

A close-up photograph of a hand holding a blue lancing device over a finger. A small drop of blood is visible on the tip of the finger. The background is a soft, out-of-focus light color.

Diabetes in New Brunswick

**Prevalence, Incidence,
Mortality and Selected
Co-Morbidities of Diabetes
1997/98 to 2001/02**

**National Diabetes
Surveillance System -
Technical Report 2005**

ACKNOWLEDGMENTS

I wish to acknowledge the contributions of the following individuals and organizations in the preparation of this report:

- Provincial Epidemiology Service:
 - Dr. Jian Liu, Biostatistician
 - Heather MacLennan-Cormier, Diabetes Surveillance Coordinator (2002/03)
 - Carolin Galvin, Diabetes Surveillance Coordinator (2003/04, 2004/05)
- Department of Health & Wellness, Hospital Services
- Department of Health & Wellness, Medicare Services
- NDSS Provincial Advisory Committee
- Public Health Agency of Canada

This is the first report on diabetes in New Brunswick using data from the recently established National Diabetes Surveillance System. It covers the period 1997/98 to 2001/02. I hope you find the information useful and would welcome any comments or suggestions you may have for improvement.



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This report is also available online at:
<http://www.gnb.ca>, keyword: Health.

ISBN: 1-55396-467-5

November 2005

REPORT HIGHLIGHTS

Prevalence of Diabetes

- ↪ New Brunswick males had a prevalence of 57 per 1,000 compared to 52 per 1,000 in Canadian males. Females in New Brunswick had a prevalence of 50 per 1,000 and the rate in Canadian females was 44 per 1,000.
- ↪ Males in New Brunswick had the third highest prevalence of diabetes of all provinces and territories in Canada (excluding Newfoundland and Labrador), exceeded only by Manitoba and Nova Scotia.
- ↪ Females in New Brunswick had the second highest prevalence of diabetes of all provinces and territories in Canada (excluding Newfoundland and Labrador), exceeded only by Manitoba.
- ↪ Prevalence peaked in the 75 to 79 year age group for males and in the 80 to 84 year age group for females.
- ↪ Sixty percent of diabetes cases were found in those aged 60 years and over.
- ↪ Prevalence in Regions 2, 5, and 7 were consistently higher than provincial rates for both genders, over the five fiscal years examined.

Incidence of Diabetes

- ↪ The incidence of diabetes in New Brunswick males was 5.5 per 1,000 and in females, 4.3 per 1,000.
- ↪ Fifty percent of incident cases of diabetes were among those aged 60 years and over.
- ↪ Incidence for males in Regions 2, 3, and 7 was higher than the provincial rate; incidence for females was higher than the provincial rate in Regions 3 and 7.

- ↪ Incidence peaked in the 70 to 74 year age group for males and in the 75 to 79 year age group for females.

Mortality

- ↪ Mortality among Canadians with diabetes (aged 20 years and over), was 13.9 per 1,000. Mortality among New Brunswickers with diabetes was slightly higher at 15.2 per 1,000.
- ↪ Male mortality was consistently higher than female mortality in both those with and in those without diabetes.
- ↪ New Brunswick males with diabetes were 1.7 times more likely to die (from any cause), compared to those without diabetes. Female mortality was even more affected by diabetes; females with diabetes were 2.2 times more likely to die (from any cause) compared to females without diabetes.
- ↪ The impact of diabetes on mortality was greater in the younger age groups, peaking in the 30 to 34 year age group, in which those with diabetes were 4.5 times more likely to die than those without diabetes, and then generally decreased with age.

Co-Morbidities

Acute Myocardial Infarction (AMI)

- ↪ The provincial hospital separation rate for AMI was almost six times higher among males with diabetes compared to males without diabetes, and roughly nine times higher in females with diabetes compared to females without.
- ↪ The ratio of hospital separation rates for AMI in those with diabetes versus those without diabetes in males, varied from 5.0 in Region 4 to 6.5 in Region 1. In females, rate ratios varied from 5.5 in Region 5 to 12.0 in Region 7.

Lower Limb Amputation (due to Peripheral Vascular Disease)

- ↪ The provincial hospital separation rate for lower limb amputation was almost 27 times higher in males with diabetes than in males without and roughly 20 times higher in females with diabetes than in females without.
- ↪ The ratio of hospital separation rates for lower limb amputation with versus without diabetes in males, varied from 17.0 in Region 7 to 30.1 in Region 3. In females, rate ratios varied from 13.3 in Region 4 to 37.8 in Region 5.

Cardiovascular Disease (CVD)

- ↪ The provincial hospital separation rate for CVD was roughly six times higher among those with diabetes of either gender, compared to those without diabetes.
- ↪ The ratio of hospital separation rates for CVD with versus without diabetes for males was highest in Region 6 at 6.3 and lowest in Region 4 at 5.1. In females, the rate ratio was highest in Region 6 at 6.8 and lowest in Region 5 at 5.1.

Heart Failure

- ↪ The provincial hospital separation rate for heart failure was nine times higher among males with diabetes than among males without and almost ten times greater among females with diabetes compared to females without.
- ↪ The ratio of hospital separation rates for heart failure with versus without diabetes for males, was lowest in Region 2 at 7.8 and highest in Region 6 at 10.8. The rate ratio for females was lowest in Region 5 at 8.3 and highest in Region 6 at 10.9.

Hypertension (detected in hospital)

- ↪ The provincial hospital separation rate for hypertension (detected in hospital) was almost eight times higher in males with diabetes compared males without diabetes and about seven times higher among females with diabetes than in females without.

↪ The ratio of hospital separation rates for hypertension with versus without diabetes in males was lowest in Region 3 at 6.8 and highest in Region 6 at 8.8. In females, the rate ratio was lowest in Region 5 at 5.6 and highest in Region 4 at 8.5.

Ischemic Heart Disease (IHD)

↪ The provincial hospital separation rate for IHD was six times higher in males with diabetes compared to males without, and eight times higher in females with diabetes compared to females without.

↪ The ratio of hospital separations rates for IHD with versus without diabetes in males varied from 5.2 in Region 5 to 6.9 in Region 7. In females, rate ratios varied from 6.9 in Region 5 to 8.7 in Region 6.

Renal Disease

↪ The provincial hospital separation rate for renal disease was almost 11 times higher in males with diabetes compared to males without and 12 times higher among females with diabetes compared to females without.

↪ The ratio of hospital separation rates for renal disease with versus without diabetes in males was lowest in Region 5 at 7.6 and highest in Region 4 at 13.4. In females, the rate ratio was lowest in Region 7 at 10.6 and highest in Region 5 at 14.5.

Stroke

↪ The provincial hospital separation rate for stroke in those with diabetes of either gender was roughly seven times higher than in those without diabetes.

↪ The ratio of hospital separation rates for stroke with versus without diabetes in males varied from 5.7 in Region 2 to 7.4 in Region 3. In females, rate ratios varied from 4.9 in Region 5 to 7.8 in Region 4.

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BACKGROUND

The National Diabetes Surveillance System (NDSS) which began in 1996, is the result of years of collaboration between provincial, territorial and federal governments, Aboriginal groups and non-governmental agencies. The NDSS is a health initiative launched within the framework of Health Canada's Canadian Diabetes Strategy, with funding for the NDSS provided by the federal government and private sector partnerships.

The NDSS is the first national health surveillance initiative based on the use of administrative data. The use of administrative databases takes advantage of high quality data that already exists in most jurisdictions. Only limited use is currently being made of these data to assess the impact of chronic diseases on population health. The use of administrative databases can be a cost-effective means of obtaining surveillance data.

New Brunswick data were not included in the first NDSS report (2003)⁵. This was due to delays in capacity building, especially around the physician diagnosis being in descriptive text rather than ICD coding. New Brunswick submitted the data required by Health Canada in May 2003. However, preliminary prevalence rates and mortality rates presented in the first NDSS report were collected prior to November 2002. A second NDSS report is expected to be released in 2005 by the Public Health Agency of Canada (newly created Health Canada affiliate), covering fiscal years 1997/98 to 2001/02. As in the first report, it will include prevalence and mortality but in addition will incorporate incidence data, hospital separation rates of several co-morbidities of diabetes, and data on health service utilization. New Brunswick data will be included in this second national report.

METHODOLOGY

Data Sources

The data required for NDSS are contained in three administrative databases. In New Brunswick, the databases used are Medicare claims (physician claims data); Hospital Financial Utilization Management Service (HFUMS), (hospital data); and the Medicare Resident Registry (health insurance registry data). Hospital data are maintained by Hospital Services, whereas physician claims data and the health insurance registry data are maintained by Medicare Services. The hospital data were used to identify co-morbid conditions, physician claims data and hospital data were used for defining the incident and prevalent cases, and the health insurance registry data provided the number of deaths and the population base for each year.

Case Definition

The case definition was based on diagnosis information that was captured either within the hospital data, the physician claims data or both. In the NDSS, a person is defined as having diabetes if there was a single hospitalization (discharge date recorded as the case date) or two physician service claims, on different days, within a two-year (730 day) period (case date identified as the earlier of the two), with ICD-9 code 250. In addition, if there was a physician service claim with a diagnosis of diabetes within 730 days prior to a hospitalization, the date of the physician service claim was used as the case date.⁴

Data Preparation

In New Brunswick, the diagnosis field in the hospital data is in ICD-9CM coding, but the diagnosis field in the physician claims data is in descriptive text. Since descriptive text does not meet the NDSS requirement of ICD-9 coding, a pilot study was conducted on 1998/99 physician claims data, and another on 2000/01 physician claims data to test an alternate methodology. The study involved using a group of diabetes terms and abbreviations in both French and English, (such as IDDM, dm, GDM, diabète) to determine which combination would be best used in a query to extract all records of persons with a diagnosis of diabetes, with minimal error. It was determined that the most efficient set of key words was 'dm', 'dm/', 'dm\ ', 'dm;', 'dm2', 'dm-2', 'dmII', 'dm-II', 'dm-I', 'dm-1', 'NIDDM', 'IDDM', 'mellitus' and 'diab'. SAS software was used to perform this query.

In the data used in the 2003 NDSS report by Health Canada, there was a concern regarding the unintentional inclusion of cases of gestational diabetes due to miscoding as diabetes mellitus. In the second request for data from the provinces and territories for the NDSS by the Public Health Agency of Canada, it was decided that gestational diabetes cases would be removed from the data. Obstetric cases (ICD-9CM codes 650 to 669), were isolated and cross-referenced with the identified cases of diabetes from the hospital data and physician claims data. The diabetes records were removed if the case date was within 90 days after an obstetrics record for a given individual. In order to meet the challenge in New Brunswick of not having ICD coding in the physician claims data, obstetrics records were isolated in a manner similar to the method described above for extracting diabetes records. An obstetrics file for physician claims data was created for each fiscal year for input into the NDSS software.

Data Processing

The software provided by the Public Health Agency of Canada (PHAC) for the National Diabetes Surveillance System, NDSSv203, runs on SAS, a statistical analysis software also provided by PHAC. The NDSSv203 software was edited to customize it for New Brunswick and then data for fiscal years 1995/96 to 2001/02 were run through the software. Results for all seven fiscal years were obtained, including incidence, prevalence, mortality and hospital separation rates for selected co-morbidities of diabetes. In comparing current rates in this report with those in the first NDSS report by Health Canada, it should be noted that the versions of software used for each differed. An older version of the NDSS software, NDSSv1.5, was used to produce the Health Canada report, and contained minor methodological differences compared to NDSSv203 used in this report.

Available Years of Data

It was determined that the earliest year of data which satisfied the minimum requirements for participating provinces and territories, was fiscal year 1995/96. The unique lifetime identifier, which is specific to each individual, was a limitation prior to this date for some provinces.

Due to time lags in processing administrative data, the most recent year of data available for the first NDSS report from all participating provinces and territories was

fiscal year 1999/00. The second NDSS report by the Public Health Agency of Canada, due to be released in 2005, will contain data from all provinces and territories up to 2001/02. This provincial report contains data from 1997/98 to 2001/02.

Validation

The case definition was originally validated in Manitoba. Subsequent work in Prince Edward Island demonstrated the validity of the case definition for persons 20 years of age and older using five years of data¹⁴. The case definition cannot produce estimates with less than three years of data; therefore the earliest year of prevalence, mortality and co-morbidity data presented is fiscal year 1997/98.⁴ Validation defined the need to have at least five years of data to produce stable estimates of incidence, therefore the earliest year of incidence data that can be presented is fiscal year 1999/00.¹⁴ In this report, the earliest year reported is 2000/01 to allow an additional year for New Brunswick rates to stabilize. There may be some under-counting of incident cases in the fiscal year 2001/02 due to the nature of the case rule (see section entitled 'Case Definition'). The addition of 2002/03 data will add diabetes cases to the 2001/02 data.

Limitations

The lack of ICD-9 coding for the diagnosis field in the physician claims data presented a challenge and as discussed in the 'Data Preparation' section, an alternate method of capturing diabetes records had to be developed. This required more time and contributed to delays in getting New Brunswick data to Health Canada in time for the publication of the first NDSS report. However, this obstacle was overcome (see section entitled 'Data Preparation'). Rather than being limited by the ICD-9 code input by the physician, New Brunswick has a text field that often contains further detail and error created by mis-coding is therefore not a factor in data quality. At this time, it is difficult to determine if all diabetes claims were captured from the physician claims database. It is possible that if the words describing diabetes were not spelled correctly, the record would not have been extracted. Initial pilot studies on samples of data suggest that the error rate created by this query was very low. This issue will continue to be examined more closely.

NDSS requires that hospital data should exclude outpatient data and data collected from day surgeries. At the time of this report, the data available for analysis did include day

METHODOLOGY

surgery data as well as out patient data. The rates were slightly affected by the additional cases resulting from the inclusion of day surgeries and outpatient data but the difference was minimal.

At this time, NDSS is unable to distinguish between type 1 and type 2 diabetes because ICD-9 coding does not make the distinction between the two types (code 250). Since this data is limited to those aged 20 years and over, it should represent mostly type 2 diabetes.⁵

In New Brunswick, not all physicians are paid on a fee-for-service basis. In 1999/00, 58% of physicians were paid solely on a fee-for-service basis. As such, physicians paid by salary or other alternate means would not be represented in the physician claims data. However, 95% of physicians in New Brunswick receive some fee-for-service compensation. Some of the salaried physicians do remit service information through 'shadow billing', although this is not done consistently. In the province of Manitoba, Saskatchewan and Alberta, where the pilot study for the feasibility of the NDSS was conducted, 40%, 82% and 98% of physicians respectively, were paid solely on a fee-for-service basis in 1999/00⁵.

It should be noted that in the data used to produce this report, there were a significant number of cases in which the region of residence of the individual was unknown. These cases were included in the provincial data. The regional data do not include these cases. The impact of this discrepancy was minimal, however as a result, regional rates may appear slightly elevated in comparison to provincial rates.

Confidentiality

To ensure confidentiality, the data from the administrative database does not contain Medicare numbers so that individuals cannot be identified. Instead, an encryption of the Medicare number was used, which provided a unique lifetime identifier that is never reused even if an individual dies or migrates to another province or territory. The same encryption method was used on Medicare numbers in all three datasets, the physician claims, hospital data and the health insurance registry, so that they were able to be linked.

The data that was sent to Health Canada was aggregated by age and gender. Data cells were suppressed where the value was less than 5.

Standardization of Rates

Age-standardization was calculated using the Canadian population distribution, based on the final postcensal estimates of the July 1, 1991 Canadian population, adjusted for census undercoverage.

RESULTS

Prevalence of Diabetes

Prevalence is defined as the “number of instances of a given disease or other condition in a given population at a designated time.”⁹ In NDSS, prevalence is calculated as prevalence over one year with the denominator being the total number of people, aged 20 years and over, in the health insurance registry.

In 1999/00, 44 per 1,000 in Canadian females and 52 per 1,000 in Canadian males⁵ aged 20 years and over, were living with a diagnosis of diabetes (age-standardized to the 1991 standard Canadian population estimates); New Brunswick’s rates were higher with a prevalence rate of 50 per 1,000 in females and 57 per 1,000 in males (Table 1). The findings of the Canadian Community Health Survey (CCHS) in 2000/01 showed that the prevalence of diabetes in New Brunswick females was

Table 1: Crude and age-standardized prevalence rates (ASPR)* of diabetes per 1,000 persons ≥20 years of age, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.

Fiscal Year	Gender	Crude Rate	ASPR
1997/98	Males	47.9	46.5
	Females	46.4	41.1
1998/99	Males	54.3	51.9
	Females	52.1	45.5
1999/00	Males	61.0	57.2
	Females	57.5	49.7
2000/01	Male	66.3	61.3
	Females	61.7	52.7
2001/02	Male	69.5	63.3
	Females	64.1	53.9

*Age-standardized using the standard 1991 Canadian population estimates.

48 per 1,000 and in males 53 per 1,000.¹² NDSS results in this report, for fiscal year 2000/01, showed a slightly higher prevalence rate at 53 per 1,000 in females and 61 per 1,000 in males, respectively.

Part of the discrepancy between the Canadian and New Brunswick rates may be attributable to the changes in methodology between the two versions of NDSS software used to produce these two different reports (see section on ‘Data Processing’). However, this does not account for the entire difference, thus it would appear that New Brunswick prevalence rates for both genders are indeed somewhat higher than Canadian rates.

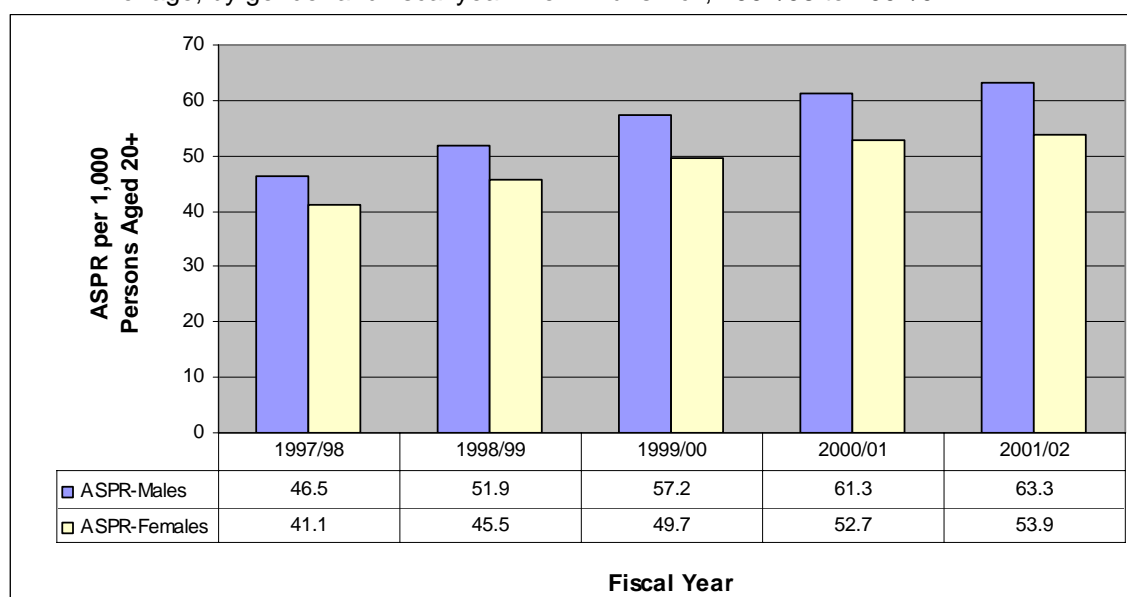
Part of the discrepancy between the CCHS results and the NDSS results for New Brunswick may be due to the difference in the age groups represented; CCHS surveyed

those aged 12 years and over and NDSS included only those aged 20 years and over. However, the major reason for the difference is most likely due to the limitations of self-reporting in survey data. An Ontario study found that there was considerable underreporting of diagnosed diabetes in response to the diabetes questionnaire in the National Population Health Survey.⁷ This was found to be true of health interview survey data in general, in that misreporting (usually underreporting) “varied by [respondents’] level of education”¹.

In 1999/00, males in New Brunswick had the third highest prevalence rate of diabetes of all provinces and territories in Canada, excluding Newfoundland and Labrador which were not included in first NDSS report. New Brunswick rates were exceeded slightly by only Manitoba and Nova Scotia. Females in New Brunswick had the second highest prevalence of all provinces and territories, exceeded only by Manitoba. Again, the change in the version of NDSS software used since the publication of the first NDSS report by Health Canada, may have affected New Brunswick’s position slightly. The second upcoming report will provide a more accurate comparison since it uses the same software and methodology used in this report.

Prevalence Over Time

Figure 1: Age-standardized prevalence rates (ASPR)* of diabetes per 1,000 persons ≥20 years of age, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



*Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

RESULTS

The prevalence of diabetes in New Brunswick showed an increase over time from 1997/98 to 2001/02 (Table 1 and Figure 1). This is to be expected for a chronic disease due to the long duration of illness.⁵ The increasing trend may be partly attributable to the establishment of the surveillance system being in its early stages. The number of cases in earlier years may be underestimated due to the nature of the case rule; pre-existing cases of diabetes would not be assigned a case date until two physician visits are seen in a 2 year period or a hospitalization occurs. In cases where contact with the health care system is infrequent, this may delay a prevalent case from being identified. This artifact will become less influential as the surveillance system matures.

