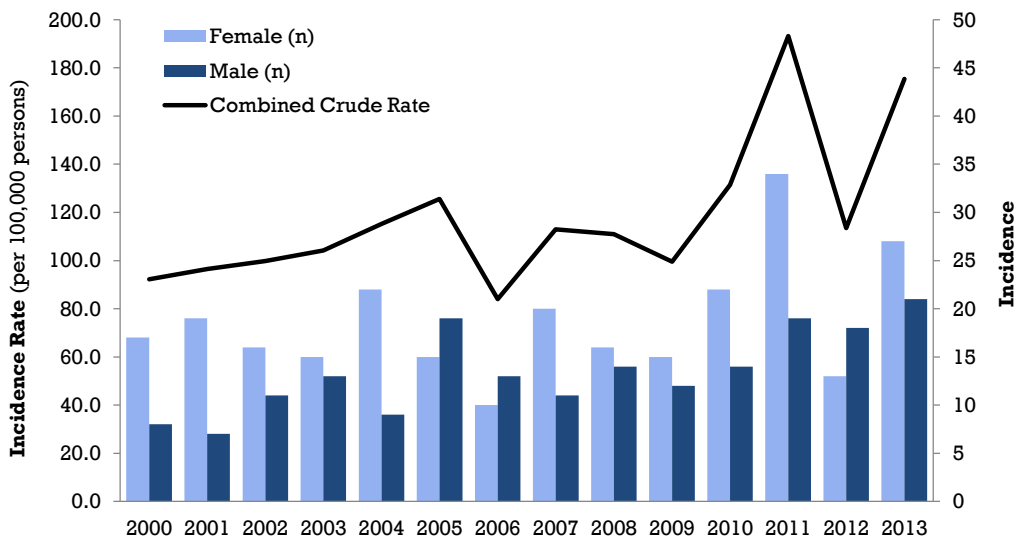


Figure 25: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, Northern Health Region, ages 1-19 years, 2000-2013

Age Adjusted Incidence Rates by RHA, 2000–2013

When comparing the age adjusted incidence rates of all the RHAs, Figure 26 shows Northern Health Region consistently had the highest incidence rate over the time period. That region also experienced the largest increase in rate from 1989 (92.2 per 100,000 persons) to 2013 (175.5 per 100,000 persons). The remaining four RHAs experienced age adjusted rates similar in value to the provincial incidence rate and lower than Northern Health Region’s rate. Southern Health-Santé Sud had the lowest incidence rate for the majority of the period, while Interlake-Eastern RHA had the second highest incidence rate for the majority of the time period. However, each the RHAs incidence rates were clustered together except for Northern Health Region. Refer to Tables 25-29 in Appendix B for detailed incidence counts and rates by RHA.

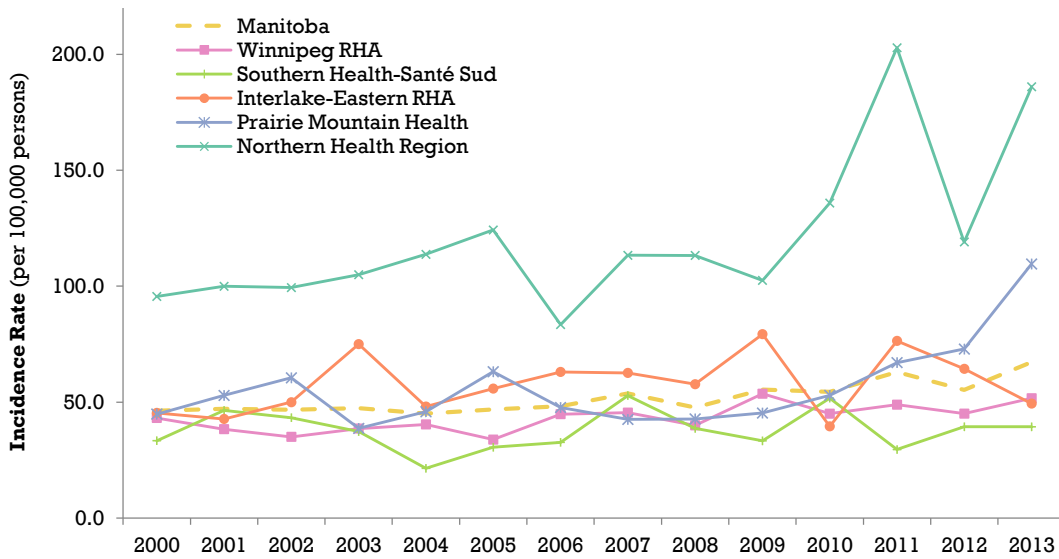


Figure 26: Age adjusted incidence rates (per 100,000 persons) of diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 2000-2013

Age Adjusted Incidence Rates by Sex and RHA, 2000–2013

Males

Figure 27 compares the male age adjusted incidence rate in each RHA between 2000 and 2013. In the beginning of this time period, from 2000-2004, the male incidence rates in all RHAs were fairly clustered together. However, Northern Health Region had the highest incidence rate for the rest of the time period. The incidence rates for the other RHAs remained relatively clustered over the time period. Refer to Tables 30-34 in Appendix B for detailed incidence counts and rates by RHA and sex.

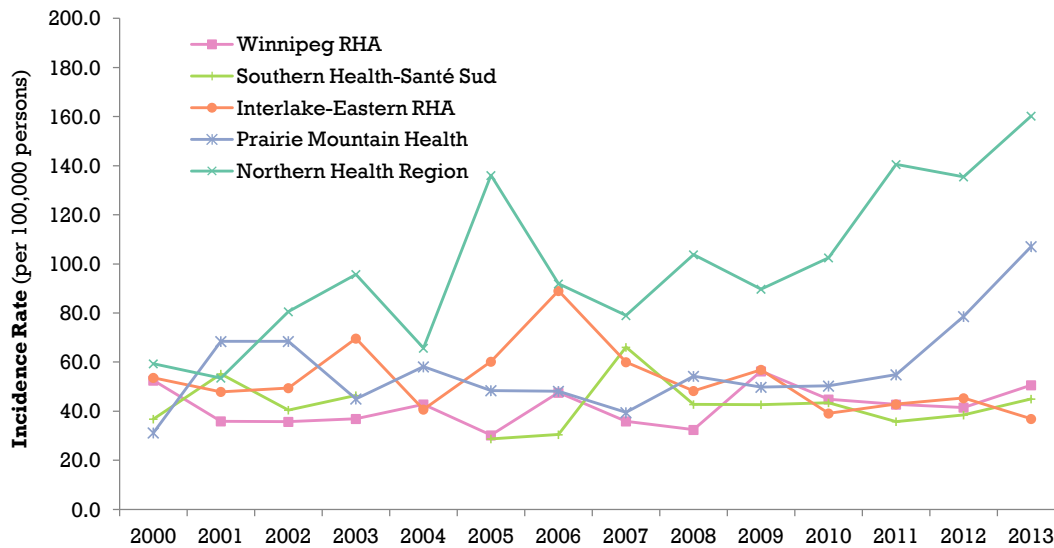


Figure 27: Age adjusted incidence rates (per 100,000 persons) of males with diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 2000-2013

Females

Figure 28 compares the female age adjusted incidence rates in each RHA between 2000 and 2013. Northern Health Region consistently had the highest female age adjusted rate while the incidence rates of the other RHAs were clustered together over the time period. Southern Health-Santé Sud had the lowest incidence rate over the majority of the period while Interlake-Eastern RHA had the second highest rate for the majority of the period, 2000-2013. Refer to Tables 30-34 in Appendix B for detailed incidence counts and rates by RHA and sex.

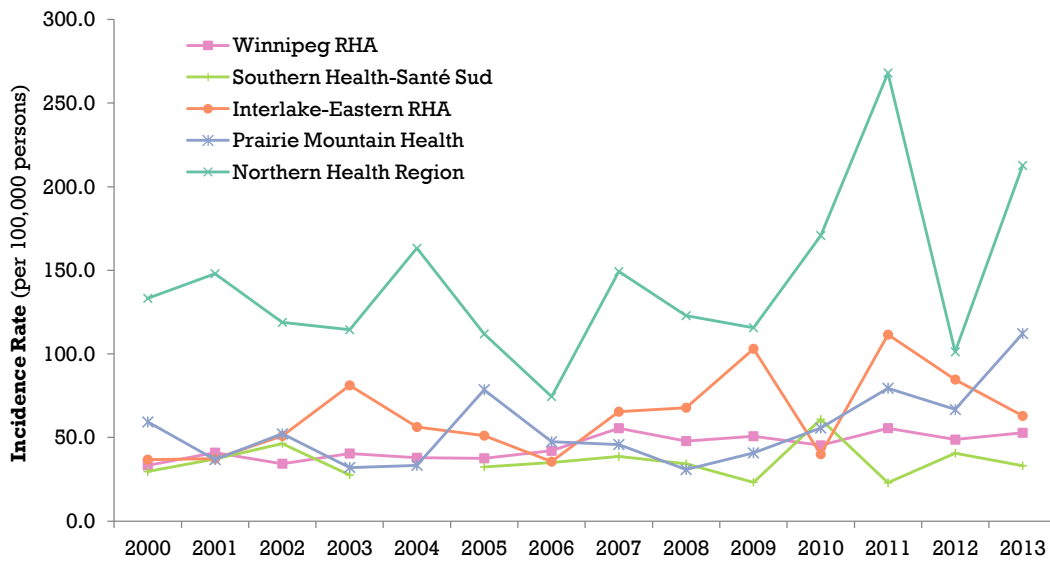


Figure 28: Age adjusted incidence rates (per 100,000 persons) of females with diabetes by Regional Health Authority (RHA), Manitoba, ages 1-19 years, 2000-2013

Summary

Between 1989 and 2013, a total of 3379 children and adolescents were diagnosed with diabetes (either type 1 or type 2 diabetes) in Manitoba. The number of diagnosed diabetes cases among Manitoban children and adolescents each year are almost tripled, from **74** new diabetes cases among individuals 1-19 years of age in 1989 to **217** in 2013. The increasing trends of newly diagnosed diabetes in children and adolescents are apparent across all age groups, except age group of 1-4 years. The largest increase in incidence rate among age groups between 1989 and 2013 was seen in the 10-14 year old age group which increased almost fourfold. Furthermore, over two thirds or 70% of the newly diagnosed diabetes are children and adolescents aged 10-19 years.

Over the entire reporting period, Northern Health Regions observed the largest rising rates of newly diagnosed diabetes. The remaining four RHAs experienced age adjusted rates similar in value to the provincial incidence rate and much lower than Northern Health Region's rate.

The burden of diabetes in Manitoba, in terms of the number of children and adolescents living with diabetes, has been more than doubled. In 2013, approximately 1366 children and adolescents were living with diagnosed diabetes. All health regions experienced an increase in diabetes prevalence. However, Northern Health Region experienced the largest increase, almost four times the number of diagnosed diabetes cases in 2013 than in 1989. Northern Health Region consistently had the highest prevalence rate over the reporting period.

References

1. Bird Y, Lemstra M, Rogers M, Moraros J. The relationship between socioeconomic status/income and prevalence of diabetes and associated conditions: A cross-sectional population-based study in Saskatchewan, Canada. *International journal for equity in health*. 2015;14:93-015-0237-0230.
2. Cameron FJ, Wherrett DK. Care of diabetes in children and adolescents: controversies, changes, and consensus. *Lancet (London, England)*. 2015;385(9982):2096-2106.
3. Association AD. Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. 2013;36(Suppl 1):8.
4. Association CD. *2015 Report on Diabetes: Driving Change*. Toronto: Canadian Diabetes Association; 2015 2015.
5. Association CD. *An Economic Tsunami: The Cost of Diabetes in Canada*. Toronto: Canadian Diabetes Association; 2011 2009.
6. Alberti G, Zimmet P, Shaw J, et al. Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. *Diabetes Care*. 2004;27(7):1798-1811.
7. Canada PHA. *Diabetes in Canada: Facts and figures from a public health perspective*. Ottawa: Public Health Agency of Canada; 2011 2011 978-1-100-19568-1.
8. Gong C, Meng X, Jiang Y, Wang X, Cui H, Chen X. Trends in childhood type 1 diabetes mellitus incidence in Beijing from 1995 to 2010: a retrospective multicenter study based on hospitalization data. *Diabetes technology & therapeutics*. 2015;17(3):159-165.
9. Feltbower RG, McKinney PA, Parslow RC, Stephenson CR, Bodansky HJ. Type 1 diabetes in Yorkshire, UK: time trends in 0-14 and 15-29-year-olds, age at onset and age-period-cohort modelling. *Diabetic medicine : a journal of the British Diabetic Association*. 2003;20(6):437-441.
10. Gale EA. Spring harvest? Reflections on the rise of type 1 diabetes. *Diabetologia*. 2005;48(12):2445-2450.
11. Haynes A, Bower C, Bulsara MK, Jones TW, Davis EA. Continued increase in the incidence of childhood Type 1 diabetes in a population-based Australian sample (1985-2002). *Diabetologia*. 2004;47(5):866-870.
12. Ball GD, McCargar LJ. Childhood obesity in Canada: a review of prevalence estimates and risk factors for cardiovascular diseases and type 2 diabetes. *Canadian journal of applied physiology = Revue canadienne de physiologie appliquee*. 2003;28(1):117-140.
13. Dabelea D. The predisposition to obesity and diabetes in offspring of diabetic mothers. *Diabetes Care*. 2007;30 Suppl 2:S169-174.
14. Fazeli Farsani S, van der Aa MP, van der Vorst MM, Knibbe CA, de Boer A. Global trends in the incidence and prevalence of type 2 diabetes in children and adolescents: a systematic review and evaluation of methodological approaches. *Diabetologia*. 2013;56(7):1471-1488.

