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Atlantic Region

The Burden of Diabetes in Atlantic Canada

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The Burden of Diabetes in Atlantic Canada

Audrey Layes

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The opinions expressed in this publication are those of the author and do not necessarily reflect the views of the Public Health Agency of Canada.

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For more information contact:
Public Health Agency of Canada
Atlantic Regional Office
1505 Barrington Street, Suite 1525
Halifax, NS B3J 3Y6
Tel: 902-426-2700
Fax: 902-426-9689
Email:ph-sp-info@phac-aspc.gc.ca
Website: www.publichealth.gc.ca/atlantic

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EXECUTIVE SUMMARY

The Burden of Diabetes in Atlantic Canada has been created by the Atlantic Regional Office of the Public Health Agency of Canada to provide timely statistics on diabetes and selected risk factors. This document aims to provide information at a level of detail that is relevant and useful to the diverse population of the region. Prevalence rates are therefore provided separately for men and women, off-reserve aboriginals, African-Canadian populations, francophones, anglophones, certain age groups and health regions within each province.

Diabetes is a chronic condition characterized by the body's inability to produce and/or use insulin properly. Insulin is needed for the body to use blood glucose as an energy source. Type 1 diabetes develops when the body fails to produce insulin. Type 2 diabetes usually results from the body's inability to use insulin and can develop into an inability to produce insulin. A healthy diet, losing excess weight and exercising regularly can significantly reduce the risk of developing type 2 diabetes and minimize the risk of complications in those living with the disease.

Highlights from this scan include:

- In 2009, the prevalence of self-reported diabetes for all of Canada was 6%. Among the Atlantic provinces, Newfoundland and Labrador had the highest prevalence at 8.1%.

- Prevalence of overweight and obesity, which are risk factors for diabetes, was higher in all the Atlantic provinces compared to Canada as a whole in 2008. This higher prevalence persisted when men and women were compared separately.

- Across Canada in 2003, 4.5% of the non-aboriginal population reported a diagnosis of diabetes. Among the aboriginal population living off-reserve, the prevalence was 6.7%. In 2002-2003, 19.7% of First Nations adults living on-reserve reported a diagnosis of diabetes.

This document has been created to serve as a tool to inform stakeholders of the epidemiology of diabetes and selected risk factors for program planning and policy development. It also serves to underline PHAC Atlantic's commitment to identify and recognize the important role of risk factors in diabetes as well as those populations within the region who are at greater risk of developing the disease.

INTRODUCTION

The Burden of Diabetes in Atlantic Canada has been created by the Atlantic Regional Office of the Public Health Agency of Canada to provide timely statistics on diabetes and selected risk factors. It also highlights the impact of diabetes on selected sub-populations within the region.

Diabetes is a chronic condition marked by high levels of blood sugar. The body needs insulin to use blood glucose as an energy source. Diabetes results from the body's inability to sufficiently produce and/or properly use insulin. Diabetes can lead to serious complications such as heart disease, blindness, kidney failure and premature death.

Type 1 diabetes develops when the body fails to produce insulin. It usually develops in childhood or adolescence and it is not preventable.

Type 2 diabetes usually develops after the age of 40 and it is preventable. Type 2 diabetes usually results from the body's inability to use insulin and can develop into an inability to produce insulin. A healthy lifestyle can significantly reduce the risk of developing type 2 diabetes. For those living with diabetes, steps can be taken to manage it effectively, and thereby lower the risk of developing complications. They include eating a healthy diet, losing excess weight and exercising regularly. Weight loss of 5% to 10% has been shown to significantly reduce risk.

Another type of diabetes, gestational diabetes, may occur during pregnancy. It usually disappears after delivery but can increase the risk of developing type 2 diabetes.[1]

Research using the Canadian Community Health Survey has shown that certain racial groups in Canada, such as aboriginal people, south asians and blacks have a significantly higher risk of developing diabetes.[2] Estimates of the prevalence of diabetes in aboriginal people have been found to be as much as 3.6 (men) and 5.3 (women) times higher compared to the Canadian population as a whole.[3]

Individuals and families bear the cost of diabetes through medical expenses, diminished quality of life and deteriorating health. These personal burdens translate into significant costs for Canadian society as a whole. With the aging of Canada's population, total direct