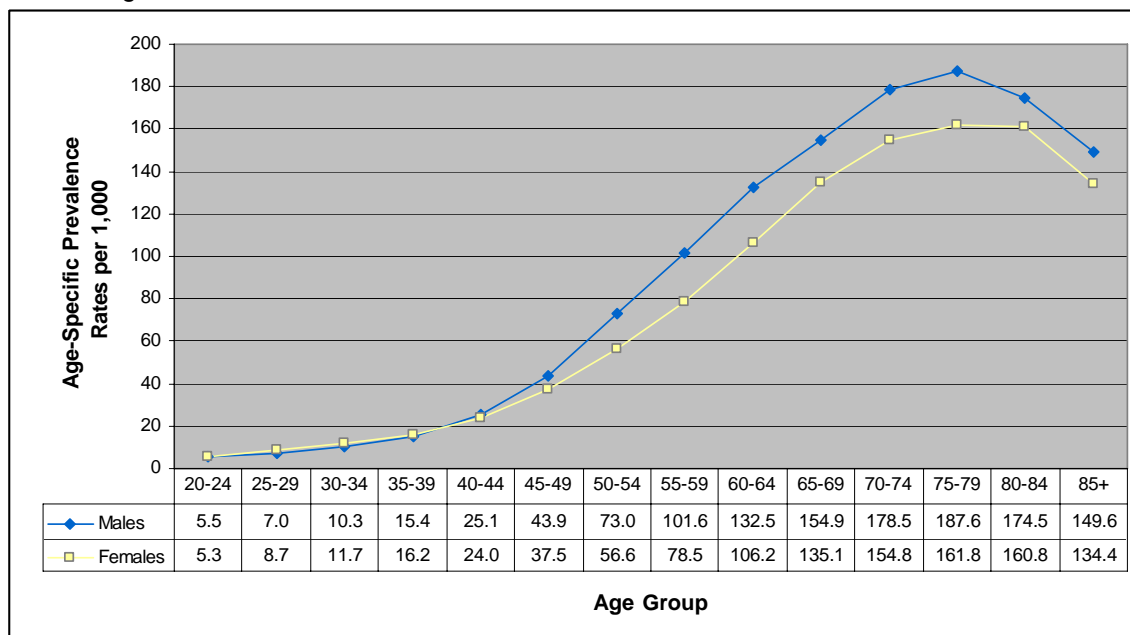
Prevalence by Age Group

In Figure 2, prevalence peaked in the 75 to 79 year age group at 187.6 per 1,000 for males and 161.8 per 1,000 for females. Sixty percent of diabetes cases were found in those aged 60 years and over. Rates started to decrease for both genders at age 80 years and over. This decrease may be partly attributable to those in older age groups tending to have multiple conditions, which may exceed the number of spaces provided for physicians to record diagnoses.

Prevalence by Gender

In all five fiscal years observed, female prevalence was lower than male prevalence (Figure 1). When examined by age group (Figure 2), the same was true with the exception of ages 25 to 39 years in which female prevalence was higher than in males. Although cases of gestational diabetes were removed from the data, it is possible that some were mis-coded as diabetes mellitus and contributed to the elevated rates among females of child-bearing age.

Figure 2: Age-specific prevalence rates of diabetes per 1,000 persons ≥20 years of age, by gender: New Brunswick, 1997/98 to 2001/02.



Prevalence by Region

Tables 2a-2e: Prevalent cases, crude and age-standardized prevalence rates (ASPR) of diabetes per 1,000 persons ≥20 years of age, by gender: New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.

Table 2a: 1997/98

Region	MALE			FEMALE		
	Prevalent Cases	Crude Rate per 1,000 population	ASPR*	Prevalent Cases	Crude Rate per 1,000 population	ASPR*
1	3,293	48.5	46.1	3,162	43.7	37.5
2	3,472	54.5	51.8	3,386	48.9	42.7
3	2,911	50.7	48.3	2,865	45.5	41.0
4	708	35.3	35.6	847	40.4	36.2
5	673	56.0	51.7	739	58.3	48.9
6	1,359	39.9	39.3	1,607	46.6	43.2
7	981	51.7	49.7	1,064	54.9	49.1
Province **	13,420	47.9	46.5	13,696	46.4	41.1

RESULTS

Table 2b: 1998/99

Region	MALE			FEMALE		
	Prevalent Cases	Crude Rate	ASPR*	Prevalent Cases	Crude Rate	ASPR*
		per 1,000 population			per 1,000 population	
1	3,659	53.5	50.2	3,507	48.2	40.9
2	3,968	62.5	58.4	3,823	55.1	47.9
3	3,287	57.3	54.0	3,240	51.4	45.8
4	804	40.0	39.4	934	44.2	39.1
5	799	67.2	60.6	871	68.8	56.4
6	1,528	45.0	43.4	1,762	51.3	46.3
7	1,129	59.6	56.4	1,228	63.5	55.3
Province **	15,206	54.3	51.9	15,394	52.1	45.5

Table 2c: 1999/00

Region	MALE			FEMALE		
	Prevalent Cases	Crude Rate	ASPR*	Prevalent Cases	Crude Rate	ASPR*
		per 1,000 population			per 1,000 population	
1	4,046	58.9	54.3	3,848	52.5	44.0
2	4,420	69.8	64.5	4,267	61.7	53.3
3	3,666	63.7	58.9	3,541	55.9	49.1
4	919	45.8	44.2	1,011	47.7	41.9
5	885	75.8	67.1	960	76.8	61.7
6	1,694	50.5	47.5	1,946	56.8	50.2
7	1,359	72.6	67.4	1,419	73.7	63.5
Province **	17,022	61.0	57.2	17,017	57.5	49.7
Canada [†]	586,158	54	52	561,984	49	44

[†] Source: Responding to the Challenge of Diabetes in Canada, First Report of the National Diabetes Surveillance System 2003 – adjusted for 4.2% of Canadian population in New Brunswick and Newfoundland and Labrador (2001 Census), not included in data.

Table 2d: 2000/01

Region	MALE			FEMALE		
	Prevalent Cases	Crude Rate	ASPR*	Prevalent Cases	Crude Rate	ASPR*
		per 1,000 population			per 1,000 population	
1	4,399	63.4	57.7	4,159	56.1	46.6
2	4,823	75.5	69.3	4,565	65.5	56.0
3	3,962	68.3	62.4	3,801	59.6	51.8
4	1,029	51.2	48.4	1,106	52.2	45.1
5	949	81.6	70.1	1,004	80.9	63.6
6	1,856	55.6	50.8	2,096	61.5	53.1
7	1,513	81.4	74.3	1,577	82.8	70.1
Province **	18,568	66.3	61.3	18,349	61.7	52.7

Table 2e: 2001/02

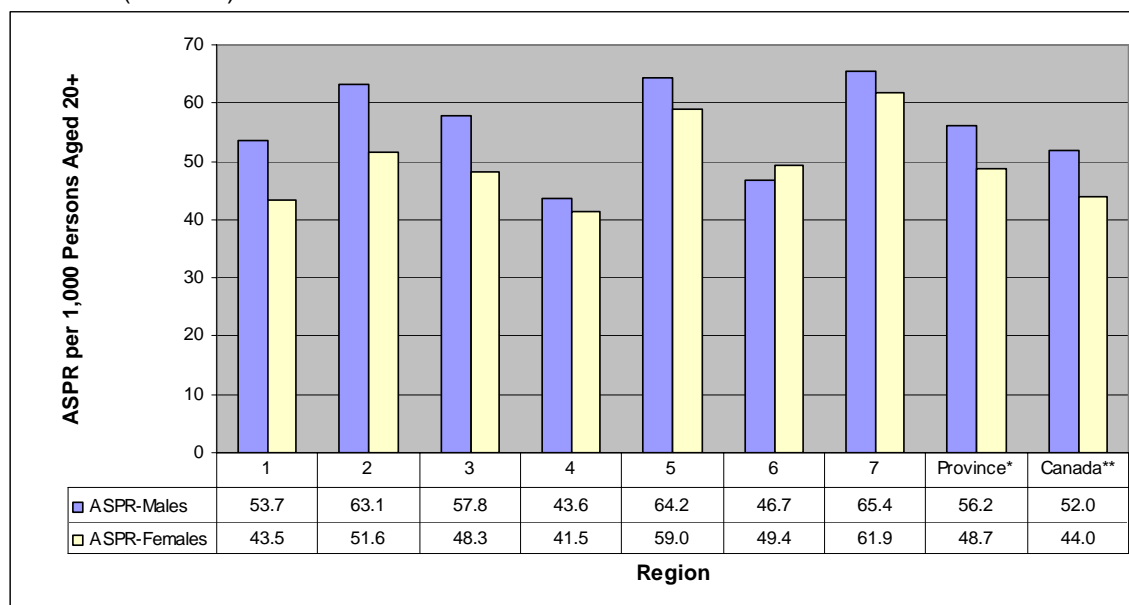
Region	MALE			FEMALE		
	Prevalent Cases	Crude Rate	ASPR*	Prevalent Cases	Crude Rate	ASPR*
		per 1,000 population			per 1,000 population	
1	4,601	65.4	59.3	4,371	58.5	48.0
2	5,028	78.4	71.3	4,750	68.3	57.6
3	4,154	71.1	64.4	3,973	62.2	53.5
4	1,074	53.1	49.9	1,124	53.2	44.9
5	987	84.1	70.7	1,025	83.1	64.0
6	1,947	58.0	52.1	2,156	63.5	53.6
7	1,633	87.4	78.4	1,633	86.3	71.3
Province**	19,521	69.5	63.3	19,112	64.1	53.9

* Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

** Provincial data include cases with unknown region of residence which are not represented in regional data.

Red font indicates where regional age-standardized rates are higher than provincial rates.

Figure 3: Age-standardized prevalence rates (ASPR)[†] of diabetes per 1,000 persons ≥20 years of age, by gender: Regions 1 to 7, New Brunswick (1997/98 to 2001/02) and Canada (1999/00).



* Provincial data include cases with unknown region of residence which are not represented in regional data.

** Source: Responding to the Challenge of Diabetes in Canada, First Report of the National Diabetes Surveillance System 2003.

† Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

The prevalence of diabetes in males in Regions 2, 3, 5, and 7 and in females in Regions 2, 3, 5, and 7, were higher than the provincial and Canadian rates (Figure 3). Upon examination of each of the 5 fiscal years represented in Tables 2a through 2e, Regions 2, 5, and 7 consistently showed age-standardized rates above the provincial rates in both genders.

Incidence of Diabetes

Incidence is defined as “the number of new events e.g. new case of disease, in a defined population, within a specified period of time.”⁹ In NDSS, incidence is calculated as incidence over one year, with the denominator being the population aged 20 years and over in the health insurance registry.

The 2001/02 age-standardized incidence rate of diabetes in New Brunswick males was 5.5 per 1,000 and in females, 4.3 per 1,000 (Table 3). The second federal NDSS report will contain incidence data, allowing for comparison to other provinces and territories as well as to Canadian rates. At this time however, there is no published NDSS incidence data for comparison. In a report on diabetes in Ontario, the crude gender-combined incidence rate in 1999 was 6.6 per 1,000 population (aged 20 years and over).⁸ In an early Manitoba study using administrative data, the 1991 gender-combined incidence rate of diabetes was found to be 5.6 per 1,000 persons aged 25 years and over.¹ In comparison, the crude gender-combined incidence rate for New Brunswick in 2001/02 was 5.5 per 1,000.

The number of incident cases in the earlier years of NDSS surveillance are overestimated because pre-existing prevalent cases are identified as incident cases as they are recognized as diabetes cases. Data validation indicated that a run-in period of five years would be needed before the distinction between prevalent and incident cases would become reliable and rates stabilized.^{13,14} In comparing New Brunswick age-standardized incidence rates to rates obtained in other studies and reports, it would appear that the rates in 2001/02 are in the expected range. However, since the case rule spans a 2 year period, (see section entitled ‘Case Definition’), there may be some under-counting in this most recent year of data since incident cases would be added to 2001/02 data with the addition of the

Table 3: Crude and age-standardized incidence rates (ASIR)* of diabetes per 1,000 persons ≥20 years of age, by gender and fiscal year: New Brunswick, 2000/01 and 2001/02.

Fiscal Year	Gender	Crude Rate	ASIR
2000/01	Male	8.1	7.4
	Females	6.8	5.9
2001/02	Male	6.1	5.5
	Females	5.0	4.3

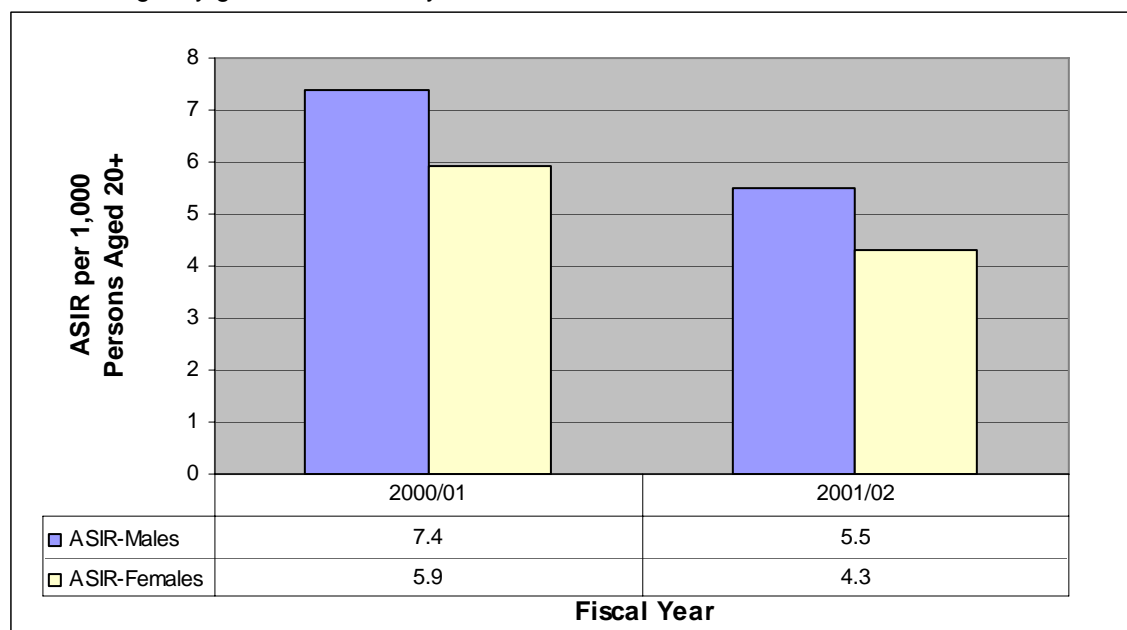
* Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

subsequent year of data. As new years of data are added, rates will become more reliable. Incidence rates in this report are to be interpreted with caution.

Incidence Over Time

Figure 4 shows an overall decrease in age-standardized incidence rates over the fiscal years 2000/01 and 2001/02. However, as described above, this may be misleading since even after a 5-year run-in time, rates in New Brunswick did not appear to have stabilized and it is expected that there would be some undercounting in 2001/02. The distinction between prevalent and incident cases are not yet clear and prevalent cases are still being labeled as incident cases as they are being identified as diabetes cases for the first time. The true trend in incidence will become clearer as additional years of data become available.

Figure 4: Age-standardized incidence rates (ASIR)* of diabetes per 1,000 persons ≥ 20 years of age, by gender and fiscal year: New Brunswick, 2000/01 to 2001/02.



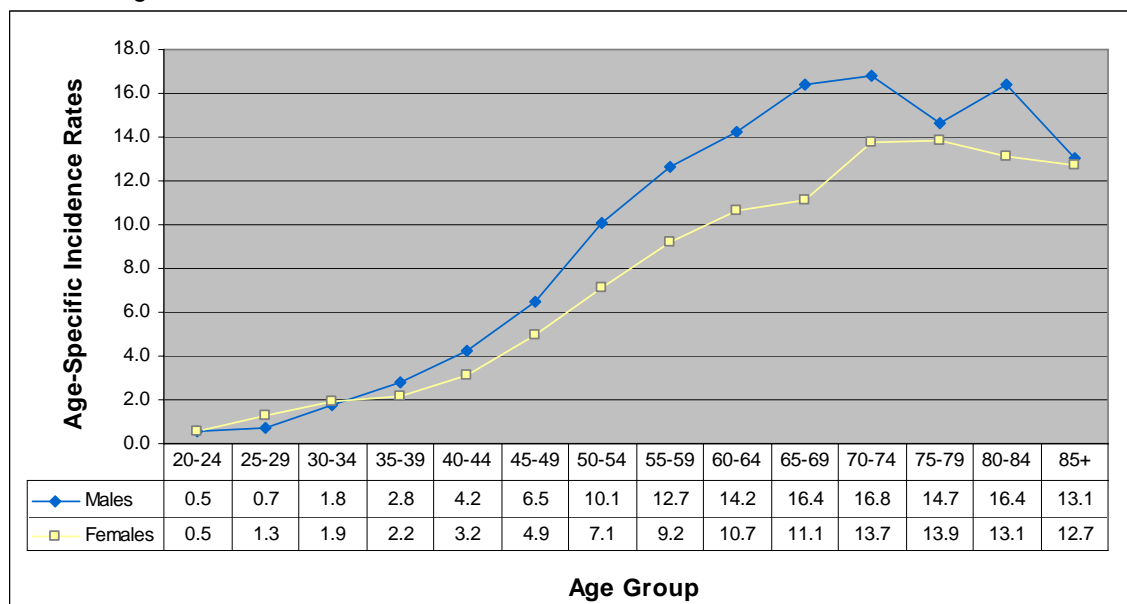
* Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

Incidence by Age Group

Incidence in males peaked in the 70 to 74 year age group at 16.8 per 1,000 persons aged 20 years and over and for females peaked in the 75 to 79 year age group at 13.9 per 1,000 (Figure 5). Fifty percent of incident cases were among those who were 60 years of age and older.

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Figure 5: Age-specific incidence rates of diabetes per 1,000 persons ≥ 20 years of age, by gender: New Brunswick, 2000/01 to 2001/02.



Incidence by Gender

Female incidence was lower than for male in both fiscal years observed (Figure 4). When broken down by age group however, female incidence exceeded male incidence in the 25 to 34 year age range (Figure 5). This may be due to mis-coding of gestational diabetes as diabetes mellitus, as discussed in the previous section on prevalence, inflating rates in the child-bearing years.

Incidence by Region

Tables 4a & 4b: Incident cases, crude and age-standardized incidence rates (ASIR) per 1,000 persons ≥ 20 years of age, by gender: New Brunswick and Regions 1 to 7, 2000/01 and 2001/02.

Table 4a: 2000/01

Region	MALE			FEMALE		
	Incident Cases	Crude Rate	ASIR*	Incident Cases	Crude Rate	ASIR*
		per 1,000 population			per 1,000 population	
1	552	8.0	7.1	480	6.5	5.5
2	530	8.3	7.6	455	6.5	5.6
3	469	8.1	7.3	416	6.5	5.7
4	154	7.7	7.1	142	6.7	5.7
5	98	8.4	7.1	82	6.6	5.4
6	244	7.3	6.4	227	6.7	6.0
7	221	11.9	10.9	224	11.8	10.1
Province**	2,270	8.1	7.4	2,029	6.8	5.9

Table 4b: 2001/02

Region	MALE			FEMALE		
	Incident Cases	Crude Rate	ASIR	Incident Cases	Crude Rate	ASIR
		per 1,000 population			per 1,000 population	
1	397	5.6	5.1	379	5.1	4.3
2	440	6.9	6.1	356	5.1	4.3
3	380	6.5	5.9	349	5.5	4.9
4	92	4.5	4.2	67	3.2	2.7
5	77	6.6	5.5	65	5.3	4.4
6	153	4.6	4.1	151	4.4	3.8
7	173	9.3	8.1	127	6.7	5.6
Province*	1,717	6.1	5.5	1,498	5.0	4.3

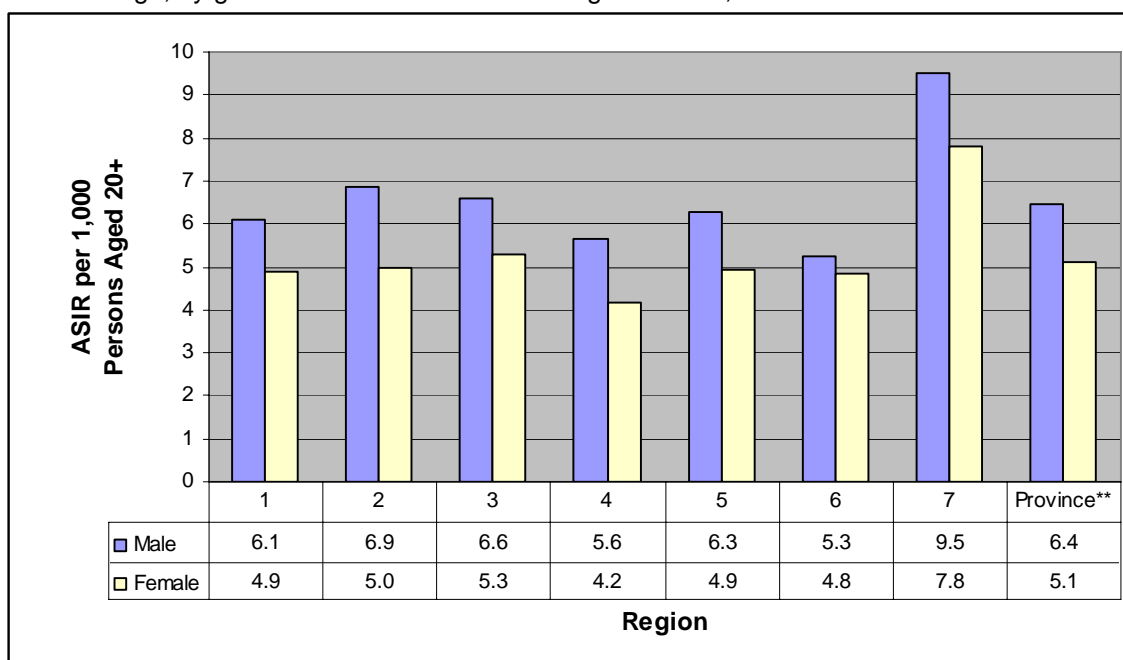
* Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

** Provincial data include cases with unknown region of residence, which are not represented in the regional data.

Red font indicates where regional age-standardized rates are higher than provincial rates.