15. Lipscombe LL, Hux JE. Trends in diabetes prevalence, incidence, and mortality in Ontario, Canada 1995-2005: a population-based study. *Lancet (London, England)*. 2007;369(9563):750-756.
16. McMahon SK, Haynes A, Ratnam N, et al. Increase in type 2 diabetes in children and adolescents in Western Australia. *The Medical journal of Australia*. 2004;180(9):459-461.
17. Pinhas-Hamiel O, Zeitler P. The global spread of type 2 diabetes mellitus in children and adolescents. *The Journal of pediatrics*. 2005;146(5):693-700.
18. Rosenbloom AL, Joe JR, Young RS, Winter WE. Emerging epidemic of type 2 diabetes in youth. *Diabetes Care*. 1999;22(2):345-354.
19. Rosenbloom AL, Silverstein JH, Amemiya S, Zeitler P, Klingensmith GJ. Type 2 diabetes in children and adolescents. *Pediatric diabetes*. 2009;10(s12):17-32.
20. Stanescu DE, Lord K, Lipman TH. The epidemiology of type 1 diabetes in children. *Endocrinol. Metab. Clin. North Am.* 2012;41(4):679-694.
21. D'Adamo E, Caprio S. Type 2 diabetes in youth: epidemiology and pathophysiology. *Diabetes Care*. 2011;34 Suppl 2:S161-165.
22. Lee JM, Pilli S, Gebremariam A, et al. Getting heavier, younger: trajectories of obesity over the life course. *International journal of obesity (2005)*. 2010;34(4):614-623.
23. Pinhas-Hamiel O, Zeitler P. Acute and chronic complications of type 2 diabetes mellitus in children and adolescents. *Lancet (London, England)*. 2007;369(9575):1823-1831.
24. Sellers EAC, Wicklow BA, Dean HJ. Clinical and demographic characteristics of type 2 diabetes in youth at diagnosis in Manitoba and northwestern Ontario (2006-2011). *Canadian Journal of Diabetes*. 2012;36(3):114-118.
25. Canada PHAo. Report from the Canadian Chronic Disease Surveillance System: Hypertension in Canada, 2010 2010; <http://www.phac-aspc.gc.ca/cd-mc/cvd-mcv/ccdss-snsmc-2010/2-1-eng.php>. Accessed June 10, 2016.
26. Lix L, Yogendram M, Mann J. Defining and validating chronic diseases: an administrative data approach - An Update with ICD-10-CA. Manitoba Centre for Health Policy; 2008: http://www.umanitoba.ca/faculties/medicine/units/mchp/projects/media/ICD10_Final.pdf. Accessed January 2, 2009.
27. Lix LM, Yogendran MS, Shaw SY, Burchill C, Metge C, Bond R. Population-based data sources for chronic disease surveillance. *Chronic Dis. Can.* 2008;29(1):31-38.
28. Chen G, Khan N, Walker R, Quan H. Validating ICD coding algorithms for diabetes mellitus from administrative data. *Diabetes Res. Clin. Pract.* 2010;89(2):189-195.
29. Quan H, Parsons GA, Ghali WA. Assessing accuracy of diagnosis-type indicators for flagging complications in administrative data. *J. Clin. Epidemiol.* 2004;57(4):366-372.
30. Blanchard JF, Ludwig S, Wajda A, et al. Incidence and prevalence of diabetes in Manitoba, 1986-1991. *Diabetes Care*. 1996;19(8):807-811.

31. Marrie R, Yu, BN, Leung, S, Elliott, L, Caetano, P, Warren, S, Wolfson, C, Patten, S, Svenson, LW, Tremlett, H, Fisk, J, & Blanchard, J The utility of administrative data for surveillance of comorbidity in multiple sclerosis: a validation study. *Journal of Neuroepidemiology*. Accepted for publication August 2012. 2012.
32. Blanchard JF, Ludwig S, Wajda A, et al. Incidence and prevalence of diabetes in Manitoba, 1986-1991. *Diabetes care*. Aug 1996;19(8):807-811.
33. Lix L, Yogendran M, Burchill C, et al. *Defining and Validating Chronic Diseases: An Administrative Data Approach*. Manitoba Centre for Health Policy;2006.
34. National Diabetes Surveillance System. *Responding to the Challenge of Diabetes in Canada*. 2009.
35. Cadieux G, Buckeridge DL, Jacques A, Libman M, Dendukuri N, Tamblyn R. Patient, physician, encounter, and billing characteristics predict the accuracy of syndromic surveillance case definitions. *BMC Public Health*. 2012;12:166.

Appendices

Appendix A - 1991 Canadian Standard Population Weights

Comment [e1]: Need reference

Age Group	1991 Canadian Standard Population Weights/100,000 Population
0-1	1428.7
1-4	5517.7
5-9	6945.4
10-14	6803.4
15-19	6849.5
20-24	7501.6
25-30	8994.4
31-34	9240.0
35-40	8338.8
41-44	7606.3
45-49	5953.6
50-54	4764.9
55-59	4404.1
60-64	4232.6
65-69	3857.0
70-74	2965.9
75-79	2212.7
80-84	1359.5
85+	1023.7

Appendix B – Tables

Table 5: Crude prevalence rates (per 1,000 persons) of diabetes by age group, ages 1-19 years, total Manitoba, 1989–2013

Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	0.5	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.5	0.4	0.6	0.5
5-9	1.4	1.5	1.4	1.5	1.5	1.6	1.5	1.5	1.5	1.6	1.6	1.7	1.7
10-14	2.1	2.2	2.4	2.6	2.6	2.7	3.0	3.0	3.0	3.1	3.2	3.1	3.5
15-19	3.0	3.3	3.4	3.5	3.9	4.0	3.9	4.1	4.5	4.5	4.4	5.1	5.5

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	0.6	0.6	0.7	0.7	0.7	0.7	0.5	0.5	0.6	0.6	0.6	0.8
5-9	1.8	1.7	1.8	1.7	1.8	2.0	2.1	2.1	2.2	2.1	2.0	1.9
10-14	3.6	4.0	4.1	4.3	4.3	4.3	4.6	4.8	4.7	4.9	5.0	5.3
15-19	5.8	5.8	5.8	6.0	6.2	6.4	6.6	7.1	7.3	7.7	7.7	8.2

Table 6: Crude prevalence rates (per 1,000 persons) of diabetes by age group, ages 1-19 years, females, 1989–2013

Females													
Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	0.5	0.3	0.4	0.5	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.6	0.6
5-9	1.2	1.5	1.4	1.4	1.6	1.7	1.5	1.5	1.3	1.3	1.3	1.5	1.7
10-14	2.0	2.1	2.3	2.5	2.4	2.5	2.8	3.1	3.3	3.4	3.5	3.3	3.4
15-19	3.2	3.5	3.4	3.6	3.9	3.9	4.0	4.5	4.8	4.8	4.5	5.0	5.7

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	0.6	0.6	0.5	0.6	0.7	0.7	0.5	0.5	0.4	0.4	0.5	0.7
5-9	1.7	1.7	1.8	1.6	1.7	2.0	1.9	1.9	1.9	2.1	2.1	2.0
10-14	3.5	3.9	4.1	4.3	4.2	4.1	4.6	5.0	4.9	5.1	5.3	5.5
15-19	5.8	5.9	6.1	6.3	6.3	6.8	6.9	7.2	7.7	8.4	7.8	8.3

Table 7: Crude prevalence rates (per 1,000 persons) of diabetes by age group, ages 1-19 years, males, 1989-2013

Males													
Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	0.5	0.4	0.4	0.4	0.6	0.8	0.7	0.6	0.6	0.5	0.3	0.6	0.5
5-9	1.4	1.4	1.5	1.5	1.4	1.4	1.4	1.6	1.6	1.9	1.9	1.9	1.8
10-14	2.1	2.3	2.5	2.7	2.9	3.0	3.1	3.0	2.8	2.7	2.9	3.0	3.5
15-19	2.9	3.2	3.3	3.5	3.9	4.1	3.9	3.8	4.1	4.3	4.4	5.1	5.4

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	0.5	0.7	0.9	0.8	0.7	0.6	0.5	0.5	0.7	0.7	0.7	0.8
5-9	1.8	1.8	1.9	1.8	1.9	2.0	2.2	2.3	2.5	2.2	2.0	1.8
10-14	3.7	4.1	4.1	4.3	4.4	4.6	4.5	4.7	4.4	4.7	4.7	5.2
15-19	5.8	5.7	5.5	5.7	6.2	6.1	6.4	7.0	6.9	7.1	7.7	8.0

Table 8: Number and prevalence rates (per 1,000 persons) of diabetes by Regional Health Authority (RHA) and sex, ages 1-19 years, 2013

All						RR
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
Winnipeg RHA	602	3.6	(3.3 - 3.9)	3.4	(3.2 - 3.7)	1.01
Southern Health-Santé Sud	171	3.1	(2.6 - 3.5)	3.0	(2.6 - 3.5)	1.08
Interlake-Eastern RHA	155	5.2	(4.4 - 6.1)	4.9	(4.2 - 5.8)	0.86
Prairie Mountain Health	200	5.0	(4.3 - 5.7)	5.0	(4.3 - 5.7)	1.13
Northern Health Region	238	8.6	(7.6 - 9.8)	9.3	(8.1 - 10.5)	0.76

Female					
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
Winnipeg RHA	292	3.6	(3.2 - 4.0)	3.4	(3.0 - 3.8)
Southern Health-Santé Sud	80	2.9	(2.3 - 3.7)	3.0	(2.3 - 3.7)
Interlake-Eastern RHA	81	5.6	(4.5 - 7.0)	5.3	(4.2 - 6.6)
Prairie Mountain Health	91	4.6	(3.7 - 5.7)	4.6	(3.7 - 5.7)
Northern Health Region	133	9.8	(8.2 - 11.7)	10.6	(8.9 - 12.6)

Male					
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
Winnipeg RHA	310	3.6	(3.2 - 4.0)	3.4	(3.1 - 3.8)
Southern Health-Santé Sud	91	3.2	(2.5 - 3.9)	3.1	(2.5 - 3.9)
Interlake-Eastern RHA	74	4.9	(3.8 - 6.1)	4.6	(3.6 - 5.7)
Prairie Mountain Health	109	5.3	(4.3 - 6.3)	5.3	(4.3 - 6.4)
Northern Health Region	105	7.5	(6.1 - 9.1)	8.0	(6.5 - 9.7)

Table 9: Number and prevalence rates (per 1,000 persons) of diabetes, ages 1-19 years, Winnipeg RHA, 1989-2013

Winnipeg RHA					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	305	1.8	(1.6 - 2.0)	1.8	(1.6 - 2.0)
1990	320	1.9	(1.7 - 2.1)	1.9	(1.7 - 2.1)
1991	318	1.9	(1.7 - 2.1)	1.9	(1.7 - 2.1)
1992	316	1.9	(1.7 - 2.1)	1.9	(1.7 - 2.1)
1993	326	1.9	(1.7 - 2.2)	2.0	(1.8 - 2.2)
1994	348	2.1	(1.9 - 2.3)	2.1	(1.9 - 2.3)
1995	356	2.1	(1.9 - 2.4)	2.2	(1.9 - 2.4)
1996	370	2.2	(2.0 - 2.5)	2.3	(2.0 - 2.5)
1997	378	2.3	(2.1 - 2.5)	2.3	(2.1 - 2.5)
1998	371	2.3	(2.0 - 2.5)	2.3	(2.0 - 2.5)
1999	371	2.3	(2.1 - 2.5)	2.2	(2.0 - 2.5)
2000	402	2.5	(2.2 - 2.7)	2.4	(2.2 - 2.7)
2001	431	2.7	(2.4 - 2.9)	2.6	(2.3 - 2.8)
2002	445	2.8	(2.5 - 3.0)	2.6	(2.4 - 2.9)
2003	457	2.8	(2.6 - 3.1)	2.7	(2.5 - 3.0)
2004	467	2.9	(2.6 - 3.2)	2.8	(2.5 - 3.0)
2005	462	2.9	(2.7 - 3.2)	2.8	(2.5 - 3.0)
2006	488	3.1	(2.8 - 3.4)	2.9	(2.7 - 3.2)
2007	499	3.2	(2.9 - 3.5)	3.0	(2.7 - 3.3)
2008	519	3.3	(3.0 - 3.5)	3.1	(2.8 - 3.3)
2009	549	3.4	(3.1 - 3.7)	3.2	(3.0 - 3.5)
2010	562	3.5	(3.2 - 3.8)	3.3	(3.0 - 3.6)
2011	588	3.6	(3.3 - 3.9)	3.4	(3.1 - 3.7)
2012	584	3.5	(3.3 - 3.8)	3.3	(3.1 - 3.6)
2013	602	3.6	(3.3 - 3.9)	3.4	(3.2 - 3.7)