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[1] *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2008*. pp. 5-6.
[2] Gerry Veenstra, *Racialized identify and health in Canada: Results from a nationally representative survey, Social Science and Medicine 2009 69; 538-542.*
[3] T. Kue Young, Jeff Reading, Brenda Elias, John O'Neil, *Type 2 diabetes mellitus in Canada's First Nations: status of an epidemic in progress, CMAJ 2000 163(5); 561-6.*

health care costs associated with diabetes are expected to increase to over 8 billion dollars annually by 2016.[4]

Several serious health problems are common among individuals with diagnosed diabetes. These include chronic kidney disease, lower limb amputations and cardiovascular diseases such as hypertensive disease, heart failure, heart attack, ischemic heart disease and stroke. [5]

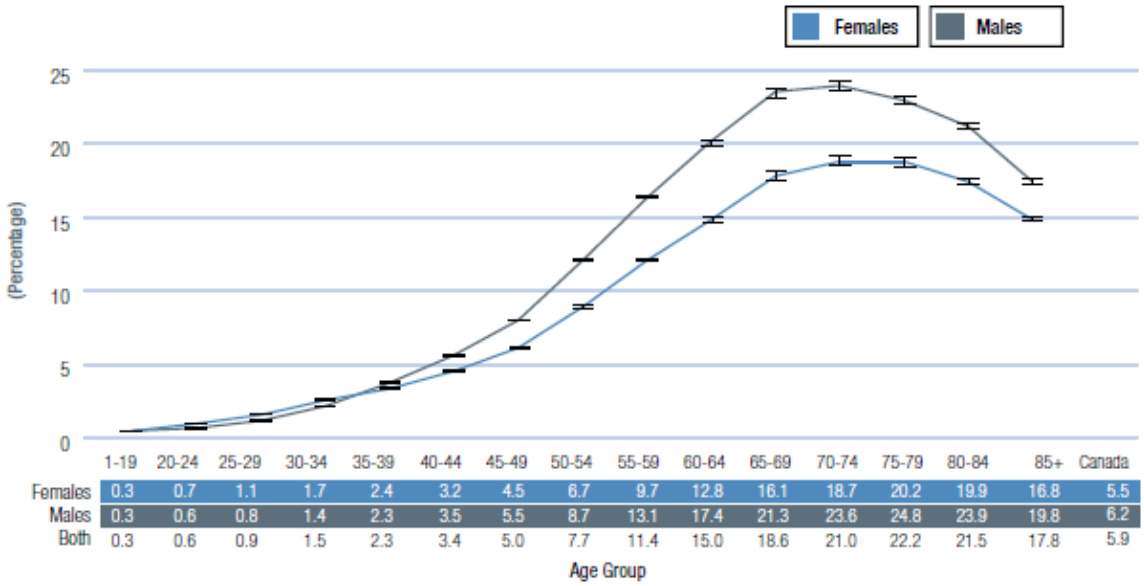
A variety of data sources using different methodologies were used to create this document. Therefore, the data in figures 1, 2, 3 and table 2 include rates of type 1 and 2 diabetes but exclude rates of gestational diabetes. All other diabetes data in this document include type 1, type 2 and gestational diabetes.

This document aims to provide information at a level of detail that is relevant and useful to the diverse population of this region. Prevalence rates are therefore provided separately for men and women, off-reserve aboriginals, African-Canadian populations, francophones, anglophones, certain age groups and health regions within each province. National Canadian prevalence and incidence rates are also provided for comparison.

[4] Arto Ohinmaa , Philip Jacobs, Jeffrey Johnson, *The projection of prevalence and cost of diabetes in Canada: 2000-2016*, *Can J Diabetes* 2004 28(2) 1-8.
[5] *Diabetes in Canada: Highlights from the National Diabetes Surveillance System 2004-2005.* p 1-4.

PREVALENCE IN CANADA

Figure 1:
Prevalence percentages of diagnosed diabetes among people aged 1 year and older by age group and sex, Canada, 2005-2006[6]



	1-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Canada
Females	0.3	0.7	1.1	1.7	2.4	3.2	4.5	6.7	9.7	12.8	16.1	18.7	20.2	19.9	16.8	5.5
Males	0.3	0.6	0.8	1.4	2.3	3.5	5.5	8.7	13.1	17.4	21.3	23.6	24.8	23.9	19.8	6.2
Both	0.3	0.6	0.9	1.5	2.3	3.4	5.0	7.7	11.4	15.0	18.6	21.0	22.2	21.5	17.8	5.9