As seen in Figure 6, incidence for males in Regions 2, 3, and 7 was higher than the provincial rate; incidence for females was higher than the provincial rate in Regions 3 and 7 (Figure 6). As discussed under the section on ‘Incidence over Time’, these rates should be interpreted with caution until further years of incidence data are available, particularly on the regional level where numbers of incident cases are smaller.

Figure 6: Age-standardized incidence rates (ASIR)^{*} of diabetes per 1,000 persons ≥20 years of age, by gender: New Brunswick and Regions 1 to 7, 2000/01 to 2001/02.



* Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

** Provincial data include cases with unknown region of residence, which are not represented in the regional data.

Mortality

The death rate is “a rate expressing the proportion of a population who die of a disease, or of all causes.”⁹ In NDSS, mortality rate is calculated as the death rate over one fiscal year, with the denominator being the health insurance registry population aged 20 years and over. Regardless of the underlying cause of death, when an individual who has been diagnosed with diabetes dies, the death is recorded as a death of an individual with diabetes. Mortality rates are calculated for the population with diabetes and for the population without diabetes.

In 1999/00, the age-gender standardized mortality rate among Canadians with diabetes (aged 20 years and over) was 13.9 per 1,000.⁵ The rate among New Brunswickers was slightly higher at 15.2 per 1,000 (age-gender standardized).

Table 5: Crude and age-standardized mortality rates (ASMR)^{*} per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.

Fiscal Year	Gender	With Diabetes		Without Diabetes		ASMR Rate Ratio
		Crude Rates	ASMR	Crude Rates	ASMR	
1997/98	Males	41.3	18.3	9.6	10.4	1.8
	Females	41.0	15.0	8.0	5.9	2.5
1998/99	Males	40.3	16.1	9.7	10.5	1.5
	Females	37.5	12.7	8.1	5.9	2.2
1999/00	Males	39.4	18.4	8.6	9.2	2.0
	Females	35.8	12.2	7.5	5.4	2.3
2000/01	Males	36.8	14.9	8.7	9.2	1.6
	Females	36.4	12.1	7.6	5.4	2.2
2001/02	Males	38.8	15.7	8.6	9.0	1.7
	Females	36.7	10.9	7.6	5.3	2.1

^{*} Age-standardized to the 1991 standard Canadian population estimates (July 1, 2001).

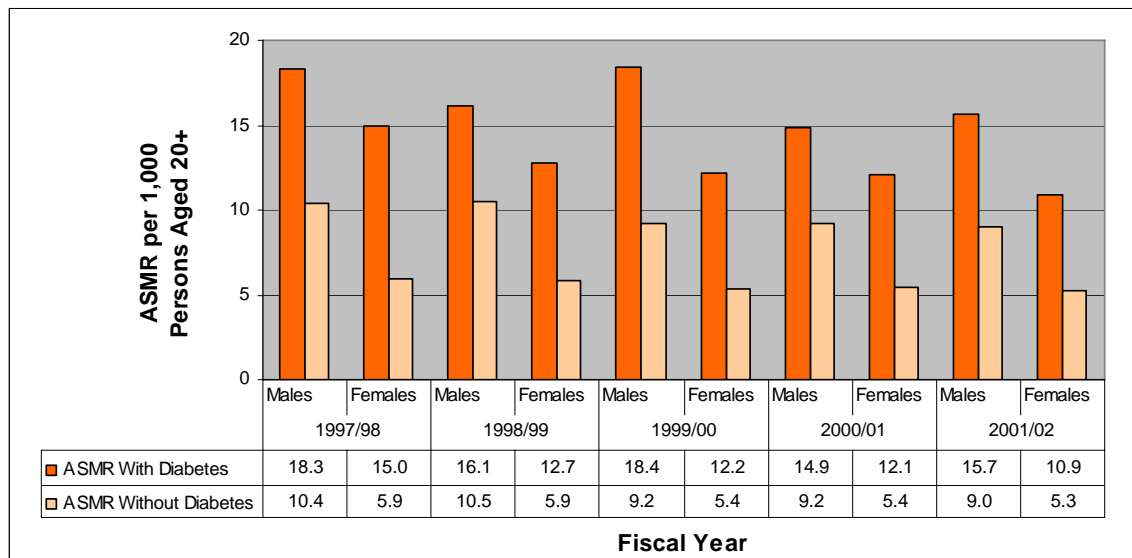
For the 2002 calendar year, Vital Statistics reported a crude death rate for diabetes of 0.30 deaths per 1,000 population (107 total deaths for NB) for males of all ages, and 0.33 per 1,000 (123 total deaths for NB) for females.¹¹ This represents deaths in which diabetes is listed on the death certificate as the primary cause of death. The NDSS found that for fiscal year 2001/02, the crude death rate among males with diabetes was 38.8 deaths per 1,000 persons aged 20 years and over (757 total deaths for NB) and for females with diabetes, 36.7 (701 total deaths for NB), (Table 5). Although in the

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NDSS death counts, diabetes was not always the primary cause of death, in many cases diabetes would have been a contributing factor i.e. the primary cause may have been a complication of diabetes. The number of deaths in males from all causes, among those with diabetes, was seven times greater than the number of deaths in which the primary cause of death was diabetes; for females the number of deaths was 6 times greater.

Mortality Over Time and by Gender

Figure 7: Age-standardized mortality rates (ASMR)^{*} per 1,000 persons ≥ 20 years of age with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



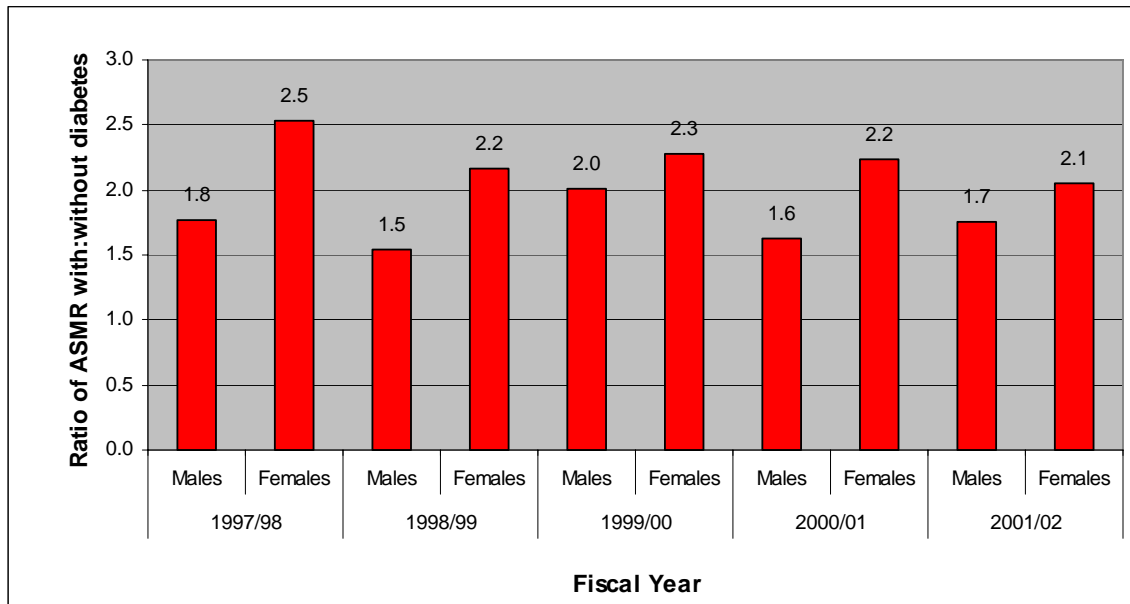
^{*} Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

For both genders, mortality was higher among those with diabetes than among those without diabetes (Figure 7). Male mortality was consistently higher than female mortality in both those with and those without diabetes. There was no consistent trend in age-standardized mortality rates over time, for either males or females, nor among those with or without diabetes.

RESULTS

Comparison of Provincial Mortality in Those With Versus Without Diabetes

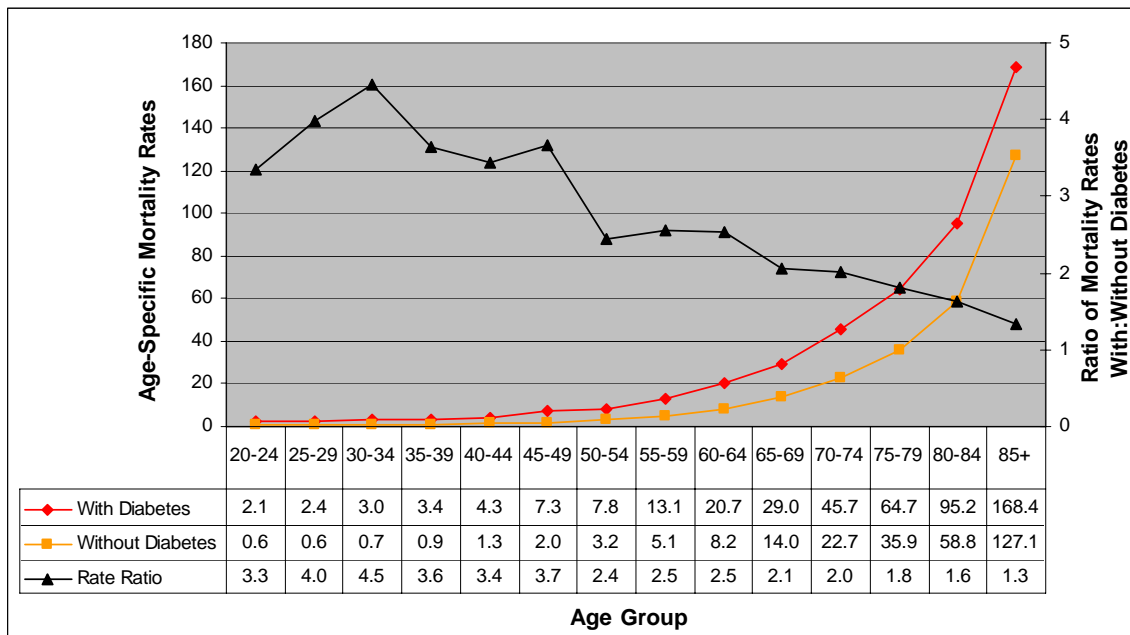
Figure 8: Ratio of age-standardized mortality rates, with versus without diabetes in persons ≥ 20 years of age, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Males with diabetes were 1.5 to 2.0 times more likely to die from any cause, compared to those without diabetes (Figure 8). Female mortality was even more affected by diabetes; females with diabetes were 2.1 to 2.5 times more likely to die from any cause, compared to females without diabetes.

Mortality by Age Group

Figure 9: Age-specific mortality rates per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: New Brunswick, 1997/98 to 2001/02.

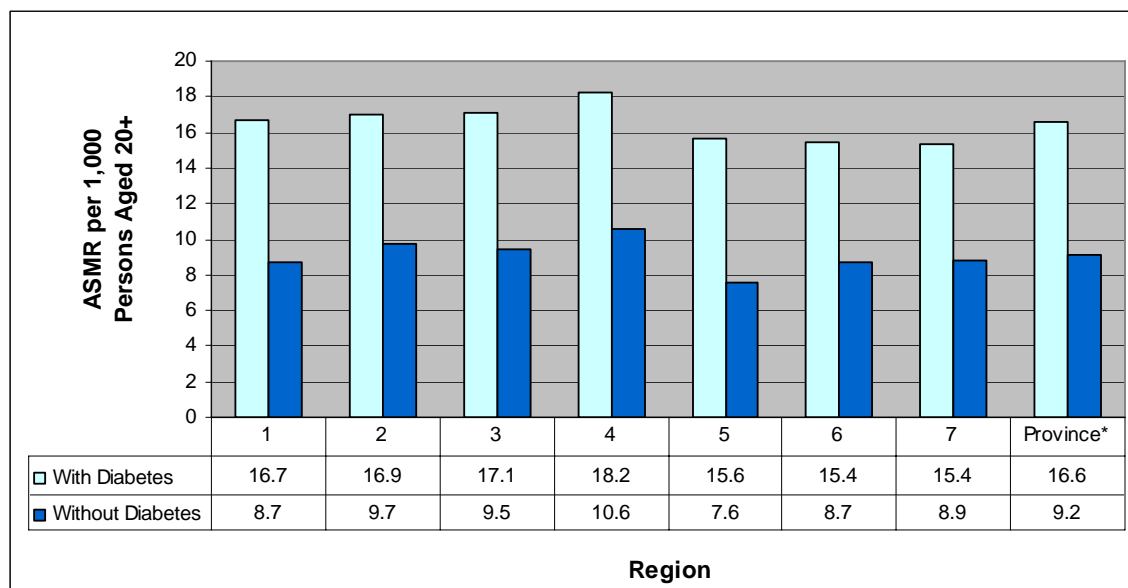


Mortality increased overall with age in both the population with diabetes and in the population without (Figure 9). Mortality was higher among those with diabetes than in those without, for all age group. After the 65 to 69 year age group, mortality rates began to increase more dramatically.

In examining the ratio of mortality among those with diabetes compared to those without (right-sided y-axis, Figure 9), the impact of diabetes on mortality was greater in the younger age groups and generally decreased with age. Those in the 30 to 34 year age group with diabetes were 4.5 times more likely to die (from any cause) than those of the same age without diabetes. By the 65 to 69 year age group, those with diabetes were about twice as likely to die as those without, and by the 85 years and over age group, the likelihood of death was roughly the same in both those with and without diabetes.

Mortality by Region

Figure 10: Age-standardized mortality rates (ASMR)[†] per 1,000 persons ≥20 years of age, with and without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



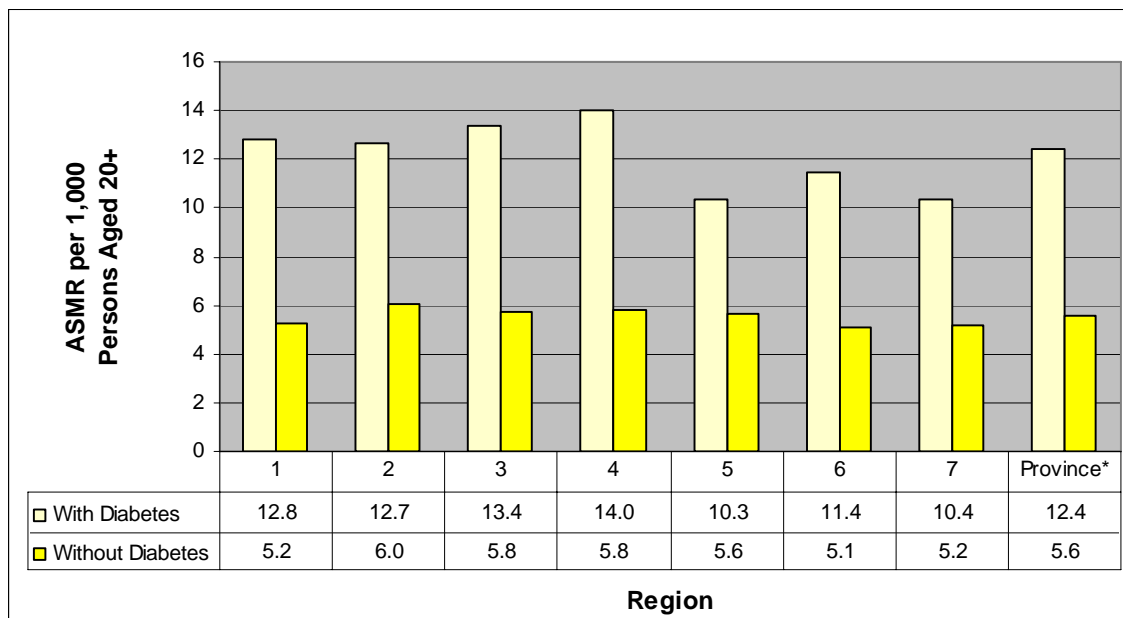
[†] Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

* Provincial data include cases with unknown region of residence which are not represented in the regional data.

As seen in Figure 10, the mortality rates in males with diabetes were higher in Regions 1, 2, 3, and 4 than the provincial rate. In the male population without diabetes, mortality was higher in Regions 2, 3, and 4 compared to the provincial rate.

As seen in Figure 11, the mortality rates in females with diabetes were higher in Regions 1, 2, 3, and 4 compared to the provincial rate. In females without diabetes, mortality was higher in Regions 2, 3, and 4 than the provincial rate.

Figure 11: Age-standardized mortality rates[†] (ASMR) per 1,000 persons ≥20 years of age, with and without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



[†] Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

* Provincial data include cases with unknown regions of residence which are not represented in regional data.

Table 6a to 6e: Death counts, crude and age-standardized mortality rates (ASMR)[†] per 1,000 persons ≥20 years of age, with and without diabetes, by gender: New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.