Table 10: Number and prevalence rates (per 1,000 persons) of diabetes, ages 1-19 years, Southern Health - Santé-Sud, 1989-2013

Southern Health-Santé Sud					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	75	1.6	(1.3 - 2.0)	1.6	(1.3 - 2.0)
1990	85	1.8	(1.5 - 2.2)	1.8	(1.4 - 2.2)
1991	82	1.8	(1.4 - 2.2)	1.7	(1.4 - 2.2)
1992	94	2.0	(1.6 - 2.5)	2.0	(1.6 - 2.4)
1993	106	2.3	(1.9 - 2.7)	2.2	(1.8 - 2.7)
1994	99	2.1	(1.7 - 2.6)	2.1	(1.7 - 2.5)
1995	93	2.0	(1.6 - 2.4)	1.9	(1.6 - 2.4)
1996	92	1.9	(1.6 - 2.4)	1.9	(1.5 - 2.3)
1997	91	1.9	(1.5 - 2.3)	1.9	(1.5 - 2.3)
1998	92	1.9	(1.6 - 2.4)	1.9	(1.5 - 2.3)
1999	91	1.9	(1.5 - 2.3)	1.8	(1.5 - 2.3)
2000	103	2.1	(1.8 - 2.6)	2.1	(1.7 - 2.5)
2001	113	2.3	(1.9 - 2.8)	2.2	(1.9 - 2.7)
2002	127	2.6	(2.2 - 3.1)	2.5	(2.1 - 3.0)
2003	134	2.7	(2.3 - 3.2)	2.6	(2.2 - 3.1)
2004	125	2.5	(2.1 - 3.0)	2.4	(2.0 - 2.9)
2005	122	2.4	(2.0 - 2.9)	2.3	(1.9 - 2.8)
2006	127	2.5	(2.1 - 3.0)	2.4	(2.0 - 2.8)
2007	145	2.8	(2.4 - 3.3)	2.7	(2.3 - 3.2)
2008	153	2.9	(2.4 - 3.4)	2.8	(2.4 - 3.3)
2009	158	2.9	(2.5 - 3.4)	2.8	(2.4 - 3.3)
2010	177	3.3	(2.8 - 3.8)	3.2	(2.7 - 3.7)
2011	174	3.2	(2.7 - 3.7)	3.1	(2.7 - 3.6)
2012	172	3.1	(2.7 - 3.6)	3.1	(2.6 - 3.6)
2013	171	3.1	(2.6 - 3.5)	3.0	(2.6 - 3.5)

Table 11: Number and prevalence rates (per 1,000 persons) of diabetes, ages 1-19 years, Interlake-Eastern RHA, 1989-2013

Interlake-Eastern RHA					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	57	1.8	(1.3 - 2.3)	1.7	(1.3 - 2.2)
1990	60	1.9	(1.4 - 2.4)	1.8	(1.4 - 2.3)
1991	65	2.0	(1.6 - 2.6)	2.0	(1.5 - 2.5)
1992	66	2.1	(1.6 - 2.6)	2.0	(1.6 - 2.6)
1993	73	2.3	(1.8 - 2.9)	2.3	(1.8 - 2.8)
1994	81	2.5	(2.0 - 3.1)	2.5	(2.0 - 3.1)
1995	82	2.6	(2.0 - 3.2)	2.5	(2.0 - 3.1)
1996	85	2.6	(2.1 - 3.2)	2.6	(2.1 - 3.2)
1997	90	2.8	(2.2 - 3.4)	2.7	(2.2 - 3.3)
1998	90	2.8	(2.2 - 3.4)	2.7	(2.2 - 3.3)
1999	97	3.0	(2.4 - 3.7)	2.9	(2.3 - 3.5)
2000	99	3.1	(2.5 - 3.7)	2.9	(2.4 - 3.6)
2001	103	3.2	(2.6 - 3.9)	3.1	(2.5 - 3.7)
2002	109	3.5	(2.8 - 4.2)	3.3	(2.7 - 3.9)
2003	121	3.9	(3.2 - 4.6)	3.6	(3.0 - 4.4)
2004	128	4.1	(3.4 - 4.9)	3.8	(3.2 - 4.6)
2005	139	4.5	(3.8 - 5.3)	4.1	(3.5 - 4.9)
2006	143	4.7	(3.9 - 5.5)	4.3	(3.6 - 5.1)
2007	143	4.7	(3.9 - 5.5)	4.3	(3.6 - 5.1)
2008	146	4.8	(4.1 - 5.7)	4.5	(3.8 - 5.3)
2009	163	5.4	(4.6 - 6.3)	5.0	(4.3 - 5.9)
2010	164	5.5	(4.7 - 6.4)	5.1	(4.3 - 5.9)
2011	164	5.4	(4.6 - 6.3)	5.0	(4.3 - 5.9)
2012	159	5.3	(4.5 - 6.2)	5.0	(4.2 - 5.8)
2013	155	5.2	(4.4 - 6.1)	4.9	(4.2 - 5.8)

Table 12: Number and prevalence rates (per 1,000 persons) of diabetes, ages 1-19 years, Prairie Mountain Health, 1989-2013

Prairie Mountain Health					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	91	1.9	(1.5 - 2.3)	1.8	(1.5 - 2.3)
1990	88	1.8	(1.5 - 2.3)	1.8	(1.4 - 2.2)
1991	95	2.0	(1.6 - 2.5)	2.0	(1.6 - 2.4)
1992	105	2.2	(1.8 - 2.7)	2.2	(1.8 - 2.7)
1993	114	2.5	(2.0 - 2.9)	2.4	(2.0 - 2.9)
1994	124	2.7	(2.2 - 3.2)	2.6	(2.2 - 3.1)
1995	124	2.7	(2.3 - 3.2)	2.7	(2.2 - 3.2)
1996	134	3.0	(2.5 - 3.5)	2.9	(2.4 - 3.4)
1997	135	3.0	(2.5 - 3.6)	2.9	(2.4 - 3.5)
1998	152	3.4	(2.9 - 4.0)	3.3	(2.8 - 3.9)
1999	151	3.4	(2.9 - 4.0)	3.3	(2.8 - 3.8)
2000	155	3.6	(3.0 - 4.2)	3.4	(2.9 - 4.0)
2001	165	3.9	(3.3 - 4.5)	3.6	(3.1 - 4.2)
2002	174	4.1	(3.5 - 4.8)	3.9	(3.3 - 4.5)
2003	164	3.9	(3.4 - 4.6)	3.7	(3.1 - 4.3)
2004	165	4.0	(3.4 - 4.7)	3.7	(3.2 - 4.4)
2005	168	4.1	(3.5 - 4.8)	3.9	(3.3 - 4.5)
2006	164	4.1	(3.5 - 4.8)	3.8	(3.3 - 4.5)
2007	157	3.9	(3.3 - 4.6)	3.7	(3.2 - 4.4)
2008	157	4.0	(3.4 - 4.7)	3.8	(3.3 - 4.5)
2009	166	4.2	(3.6 - 4.9)	4.1	(3.5 - 4.7)
2010	155	3.9	(3.3 - 4.6)	3.8	(3.2 - 4.5)
2011	159	4.0	(3.4 - 4.6)	3.9	(3.3 - 4.6)
2012	174	4.3	(3.7 - 5.0)	4.3	(3.7 - 5.0)
2013	200	5.0	(4.3 - 5.7)	5.0	(4.3 - 5.7)

Table 13: Number and prevalence rates (per 1,000 persons) of diabetes, ages 1-19 years, Northern Health Region, 1989-2013

Northern Health Region					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	61	2.2	(1.7 - 2.8)	2.2	(1.7 - 2.9)
1990	68	2.5	(1.9 - 3.2)	2.5	(1.9 - 3.2)
1991	71	2.6	(2.0 - 3.3)	2.7	(2.1 - 3.4)
1992	82	3.1	(2.4 - 3.8)	3.2	(2.5 - 3.9)
1993	85	3.2	(2.5 - 3.9)	3.3	(2.7 - 4.1)
1994	76	2.8	(2.2 - 3.6)	3.0	(2.4 - 3.8)
1995	78	2.9	(2.3 - 3.6)	3.0	(2.4 - 3.8)
1996	81	3.0	(2.3 - 3.7)	3.1	(2.5 - 3.9)
1997	87	3.2	(2.5 - 3.9)	3.4	(2.7 - 4.1)
1998	87	3.2	(2.6 - 3.9)	3.4	(2.7 - 4.2)
1999	90	3.3	(2.7 - 4.1)	3.5	(2.8 - 4.3)
2000	107	3.9	(3.2 - 4.8)	4.1	(3.4 - 5.0)
2001	123	4.5	(3.8 - 5.4)	4.7	(3.9 - 5.6)
2002	123	4.5	(3.8 - 5.4)	4.7	(3.9 - 5.6)
2003	141	5.2	(4.4 - 6.2)	5.3	(4.5 - 6.3)
2004	150	5.6	(4.7 - 6.5)	5.6	(4.7 - 6.5)
2005	168	6.2	(5.3 - 7.2)	6.2	(5.3 - 7.2)
2006	168	6.1	(5.2 - 7.1)	6.1	(5.2 - 7.1)
2007	178	6.5	(5.5 - 7.5)	6.5	(5.6 - 7.5)
2008	181	6.7	(5.7 - 7.7)	6.8	(5.8 - 7.9)
2009	182	6.7	(5.7 - 7.7)	6.9	(5.9 - 7.9)
2010	181	6.6	(5.7 - 7.6)	6.9	(5.9 - 8.0)
2011	206	7.5	(6.5 - 8.6)	7.9	(6.8 - 9.0)
2012	211	7.7	(6.7 - 8.8)	8.2	(7.1 - 9.3)
2013	238	8.6	(7.6 - 9.8)	9.3	(8.1 - 10.5)

Table 14: Number and prevalence rates (per 1,000 persons) of diabetes by sex, ages 1-19 years, Winnipeg RHA, 1989-2013

Winnipeg											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	153	1.8	(1.6 - 2.2)	1.8	(1.6 - 2.2)	152	1.7	(1.5 - 2.0)	1.7	(1.5 - 2.0)	0.95
1990	158	1.9	(1.6 - 2.2)	1.9	(1.6 - 2.2)	162	1.9	(1.6 - 2.2)	1.9	(1.6 - 2.2)	0.98
1991	147	1.8	(1.5 - 2.1)	1.8	(1.5 - 2.1)	171	2.0	(1.7 - 2.3)	2.0	(1.7 - 2.3)	1.11
1992	145	1.8	(1.5 - 2.1)	1.8	(1.5 - 2.1)	171	2.0	(1.7 - 2.3)	2.0	(1.7 - 2.3)	1.13
1993	149	1.8	(1.5 - 2.1)	1.8	(1.6 - 2.2)	177	2.1	(1.8 - 2.4)	2.1	(1.8 - 2.4)	1.14
1994	155	1.9	(1.6 - 2.2)	1.9	(1.6 - 2.2)	193	2.3	(2.0 - 2.6)	2.3	(2.0 - 2.6)	1.20
1995	165	2.0	(1.7 - 2.4)	2.0	(1.7 - 2.4)	191	2.2	(1.9 - 2.6)	2.3	(2.0 - 2.6)	1.11
1996	186	2.3	(2.0 - 2.6)	2.3	(2.0 - 2.7)	184	2.2	(1.9 - 2.5)	2.2	(1.9 - 2.5)	0.95
1997	189	2.3	(2.0 - 2.7)	2.4	(2.0 - 2.7)	189	2.2	(1.9 - 2.6)	2.3	(1.9 - 2.6)	0.96
1998	173	2.2	(1.9 - 2.5)	2.2	(1.8 - 2.5)	198	2.4	(2.1 - 2.7)	2.4	(2.0 - 2.7)	1.09
1999	171	2.2	(1.8 - 2.5)	2.1	(1.8 - 2.5)	200	2.4	(2.1 - 2.8)	2.4	(2.1 - 2.7)	1.11
2000	178	2.2	(1.9 - 2.6)	2.2	(1.9 - 2.5)	224	2.7	(2.3 - 3.1)	2.6	(2.3 - 3.0)	1.20
2001	193	2.4	(2.1 - 2.8)	2.4	(2.0 - 2.7)	238	2.9	(2.5 - 3.3)	2.8	(2.4 - 3.2)	1.17
2002	197	2.5	(2.2 - 2.9)	2.4	(2.1 - 2.8)	248	3.0	(2.6 - 3.4)	2.9	(2.5 - 3.3)	1.20
2003	208	2.6	(2.3 - 3.0)	2.5	(2.2 - 2.9)	249	3.0	(2.7 - 3.4)	2.9	(2.5 - 3.3)	1.14
2004	217	2.8	(2.4 - 3.2)	2.6	(2.3 - 3.0)	250	3.0	(2.7 - 3.4)	2.9	(2.6 - 3.3)	1.10
2005	223	2.9	(2.5 - 3.3)	2.7	(2.4 - 3.1)	239	2.9	(2.6 - 3.3)	2.8	(2.5 - 3.2)	1.03
2006	233	3.0	(2.6 - 3.4)	2.8	(2.5 - 3.2)	255	3.2	(2.8 - 3.6)	3.0	(2.6 - 3.4)	1.05
2007	248	3.2	(2.8 - 3.7)	3.0	(2.7 - 3.4)	251	3.1	(2.7 - 3.5)	2.9	(2.6 - 3.3)	0.97
2008	262	3.4	(3.0 - 3.8)	3.2	(2.8 - 3.6)	257	3.1	(2.8 - 3.6)	3.0	(2.6 - 3.3)	0.94
2009	277	3.5	(3.1 - 4.0)	3.3	(2.9 - 3.8)	272	3.3	(2.9 - 3.7)	3.1	(2.8 - 3.5)	0.94
2010	274	3.5	(3.1 - 3.9)	3.3	(2.9 - 3.7)	288	3.5	(3.1 - 3.9)	3.3	(2.9 - 3.7)	1.00
2011	289	3.6	(3.2 - 4.1)	3.4	(3.1 - 3.9)	299	3.6	(3.2 - 4.0)	3.4	(3.0 - 3.8)	0.98
2012	284	3.5	(3.1 - 4.0)	3.4	(3.0 - 3.8)	300	3.5	(3.2 - 4.0)	3.3	(3.0 - 3.7)	1.00
2013	292	3.6	(3.2 - 4.0)	3.4	(3.0 - 3.8)	310	3.6	(3.2 - 4.0)	3.4	(3.1 - 3.8)	1.01