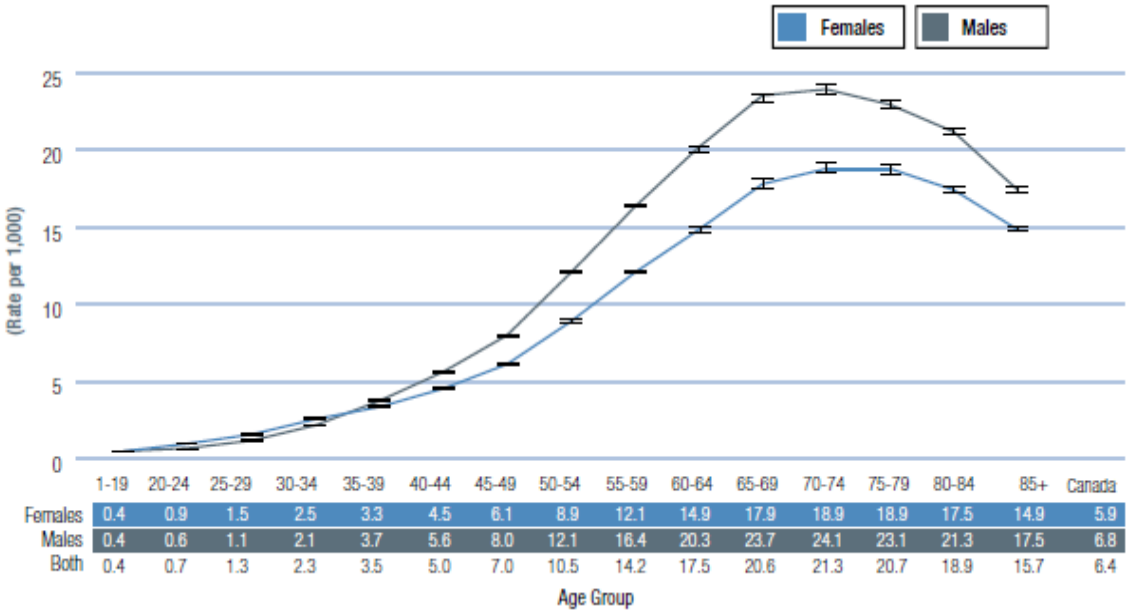
Age Group

In 2005-2006, the prevalence of diagnosed diabetes was lower among children and adolescents than adults. The rate was greatest among adults aged 75 to 79 at about 22% prevalence.

[6] *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2008*. Catalogue number HP32-2/1-2008. p. 10. Public Health Agency of Canada, using NDSS administrative data files contributed by provinces and territories, as of August, 2008. Data for Nunavut were unavailable. The 95% confidence interval shows an estimated range of values which is likely to include the true incidence rate 19 times out of 20.

INCIDENCE IN CANADA

Figure 2:
Incidence rate of diagnosed diabetes among people aged 1 year and older, by age group and sex, Canada, 2005-2006[7]



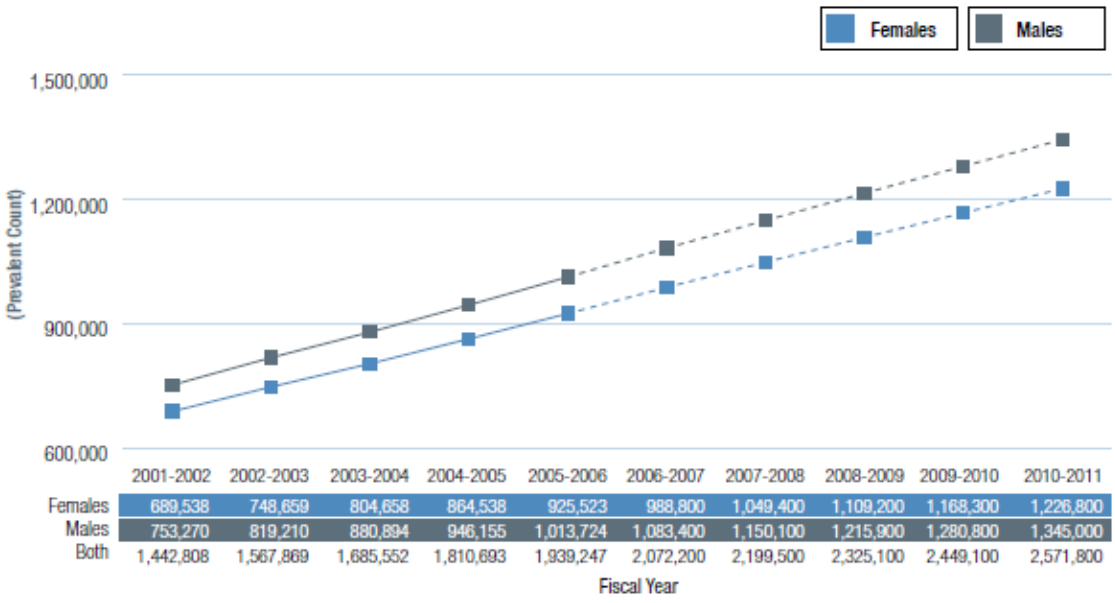
In 2005-2006, 199,471 individuals were newly diagnosed with diabetes – a rate of 6.4 per 1,000 in the population aged one and older.