Table 6a: 1997/98

Region	Persons With Diabetes						Persons Without Diabetes					
	MALE			FEMALE			MALE			FEMALE		
	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR
	per 1,000			per 1,000			per 1,000			per 1,000		
1	144	43.7	19.5	131	41.4	18.5	601	9.3	9.5	556	8.0	5.6
2	129	37.2	18.8	139	41.1	14.9	654	10.9	11.2	646	9.8	6.6
3	127	43.6	17.4	117	40.8	14.4	541	9.9	10.7	475	7.9	6.1
4	28	39.5	17.0	38	44.9	17.1	190	9.8	11.0	164	8.1	6.5
5	24	35.7	17.0	22	29.8	9.8	114	10.1	10.7	89	7.5	5.2
6	61	44.9	17.8	77	47.9	15.2	288	8.8	9.8	184	5.6	4.7
7	41	41.8	17.1	37	34.8	12.0	182	10.1	10.5	148	8.1	6.2
Province*	554	41.3	18.3	561	41.0	15.0	2,576	9.6	10.4	2,262	8.0	5.9

Table 6b: 1998/99

Region	Persons With Diabetes						Persons Without Diabetes					
	MALE			FEMALE			MALE			FEMALE		
	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR
	per 1,000			per 1,000			per 1,000			per 1,000		
1	141	38.5	15.8	143	40.8	11.6	579	9.0	9.1	588	8.5	5.7
2	147	37.0	15.8	126	33.0	14.6	637	10.7	11.1	674	10.3	6.8
3	144	43.8	16.6	124	38.3	13.4	515	9.5	10.3	453	7.6	5.8
4	33	41.0	15.2	37	39.6	12.9	239	12.4	13.8	138	6.8	5.5
5	35	43.8	17.9	19	21.8	7.3	137	12.4	13.0	108	9.2	6.1
6	65	42.5	15.9	72	40.9	10.2	291	9.0	9.8	187	5.7	4.8
7	47	41.6	17.0	56	45.6	13.1	177	9.9	10.6	127	7.0	5.3
Province*	613	40.3	16.1	578	37.5	12.7	2,581	9.7	10.5	2,282	8.1	5.9

Table 6c: 1999/00

Region	Persons With Diabetes						Persons Without Diabetes					
	MALE			FEMALE			MALE			FEMALE		
	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR
		per 1,000			per 1,000			per 1,000			per 1,000	
1	162	40.0	16.9	143	37.2	10.6	531	8.2	8.3	504	7.3	4.9
2	156	35.3	18.9	147	34.5	13.9	586	9.9	10.4	562	8.7	5.6
3	158	43.1	19.5	132	37.3	13.4	428	7.9	8.4	470	7.9	5.9
4	44	47.9	31.2	46	45.5	14.3	191	10.0	11.3	156	7.7	6.0
5	31	35.0	14.2	29	30.2	10.0	94	8.7	9.4	87	7.5	4.9
6	78	46.0	18.2	72	37.0	11.5	278	8.7	9.4	205	6.3	5.3
7	41	30.2	11.5	40	28.2	8.1	143	8.2	8.5	103	5.8	4.2
Province*	670	39.4	18.4	609	35.8	12.2	2,259	8.6	9.2	2,089	7.5	5.4

Table 6d: 2000/01

Region	Persons With Diabetes						Persons Without Diabetes					
	MALE			FEMALE			MALE			FEMALE		
	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR
		per 1,000			per 1,000			per 1,000			per 1,000	
1	180	40.9	16.0	158	38.0	14.1	563	8.7	8.7	528	7.5	5.0
2	180	37.3	14.7	140	30.7	10.0	556	9.4	9.7	572	8.8	5.8
3	150	37.9	15.7	160	42.1	15.2	489	9.0	9.5	452	7.5	5.6
4	26	25.3	11.9	43	38.9	12.3	181	9.5	10.6	152	7.6	5.7
5	31	32.7	13.9	35	34.9	11.3	80	7.5	7.6	98	8.6	5.8
6	59	31.8	10.9	82	39.1	10.2	264	8.4	8.7	210	6.6	5.3
7	58	38.3	16.0	50	31.7	10.7	144	8.4	8.9	120	6.9	5.0
Province*	684	36.8	14.9	668	36.4	12.1	2,281	8.7	9.2	2,134	7.6	5.4

Table 6e: 2001/02

Region	Persons With Diabetes						Persons Without Diabetes					
	MALE			FEMALE			MALE			FEMALE		
	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR	Deaths	Crude Rate	ASMR
		per 1,000			per 1,000			per 1,000			per 1,000	
1	168	36.5	15.8	175	40.0	10.6	508	7.7	7.8	536	7.6	5.0
2	187	37.2	16.4	165	34.7	11.2	540	9.1	9.5	544	8.4	5.4
3	172	41.4	16.0	139	35.0	10.9	464	8.6	8.9	458	7.6	5.5
4	37	34.5	12.6	41	36.5	13.4	171	8.9	10.1	145	7.3	5.4
5	42	42.6	16.1	45	43.9	11.7	115	10.7	10.5	101	8.9	6.0
6	83	42.6	15.4	86	39.9	10.8	293	9.3	9.5	207	6.5	5.2
7	66	40.4	15.7	50	30.6	9.0	152	8.9	9.1	115	6.7	5.0
Province*	757	38.8	15.7	701	36.7	10.9	2,248	8.6	9.0	2,110	7.6	5.3

* Provincial data include cases with unknown region of residence which are not represented in the regional data.

† Age-standardized using the standard 1991 Canadian population estimates (July 1st, 1991).

Red font indicates where regional age-standardized rates are higher than provincial rates.

Table 7: Ratio of age-standardized mortality rates in those with versus those without diabetes in persons ≥ 20 years of age, by gender and fiscal year: New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.

Region	ASMR Rate Ratio With:Without Diabetes									
	1997/98		1998/99		1999/00		2000/01		2001/02	
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES
1	2.1	3.3	1.7	2.0	2.0	2.1	1.8	2.8	2.0	2.1
2	1.7	2.2	1.4	2.2	1.8	2.5	1.5	1.7	1.7	2.1
3	1.6	2.3	1.6	2.3	2.3	2.3	1.7	2.7	1.8	2.0
4	1.5	2.6	1.1	2.3	2.8	2.4	1.1	2.2	1.3	2.5
5	1.6	1.9	1.4	1.2	1.5	2.0	1.8	2.0	1.5	2.0
6	1.8	3.2	1.6	2.1	1.9	2.2	1.3	1.9	1.6	2.1
7	1.6	1.9	1.6	2.5	1.3	1.9	1.8	2.1	1.7	1.8
Province*	1.8	2.5	1.5	2.2	2.0	2.3	1.6	2.2	1.7	2.1

* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Comparison of Regional Mortality in Those With Versus Without Diabetes

Figure 12: Ratio of age-standardized mortality rates (ASMR) with versus without diabetes in persons ≥ 20 years of age, by gender: New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.

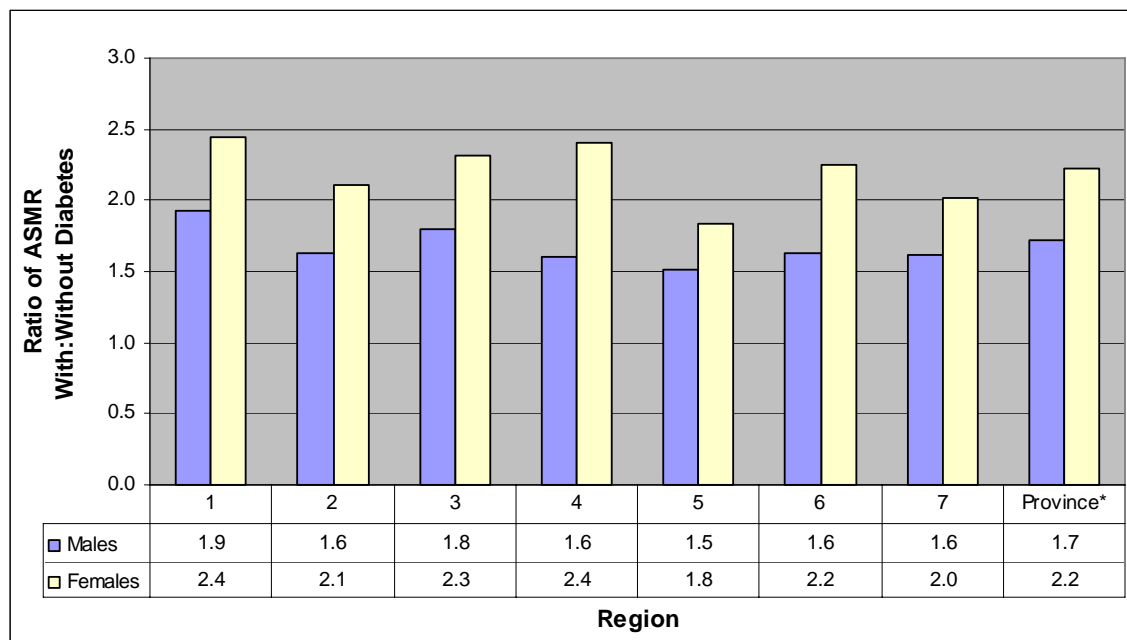


Figure 12 represents the ratio of age-standardized mortality rates among those with diabetes to those without diabetes. A rate ratio greater than one, as seen in all regions and in both genders, indicates that those with diabetes had a greater likelihood of death than their diabetes-free counterparts. Females rate ratios exceeded male rate ratios. This means that the impact of diabetes on mortality was greater in females than in males. New Brunswick males with diabetes were 1.7 times more likely to die than those without diabetes and New Brunswick females with diabetes were 2.2 times more likely to die than those without diabetes. The mortality rate ratio in males ranged from 1.5 in Region 5 to 2.0 in Region 1; in females the rate ratio ranged from 1.8 in Region 5 to 2.4 in Regions 1 and 4.

CO-MORBIDITIES

In this section of the report, rates of co-morbid conditions were calculated as follows: The numerator was the number of hospital separations in which any of the first 12 diagnostic codes captured on the hospital discharge abstracts included the selected co-morbid condition. The denominator was split into two different populations; the number of persons in the health insurance registry aged 20 years and older with diabetes, and those without diabetes. The most significant finding to consider is the ratio of these co-morbid rates in those with diabetes versus those without diabetes, since it is a reflection of the impact of diabetes on morbidity and on the burden to the health care system.

Rates in this section are crude rates and as such, any comparison between regions should be done with caution since differences in age structure between regions have not been taken into account.

Acute Myocardial Infarction

(ICD-9CM: 410)

According to the 2000 Report by the Heart and Stroke Foundation of Canada, *The Changing Face of Heart Disease and Stroke in Canada*, “ischemic heart disease accounts for the greatest percentage of deaths [due to cardiovascular disease in Canada] at 20%, of which half are attributable to acute myocardial infarction.”⁶ Diabetes is associated with an increase in the risk factors that contribute to acute myocardial infarction (AMI) such as hypertension, elevated cholesterol and elevated triglycerides.

Figure 13: Crude hospital separation rates for **acute myocardial infarction** (AMI) per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.

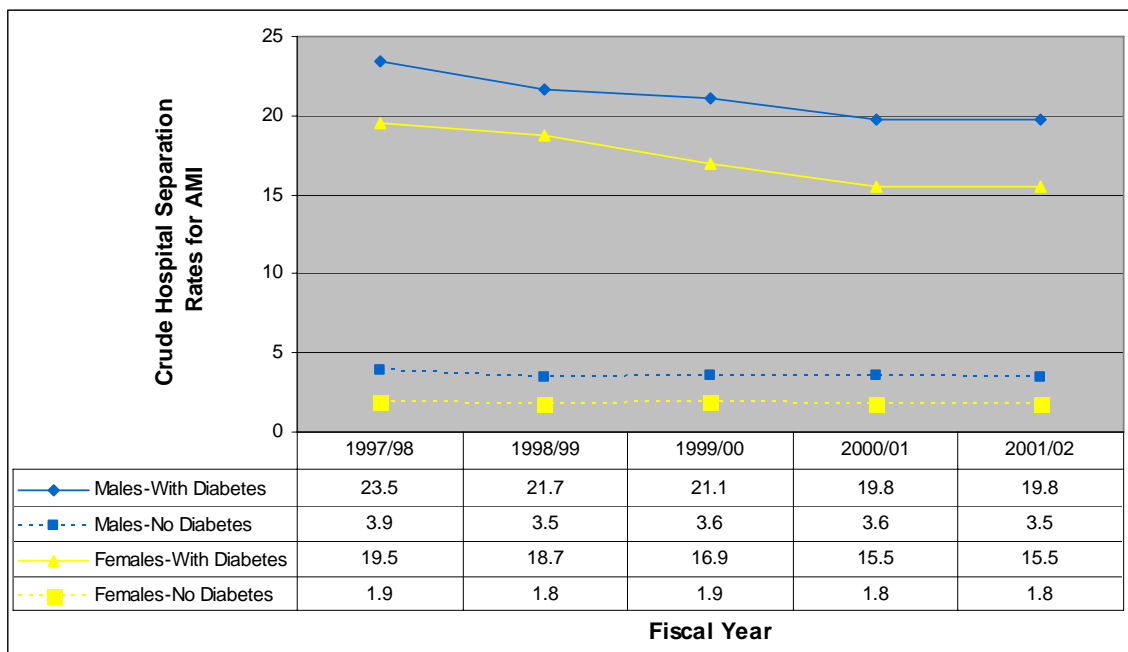
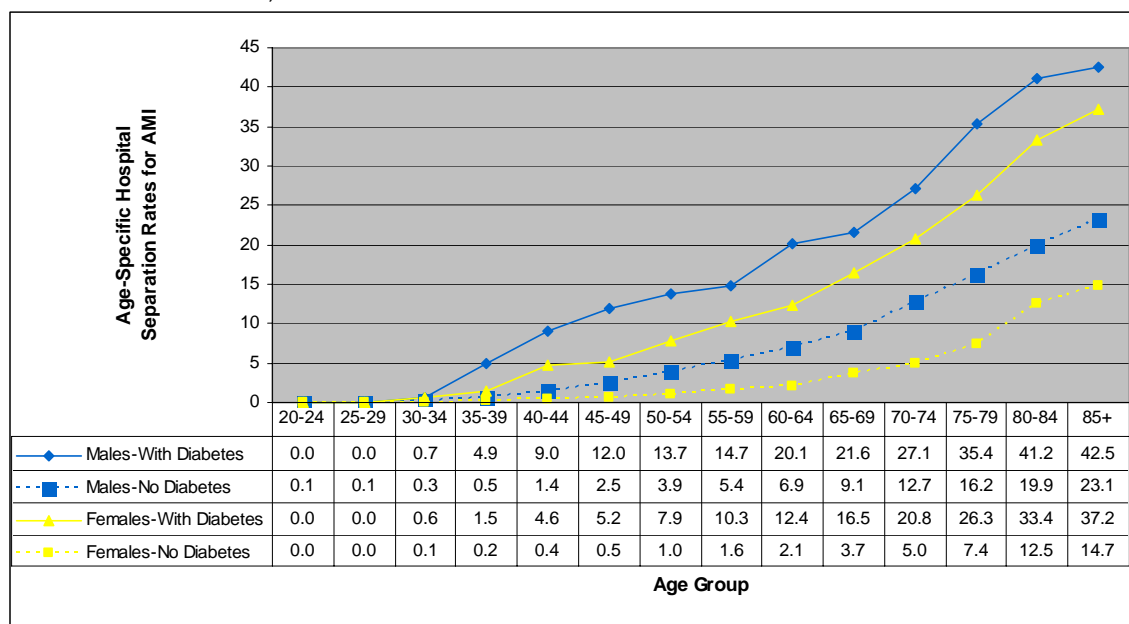


Figure 13 demonstrates that hospital separation rates for AMI were considerably higher among those with diabetes than among those without diabetes, in both genders and across the five fiscal years examined. Rates were higher in males than in females for both those with and those without diabetes.

Age-Specific Rates

Figure 14: Age-specific hospital separation rates for **acute myocardial infarction (AMI)** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



As seen in Figure 14, rates of hospital separations for AMI among those with and among those without diabetes increased with age. The increase became more pronounced in males with diabetes after the 65 to 69 year age group and in females after the 60 to 64 year age group. For those without diabetes of both genders, the increase became more pronounced after the 60 to 64 year age group. Males had higher rates of AMI detected in hospital than females, in all age groups and in both those with and without diabetes.

Rates by Region

Hospital separation rates for AMI were significantly higher in those with diabetes than in those without diabetes, in both genders and across the seven health regions (Figures 15 and 16).

In males with diabetes, rates varied from 17.8 per 1,000 in Region 2 to 26.0 in Region 7; for males without diabetes, rates varied from 3.4 per 1,000 in Region 1 to 4.2 in Region 7.

In females with diabetes, rates varied from 13.5 per 1,000 in Region 4 to 23.6 in Region 7; for females without diabetes, rates varied from 1.5 per 1,000 in Region 6 to 2.5 in Region 5.

Figure 15: Crude hospital separation rates for **acute myocardial infarction** (AMI) per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.

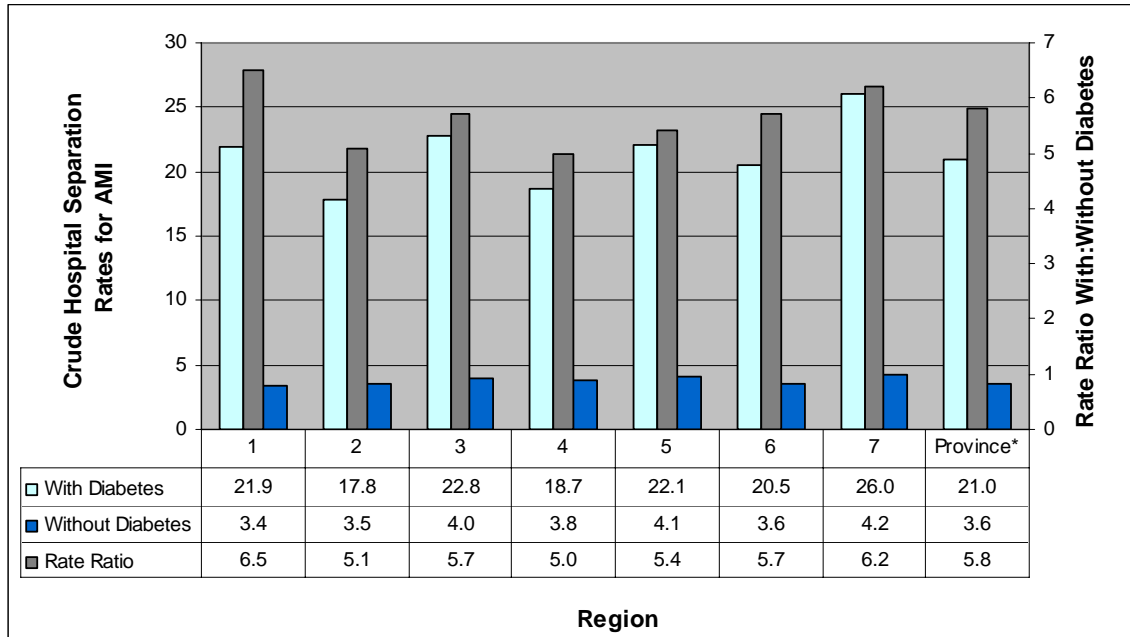
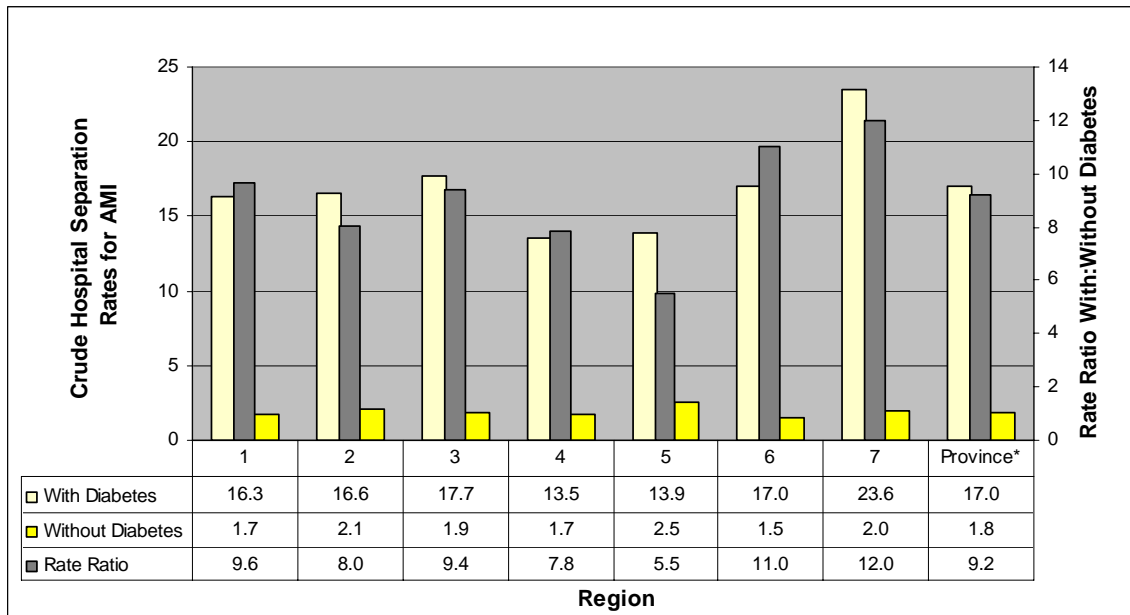


Figure 16: Crude hospital separation rates for **acute myocardial infarction** (AMI) per 100,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Ratio of Hospital Separation Rates With Versus Without Diabetes

In New Brunswick, the hospital separation rate for AMI in males was 5.8 times higher for those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes in males, varied from 5.0 in Region 4 to 6.5 in Region 1 (right-sided y-axis, Figure 15).

Diabetes impacted rates of AMI considerably more in females than in males. In New Brunswick females, the hospital separation rate for AMI was 9.4 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes varied from 5.5 in Region 5 to 12.0 in Region 7 (right-sided y-axis, Figure 16).