Table 15: Number and prevalence rates (per 1,000 persons) of diabetes by sex, ages 1-19 years, Southern Health – Santé Sud, 1989-2013

Southern Health-Santé Sud											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	31	1.4	(0.9 - 1.9)	1.4	(0.9 - 1.9)	44	1.8	(1.3 - 2.5)	1.8	(1.3 - 2.5)	1.35
1990	39	1.7	(1.2 - 2.3)	1.7	(1.2 - 2.3)	46	1.9	(1.4 - 2.6)	1.9	(1.4 - 2.5)	1.12
1991	37	1.6	(1.2 - 2.3)	1.6	(1.1 - 2.2)	45	1.9	(1.4 - 2.5)	1.9	(1.4 - 2.5)	1.16
1992	46	2.0	(1.5 - 2.7)	2.0	(1.5 - 2.7)	48	2.0	(1.5 - 2.7)	2.0	(1.4 - 2.6)	0.99
1993	50	2.2	(1.6 - 2.9)	2.2	(1.6 - 2.9)	56	2.3	(1.8 - 3.0)	2.3	(1.7 - 3.0)	1.06
1994	46	2.0	(1.5 - 2.7)	2.0	(1.5 - 2.7)	53	2.2	(1.6 - 2.9)	2.1	(1.6 - 2.8)	1.09
1995	44	1.9	(1.4 - 2.6)	1.9	(1.4 - 2.6)	49	2.0	(1.5 - 2.7)	2.0	(1.5 - 2.6)	1.05
1996	46	2.0	(1.5 - 2.7)	2.0	(1.4 - 2.6)	46	1.9	(1.4 - 2.5)	1.8	(1.3 - 2.4)	0.94
1997	45	2.0	(1.4 - 2.6)	1.9	(1.4 - 2.5)	46	1.9	(1.4 - 2.5)	1.8	(1.3 - 2.4)	0.96
1998	48	2.1	(1.5 - 2.8)	2.0	(1.5 - 2.7)	44	1.8	(1.3 - 2.4)	1.7	(1.3 - 2.3)	0.86
1999	46	2.0	(1.5 - 2.7)	1.9	(1.4 - 2.6)	45	1.8	(1.3 - 2.4)	1.8	(1.3 - 2.4)	0.91
2000	52	2.2	(1.7 - 2.9)	2.2	(1.6 - 2.8)	51	2.1	(1.5 - 2.7)	2.0	(1.5 - 2.6)	0.92
2001	57	2.4	(1.8 - 3.1)	2.3	(1.8 - 3.0)	56	2.3	(1.7 - 2.9)	2.2	(1.6 - 2.8)	0.93
2002	65	2.8	(2.1 - 3.5)	2.7	(2.1 - 3.4)	62	2.5	(1.9 - 3.2)	2.4	(1.8 - 3.1)	0.90
2003	68	2.9	(2.2 - 3.6)	2.7	(2.1 - 3.5)	66	2.6	(2.0 - 3.3)	2.5	(2.0 - 3.2)	0.91
2004	64	2.7	(2.1 - 3.4)	2.6	(2.0 - 3.3)	61	2.4	(1.8 - 3.1)	2.3	(1.8 - 3.0)	0.89
2005	63	2.6	(2.0 - 3.3)	2.5	(1.9 - 3.2)	59	2.3	(1.7 - 2.9)	2.2	(1.7 - 2.8)	0.88
2006	63	2.6	(2.0 - 3.3)	2.4	(1.9 - 3.1)	64	2.4	(1.9 - 3.1)	2.3	(1.8 - 3.0)	0.96
2007	67	2.7	(2.1 - 3.4)	2.6	(2.0 - 3.3)	78	2.9	(2.3 - 3.6)	2.8	(2.2 - 3.5)	1.10
2008	71	2.8	(2.2 - 3.5)	2.7	(2.1 - 3.4)	82	3.0	(2.4 - 3.7)	2.9	(2.3 - 3.6)	1.08
2009	69	2.7	(2.1 - 3.4)	2.6	(2.0 - 3.2)	89	3.2	(2.6 - 4.0)	3.1	(2.5 - 3.8)	1.21
2010	87	3.3	(2.7 - 4.1)	3.3	(2.6 - 4.0)	90	3.2	(2.6 - 4.0)	3.1	(2.5 - 3.9)	0.97
2011	85	3.2	(2.6 - 4.0)	3.2	(2.5 - 3.9)	89	3.2	(2.5 - 3.9)	3.1	(2.5 - 3.8)	0.99
2012	82	3.0	(2.4 - 3.8)	3.0	(2.4 - 3.8)	90	3.1	(2.5 - 3.9)	3.1	(2.5 - 3.8)	1.03
2013	80	2.9	(2.3 - 3.7)	3.0	(2.3 - 3.7)	91	3.2	(2.5 - 3.9)	3.1	(2.5 - 3.9)	1.08

Table 16: Number and prevalence rates (per 1,000 persons) of diabetes by sex, ages 1-19 years, Interlake – Eastern RHA, 1989-2013

Interlake-Eastern RHA											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	22	1.4	(0.9 - 2.1)	1.4	(0.9 - 2.1)	35	2.1	(1.4 - 2.9)	2.0	(1.4 - 2.8)	1.48
1990	26	1.7	(1.1 - 2.4)	1.6	(1.1 - 2.4)	34	2.1	(1.4 - 2.9)	2.0	(1.4 - 2.7)	1.23
1991	30	1.9	(1.3 - 2.8)	1.9	(1.3 - 2.7)	35	2.1	(1.5 - 2.9)	2.1	(1.4 - 2.9)	1.09
1992	32	2.1	(1.4 - 2.9)	2.1	(1.4 - 2.9)	34	2.1	(1.4 - 2.9)	2.0	(1.4 - 2.8)	0.99
1993	34	2.2	(1.5 - 3.1)	2.2	(1.5 - 3.1)	39	2.4	(1.7 - 3.2)	2.3	(1.6 - 3.2)	1.07
1994	38	2.5	(1.7 - 3.4)	2.4	(1.7 - 3.3)	43	2.6	(1.9 - 3.5)	2.6	(1.9 - 3.5)	1.05
1995	40	2.6	(1.8 - 3.5)	2.5	(1.8 - 3.5)	42	2.5	(1.8 - 3.4)	2.5	(1.8 - 3.4)	0.98
1996	41	2.6	(1.9 - 3.6)	2.6	(1.9 - 3.5)	44	2.6	(1.9 - 3.5)	2.6	(1.9 - 3.5)	1.00
1997	43	2.7	(2.0 - 3.7)	2.7	(2.0 - 3.7)	47	2.8	(2.1 - 3.7)	2.7	(2.0 - 3.6)	1.02
1998	48	3.1	(2.3 - 4.1)	3.0	(2.2 - 4.0)	42	2.5	(1.8 - 3.4)	2.4	(1.8 - 3.3)	0.82
1999	54	3.4	(2.6 - 4.5)	3.3	(2.5 - 4.4)	43	2.6	(1.9 - 3.5)	2.5	(1.8 - 3.3)	0.75
2000	51	3.3	(2.4 - 4.3)	3.1	(2.3 - 4.1)	48	2.9	(2.1 - 3.8)	2.8	(2.0 - 3.7)	0.88
2001	53	3.4	(2.6 - 4.5)	3.3	(2.4 - 4.3)	50	3.1	(2.3 - 4.0)	2.9	(2.1 - 3.8)	0.89
2002	53	3.5	(2.6 - 4.5)	3.3	(2.5 - 4.3)	56	3.5	(2.6 - 4.5)	3.2	(2.4 - 4.2)	1.00
2003	61	4.0	(3.1 - 5.2)	3.8	(2.9 - 4.9)	60	3.7	(2.8 - 4.8)	3.5	(2.7 - 4.6)	0.92
2004	67	4.4	(3.4 - 5.6)	4.1	(3.2 - 5.3)	61	3.8	(2.9 - 4.9)	3.6	(2.7 - 4.6)	0.85
2005	69	4.6	(3.6 - 5.8)	4.2	(3.3 - 5.3)	70	4.4	(3.4 - 5.5)	4.1	(3.2 - 5.2)	0.95
2006	66	4.4	(3.4 - 5.6)	4.0	(3.1 - 5.1)	77	4.9	(3.9 - 6.1)	4.6	(3.6 - 5.7)	1.11
2007	63	4.2	(3.2 - 5.4)	3.9	(3.0 - 5.0)	80	5.1	(4.1 - 6.4)	4.8	(3.8 - 6.0)	1.21
2008	69	4.7	(3.6 - 5.9)	4.3	(3.3 - 5.5)	77	5.0	(3.9 - 6.2)	4.7	(3.7 - 5.9)	1.06
2009	79	5.4	(4.3 - 6.7)	5.0	(3.9 - 6.2)	84	5.4	(4.3 - 6.7)	5.1	(4.0 - 6.3)	1.00
2010	80	5.5	(4.4 - 6.9)	5.1	(4.0 - 6.3)	84	5.4	(4.3 - 6.7)	5.1	(4.1 - 6.3)	0.98
2011	86	5.9	(4.7 - 7.2)	5.4	(4.3 - 6.7)	78	5.0	(3.9 - 6.2)	4.7	(3.7 - 5.9)	0.85
2012	82	5.6	(4.5 - 7.0)	5.3	(4.2 - 6.6)	77	5.0	(3.9 - 6.2)	4.7	(3.7 - 5.8)	0.88
2013	81	5.6	(4.5 - 7.0)	5.3	(4.2 - 6.6)	74	4.9	(3.8 - 6.1)	4.6	(3.6 - 5.7)	0.86

Table 17: Number and prevalence rates (per 1,000 persons) of diabetes by sex, ages 1-19 years, Prairie Mountain Health, 1989-2013