The incidence rates of diagnosed diabetes in 2005-2006 were lower for children and adolescents than for adults. The rates rose steeply after age 45. Men over age 40 had a significantly higher rate of diagnosed diabetes than women.

[7] *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2008*. p 14. Public Health Agency of Canada, using NDSS administrative data files contributed by provinces and territories, as of August, 2008. Data for Nunavut were unavailable. The 95% confidence interval shows an estimated range of values which is likely to include the true incidence rate 19 times out of 20.

PROJECTION FOR CANADA

Figure 3:
Observed and projected prevalence of diagnosed diabetes among people aged 1 year and older, by sex observed: 2001-2002 to 2005-2006 and projected: 2006-2007 to 2010-2011[8]



Between 2006 and 2011, an increase of about 33% in diagnosed diabetes cases is expected. Due to an increased risk of developing diabetes over the age of 40, the entrance of the baby boom generation into the older age groups, and the rise in the prevalence of obesity, 35% of people with diagnosed diabetes will be 50 to 64 years old by 2010-2011. For a diagram of the demographic distribution in Canada in 2006, see Figure 4.

[8] *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2008*. p. 12. Public Health Agency of Canada, using NDSS administrative data files contributed by provinces and territories, as of August, 2008. Data for Nunavut were unavailable. Counts were rounded to the nearest 100.

AGE DISTRIBUTION IN CANADA

Figure 4:
Age pyramid of the Canadian population in 2006[9]