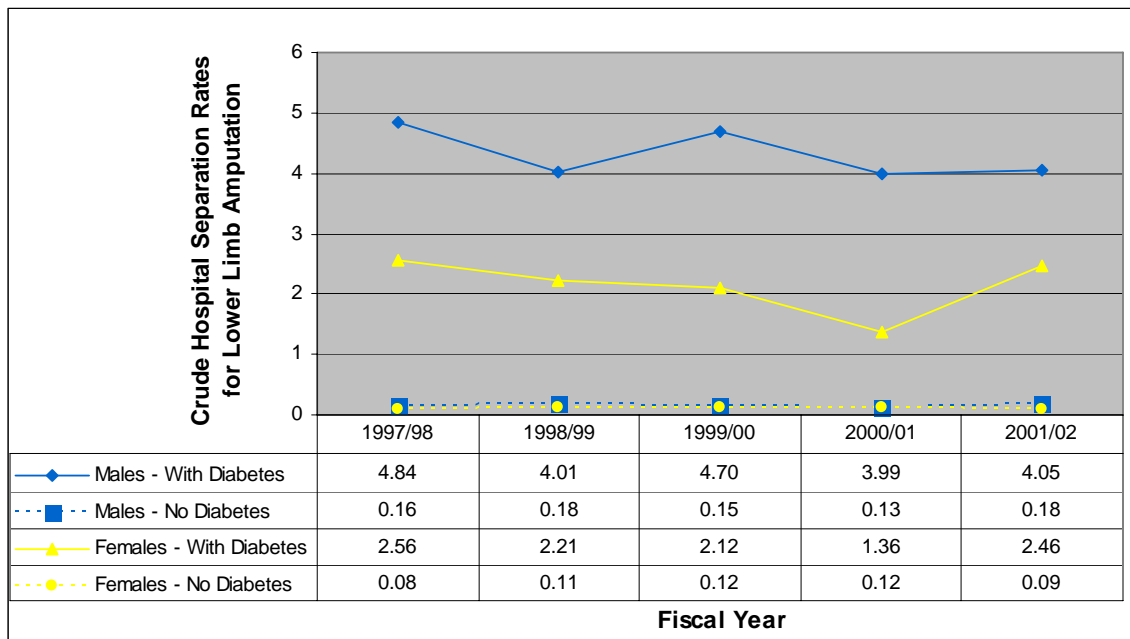
Lower Limb Amputation (due to Peripheral Vascular Disease)

(ICD-9CM procedure codes: 8411-8417, excluding ICD-9CM: 170, 171, 213, 740-759, 800-900, 901-904, 940-950)

One of the complications of diabetes is macrovascular damage, which contributes to a decrease in blood circulation. One of the possible outcomes of this decrease in circulation is an amputation of the lower limb.³

Hospital separation rates for amputation of the lower limb were dramatically higher in both males and females with diabetes compared to those without diabetes, (Figure 17). Rates were higher for males than for females in all five fiscal years and in both those with and those without diabetes, but particularly among those with diabetes.

Figure 17: Crude hospital separation rates for **lower limb amputation** per 1,000 persons ≥20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



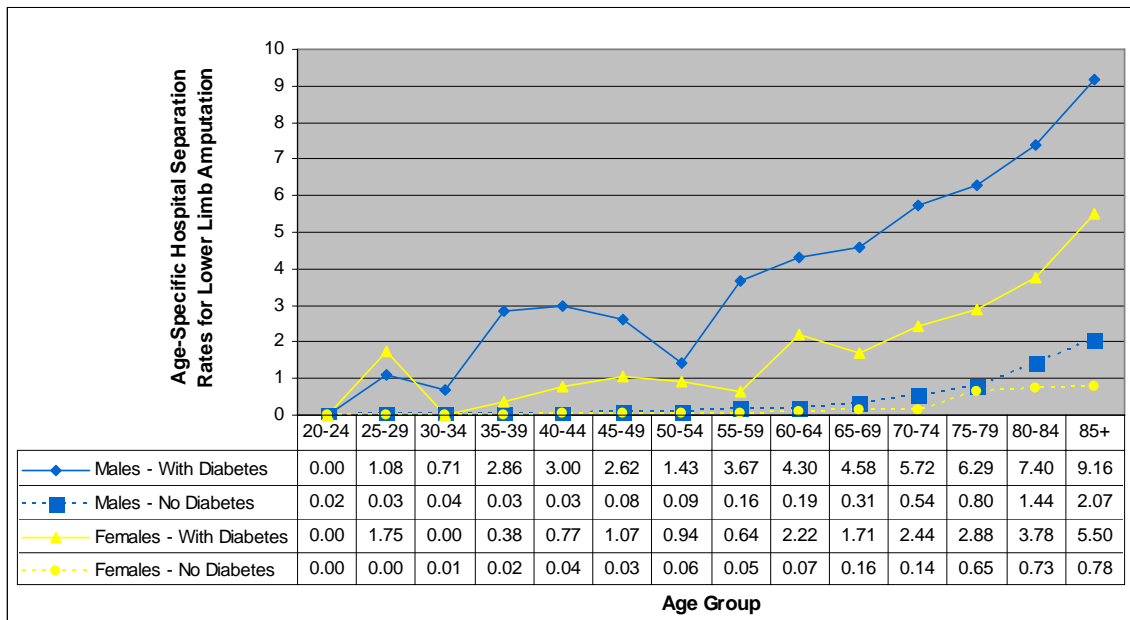
Age-Specific Rates

In the younger age groups, hospital separation rates for lower limb amputation among those with diabetes, fluctuated inconsistently due to the small number of cases (Figure 18). After the 20 to 24 year age group in males and the 30 to 34 year age group in females, rates among those with diabetes were considerably higher than among those

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without diabetes. In those without diabetes, rates generally increased with age; among those with diabetes, there was no consistent trend until the 50 to 54 year age group in males and the 55 to 59 year age group in females, when rates began to increase more dramatically and more consistently with increasing age. Rates in males exceeded those in females, with the exception of those with diabetes in the 25 to 29 year age group and those without diabetes in the 40 to 44 year age group, where the reverse was true.

Figure 18: Age-specific hospital separation rates for **lower limb amputation** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



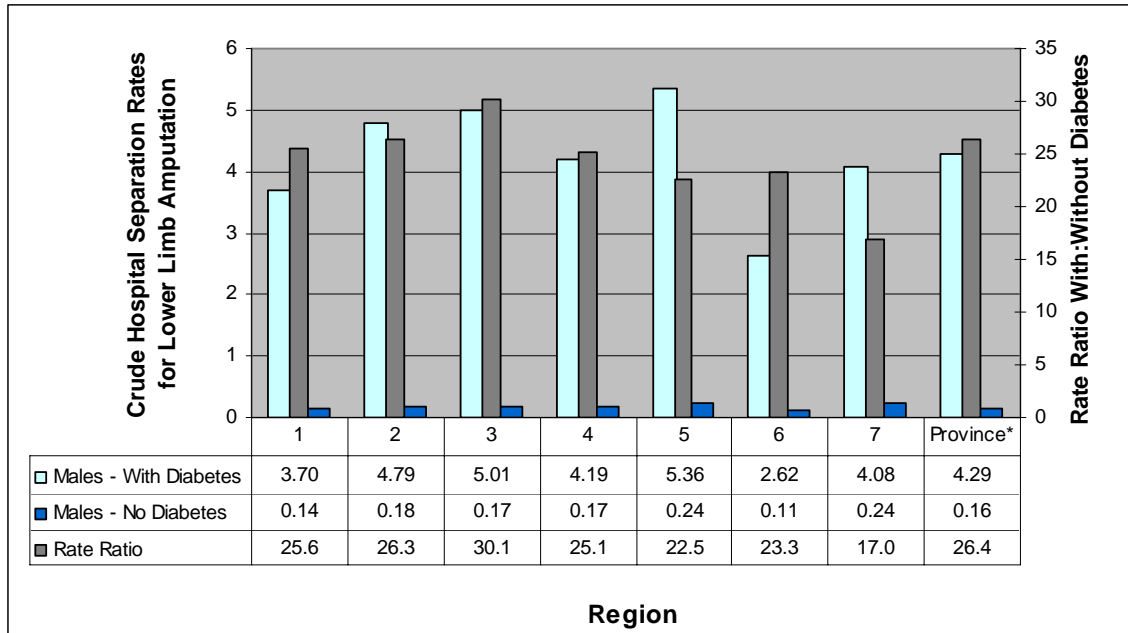
Rates by Region

Hospital separation rates for lower limb amputation were dramatically higher in those with diabetes compared to those without, in both genders and across the seven health regions (Figures 19 and 20).

In males with diabetes rates varied from 2.62 per 1,000 in Region 6 to 5.36 in Region 5. For males without diabetes, rates varied from 0.11 per 1,000 in Region 6 to 0.24 in Regions 5 and 7.

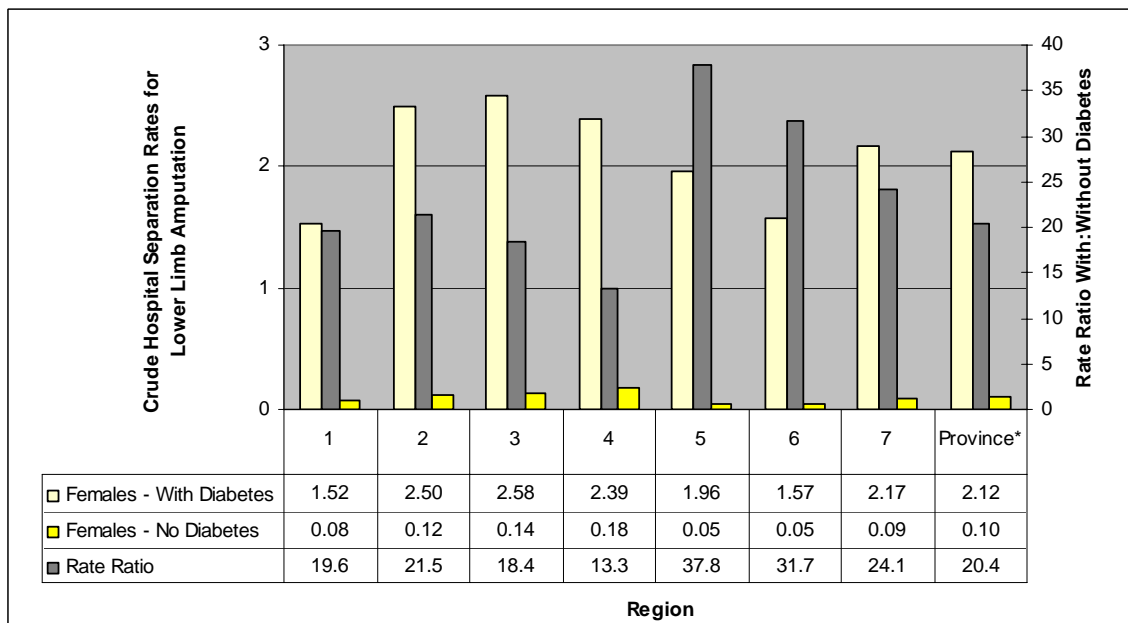
For females with diabetes, rates varied from 1.52 per 1,000 in Region 1 to 2.58 in Region 3. For females without diabetes rates varied from 0.05 per 1,000 in Regions 5 and 6, to 0.18 in Region 4.

Figure 19: Crude hospital separation rates for **lower limb amputation** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Figure 20: Crude hospital separation rates for **lower limb amputation** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Ratio of Hospital Separation Rates With Versus Without Diabetes

In New Brunswick, the hospital separation rate for lower limb amputation was 26.4 times higher in males with diabetes compared to those without diabetes. The ratio of hospital separation rates with versus without diabetes in males varied from 17.0 in Region 7 to 30.1 in Region 3 (right-sided y-axis, Figure 19).

For females in New Brunswick, the hospital separation rate was 20.4 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes in females varied from 13.3 in Region 4, to 37.8 in Region 5 (right-sided y-axis, Figure 20).

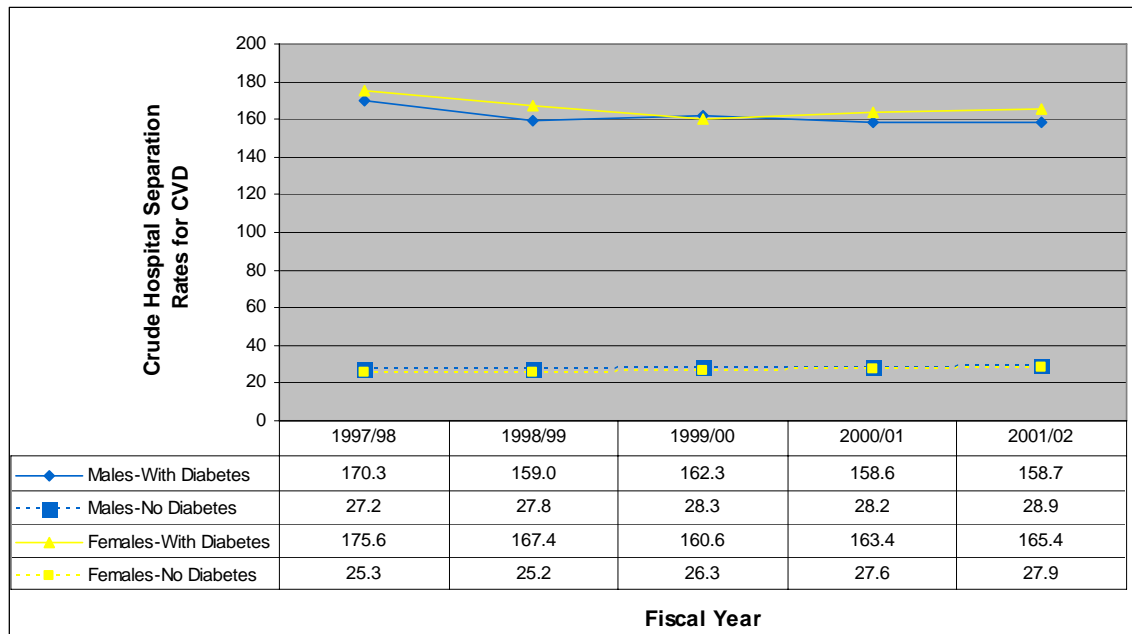
Cardiovascular Disease

(ICD-9CM: 390-448)

Cardiovascular disease (heart disease and stroke) is the number one cause of death among Canadians, accounting for 36% of all deaths.⁶ It is the third highest cause of potential years of life lost prior to age 75.⁶ The incidence of cardiovascular disease and many of the risk factors leading to cardiovascular disease are increased by diabetes. In this section, cardiovascular disease does not include stroke; stroke as a co-morbidity of diabetes, will be examined separately.

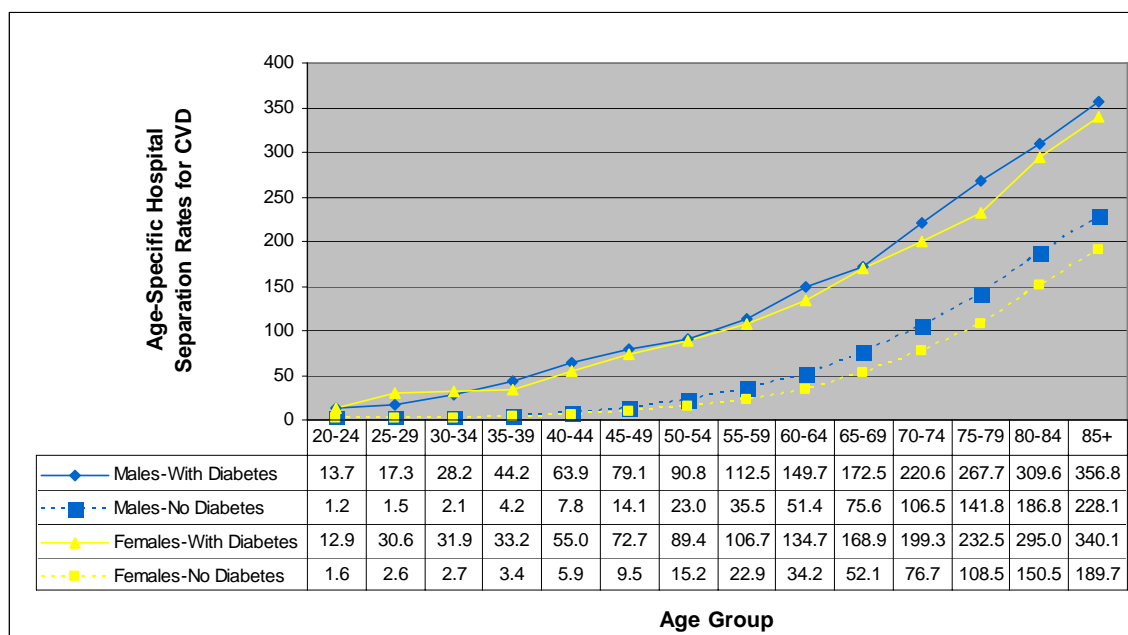
Hospital separation rates for cardiovascular disease (CVD) were significantly higher in both genders among those with diabetes compared to those without diabetes (Figure 21). Rates were similar between genders although among those with diabetes, rates were on average slightly higher in females than in males with the reverse being true among those without diabetes.

Figure 21: Crude hospital separation rates for **cardiovascular disease** (CVD) per 1,000 persons ≥20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Age-Specific Rates

Figure 22: Age-specific hospital separation rates for **cardiovascular disease (CVD)** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



Hospital separation rates for CVD increased with age in both genders, for both those with and without diabetes (Figure 22). Rates among those with diabetes were higher than in those without, in both genders and across all age groups. In those without diabetes, rates were higher in males than in females except in the younger age groups, from 20 to 34 years, where the reverse was true. In those with diabetes, rates were also higher in males than in females, with the exception of those aged 25 to 34 years, where female rates exceeded male rates.

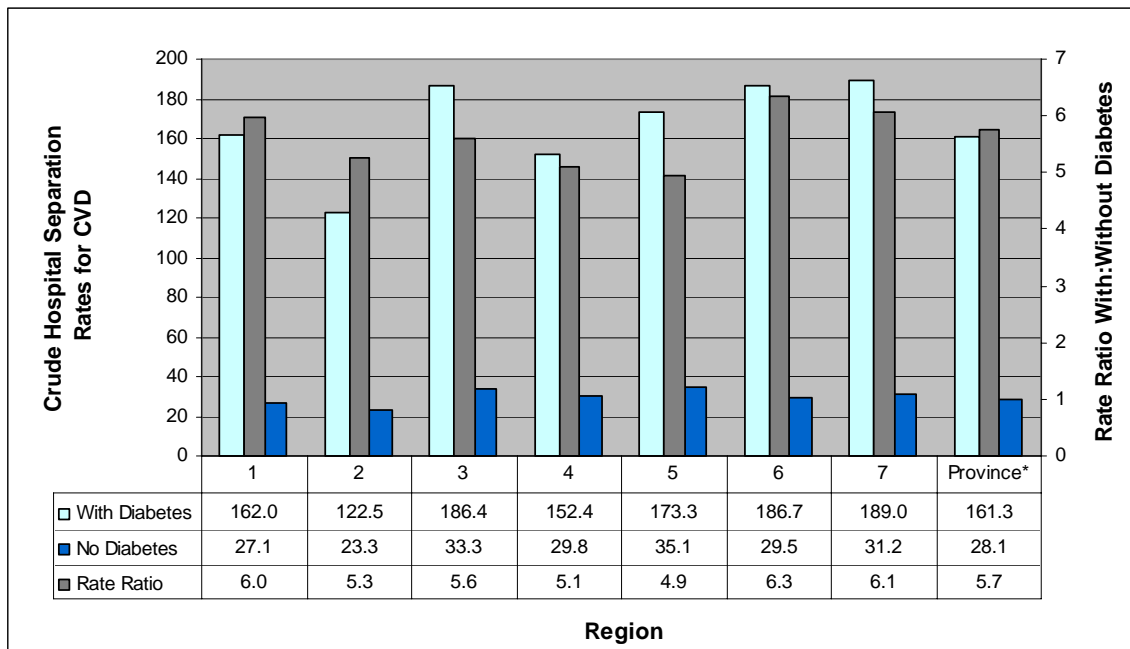
Rates by Region

Hospital separation rates for CVD were considerably higher in those with diabetes compared to those without diabetes, for both genders and across the seven health regions (Figures 23 and 24).

In males with diabetes, rates varied from 122.5 per 1,000 in Region 2 to 189.0 in Region 7, (Figure 23). For males without diabetes, rates varied from 23.3 per 1,000 in Region 2 to 35.1 in Region 5.

Rates in females with diabetes varied from 120.1 per 1,000 in Region 2 to 196.0 in Region 6. In females without diabetes, rates varied from 20.9 per 1,000 in Region 2 to 35.2 in Region 5.

Figure 23: Crude hospital separation rates for **cardiovascular disease (CVD)** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

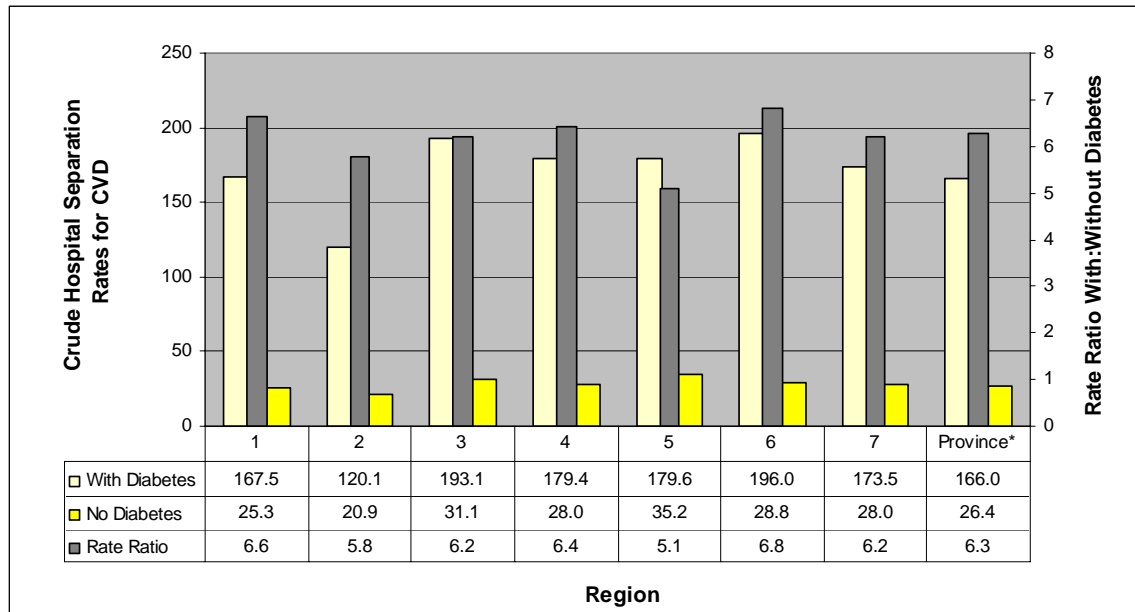
Ratio of Hospital Separation Rates With Versus Without Diabetes

Hospital separations for CVD in New Brunswick males with diabetes were 5.7 times higher than in males without diabetes. The ratio of hospital separations with versus without diabetes for males was highest in Region 6 at 6.3 and lowest in Region 4 at 5.1 (right-sided x-axis, Figure 23).