Prairie Mountain Health											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	50	2.1	(1.6 - 2.8)	2.1	(1.5 - 2.7)	41	1.6	(1.2 - 2.2)	1.6	(1.2 - 2.2)	0.77
1990	46	2.0	(1.4 - 2.6)	1.9	(1.4 - 2.6)	42	1.7	(1.2 - 2.3)	1.7	(1.2 - 2.3)	0.86
1991	49	2.1	(1.6 - 2.8)	2.1	(1.5 - 2.8)	46	1.9	(1.4 - 2.5)	1.9	(1.4 - 2.5)	0.88
1992	56	2.5	(1.9 - 3.2)	2.4	(1.8 - 3.1)	49	2.0	(1.5 - 2.7)	2.0	(1.5 - 2.6)	0.82
1993	60	2.7	(2.0 - 3.4)	2.6	(2.0 - 3.3)	54	2.3	(1.7 - 2.9)	2.2	(1.7 - 2.9)	0.85
1994	60	2.7	(2.1 - 3.5)	2.6	(2.0 - 3.4)	64	2.7	(2.1 - 3.4)	2.7	(2.0 - 3.4)	1.00
1995	60	2.7	(2.1 - 3.5)	2.6	(2.0 - 3.4)	64	2.7	(2.1 - 3.5)	2.7	(2.1 - 3.4)	1.01
1996	67	3.0	(2.4 - 3.9)	2.9	(2.3 - 3.7)	67	2.9	(2.2 - 3.6)	2.8	(2.2 - 3.6)	0.94
1997	66	3.0	(2.3 - 3.8)	2.9	(2.2 - 3.7)	69	3.0	(2.3 - 3.8)	2.9	(2.3 - 3.7)	0.99
1998	75	3.5	(2.7 - 4.4)	3.3	(2.6 - 4.2)	77	3.4	(2.7 - 4.2)	3.2	(2.6 - 4.1)	0.97
1999	73	3.4	(2.7 - 4.3)	3.3	(2.5 - 4.1)	78	3.5	(2.7 - 4.3)	3.3	(2.6 - 4.1)	1.01
2000	77	3.6	(2.9 - 4.5)	3.4	(2.7 - 4.3)	78	3.5	(2.8 - 4.4)	3.3	(2.6 - 4.2)	0.97
2001	80	3.8	(3.0 - 4.8)	3.6	(2.9 - 4.5)	85	3.9	(3.1 - 4.8)	3.6	(2.9 - 4.5)	1.01
2002	81	3.9	(3.1 - 4.9)	3.7	(2.9 - 4.6)	93	4.3	(3.5 - 5.3)	4.1	(3.3 - 5.0)	1.10
2003	74	3.6	(2.9 - 4.6)	3.4	(2.7 - 4.3)	90	4.2	(3.4 - 5.2)	3.9	(3.2 - 4.8)	1.16
2004	74	3.7	(2.9 - 4.6)	3.4	(2.7 - 4.3)	91	4.3	(3.5 - 5.3)	4.1	(3.3 - 5.0)	1.18
2005	75	3.8	(3.0 - 4.7)	3.5	(2.8 - 4.4)	93	4.5	(3.6 - 5.5)	4.2	(3.4 - 5.1)	1.19
2006	74	3.8	(3.0 - 4.7)	3.5	(2.7 - 4.4)	90	4.4	(3.5 - 5.4)	4.1	(3.3 - 5.1)	1.17
2007	72	3.7	(2.9 - 4.7)	3.5	(2.7 - 4.4)	85	4.2	(3.3 - 5.2)	4.0	(3.2 - 4.9)	1.13
2008	68	3.5	(2.8 - 4.5)	3.4	(2.6 - 4.3)	89	4.4	(3.6 - 5.5)	4.3	(3.4 - 5.3)	1.25
2009	69	3.6	(2.8 - 4.5)	3.5	(2.7 - 4.4)	97	4.8	(3.9 - 5.9)	4.7	(3.8 - 5.7)	1.34
2010	66	3.4	(2.6 - 4.3)	3.3	(2.6 - 4.2)	89	4.4	(3.5 - 5.4)	4.3	(3.4 - 5.3)	1.29
2011	70	3.6	(2.8 - 4.5)	3.5	(2.7 - 4.4)	89	4.3	(3.5 - 5.3)	4.3	(3.5 - 5.3)	1.21
2012	77	3.9	(3.1 - 4.9)	3.9	(3.1 - 4.9)	97	4.7	(3.8 - 5.7)	4.7	(3.8 - 5.7)	1.20
2013	91	4.6	(3.7 - 5.7)	4.6	(3.7 - 5.7)	109	5.3	(4.3 - 6.3)	5.3	(4.3 - 6.4)	1.13

Table 18: Number and prevalence rates (per 1,000 persons) of diabetes by sex, ages 1-19 years, Northern Health Region, 1989-2013

Northern Health Region											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	31	2.3	(1.6 - 3.3)	2.3	(1.6 - 3.3)	30	2.1	(1.4 - 3.0)	2.1	(1.4 - 3.0)	0.91
1990	35	2.6	(1.8 - 3.7)	2.7	(1.9 - 3.7)	33	2.4	(1.6 - 3.3)	2.4	(1.6 - 3.3)	0.89
1991	40	3.0	(2.2 - 4.1)	3.1	(2.2 - 4.2)	31	2.2	(1.5 - 3.2)	2.3	(1.5 - 3.2)	0.74
1992	43	3.3	(2.4 - 4.4)	3.4	(2.5 - 4.6)	39	2.9	(2.0 - 3.9)	2.9	(2.1 - 4.0)	0.87
1993	43	3.3	(2.4 - 4.4)	3.5	(2.5 - 4.7)	42	3.1	(2.2 - 4.2)	3.2	(2.3 - 4.3)	0.94
1994	41	3.1	(2.2 - 4.2)	3.3	(2.4 - 4.5)	35	2.6	(1.8 - 3.6)	2.7	(1.9 - 3.7)	0.82
1995	43	3.3	(2.4 - 4.4)	3.5	(2.5 - 4.7)	35	2.5	(1.8 - 3.5)	2.6	(1.8 - 3.6)	0.78
1996	47	3.5	(2.6 - 4.7)	3.8	(2.8 - 5.0)	34	2.4	(1.7 - 3.4)	2.5	(1.7 - 3.5)	0.69
1997	52	3.9	(2.9 - 5.1)	4.1	(3.1 - 5.4)	35	2.5	(1.7 - 3.5)	2.6	(1.8 - 3.6)	0.65
1998	52	3.9	(2.9 - 5.1)	4.2	(3.1 - 5.5)	35	2.5	(1.7 - 3.5)	2.6	(1.8 - 3.6)	0.64
1999	50	3.7	(2.8 - 4.9)	4.0	(2.9 - 5.2)	40	2.9	(2.1 - 3.9)	3.0	(2.1 - 4.1)	0.77
2000	61	4.6	(3.5 - 5.9)	4.8	(3.7 - 6.2)	46	3.3	(2.4 - 4.4)	3.4	(2.5 - 4.6)	0.72
2001	73	5.5	(4.3 - 6.9)	5.7	(4.5 - 7.2)	50	3.6	(2.7 - 4.8)	3.8	(2.8 - 5.0)	0.66
2002	76	5.7	(4.5 - 7.1)	5.9	(4.6 - 7.3)	47	3.4	(2.5 - 4.5)	3.5	(2.6 - 4.7)	0.60
2003	82	6.2	(4.9 - 7.7)	6.4	(5.1 - 7.9)	59	4.3	(3.3 - 5.5)	4.3	(3.3 - 5.6)	0.69
2004	89	6.7	(5.4 - 8.3)	6.7	(5.4 - 8.3)	61	4.4	(3.4 - 5.7)	4.5	(3.4 - 5.7)	0.66
2005	93	7.0	(5.6 - 8.6)	7.0	(5.6 - 8.5)	75	5.4	(4.2 - 6.8)	5.4	(4.2 - 6.8)	0.77
2006	91	6.8	(5.4 - 8.3)	6.7	(5.4 - 8.3)	77	5.5	(4.3 - 6.8)	5.5	(4.3 - 6.9)	0.81
2007	103	7.6	(6.2 - 9.2)	7.6	(6.2 - 9.3)	75	5.3	(4.2 - 6.7)	5.4	(4.2 - 6.8)	0.70
2008	101	7.5	(6.1 - 9.2)	7.7	(6.3 - 9.3)	80	5.8	(4.6 - 7.2)	5.9	(4.7 - 7.4)	0.77
2009	100	7.4	(6.1 - 9.1)	7.7	(6.3 - 9.3)	82	5.9	(4.7 - 7.4)	6.1	(4.8 - 7.5)	0.80
2010	106	7.8	(6.4 - 9.5)	8.2	(6.7 - 9.9)	75	5.4	(4.2 - 6.7)	5.6	(4.4 - 7.0)	0.69
2011	126	9.3	(7.7 - 11.0)	9.8	(8.2 - 11.7)	80	5.7	(4.5 - 7.1)	6.0	(4.7 - 7.4)	0.62
2012	120	8.9	(7.4 - 10.6)	9.5	(7.9 - 11.4)	91	6.5	(5.2 - 8.0)	6.8	(5.5 - 8.4)	0.73
2013	133	9.8	(8.2 - 11.7)	10.6	(8.9 - 12.6)	105	7.5	(6.1 - 9.1)	8.0	(6.5 - 9.7)	0.76

Table 19: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, total Manitoba, 1989–2013

Manitoba					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	74	22.7	(17.9 - 28.6)	22.6	(17.8 - 28.4)
1990	91	28.1	(22.6 - 34.5)	28.1	(22.6 - 34.5)
1991	87	27.0	(21.6 - 33.3)	27.0	(21.7 - 33.3)
1992	95	29.6	(24.0 - 36.2)	29.7	(24.0 - 36.3)
1993	103	32.3	(26.3 - 39.1)	32.3	(26.4 - 39.2)
1994	104	32.6	(26.7 - 39.6)	32.7	(26.7 - 39.6)
1995	104	32.7	(26.7 - 39.6)	32.6	(26.7 - 39.6)
1996	110	34.6	(28.4 - 41.7)	34.6	(28.5 - 41.8)
1997	95	30.0	(24.3 - 36.7)	29.9	(24.2 - 36.6)
1998	109	34.7	(28.5 - 41.8)	34.4	(28.2 - 41.5)
1999	99	31.6	(25.7 - 38.5)	31.0	(25.2 - 37.8)
2000	147	47.0	(39.7 - 55.2)	46.3	(39.1 - 54.5)
2001	151	48.5	(41.1 - 56.9)	47.1	(39.9 - 55.3)
2002	148	47.8	(40.4 - 56.1)	46.7	(39.4 - 54.9)
2003	152	49.2	(41.6 - 57.6)	47.5	(40.2 - 55.8)
2004	143	46.3	(39.0 - 54.6)	45.1	(38.0 - 53.3)
2005	150	48.9	(41.4 - 57.3)	46.9	(39.7 - 55.2)
2006	151	49.3	(41.8 - 57.8)	48.3	(40.9 - 56.7)
2007	169	55.1	(47.1 - 64.1)	53.7	(45.9 - 62.6)
2008	152	49.3	(41.8 - 57.8)	47.8	(40.4 - 56.0)
2009	176	56.8	(48.7 - 65.9)	55.5	(47.6 - 64.4)
2010	172	55.0	(47.1 - 63.9)	54.5	(46.6 - 63.3)
2011	202	64.1	(55.6 - 73.6)	63.0	(54.6 - 72.4)
2012	178	56.1	(48.1 - 64.9)	55.4	(47.5 - 64.1)
2013	217	68.0	(59.3 - 77.7)	67.3	(58.6 - 76.9)

Table 20: Number of incident cases and incidence rate (per 100,000 persons) of diabetes by sex, ages 1-19 years, 1989–2013

Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	44	27.8	(20.2 - 37.3)	27.6	(20.1 - 37.1)	30	18.0	(12.1 - 25.7)	17.9	(12.1 - 25.6)	0.65
1990	46	29.2	(21.3 - 38.9)	29.1	(21.3 - 38.9)	45	27.1	(19.8 - 36.2)	27.1	(19.8 - 36.3)	0.93
1991	40	25.5	(18.2 - 34.7)	25.5	(18.2 - 34.7)	47	28.5	(20.9 - 37.9)	28.5	(20.9 - 37.8)	1.12
1992	51	32.7	(24.3 - 42.9)	32.7	(24.4 - 43.0)	44	26.8	(19.5 - 35.9)	26.8	(19.5 - 36.0)	0.82
1993	48	30.8	(22.7 - 40.9)	30.9	(22.8 - 41.0)	55	33.6	(25.3 - 43.8)	33.7	(25.4 - 43.9)	1.09
1994	52	33.5	(25.0 - 43.9)	33.6	(25.1 - 44.0)	52	31.9	(23.8 - 41.8)	31.9	(23.8 - 41.8)	0.95
1995	55	35.4	(26.7 - 46.1)	35.4	(26.7 - 46.1)	49	30.0	(22.2 - 39.7)	30.0	(22.2 - 39.7)	0.85
1996	74	47.7	(37.5 - 59.9)	47.9	(37.6 - 60.2)	36	22.1	(15.5 - 30.6)	22.0	(15.4 - 30.5)	0.46
1997	48	31.1	(22.9 - 41.2)	31.0	(22.9 - 41.2)	47	29.0	(21.3 - 38.5)	28.9	(21.2 - 38.5)	0.93
1998	56	36.6	(27.6 - 47.5)	36.4	(27.5 - 47.4)	53	32.9	(24.6 - 43.0)	32.5	(24.3 - 42.5)	0.90
1999	48	31.5	(23.2 - 41.7)	31.0	(22.8 - 41.2)	51	31.7	(23.6 - 41.7)	31.0	(23.1 - 40.9)	1.01
2000	70	45.9	(35.8 - 58.0)	44.9	(35.0 - 56.9)	77	48.0	(37.9 - 60.0)	47.6	(37.6 - 59.6)	1.04
2001	75	49.4	(38.9 - 61.9)	48.3	(38.0 - 60.7)	76	47.6	(37.5 - 59.6)	46.0	(36.2 - 57.7)	0.96
2002	74	49.0	(38.4 - 61.5)	47.7	(37.4 - 60.0)	74	46.6	(36.6 - 58.5)	45.7	(35.9 - 57.6)	0.95
2003	75	49.7	(39.1 - 62.3)	47.5	(37.4 - 59.8)	77	48.6	(38.3 - 60.7)	47.4	(37.4 - 59.5)	0.98
2004	75	49.8	(39.2 - 62.4)	47.7	(37.5 - 59.9)	68	43.0	(33.4 - 54.6)	42.7	(33.1 - 54.3)	0.86
2005	78	52.1	(41.2 - 65.0)	49.7	(39.3 - 62.2)	72	45.8	(35.8 - 57.7)	44.3	(34.6 - 56.0)	0.88
2006	66	44.1	(34.1 - 56.1)	43.5	(33.6 - 55.6)	85	54.2	(43.3 - 67.1)	52.8	(42.2 - 65.5)	1.23
2007	93	62.2	(50.2 - 76.1)	60.4	(48.7 - 74.1)	76	48.4	(38.2 - 60.6)	47.4	(37.3 - 59.5)	0.78
2008	80	53.2	(42.2 - 66.2)	51.2	(40.6 - 63.9)	72	45.6	(35.7 - 57.5)	44.4	(34.7 - 56.1)	0.86
2009	86	56.9	(45.5 - 70.3)	55.5	(44.4 - 68.7)	90	56.7	(45.6 - 69.7)	55.5	(44.6 - 68.3)	1.00
2010	93	61.0	(49.2 - 74.7)	59.5	(48.0 - 73.0)	79	49.3	(39.0 - 61.4)	49.8	(39.4 - 62.1)	0.81
2011	118	76.9	(63.7 - 92.1)	75.5	(62.5 - 90.5)	84	52.0	(41.5 - 64.4)	51.2	(40.8 - 63.4)	0.68
2012	90	58.2	(46.8 - 71.6)	57.4	(46.2 - 70.7)	88	54.0	(43.3 - 66.5)	53.4	(42.8 - 65.8)	0.93
2013	111	71.5	(58.8 - 86.1)	70.9	(58.3 - 85.4)	106	64.7	(53.0 - 78.3)	63.8	(52.2 - 77.2)	0.91