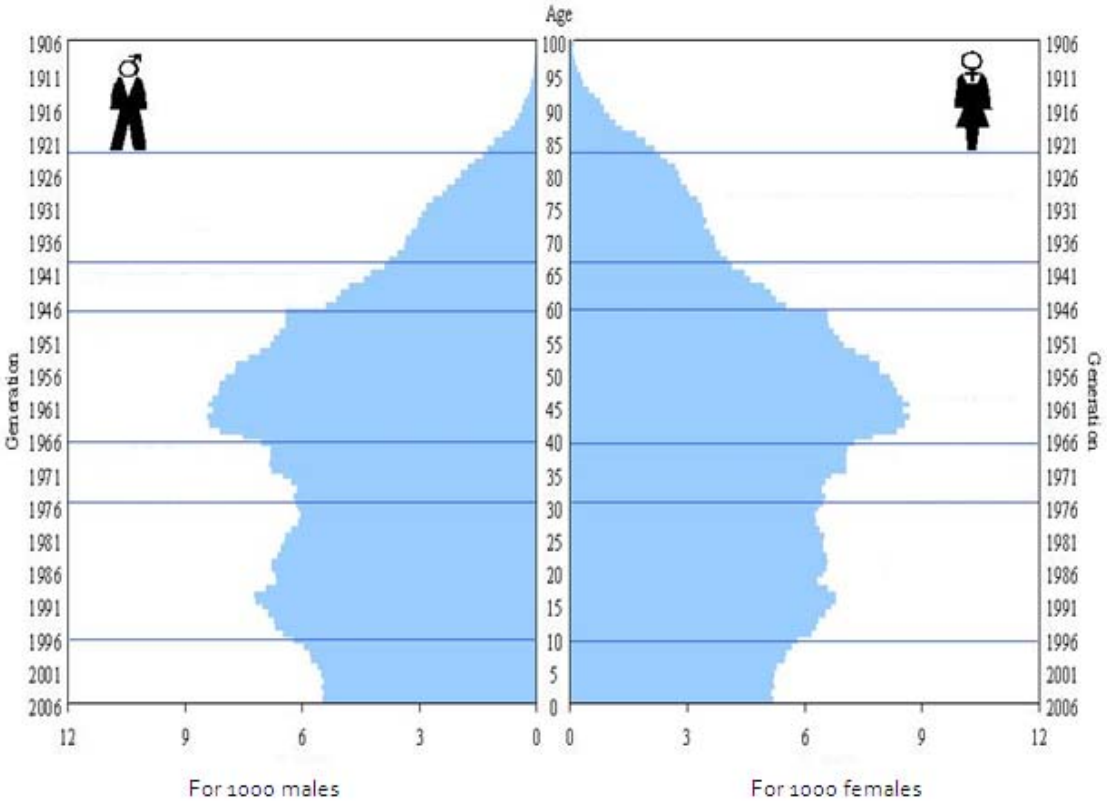


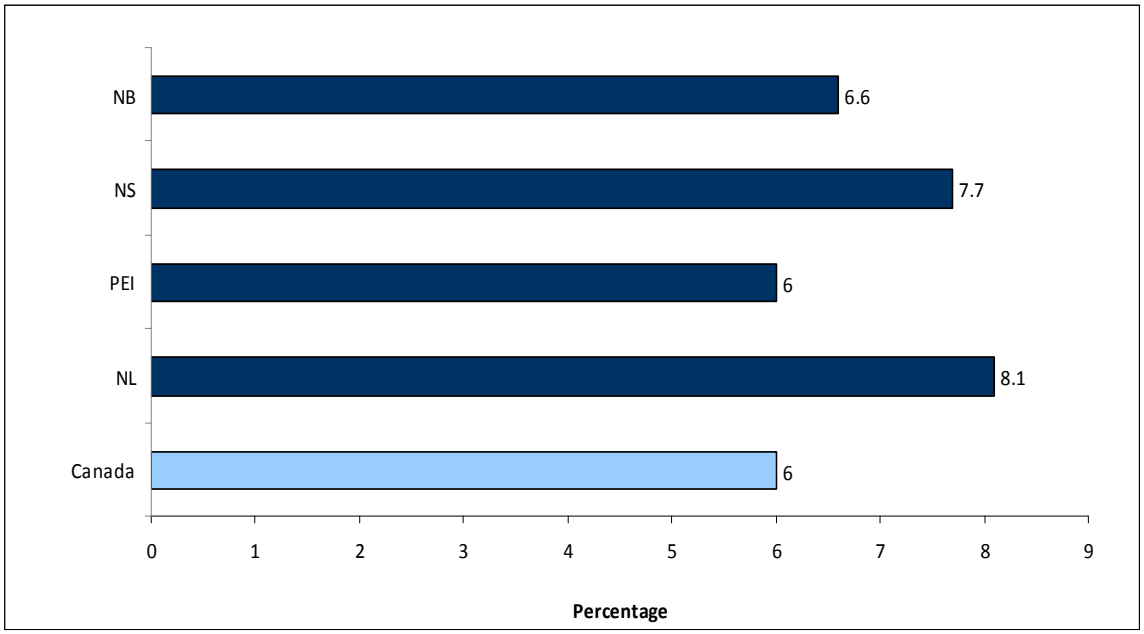
Figure 4 depicts the age pyramid of Canada in 2006. On the left of the graph, data for men are shown, and on the right, data for women. In 2006, baby-boomers, people born between 1946 and 1965, were between 41 and 60 years old. Nearly one in three Canadians was a baby-boomer in 2006. The large number of baby-boomers, the increased risk of developing diabetes after the age of 40 and the increased prevalence of obesity in Canada mean that about one in three people (35%) of people with diagnosed diabetes will be 50 to 64 years old by 2010-2011.[10]

[9] Statistics Canada, Census of Population, 2006. *Different cohorts among the age pyramid of the Canadian population in 2006*. http://www12.statcan.ca/census-recensement/2006/as-sa/97-551/figures/c7-eng.cfm (accessed: May 10, 2010).

[10] *Report from the National Diabetes Surveillance System: Diabetes in Canada, 2008*. p.12.