Hospital separations for CVD in New Brunswick females with diabetes, were 6.3 times higher than among those without diabetes. The ratio of hospital separations with versus without diabetes for females was highest in Region 6 at 6.8 and lowest in Region 5 at 5.1 (right-sided x-axis, Figure 24).

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Figure 24: Crude hospital separation rates for **cardiovascular disease (CVD)** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



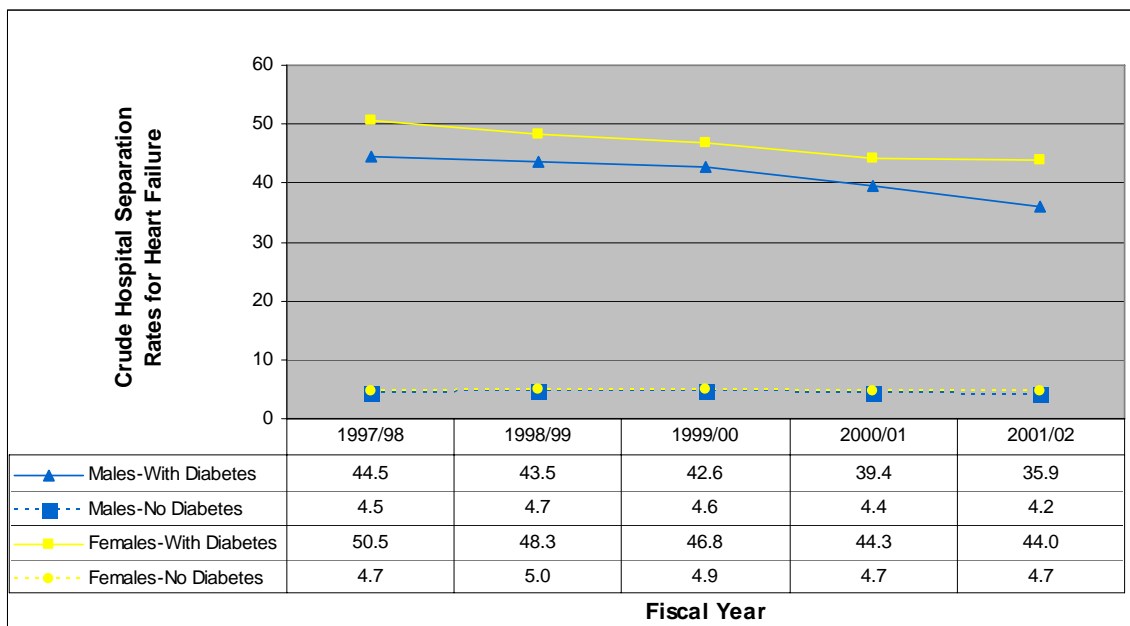
* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Heart Failure

(ICD-9CM: 428)

Hospital separations rates for heart failure among females with diabetes exceeded rates in males with diabetes (Figure 25). For those without diabetes, rates were very similar between genders. For both genders, rates were significantly higher among those with diabetes compared to those without, for all five fiscal years examined.

Figure 25: Crude hospital separation rates for **heart failure** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Age-Specific Rates

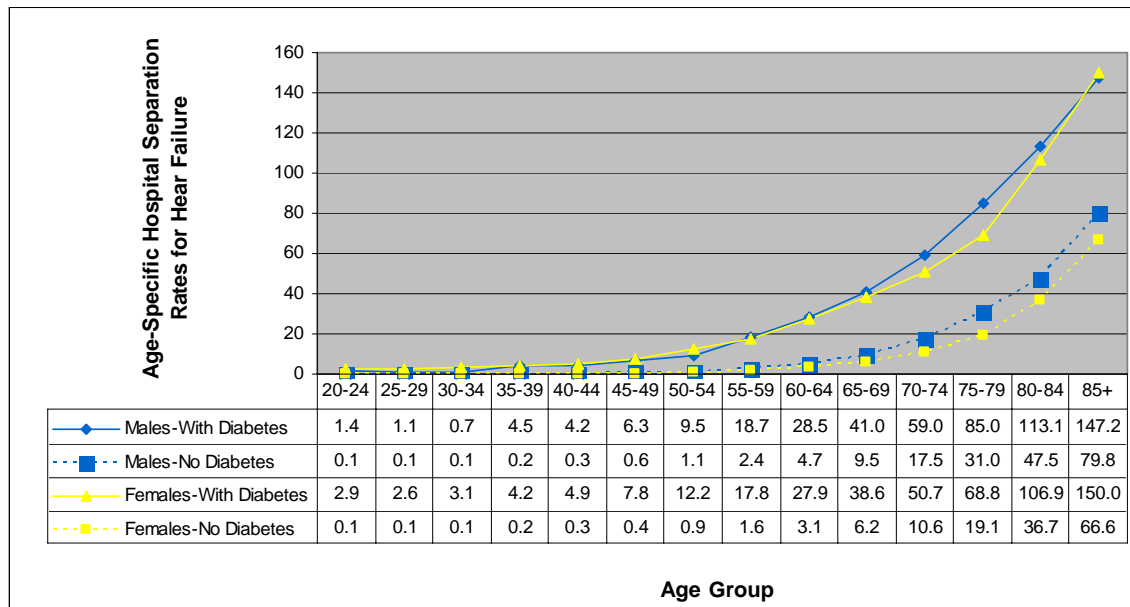
Hospital separation rates for heart failure generally increased with age in both genders and for both those with and without diabetes, although among those with diabetes this trend was inconsistent in males less than 45 years of age and in females less than 35 years of age (Figure 26). Rates among those with diabetes were higher than among those without for both genders and across all age groups.

In those without diabetes, male rates exceeded female rates from the 45 to 49 year age group and over. In those with diabetes, male rates exceeded female rates from the 55 to 59 year age group, up to and including the 80 to 84 year age group. The reverse was true from the 20 to 24 year age group to the 50 to 54 year age group, where rates in

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females with diabetes exceeded rates in males, with the exception of the 35 to 39 year age group.

Figure 26: Age-specific hospital separation rates for **heart failure** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



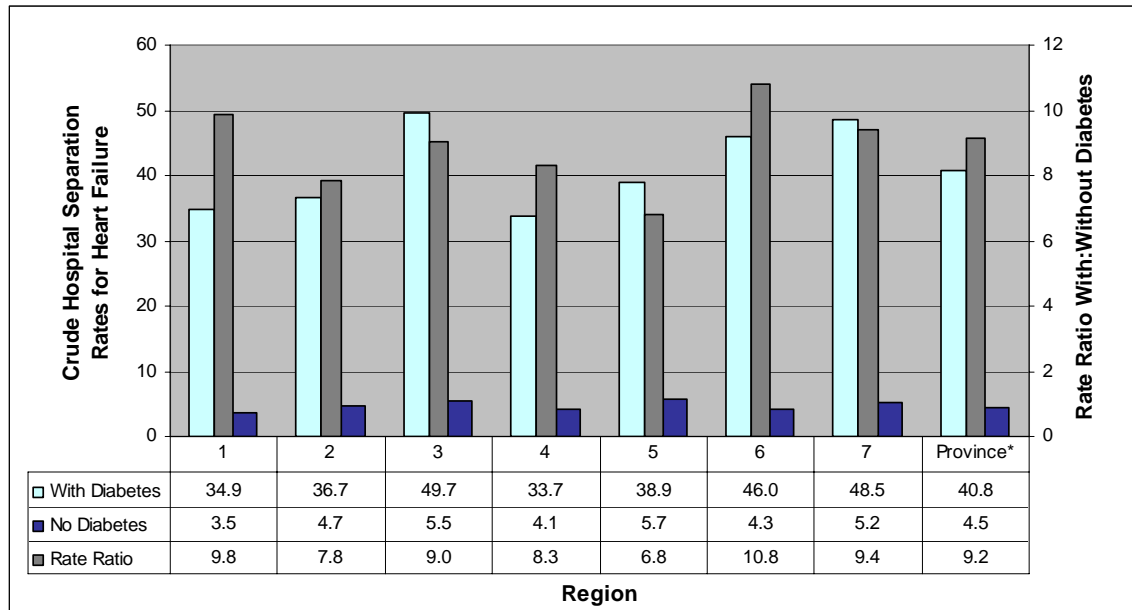
Rates by Region

Hospital separation rates for heart failure in both males and females, were significantly higher in those with diabetes than in those without, across the seven regions (Figures 27 and 28).

In males with diabetes, rates varied from 33.7 per 1,000 in Region 4 to 49.7 in Region 3. In males without diabetes, rates varied from 3.5 per 1,000 in Region 1 to 5.7 in Region 5.

In females with diabetes, rates varied from 40.0 per 1,000 in Regions 1 and 4 to 55.9 in Region 3. In females without diabetes, rates varied from 3.7 per 1,000 in Region 1 to 6.6 in Region 5.

Figure 27: Crude hospital separation rates for **heart failure** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

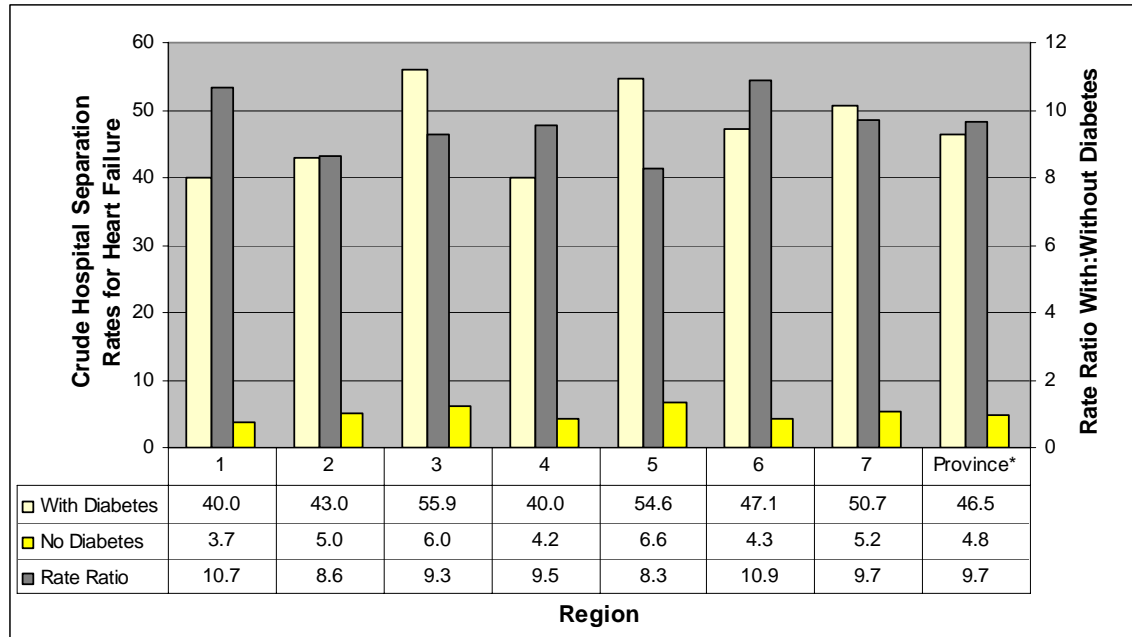
Ratio of Hospital Separation Rates With Versus Without Diabetes

The hospital separation rate for heart failure in New Brunswick males was 9.2 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes was lowest in Region 2 at 7.8 and highest in Region 6 at 10.8 (right-sided x-axis, Figure 27).

The hospital separation rate for heart failure in New Brunswick females was 9.7 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes in females was lowest in Region 5 at 8.3 and highest in Region 6 at 10.9 (right-sided x-axis, Figure 28).

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Figure 28: Crude hospital separation rates for **heart failure** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

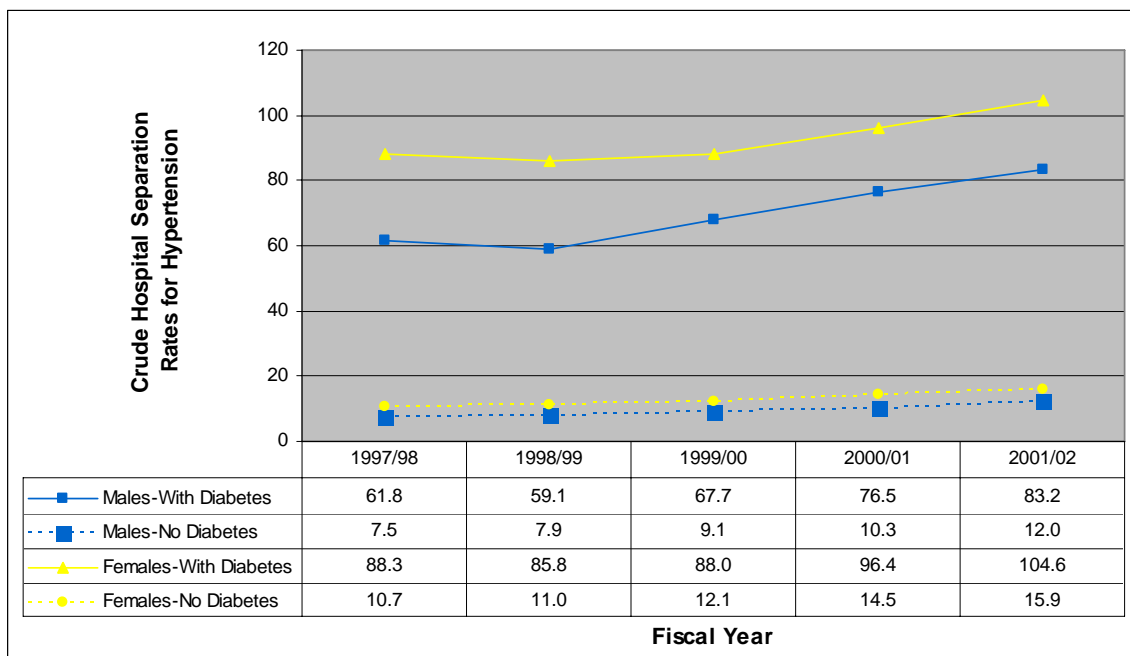
Hypertension (detected in hospital)

(ICD-9CM: 401-405)

According to the 2000 Report by the Heart and Stroke Foundation of Canada, *The Changing Face of Heart Disease and Stroke in Canada*, “adult onset diabetes (often referred to as type 2 diabetes), is a significant risk factor in the development of high blood pressure...”⁶

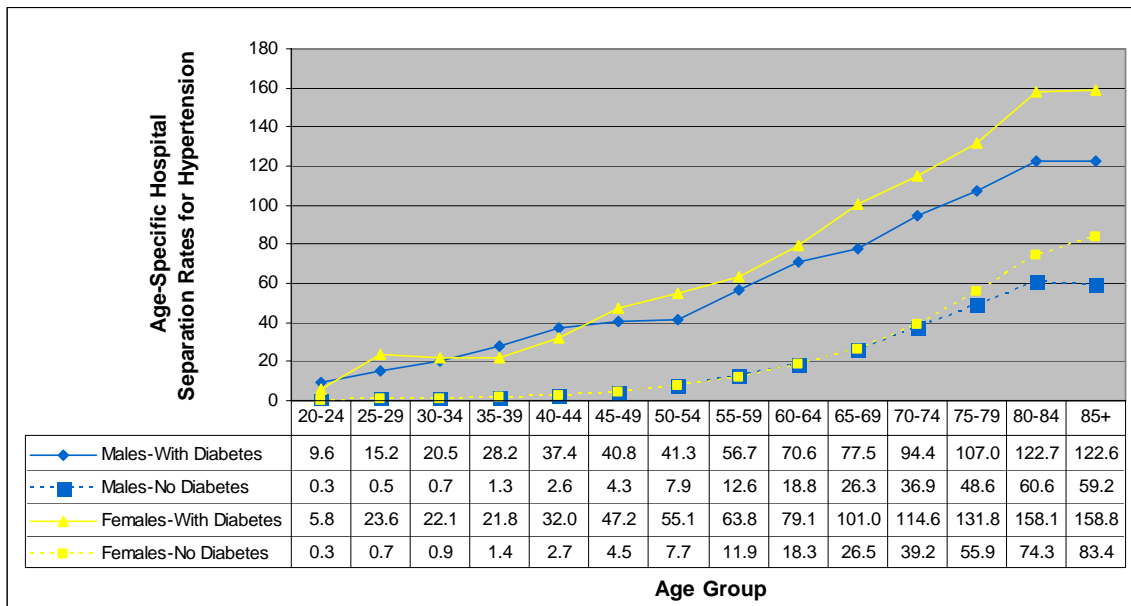
Figure 29 shows that rates of hospital separations for hypertension (detected in hospital) in both genders were markedly higher among those with diabetes than among those without, for all five fiscal years in the reporting period. Rates were higher in females than in males in both those with and those without diabetes, although the difference was more striking among those with diabetes.

Figure 29: Crude hospital separation rates for **hypertension** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Age-Specific Rates

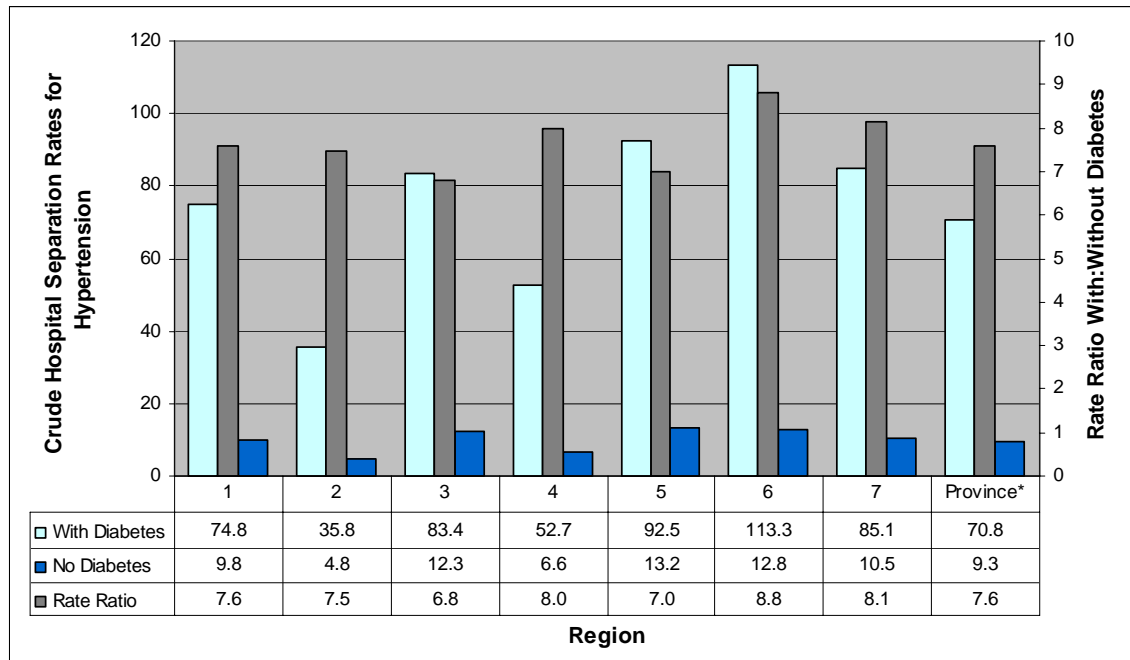
Figure 30: Age-Specific hospital separation rates for **hypertension** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



In Figure 30, hospital separation rates for hypertension among those with diabetes were greater across the age groups, for both genders, than among those without diabetes. Overall, rates increased with age, in both genders and in both those with and without diabetes. Among those with diabetes, rates were greater in females than in males with the exception of the 20 to 24 year age group and in those aged 35 to 44 years, where the reverse was true. In those without diabetes, rates were also greater in females than in males except in the 20 to 24 year age group and in those aged 50 to 64 years, where male rates were greater than female rates.