Table 21: Crude incidence rates (per 100,000 persons) of diabetes by age group, ages 1-19 years, total Manitoba, 1989-2013

Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	11.4	17.0	15.6	17.0	20.0	24.5	16.0	19.3	19.7	20.4	11.3	28.0	15.1
5-9	16.3	24.4	21.0	22.2	31.6	26.8	25.5	24.3	25.5	23.3	23.4	36.7	33.8
10-14	25.3	37.6	30.4	41.5	29.1	35.0	45.6	39.5	34.6	48.9	47.4	56.4	60.6
15-19	36.0	31.8	39.6	36.5	46.7	43.4	41.2	53.5	38.5	43.2	39.1	61.8	74.5

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	27.1	22.2	27.4	24.1	27.4	23.5	17.9	17.3	27.4	22.5	25.4	28.2
5-9	35.8	35.2	34.4	27.3	45.9	47.5	30.2	47.3	51.8	37.9	38.3	47.0
10-14	62.7	78.5	57.8	72.3	73.4	85.2	82.8	81.1	74.1	105.0	82.9	98.8
15-19	58.6	51.0	58.6	61.4	43.6	54.7	56.4	70.9	60.8	81.5	71.1	90.0

Table 22: Crude incidence rates (per 100,000 persons) of diabetes by age group, ages 1-19 years, females, 1989-2013

Females													
Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	S	17.4	S	S	S	23.5	S	S	S	22.52	S	S	S
5-9	19.2	28.7	S	21.6	33.6	28.7	23.8	26.0	23.6	16.68	21.6	36.3	44.4
10-14	27.2	32.3	24.9	42.7	25.0	32.4	54.4	54.3	36.8	49.04	43.8	60.2	50.1
15-19	47.7	36.3	42.0	45.0	50.3	48.3	46.0	84.1	46.0	55.99	42.8	62.3	76.7

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	24.3	S	21.0	21.2	28.0	S	S	S	S	18.36	24.4	24.4
5-9	35.4	28.4	23.6	26.8	45.9	57.1	29.7	48.5	39.9	44.1	40.4	64.0
10-14	66.4	92.1	73.3	74.0	58.1	93.7	85.1	68.3	91.7	130.1	79.3	99.4
15-19	61.4	48.7	69.6	73.5	39.8	67.4	69.2	80.5	87.8	102.3	81.3	89.1

Table 23: Crude incidence rates (per 100,000 persons) of diabetes by age group, ages 1-19 years, males, 1989-2013

Males													
Age group in years	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1-4	S	16.6	S	S	S	25.4	S	S	S	18.4	S	38.4	S
5-9	13.6	20.4	S	22.8	29.81	25.1	27.2	22.6	27.2	29.6	25.2	37.1	23.6
10-14	23.5	42.7	35.6	40.4	32.89	37.5	37.4	25.5	32.5	48.8	50.8	52.7	70.6
15-19	24.9	27.6	37.4	28.5	43.27	38.8	36.5	24.3	31.4	31.1	35.7	61.3	72.4

Age group in years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1-4	29.8	S	33.5	26.9	26.77	S	S	S	S	26.5	26.3	31.8
5-9	36.1	41.6	44.7	27.8	45.97	38.4	30.7	46.1	63.0	32.1	36.2	30.7
10-14	59.2	65.6	43.0	70.7	87.97	77.1	80.6	93.1	57.5	81.5	86.3	98.2
15-19	55.9	53.2	48.0	49.9	47.23	42.5	44.2	61.7	35.2	61.8	61.4	90.8

Table 24: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by Regional Health Authority (RHA) and sex, ages 1-19 years, 2013

All						RR
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
Winnipeg RHA	88	53.0	(42.5 - 65.2)	51.7	(41.5 - 63.8)	0.95
Southern Health-Santé Sud	22	39.4	(24.7 - 59.6)	39.4	(24.7 - 59.7)	1.37
Interlake-Eastern RHA	15	50.9	(28.5 - 83.9)	49.4	(27.6 - 82.3)	0.63
Prairie Mountain Health	44	109.5	(79.6 - 147.0)	109.6	(79.6 - 147.2)	0.95
Northern Health Region	48	175.5	(129.4 - 232.6)	186.0	(137.1 - 247.1)	0.75

Female					
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
Winnipeg RHA	44	54.4	(39.5 - 73.1)	52.8	(38.4 - 71.1)
Southern Health-Santé Sud	9	33.1	(15.1 - 62.8)	33.1	(15.2 - 63.0)
Interlake-Eastern RHA	9	62.9	(28.7 - 119.3)	62.9	(28.7 - 120.8)
Prairie Mountain Health	22	112.5	(70.5 - 170.4)	112.2	(70.3 - 170.1)
Northern Health Region	27	201.3	(132.7 - 292.9)	212.7	(140.0 - 310.4)

Male					
RHA	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
Winnipeg RHA	44	51.6	(37.5 - 69.2)	50.6	(36.8 - 68.2)
Southern Health-Santé Sud	13	45.3	(24.1 - 77.5)	45.0	(24.0 - 77.1)
Interlake-Eastern RHA	6	39.5	(14.5 - 86.0)	36.9	(13.5 - 82.8)
Prairie Mountain Health	22	106.7	(66.9 - 161.5)	107.1	(67.1 - 162.4)
Northern Health Region	21	150.6	(93.2 - 230.2)	160.2	(99.1 - 245.7)

Table 25: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, Winnipeg RHA, 1989-2013

Winnipeg RHA					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	42	24.7	(17.8 - 33.4)	24.6	(17.8 - 33.3)
1990	44	25.9	(18.8 - 34.8)	26.0	(18.9 - 34.9)
1991	41	24.2	(17.4 - 32.8)	24.3	(17.4 - 32.9)
1992	44	26.1	(19.0 - 35.1)	26.3	(19.1 - 35.4)
1993	45	26.8	(19.6 - 35.9)	27.0	(19.7 - 36.2)
1994	55	32.9	(24.8 - 42.8)	33.1	(24.9 - 43.1)
1995	51	30.6	(22.8 - 40.3)	30.7	(22.9 - 40.4)
1996	53	32.0	(24.0 - 41.9)	32.3	(24.2 - 42.3)
1997	51	31.0	(23.1 - 40.7)	31.1	(23.2 - 41.0)
1998	38	23.3	(16.5 - 32.0)	23.4	(16.6 - 32.2)
1999	43	26.5	(19.2 - 35.7)	26.1	(18.9 - 35.3)
2000	71	43.7	(34.2 - 55.2)	43.2	(33.7 - 54.6)
2001	64	39.5	(30.5 - 50.5)	38.4	(29.6 - 49.2)
2002	58	36.0	(27.3 - 46.5)	35.1	(26.6 - 45.5)
2003	64	39.8	(30.6 - 50.8)	38.6	(29.7 - 49.5)
2004	66	41.2	(31.8 - 52.4)	40.4	(31.2 - 51.6)
2005	56	35.4	(26.7 - 45.9)	33.9	(25.6 - 44.2)
2006	71	45.1	(35.2 - 56.9)	44.9	(35.0 - 56.8)
2007	74	47.1	(37.0 - 59.1)	45.5	(35.7 - 57.3)
2008	66	41.5	(32.1 - 52.8)	40.0	(30.9 - 51.1)
2009	88	55.0	(44.1 - 67.8)	53.7	(43.0 - 66.3)
2010	75	46.3	(36.4 - 58.1)	45.1	(35.4 - 56.6)
2011	82	50.3	(40.0 - 62.5)	48.9	(38.9 - 60.9)
2012	76	46.1	(36.4 - 57.8)	45.1	(35.5 - 56.5)
2013	88	53.0	(42.5 - 65.2)	51.7	(41.5 - 63.8)

Table 26: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, Southern Health – Santé Sud, 1989-2013

Southern Health-Santé Sud					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	8	17.1	(7.4 - 33.6)	17.0	(7.3 - 33.6)
1990	16	34.3	(19.6 - 55.6)	33.9	(19.4 - 55.3)
1991	9	19.4	(8.9 - 36.9)	19.2	(8.8 - 36.8)
1992	13	27.8	(14.8 - 47.6)	27.7	(14.7 - 47.6)
1993	15	32.1	(18.0 - 53.0)	31.9	(17.8 - 52.8)
1994	S	S	S	S	S
1995	S	S	S	S	S
1996	14	29.4	(16.1 - 49.4)	28.7	(15.7 - 48.5)
1997	10	21.0	(10.1 - 38.7)	20.7	(9.9 - 38.4)
1998	15	31.6	(17.7 - 52.0)	31.3	(17.5 - 52.0)
1999	8	16.8	(7.2 - 33.00)	16.3	(7.0 - 32.6)
2000	16	33.4	(19.1 - 54.2)	33.4	(19.1 - 54.8)
2001	23	47.8	(30.3 - 71.7)	46.5	(29.4 - 70.3)
2002	21	43.7	(27.0 - 66.8)	43.3	(26.8 - 66.8)
2003	19	38.9	(23.4 - 60.8)	37.3	(22.4 - 58.9)
2004	11	22.3	(11.1 - 39.9)	21.5	(10.7 - 39.0)
2005	16	31.9	(18.2 - 51.8)	30.6	(17.4 - 50.2)
2006	17	33.5	(19.5 - 53.6)	32.7	(19.0 - 52.8)
2007	28	54.0	(35.9 - 78.0)	52.9	(35.1 - 76.8)
2008	21	39.7	(24.6 - 60.7)	38.7	(23.9 - 59.4)
2009	18	33.7	(20.0 - 53.2)	33.3	(19.7 - 52.9)
2010	28	52.0	(34.5 - 75.1)	51.8	(34.4 - 74.9)
2011	16	29.4	(16.8 - 47.7)	29.6	(16.9 - 48.1)
2012	22	39.7	(24.9 - 60.2)	39.4	(24.7 - 59.8)
2013	22	39.4	(24.7 - 59.6)	39.4	(24.7 - 59.7)

Table 27: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, Interlake-Eastern RHA, 1989-2013

Interlake-Eastern RHA					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	S	S	S	S	S
1990	10	31.1	(14.9 - 57.3)	31.2	(15.0 - 57.9)
1991	10	31.3	(15.0 - 57.6)	30.8	(14.8 - 57.3)
1992	10	31.5	(15.1 - 57.8)	30.8	(14.8 - 57.2)
1993	11	34.6	(17.3 - 61.9)	34.5	(17.2 - 62.2)
1994	14	43.9	(24.0 - 73.6)	43.4	(23.7 - 73.3)
1995	9	28.1	(12.9 - 53.3)	27.9	(12.8 - 53.6)
1996	S	S	S	S	S
1997	11	33.9	(16.9 - 60.6)	33.4	(16.7 - 60.5)
1998	14	43.4	(23.7 - 72.9)	41.7	(22.8 - 71.0)
1999	19	58.8	(35.4 - 91.8)	57.0	(34.3 - 90.2)
2000	15	46.8	(26.2 - 77.1)	45.4	(25.3 - 76.3)
2001	14	44.1	(24.1 - 74.0)	42.8	(23.3 - 73.4)
2002	16	50.9	(29.1 - 82.7)	50.0	(28.5 - 82.7)
2003	24	76.8	(49.2 - 114.3)	75.1	(47.8 - 113.4)
2004	16	51.3	(29.3 - 83.3)	48.1	(27.5 - 80.0)
2005	18	58.2	(34.5 - 92.0)	55.9	(32.9 - 90.2)
2006	21	68.7	(42.5 - 105.0)	63.1	(38.9 - 98.4)
2007	19	62.5	(37.6 - 97.6)	62.6	(37.5 - 99.4)
2008	18	59.8	(35.4 - 94.4)	57.8	(34.1 - 92.7)
2009	25	83.3	(53.9 - 122.9)	79.4	(51.2 - 118.4)
2010	12	40.2	(20.8 - 70.2)	39.6	(20.3 - 70.2)
2011	24	79.6	(51.0 - 118.5)	76.4	(48.9 - 114.7)
2012	20	66.9	(40.8 - 103.3)	64.4	(39.3 - 100.4)
2013	15	50.9	(28.5 - 83.9)	49.4	(27.6 - 82.3)

Table 28: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, Prairie Mountain Health, 1989-2013

Prairie Mountain Health					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	8	16.4	(7.1 - 32.4)	16.0	(6.9 - 31.9)
1990	10	20.9	(10.0 - 38.4)	20.4	(9.8 - 37.8)
1991	14	29.7	(16.2 - 49.8)	29.0	(15.9 - 49.0)
1992	15	32.1	(18.0 - 52.9)	31.8	(17.8 - 52.8)
1993	17	36.7	(21.4 - 58.7)	36.1	(21.0 - 58.2)
1994	22	47.9	(30.0 - 72.5)	48.4	(30.3 - 73.6)
1995	25	54.8	(35.5 - 81.0)	53.6	(34.7 - 79.6)
1996	23	50.8	(32.2 - 76.3)	50.3	(31.8 - 76.0)
1997	9	20.1	(9.2 - 38.2)	20.7	(9.4 - 39.9)
1998	29	65.5	(43.9 - 94.1)	63.1	(42.2 - 91.4)
1999	14	31.9	(17.4 - 53.6)	31.4	(17.1 - 53.6)
2000	20	46.0	(28.1 - 71.0)	44.9	(27.3 - 70.2)
2001	24	56.2	(36.0 - 83.7)	52.9	(33.9 - 79.7)
2002	26	61.9	(40.4 - 90.7)	60.5	(39.4 - 89.7)
2003	17	41.0	(23.9 - 65.7)	38.7	(22.5 - 63.1)
2004	19	46.4	(27.9 - 72.4)	45.9	(27.5 - 72.7)
2005	26	64.1	(41.9 - 93.9)	63.2	(41.1 - 93.5)
2006	19	47.5	(28.6 - 74.2)	47.7	(28.6 - 75.2)
2007	17	42.8	(24.9 - 68.5)	42.6	(24.7 - 68.7)
2008	17	43.5	(25.3 - 69.6)	42.8	(24.9 - 69.0)
2009	18	45.8	(27.2 - 72.4)	45.3	(26.8 - 72.1)
2010	21	52.9	(32.8 - 80.9)	53.0	(32.8 - 81.2)
2011	27	67.6	(44.5 - 98.3)	67.1	(44.2 - 97.8)
2012	29	72.2	(48.4 - 103.7)	72.9	(48.8 - 104.8)
2013	44	109.5	(79.6 - 147.0)	109.6	(79.6 - 147.2)

Table 29: Number of incident cases and incidence rates (per 100,000 persons) of diabetes, ages 1-19 years, Northern Health Region, 1989-2013

Northern Health Region					
Year	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)
1989	11	40.0	(19.9 - 71.5)	40.1	(20.0 - 71.8)
1990	11	40.3	(20.1 - 72.1)	40.3	(20.1 - 72.2)
1991	13	48.0	(25.5 - 82.0)	49.4	(26.3 - 84.5)
1992	13	48.6	(25.9 - 83.1)	49.7	(26.5 - 85.3)
1993	15	56.3	(31.5 - 92.8)	57.1	(31.9 - 94.7)
1994	8	30.0	(12.9 - 59.1)	31.4	(13.5 - 62.4)
1995	16	59.2	(33.8 - 96.1)	62.5	(35.6 - 102.0)
1996	16	58.5	(33.4 - 95.0)	63.1	(36.0 - 102.9)
1997	14	51.1	(27.9 - 85.8)	52.7	(28.8 - 89.2)
1998	13	47.8	(25.5 - 81.8)	50.5	(26.8 - 86.9)
1999	15	55.3	(30.9 - 91.2)	56.9	(31.8 - 94.6)
2000	25	92.2	(59.7 - 136.1)	95.6	(61.8 - 141.7)
2001	26	96.4	(63.0 - 141.3)	100.0	(65.2 - 147.0)
2002	27	99.9	(65.8 - 145.3)	99.4	(65.4 - 145.4)
2003	28	104.2	(69.2 - 150.6)	105.0	(69.7 - 152.3)
2004	31	115.3	(78.3 - 163.6)	113.8	(77.2 - 162.0)
2005	34	125.6	(87.0 - 175.5)	124.3	(86.0 - 173.9)
2006	23	84.0	(53.3 - 126.1)	83.5	(52.9 - 125.4)
2007	31	113.0	(76.8 - 160.4)	113.3	(77.0 - 161.0)
2008	30	111.0	(74.9 - 158.4)	113.3	(76.4 - 161.8)
2009	27	99.6	(65.6 - 144.9)	102.5	(67.6 - 149.2)
2010	36	131.5	(92.1 - 182.0)	135.9	(95.1 - 188.3)
2011	53	193.2	(144.7 - 252.7)	202.8	(151.9 - 265.5)
2012	31	113.5	(77.1 - 161.1)	119.1	(80.9 - 169.4)
2013	48	175.5	(129.4 - 232.6)	186.0	(137.1 - 247.1)

Table 30: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, ages 1-19 years, Winnipeg RHA, 1989-2013

Winnipeg RHA											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	25	30.1	(19.5 - 44.5)	30.0	(19.4 - 44.4)	17	19.6	(11.4 - 31.3)	19.5	(11.4 - 31.2)	0.65
1990	20	24.1	(14.7 - 37.2)	24.2	(14.8 - 37.4)	24	27.6	(17.7 - 41.1)	27.7	(17.8 - 41.3)	1.14
1991	15	18.1	(10.2 - 29.9)	18.0	(10.1 - 29.7)	26	30.0	(19.6 - 43.9)	30.2	(19.7 - 44.3)	1.65
1992	21	25.5	(15.8 - 39.0)	25.8	(16.0 - 39.4)	23	26.7	(16.9 - 40.0)	26.9	(17.0 - 40.4)	1.05
1993	21	25.6	(15.8 - 39.1)	25.8	(16.0 - 39.5)	24	28.0	(18.0 - 41.7)	28.2	(18.1 - 42.0)	1.10
1994	25	30.5	(19.8 - 45.1)	30.8	(19.9 - 45.5)	30	35.2	(23.7 - 50.2)	35.4	(23.9 - 50.5)	1.15
1995	28	34.3	(22.8 - 49.6)	34.6	(23.0 - 50.0)	23	27.1	(17.2 - 40.6)	27.0	(17.1 - 40.6)	0.79
1996	37	45.7	(32.1 - 62.9)	46.2	(32.5 - 63.8)	16	19.0	(10.8 - 30.8)	18.9	(10.8 - 30.8)	0.42
1997	23	28.6	(18.1 - 42.9)	28.8	(18.3 - 43.3)	28	33.3	(22.1 - 48.1)	33.4	(22.2 - 48.3)	1.17
1998	14	17.5	(9.6 - 29.4)	17.9	(9.8 - 30.0)	24	28.8	(18.4 - 42.8)	28.7	(18.4 - 42.8)	1.64
1999	22	27.8	(17.4 - 42.0)	27.4	(17.2 - 41.7)	21	25.3	(15.6 - 38.6)	24.9	(15.4 - 38.2)	0.91
2000	27	34.1	(22.5 - 49.6)	33.4	(22.0 - 48.9)	44	52.9	(38.5 - 71.0)	52.5	(38.1 - 70.7)	1.55
2001	33	41.8	(28.8 - 58.7)	41.0	(28.2 - 57.9)	31	37.4	(25.4 - 53.1)	35.9	(24.4 - 51.3)	0.90
2002	28	35.6	(23.6 - 51.4)	34.4	(22.8 - 50.1)	30	36.3	(24.5 - 51.8)	35.7	(24.1 - 51.3)	1.02
2003	33	42.0	(28.9 - 59.0)	40.5	(27.8 - 57.2)	31	37.7	(25.6 - 53.4)	36.9	(25.0 - 52.7)	0.90
2004	31	39.5	(26.9 - 56.1)	37.9	(25.7 - 54.2)	35	42.7	(29.8 - 59.5)	42.8	(29.8 - 59.9)	1.08
2005	31	40.1	(27.2 - 56.9)	37.6	(25.5 - 53.9)	25	30.9	(20.0 - 45.6)	30.2	(19.5 - 45.0)	0.77
2006	32	41.5	(28.4 - 58.6)	42.1	(28.7 - 59.8)	39	48.5	(34.5 - 66.2)	47.6	(33.8 - 65.4)	1.17
2007	44	57.3	(41.7 - 77.0)	55.6	(40.3 - 75.0)	30	37.3	(25.2 - 53.3)	35.9	(24.2 - 51.7)	0.65
2008	39	50.2	(35.7 - 68.7)	47.9	(34.0 - 65.9)	27	33.2	(21.9 - 48.3)	32.4	(21.3 - 47.5)	0.66
2009	41	52.5	(37.7 - 71.3)	50.8	(36.4 - 69.2)	47	57.4	(42.2 - 76.4)	56.3	(41.3 - 75.1)	1.09
2010	38	48.1	(34.0 - 66.0)	45.3	(32.1 - 62.6)	37	44.7	(31.5 - 61.6)	44.8	(31.5 - 62.0)	0.93
2011	45	56.6	(41.3 - 75.8)	55.6	(40.5 - 74.6)	37	44.3	(31.2 - 61.1)	42.8	(30.1 - 59.2)	0.78
2012	40	49.8	(35.6 - 67.9)	48.8	(34.8 - 66.6)	36	42.6	(29.9 - 59.0)	41.5	(29.1 - 57.7)	0.86
2013	44	54.4	(39.5 - 73.1)	52.8	(38.4 - 71.1)	44	51.6	(37.5 - 69.2)	50.6	(36.8 - 68.2)	0.95

Table 31: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, ages 1-19 years, Southern Health – Santé Sud, 1989-2013

Southern Health-Santé Sud											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	S	S	S	S	S	S	S	S	S	S	S
1990	8	35.1	(15.2 - 69.2)	35.0	(15.1 - 69.6)	8	33.4	(14.4 - 65.9)	32.9	(14.2 - 65.3)	0.95
1991	S	S	S	S	S	S	S	S	S	S	S
1992	S	S	S	S	S	S	S	S	S	S	S
1993	7	30.8	(12.4 - 63.5)	31.1	(12.5 - 64.4)	8	33.4	(14.4 - 65.8)	32.4	(14.0 - 64.5)	1.08
1994	S	S	S	S	S	S	S	S	S	S	S
1995	S	S	S	S	S	S	S	S	S	S	S
1996	S	S	S	S	S	S	S	S	S	S	S
1997	S	S	S	S	S	S	S	S	S	S	S
1998	8	34.8	(15.0 - 68.6)	34.4	(14.8 - 68.8)	7	28.5	(11.5 - 58.7)	28.4	(11.4 - 59.5)	0.82
1999	S	S	S	S	S	S	S	S	S	S	S
2000	7	30.1	(12.1 - 62.1)	29.7	(11.9 - 62.5)	9	36.5	(16.7 - 69.2)	36.8	(16.8 - 71.1)	1.21
2001	9	38.5	(17.6 - 73.0)	37.2	(17.0 - 72.0)	14	56.6	(30.9 - 94.9)	55.2	(30.1 - 93.9)	1.47
2002	11	47.1	(23.5 - 84.2)	46.4	(23.1 - 84.2)	10	40.5	(19.4 - 74.4)	40.5	(19.4 - 75.6)	0.86
2003	7	29.6	(11.9 - 60.9)	27.7	(11.1 - 58.6)	12	47.8	(24.7 - 83.4)	46.4	(23.9 - 82.2)	1.61
2004	S	S	S	S	S	S	S	S	S	S	S
2005	8	32.9	(14.2 - 64.9)	32.4	(14.0 - 64.9)	8	30.9	(13.4 - 61.0)	28.8	(12.4 - 58.0)	0.94
2006	9	36.5	(16.7 - 69.3)	35.1	(16.1 - 67.7)	8	30.6	(13.2 - 60.3)	30.5	(13.1 - 61.0)	0.84
2007	10	39.7	(19.1 - 73.1)	38.7	(18.5 - 71.9)	18	67.4	(39.9 - 106.5)	66.1	(39.1 - 105.3)	1.70
2008	9	35.1	(16.1 - 66.7)	34.4	(15.7 - 65.8)	12	44.0	(22.7 - 76.8)	42.8	(22.1 - 75.4)	1.25
2009	6	23.1	(8.5 - 50.4)	23.3	(8.5 - 50.9)	12	43.6	(22.5 - 76.1)	42.7	(22.1 - 75.1)	1.88
2010	16	61.3	(35.0 - 99.6)	60.9	(34.8 - 99.2)	12	43.2	(22.3 - 75.4)	43.4	(22.4 - 76.1)	0.70
2011	6	22.7	(8.3 - 49.4)	22.9	(8.4 - 50.0)	10	35.6	(17.1 - 65.5)	35.8	(17.2 - 66.1)	1.57
2012	11	41.0	(20.4 - 73.3)	40.6	(20.3 - 72.9)	11	38.6	(19.3 - 69.0)	38.5	(19.2 - 69.0)	0.94
2013	9	33.1	(15.1 - 62.8)	33.1	(15.2 - 63.0)	13	45.3	(24.1 - 77.5)	45.0	(24.0 - 77.1)	1.37