Rates by Region

Figure 31: Crude hospital separation rates for **hypertension** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Hospital separation rates for hypertension among those with diabetes were much greater than in those without diabetes, in both genders and across the seven regions (Figures 31 and 32).

In males with diabetes, rates varied from 35.8 per 1,000 in Region 2 to 113.3 in Region 6. In males without diabetes, rates varied from 4.8 per 1,000 in Region 2 to 13.2 in Region 5.

In females with diabetes, rates ranged from 44.3 per 1,000 in Region 2 to 147.5 in Region 6. In females without diabetes, rates ranged from 6.3 per 1,000 in Region 2 to 19.5 in Region 5.

Ratio of Hospital Separation Rates With Versus Without Diabetes

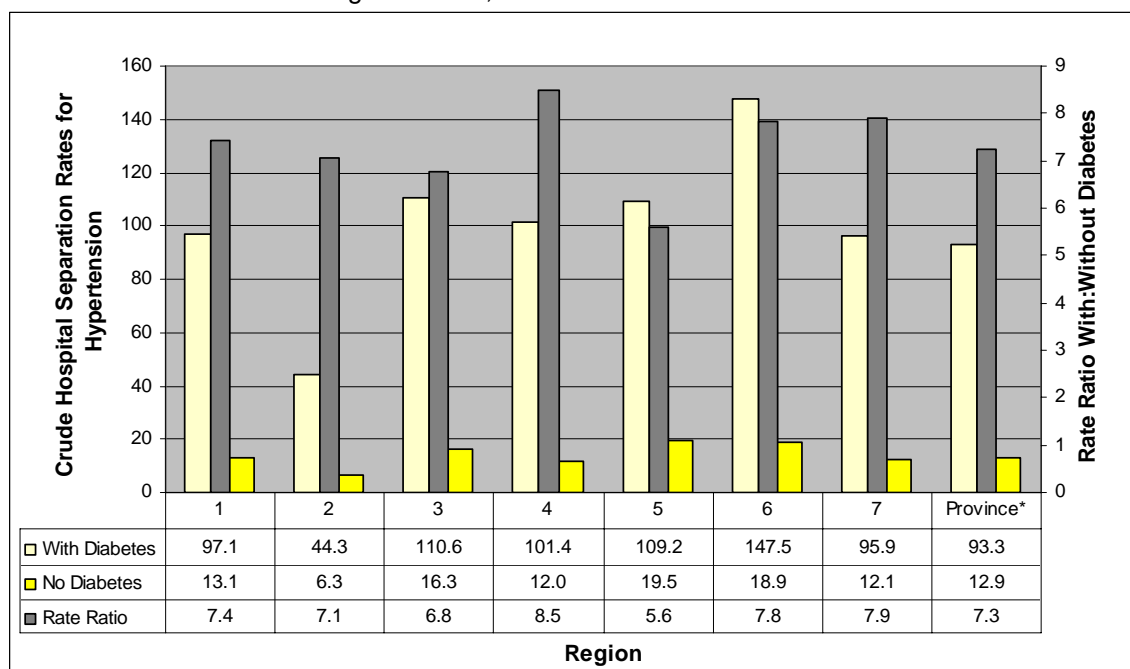
In New Brunswick males, those with diabetes had 7.6 times higher hospital separation rates for hypertension compared to those without diabetes. The ratio of hospital

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separation rates with versus without diabetes was lowest in Region 3 at 6.8 and highest in Region 6 at 8.8 (right-sided x-axis, Figure 31).

In New Brunswick females, those with diabetes had 7.3 times higher hospital separation rates for hypertension compared to those without diabetes (Figure 32). The ratio of hospital separation rates with versus without diabetes was lowest in Region 5 at 5.6 and highest in Region 4 at 8.5 (right-sided x-axis, Figure 32).

Figure 32: Crude hospital separation rates for **hypertension** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

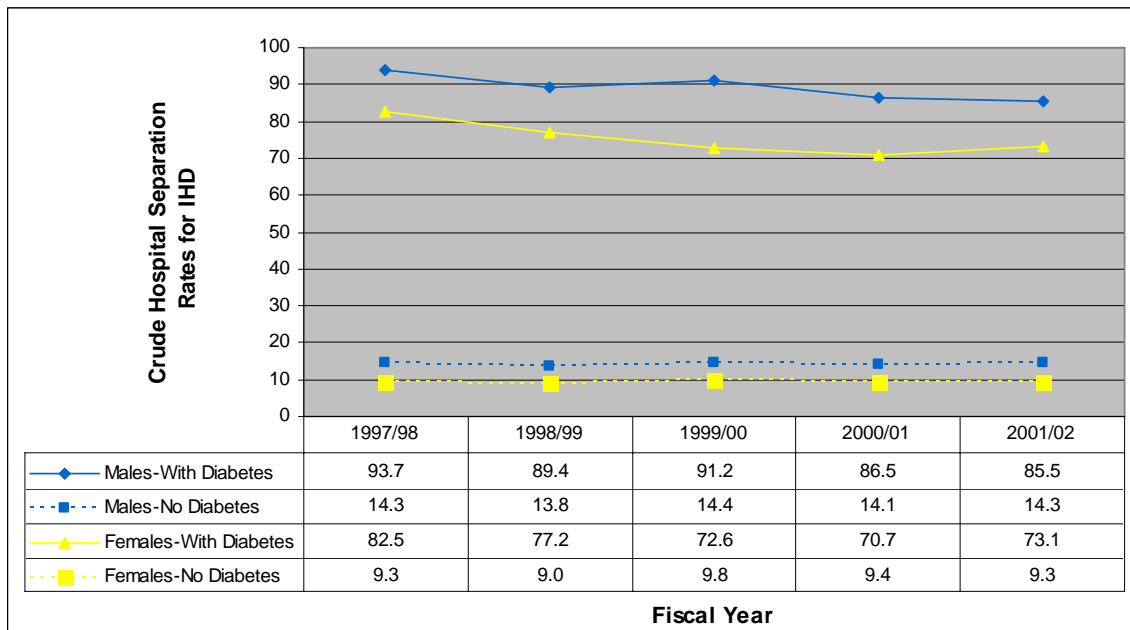
Ischemic Heart Disease

(ICD-9CM: 410-414)

As discussed in the section on acute myocardial infarction, ischemic heart disease is the leading cause of death due to cardiovascular disease, and cardiovascular disease is the leading cause of death in Canada.⁶ Diabetes is a major risk factor in the development of ischemic heart disease.

As seen in Figure 33, hospital separation rates for ischemic heart disease (IHD) in those with diabetes were considerably higher than in those without diabetes, in both genders and in all five fiscal years in the reporting period. Rates in males exceeded those in females in both those with diabetes and in those without.

Figure 33: Crude hospital separation rates for **ischemic heart disease (IHD)** per 1,000 persons ≥20 years of age with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Age-Specific Rates

Figure 34: Age-specific hospital separation rates for **ischemic heart disease (IHD)** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.

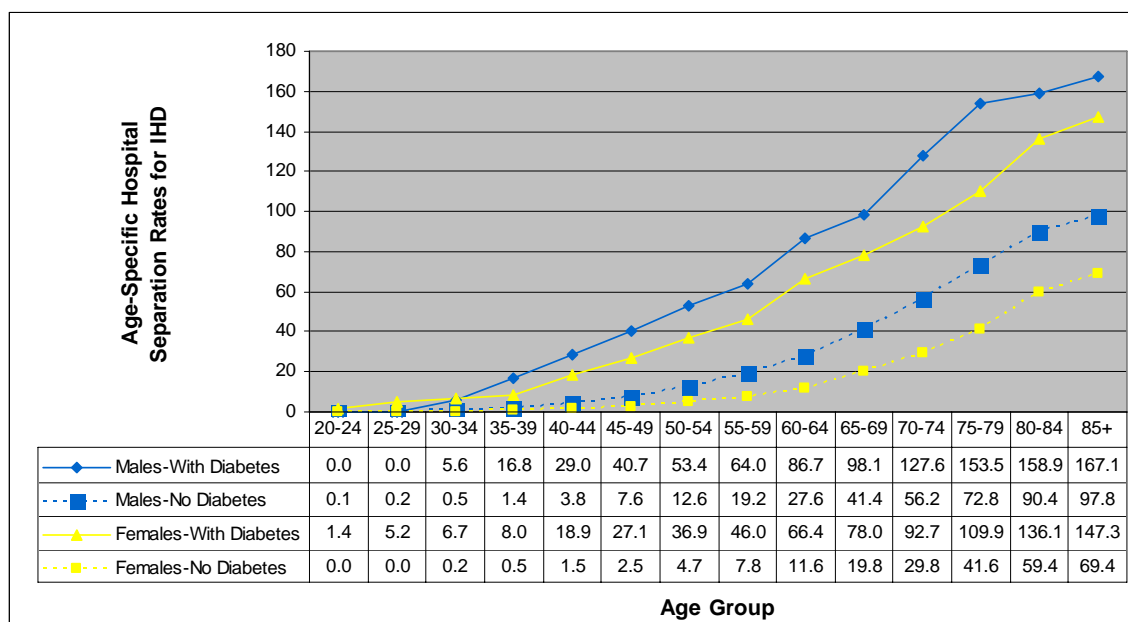


Figure 34 shows an increase with age in hospital separation rates for IHD in both genders and in both those with and without diabetes. Males had higher rates than females in both those with diabetes and in those without, except in the younger age groups with diabetes, from 20 to 29 years, where there were no male cases and in the 30 to 34 year age group where the female rate was greater than the male rate. Rates among those with diabetes were higher than in those without in all age groups, in both genders, again with the exception of males with diabetes aged 20 to 34 years.

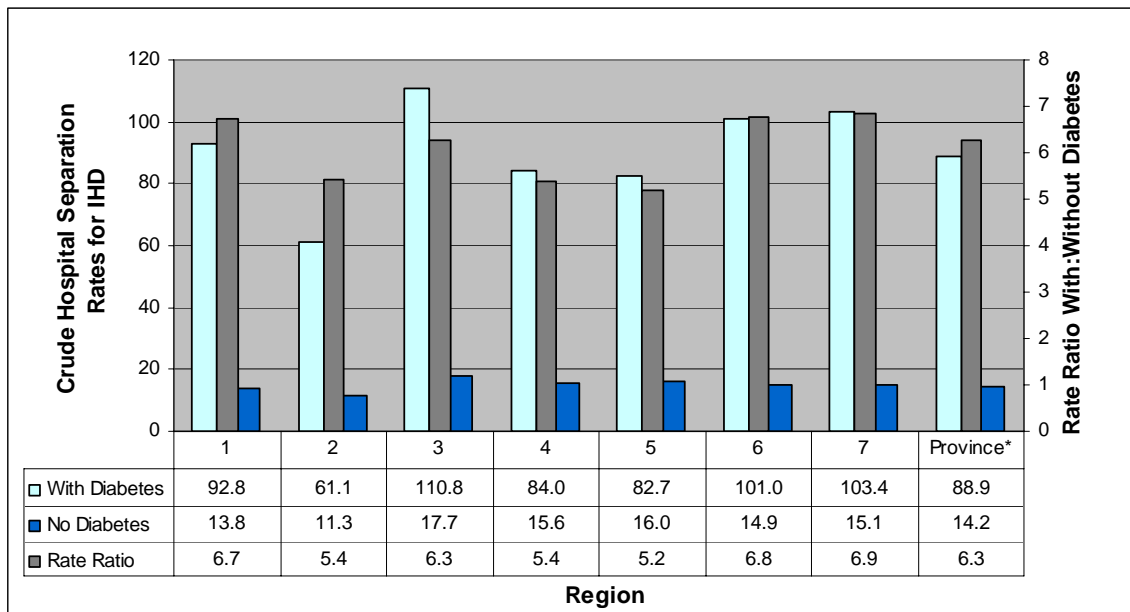
Rates by Region

Hospital separation rates for IHD were markedly higher among those with diabetes than among those without, in both genders and across the seven regions (Figures 35 and 36).

In males with diabetes, rates varied from 61.1 per 1,000 in Region 2 to 110.8 in Region 3. In males without diabetes, rates ranged from 11.3 per 1,000 in Region 2 to 17.7 in Region 3.

In females with diabetes, rates varied from 50.8 per 1,000 in Region 2 to 97.2 in Region 3. In females without diabetes, rates ranged from 6.9 per 1,000 in Region 2 to 12.0 in Region 3.

Figure 35: Crude hospital separation rates for **ischemic heart disease (IHD)** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

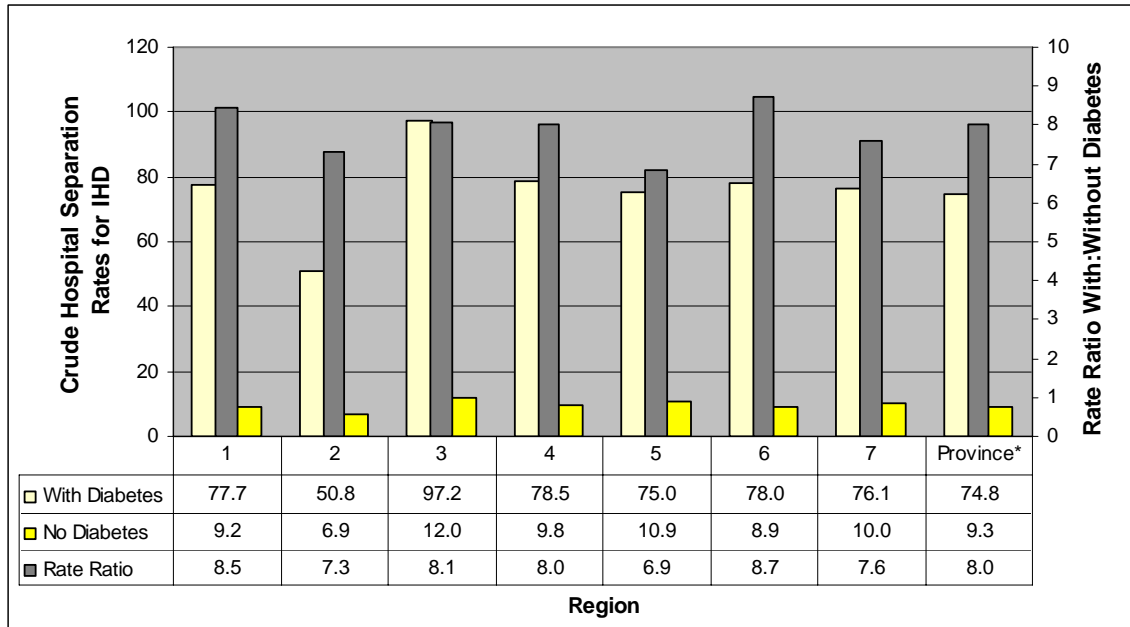
Ratio of Hospital Separation Rates With Versus Without Diabetes

New Brunswick males with diabetes had 6.3 times higher hospital separation rates for IHD than males without diabetes. The ratio of hospital separation rates with versus without diabetes was lowest in Region 5 at 5.2 and highest in Region 7 at 6.9 (right-sided x-axis, Figure 35).

New Brunswick females with diabetes had 8.0 times higher hospital separation rates for IHD than females without diabetes. The ratio of hospital separation rates with versus without diabetes was lowest in Region 5 at 6.9 and highest in Region 6 at 8.7 (right-sided x-axis, Figure 36).

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Figure 36: Crude hospital separation rates for **ischemic heart disease (IHD)** per 1,000 persons ≥ 20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



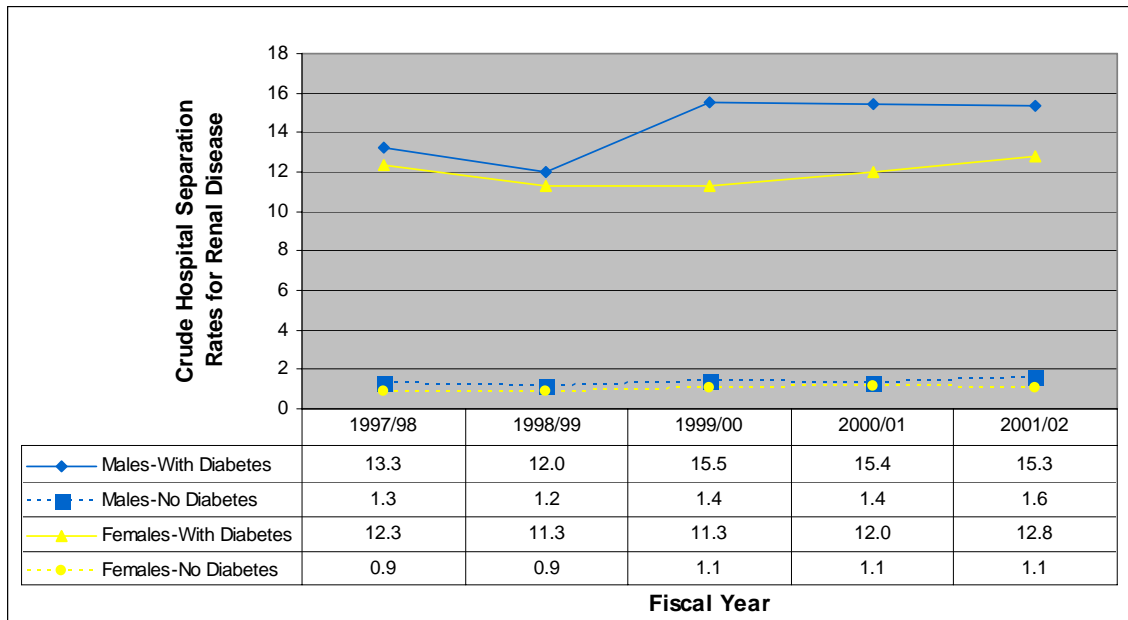
* Provincial data include cases with unknown region of residence which are not reflected in the regional data.

Renal Disease

(ICD-9CM: 585-586)

Renal disease can be a complication of diabetes, which if left untreated results in renal failure.

Figure 37: Crude hospital separation rates for renal disease per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Hospital separation rates for renal disease among those with diabetes of both genders were considerably higher than in those without diabetes (Figure 37). Rates among males were higher than among females, particularly in those with diabetes, for all five fiscal years observed.

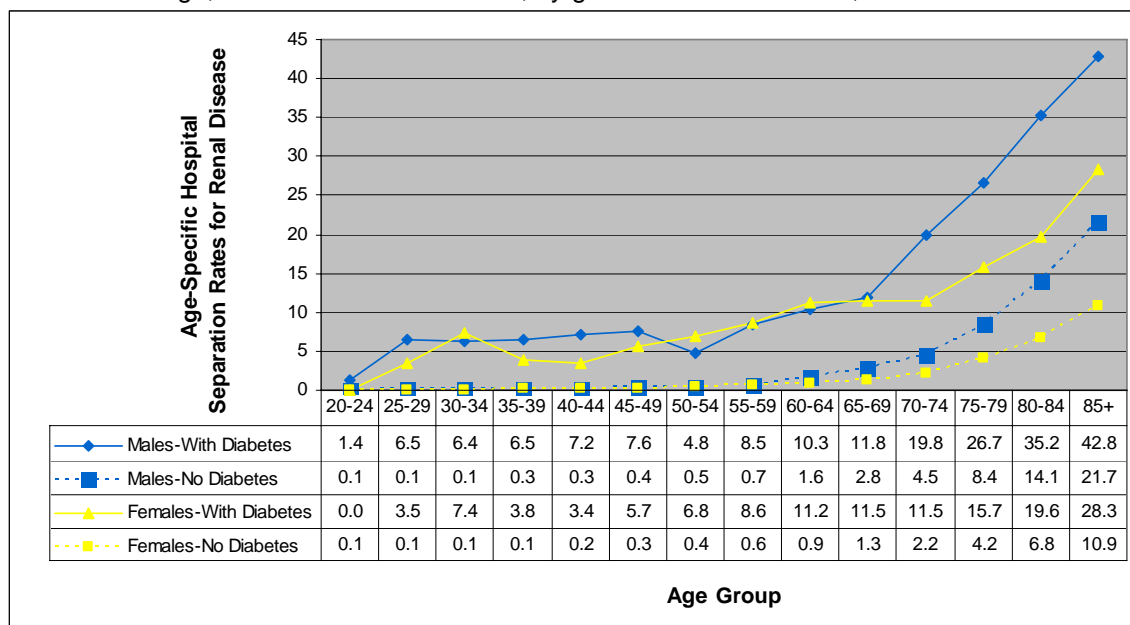
Age-Specific Rates

As seen in Figure 38, hospital separation rates for renal disease among those with diabetes fluctuated until the 55 to 59 year age group in males, when rates began to increase more consistently with age, with a dramatic increase from the 65 to 69 year age group and over. In females, there was no clear pattern in relation to age until rates began increasing steadily in the 45 to 49 year age group and over. Rates in those with diabetes exceeded rates in those without diabetes across all age groups, except in females aged 20 to 24 years, where there were no cases. In those without diabetes,

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male rates exceeded female rates across all age groups. This was not true in those with diabetes; female rates exceeded male rates in the 30 to 34 year age group as well as from ages 50 to 64 years.