Table 32: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, ages 1-19 years, Interlake – Eastern RHA, 1989-2013

Interlake - Eastern RHA											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	S	S	S	S	S	S	S	S	S	S	S
1990	S	S	S	S	S	S	S	S	S	S	S
1991	S	S	S	S	S	S	S	S	S	S	S
1992	S	S	S	S	S	S	S	S	S	S	S
1993	S	S	S	S	S	S	S	S	S	S	S
1994	7	45.6	(18.3 - 94.0)	45.6	(18.3 - 95.0)	7	42.3	(17.0 - 87.1)	41.4	(16.6 - 86.5)	0.93
1995	S	S	S	S	S	S	S	S	S	S	S
1996	S	S	S	S	S	S	S	S	S	S	S
1997	S	S	S	S	S	S	S	S	S	S	S
1998	S	S	S	S	S	S	S	S	S	S	S
1999	11	70.4	(35.1 - 125.9)	68.8	(34.3 - 125.2)	8	48.0	(20.7 - 94.5)	46.0	(19.8 - 93.4)	0.68
2000	6	38.6	(14.2 - 84.1)	36.8	(13.5 - 83.3)	9	54.4	(24.9 - 103.3)	53.6	(24.3 - 104.8)	1.41
2001	6	39.0	(14.3 - 84.9)	37.3	(13.7 - 84.9)	8	48.9	(21.1 - 96.3)	47.9	(20.5 - 98.0)	1.25
2002	8	52.5	(22.7 - 103.4)	50.9	(22.0 - 103.7)	8	49.4	(21.3 - 97.4)	49.5	(21.2 - 100.9)	0.94
2003	13	86.2	(45.9 - 147.4)	81.2	(43.0 - 142.7)	11	68.1	(34.0 - 121.8)	69.6	(34.4 - 127.9)	0.79
2004	9	59.6	(27.3 - 113.2)	56.3	(25.7 - 110.8)	7	43.5	(17.5 - 89.6)	40.7	(16.3 - 88.4)	0.73
2005	8	53.4	(23.1 - 105.2)	51.1	(22.0 - 104.7)	10	62.8	(30.1 - 115.4)	60.2	(28.5 - 115.0)	1.18
2006	6	40.3	(14.8 - 87.8)	35.6	(13.1 - 82.7)	15	95.6	(53.5 - 157.6)	89.0	(49.5 - 150.9)	2.37
2007	10	67.4	(32.3 - 123.9)	65.5	(31.2 - 123.9)	9	57.9	(26.5 - 109.9)	60.0	(27.1 - 117.0)	0.86
2008	10	68.0	(32.6 - 125.1)	67.8	(32.3 - 127.6)	8	51.9	(22.4 - 102.2)	48.3	(20.8 - 98.4)	0.76
2009	16	109.7	(62.7 - 178.2)	103.1	(58.8 - 170.2)	9	58.3	(26.7 - 110.7)	56.9	(25.8 - 110.4)	0.53
2010	6	41.6	(15.3 - 90.5)	40.0	(14.6 - 89.8)	6	38.9	(14.3 - 84.6)	39.1	(14.2 - 86.9)	0.94
2011	17	116.5	(67.9 - 186.6)	111.5	(64.8 - 180.7)	7	45.0	(18.1 - 92.7)	42.9	(17.1 - 90.4)	0.39
2012	13	89.8	(47.8 - 153.6)	84.7	(45.0 - 147.1)	7	45.3	(18.2 - 93.4)	45.3	(18.2 - 94.9)	0.50
2013	9	62.9	(28.7 - 119.3)	62.9	(28.7 - 120.8)	6	39.5	(14.5 - 86.0)	36.9	(13.5 - 82.8)	0.63

Table 33: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, ages 1-19 years, Prairie Mountain Health, 1989-2013

Prairie Mountain Health											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	S	S	S	S	S	S	S	S	S	S	S
1990	S	S	S	S	S	S	S	S	S	S	S
1991	S	S	S	S	S	S	S	S	S	S	S
1992	9	39.7	(18.1 - 75.3)	39.2	(17.9 - 75.1)	6	24.9	(9.1 - 54.3)	25.1	(9.2 - 55.3)	0.63
1993	9	40.1	(18.3 - 76.1)	39.0	(17.8 - 75.0)	8	33.5	(14.4 - 65.9)	33.3	(14.4 - 66.5)	0.83
1994	9	40.4	(18.5 - 76.8)	40.3	(18.4 - 77.3)	13	54.9	(29.3 - 94)	56.1	(29.8 - 96.7)	1.36
1995	13	58.7	(31.3 - 100.5)	56.7	(30.2 - 98.1)	12	51.2	(26.4 - 89.4)	50.7	(26.2 - 89.6)	0.87
1996	14	63.7	(34.9 - 107)	62.1	(33.9 - 105.6)	9	38.7	(17.7 - 73.4)	39.1	(17.8 - 75.3)	0.61
1997	S	S	S	S	S	S	S	S	S	S	S
1998	15	69.7	(39.0 - 115.0)	68.1	(38.0 - 113.9)	14	61.6	(33.7 - 103.3)	58.2	(31.8 - 99.5)	0.88
1999	6	28.1	(10.3 - 61.1)	27.7	(10.1 - 62.3)	8	35.5	(15.3 - 70.0)	34.9	(15.0 - 70.8)	1.27
2000	13	61.2	(32.6 - 104.6)	59.3	(31.5 - 103.2)	7	31.4	(12.6 - 64.8)	31.2	(12.5 - 66.3)	0.51
2001	8	38.5	(16.6 - 75.8)	36.8	(15.9 - 74.8)	16	73.1	(41.8 - 118.7)	68.4	(39.0 - 113.2)	1.90
2002	11	53.5	(26.7 - 95.7)	52.2	(25.9 - 95.6)	15	70.0	(39.2 - 115.5)	68.4	(38.1 - 115.0)	1.31
2003	7	34.6	(13.9 - 71.2)	32.1	(12.9 - 69.0)	10	47.2	(22.7 - 86.9)	45.0	(21.5 - 85.0)	1.37
2004	7	34.9	(14.0 - 71.8)	33.4	(13.3 - 71.6)	12	57.4	(29.7 - 100.3)	58.1	(29.9 - 103.1)	1.65
2005	16	80.5	(46.0 - 130.7)	78.6	(44.7 - 129.8)	10	48.3	(23.2 - 88.9)	48.4	(23.1 - 90.7)	0.60
2006	9	45.9	(21.0 - 87.1)	47.5	(21.6 - 91.6)	10	49.1	(23.5 - 90.2)	48.2	(23.0 - 90.0)	1.07
2007	9	46.4	(21.2 - 88.0)	45.9	(20.9 - 88.3)	8	39.4	(17.0 - 77.6)	39.5	(17.0 - 78.9)	0.85
2008	6	31.4	(11.5 - 68.3)	30.8	(11.3 - 68.4)	11	55.1	(27.5 - 98.6)	54.3	(27.0 - 98.1)	1.76
2009	8	41.7	(18.0 - 82.1)	40.9	(17.6 - 81.7)	10	49.8	(23.9 - 91.6)	49.8	(23.9 - 92.3)	1.20
2010	11	56.6	(28.3 - 101.4)	55.7	(27.8 - 100.5)	10	49.3	(23.7 - 90.7)	50.3	(24.1 - 92.8)	0.87
2011	16	82.1	(46.9 - 133.4)	79.5	(45.4 - 129.7)	11	53.7	(26.8 - 96.1)	54.9	(27.4 - 98.4)	0.65
2012	13	66.4	(35.4 - 113.6)	66.8	(35.5 - 114.4)	16	77.7	(44.4 - 126.1)	78.6	(44.9 - 127.8)	1.17
2013	22	112.5	(70.5 - 170.4)	112.2	(70.3 - 170.1)	22	106.7	(66.9 - 161.5)	107.1	(67.1 - 162.4)	0.95

Table 34: Number of incident cases and incidence rates (per 100,000 persons) of diabetes by sex, ages 1-19 years, Northern Health Region, 1989-2013

Northern Health Region											
Year	Female					Male					RR
	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	N	Crude Rate	(95% CIs)	Adjusted Rate	(95% CIs)	M/F
1989	S	S	S	S	S	S	S	S	S	S	S
1990	S	S	S	S	S	S	S	S	S	S	S
1991	S	S	S	S	S	S	S	S	S	S	0.08
1992	5	38.1	(12.4 - 89.0)	39.2	(12.7 - 92.3)	8	58.7	(25.3 - 115.6)	59.8	(25.8 - 118.2)	1.54
1993	8	61.2	(26.4 - 120.5)	64.8	(27.9 - 128.3)	7	51.6	(20.7 - 106.3)	50.2	(20.1 - 105.0)	0.84
1994	8	61.2	(26.4 - 120.6)	64.5	(27.8 - 128.2)	0	0.0	(0 - 0)	0.0	(0 - 0)	N/A
1995	10	75.8	(36.4 - 139.4)	81.7	(39.1 - 151.3)	6	43.4	(15.9 - 94.4)	44.6	(16.3 - 98.4)	0.57
1996	S	S	S	S	S	S	S	S	S	S	S
1997	S	S	S	S	S	S	S	S	S	S	S
1998	S	S	S	S	S	S	S	S	S	S	S
1999	6	45.1	(16.5 - 98.1)	46.5	(17.0 - 102.9)	9	65.1	(29.8 - 123.6)	66.9	(30.5 - 128.3)	1.44
2000	17	128.0	(74.6 - 205.0)	133.3	(77.5 - 214.6)	8	57.8	(25.0 - 113.9)	59.4	(25.6 - 118.4)	0.45
2001	19	143.8	(86.6 - 224.5)	148.0	(89.0 - 232.1)	7	50.9	(20.5 - 104.9)	53.5	(21.4 - 111.5)	0.35
2002	16	120.6	(68.9 - 195.8)	118.9	(67.8 - 194.9)	11	79.9	(39.9 - 143.0)	80.6	(40.1 - 145.5)	0.66
2003	15	113.8	(63.7 - 187.8)	114.5	(63.9 - 190.2)	13	94.9	(50.5 - 162.3)	95.7	(50.9 - 164.6)	0.83
2004	22	166.7	(104.4 - 252.3)	163.2	(102.1 - 248.3)	9	65.7	(30.0 - 124.7)	65.7	(30.0 - 125.6)	0.39
2005	15	113.4	(63.5 - 187.0)	111.9	(62.6 - 185.3)	19	137.3	(82.7 - 214.4)	136.0	(81.9 - 213.0)	1.21
2006	10	74.8	(35.8 - 137.5)	74.5	(35.7 - 137.4)	13	92.9	(49.4 - 158.8)	91.9	(48.9 - 157.7)	1.24
2007	20	148.7	(90.8 - 229.6)	149.3	(91.2 - 230.7)	11	78.7	(39.3 - 140.8)	79.0	(39.4 - 141.7)	0.53
2008	16	120.1	(68.6 - 195.0)	122.9	(70.2 - 199.7)	14	102.2	(55.9 - 171.4)	103.8	(56.7 - 174.3)	0.85
2009	15	112.4	(62.9 - 185.3)	115.7	(64.7 - 191.1)	12	87.2	(45.0 - 152.2)	89.7	(46.4 - 156.9)	0.78
2010	22	163.2	(102.3 - 247.1)	170.8	(107.0 - 258.8)	14	100.7	(55.1 - 169.0)	102.5	(56.0 - 172.6)	0.62
2011	34	252.1	(174.6 - 352.3)	268.0	(185.6 - 374.7)	19	136.2	(82.0 - 212.8)	140.5	(84.5 - 220.0)	0.54
2012	13	97.2	(51.8 - 166.2)	101.3	(53.9 - 174.2)	18	129.1	(76.5 - 204.0)	135.5	(80.2 - 214.6)	1.33
2013	27	201.3	(132.7 - 292.9)	212.7	(140.0 - 310.4)	21	150.6	(93.2 - 230.2)	160.2	(99.1 - 245.7)	0.75

"N/A" = Not Applicable

Appendix C – Type I and Type II Diabetes

Type I diabetes was formerly called insulin-dependent or juvenile-onset diabetes. The beta cells of the pancreas produce no or inadequate insulin. It usually begins before an individual is 20 years of age. Type 1 diabetes is believed to be caused by a combination of genetic factors and environmental stressors leading the body's own immune system to attack insulin secreting beta cells in the pancreas. People with Type 1 diabetes must administer multiple, daily insulin injections and carefully monitor their blood sugar levels, physical activity and food intake.

Type II diabetes was formerly called non-insulin-dependent or adult-onset diabetes. The body is unable to use its own insulin (insulin resistance). Obese individuals more than 40 years old are at highest risk of Type II diabetes. It appears that certain ethnic groups are at particularly high risk of developing Type II diabetes, specifically South Asians, African Americans and North American First Nations populations. Type II diabetes is managed with weight reduction, changes in food intake and exercise, and regular monitoring of blood sugar. In many cases, however, people with Type II diabetes may require medication to stimulate insulin release by the pancreas or help overcome insulin resistance and may require insulin injections.