Figure 38: Age-specific hospital separation rates for **renal disease** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.



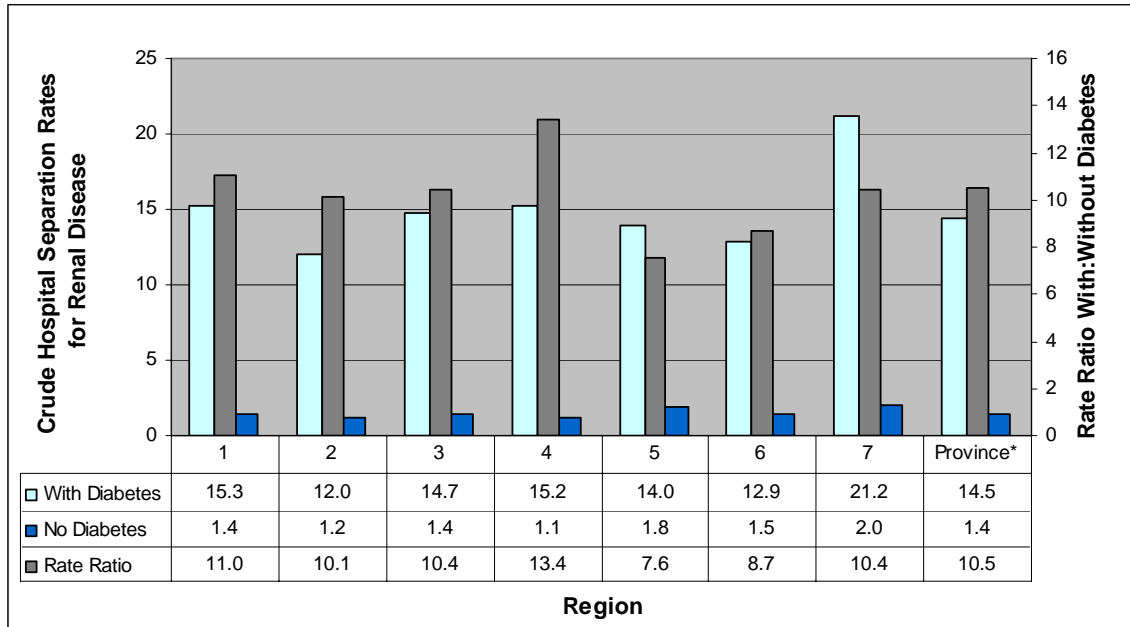
Rates by Region

Hospital separation rates for renal disease in both genders and across the seven health regions were significantly higher in those with diabetes compared to those without (Figures 39 and 40).

In males with diabetes, rates varied from 12.0 per 1,000 in Region 2 to 21.2 in Region 7. In males without diabetes, rates ranged from 1.1 per 1,000 in Region 4 to 2.0 in Region 7.

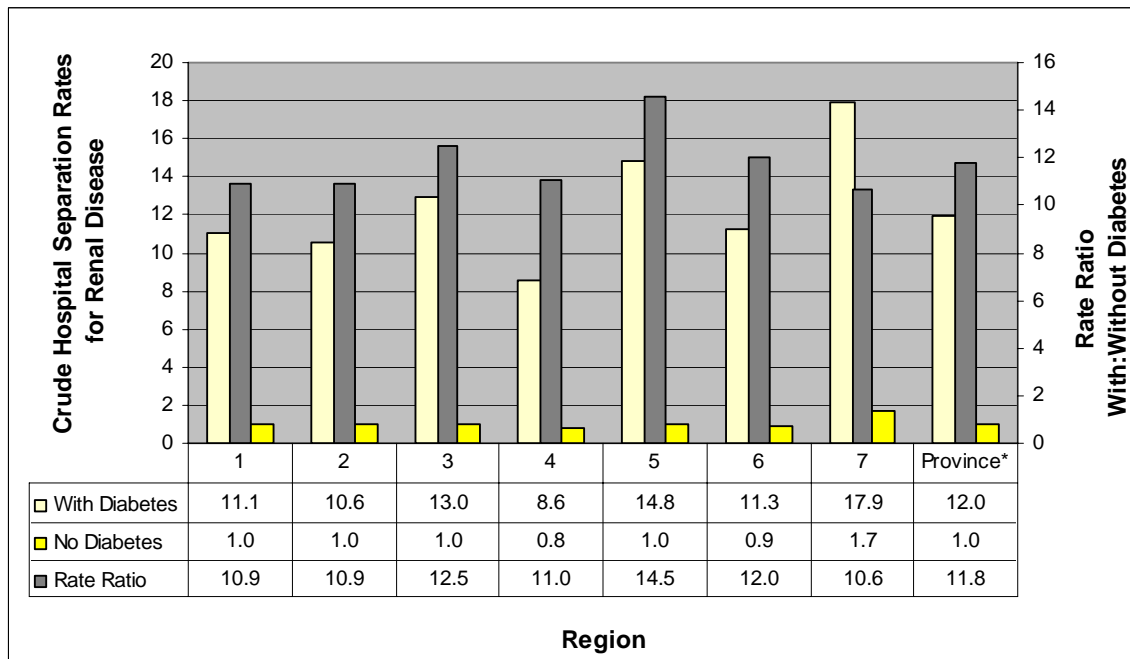
In females with diabetes, rates varied from 8.6 per 1,000 in Region 4 to 17.9 in Region 7. In females without diabetes rates ranged from 0.8 per 1,000 in Region 4 to 1.7 in Region 7.

Figure 39: Crude hospital separation rates for **renal disease** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: **MALES**, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Figure 40: Crude hospital separation rates for **renal disease** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: **FEMALES**, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not reflected in the regional data.

Ratio of Hospital Separation Rates With Versus Without Diabetes

The hospital separation rate for renal disease in New Brunswick males was 10.5 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes was lowest in Region 5 at 7.6 and highest in Region 4 at 13.4 (right-sided x-axis, Figure 39).

The hospital separation rate for renal disease in New Brunswick females was 11.8 times higher in those with diabetes compared to those without. The ratio of hospital separation rates with versus without diabetes was lowest in Region 7 at 10.6 and highest in Region 5 at 14.5 (right-sided x-axis, Figure 40).

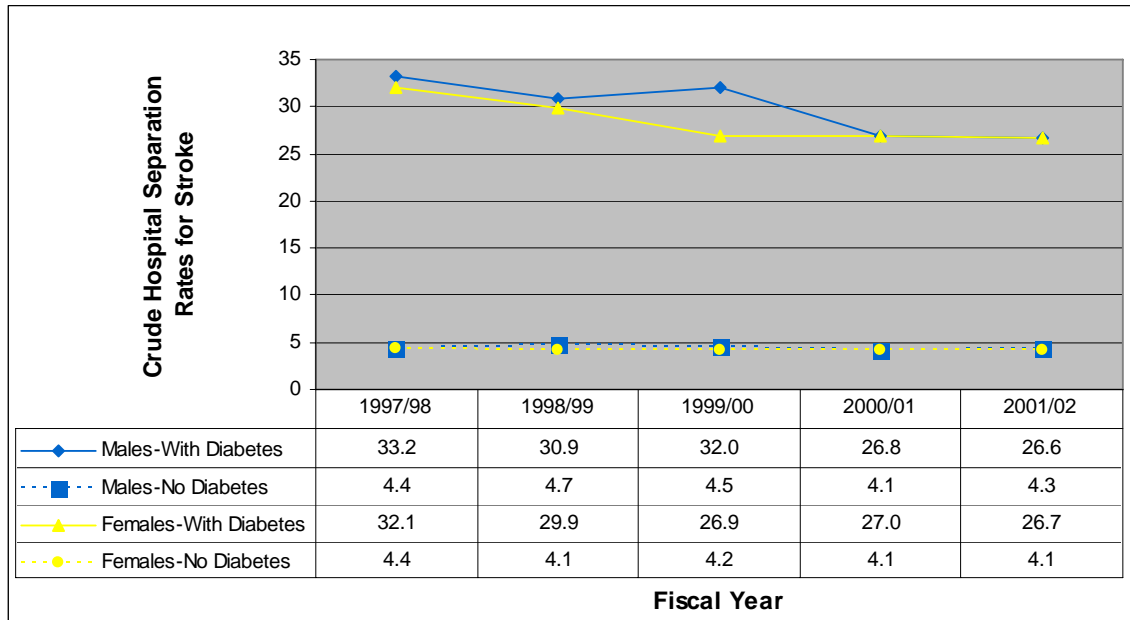
Stroke

(ICD-9CM: 430-438)

Cerebrovascular disease, which includes stroke, is the cause of 7% of deaths due to cardiovascular disease in Canada.⁶ Diabetes is a major risk factor for stroke.

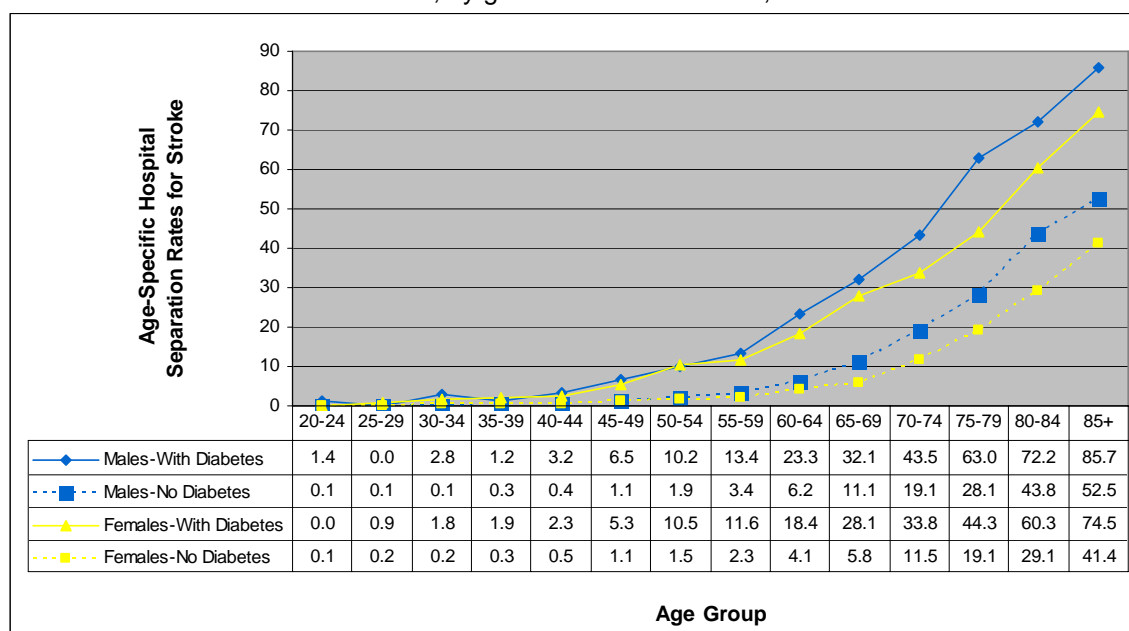
Hospital separation rates for stroke among those with diabetes were markedly higher than among those without diabetes, for all fiscal years examined and in both genders (Figure 41). There was no consistent pattern with respect to gender; rates in females were similar to rates in males in both those with and without diabetes.

Figure 41: Crude hospital separation rates for **stroke** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender and fiscal year: New Brunswick, 1997/98 to 2001/02.



Age-Specific Rates

Figure 42: Age-specific hospital separation rates for **stroke** per 1,000 persons ≥ 20 years of age, with and without diabetes, by gender: New Brunswick, 1997/98 to 2001/02.

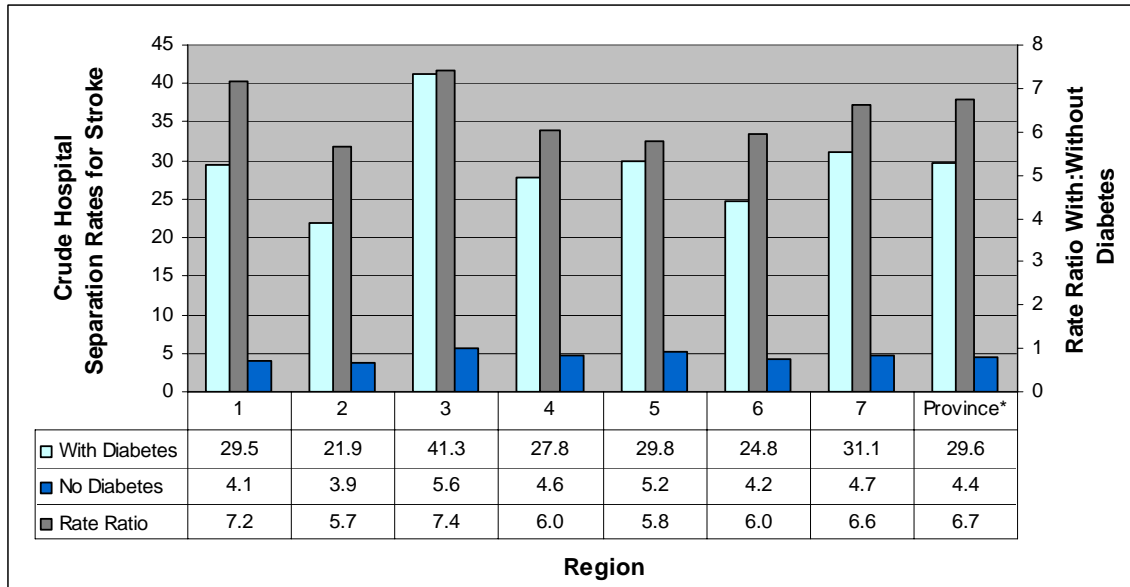


In Figure 42, hospital separation rates for stroke increased with age, with deviations from this pattern in males in the younger age groups; rates fluctuated due to small numbers of cases, from ages 20 to 34 years in those with diabetes and from ages 20 to 29 years in those without diabetes. Rates among those with diabetes began increasing more markedly after the 55 to 59 year age group whereas among those without diabetes, this increase did not occur until the 65 to 69 year age group.

In those with diabetes, rates in males exceeded those in females from the 40 to 44 year age group and over. In those without diabetes, male rates were greater than female rates from the 45 to 49 year age group and over. Rates among those with diabetes were greater than among those without diabetes, with the exception of males in the 25 to 29 year age group and females in the 20 to 24 year age group in which there were no cases of diabetes.

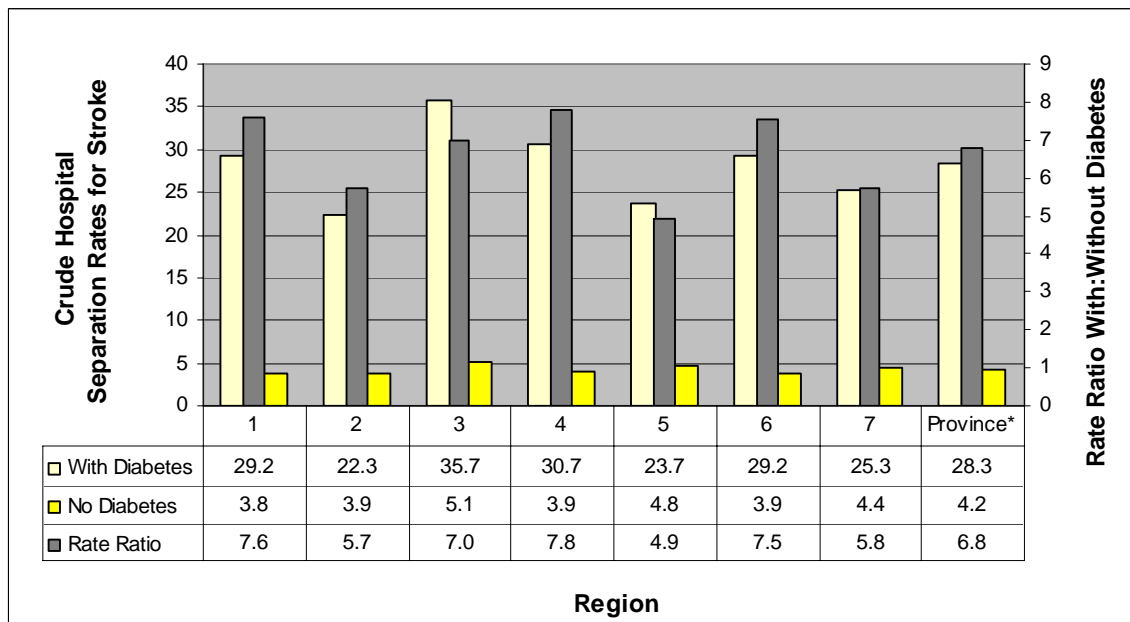
Rates by Region

Figure 43: Crude hospital separation rates for **stroke** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: MALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

Figure 44: Crude hospital separation rates for **stroke** per 1,000 persons ≥20 years of age with and without diabetes, and rate ratio with:without diabetes: FEMALES, New Brunswick and Regions 1 to 7, 1997/98 to 2001/02.



* Provincial data include cases with unknown region of residence which are not represented in the regional data.

CO-MORBIDITIES

Hospital separation rates for stroke were significantly higher in those with diabetes than in those without diabetes, for both genders and across the seven health regions (Figures 43 and 44).

Rates in males with diabetes varied from 21.9 per 1,000 in Region 2 to 41.3 in Region 3. Rates in males without diabetes ranged from 3.9 per 1,000 in Region 2 to 5.6 in Region 3.

Rates in females with diabetes varied from 22.3 per 1,000 in Region 2 to 35.7 in Region 3. Rates in females without diabetes ranged from 3.8 per 1,000 in Region 1 to 5.1 in Region 3.

Ratio of Hospital Separation Rates With Versus Without Diabetes

Hospital separation rates for stroke in New Brunswick males with diabetes were 6.7 times higher compared to rates in males without diabetes. The ratio of hospital separations with versus without diabetes in males was lowest in Region 2 at 5.7 and highest in Region 3 at 7.4 (right-sided x-axis, Figure 43).

In New Brunswick females with diabetes, hospital separations for stroke were 6.8 times higher compared to females without diabetes. The ratio of hospital separations with versus without diabetes in females were lowest in Region 5 at 4.9 and highest in Region 4 at 7.8 (right-sided x-axis, Figure 44).

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ACRONYMS

AMI	Acute Myocardial Infarction
ASIR	Age-Standardized Incidence Rate
ASMR	Age-Standardized Mortality Rate
ASPR	Age-Standardized Prevalence Rate
CCHS	Canadian Community Health Survey
CVD	Cardiovascular Disease
HFUMS	Hospital Financial Utilization Management System
ICD-9CM	International Classification of Disease, 9 th Revision, Clinical Modification
IHD	Ischemic Heart Disease
NDSS	National Diabetes Surveillance System
PHAC	Public Health Agency of Canada

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APPENDIX 1

Comparison of NDSS and Statistics Canada Counts of Population ≥ 20 Year of Age.

Region	Population Counts and Estimates (≥ 20 years of age)	1998/99	1999/00	2000/01	2001/02
1	Statistics Canada Estimate (July count)	140,919	142,502	144,588	146,720
	NDSS Annual Count	141,103	142,050	143,457	145,013
	NDSS:Statistics Canada (%)	100.13	99.68	99.22	98.84
2	Statistics Canada Estimate (July count)	131,254	132,062	130,108	130,723
	NDSS Annual Count	132,858	132,453	133,642	133,650
	NDSS:Statistics Canada (%)	101.22	100.30	102.72	102.24
3	Statistics Canada Estimate (July count)	123,778	125,102	125,620	127,188
	NDSS Annual Count	120,367	120,898	121,831	122,243
	NDSS:Statistics Canada (%)	97.24	96.64	96.98	96.11
4	Statistics Canada Estimate (July count)	40,426	40,675	40,491	40,525
	NDSS Annual Count	41,240	41,246	41,274	41,332
	NDSS:Statistics Canada (%)	102.01	101.40	101.93	101.99
5	Statistics Canada Estimate (July count)	24,121	24,101	23,497	23,168
	NDSS Annual Count	24,546	24,184	24,049	24,070
	NDSS:Statistics Canada (%)	101.76	100.34	102.35	103.89
6	Statistics Canada Estimate (July count)	66,708	66,993	65,798	65,457
	NDSS Annual Count	68,323	67,787	67,462	67,541
	NDSS:Statistics Canada (%)	102.42	101.19	102.53	103.18
7	Statistics Canada Estimate (July count)	37,022	37,313	36,753	36,695
	NDSS Annual Count	38,284	37,968	37,623	37,594
	NDSS:Statistics Canada (%)	103.41	101.76	102.37	102.45
Province	Statistics Canada Estimate (July count)	564,228	568,748	566,855	570,476
	NDSS Annual Count	575,685	574,824	577,581	579,135
	NDSS:Statistics Canada (%)	102.03	101.07	101.89	101.52

APPENDIX 2

Regional Health Authorities