PREVALENCE IN ATLANTIC CANADA

Figure 5:
Prevalence percentages of diagnosed diabetes among people aged 12 and older in the Atlantic provinces, 2009[11]

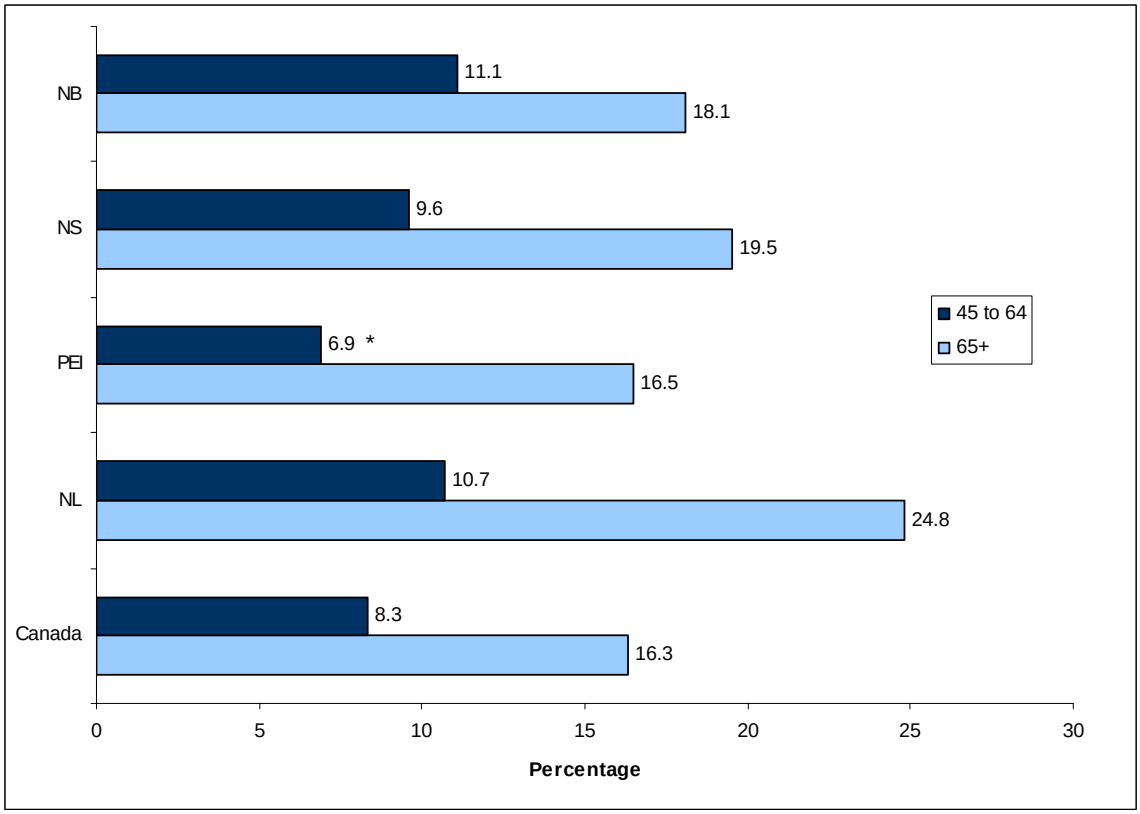


In 2009, the prevalence of diabetes in PEI was equal to the Canadian rate of 6% while NB was virtually the same at 6.6%. Newfoundland and Labrador (8.1%) and Nova Scotia (7.7%) both had significantly higher prevalences of diabetes compared to the Canadian prevalence (based on confidence intervals, not shown).

[11] Statistics Canada. *Table 105-0501 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 26, 2009. http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&RootDir=CII/&ResultTemplate=CII/CII___&Array_Pick=1&ArrayId=1050501 (accessed July 6, 2010)

PREVALENCE IN ATLANTIC CANADA

Figure 6:
Prevalence percentage of diagnosed diabetes, both sexes, by age group, in the Atlantic provinces and Canada, 2007-2008[12]



Across all age groups, the oldest age group (65+) had the highest percentage of individuals who had been diagnosed with diabetes by a health professional. For all of Canada, the percentage of diabetes in the oldest age group was 16.3%. The same pattern emerged in the Atlantic provinces. The oldest age group had a percentage of 18.1% in New Brunswick, 19.5% in Nova Scotia, 16.5% in Prince Edward Island and 24.8% in Newfoundland and Labrador. The differences between age groups in Figure 6 were all statistically significant (based on confidence intervals, not shown).

* This estimate (6.9) was less precise because of the sampling methods used and should be interpreted with caution. In addition, data for the age groups below 45 years are not shown because much of the data for those age groups were too unreliable to be published due to extreme sampling variability.

[12] Statistics Canada. *Table 105-0502 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007/2008 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 26, 2009. http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?21547Lang=E&RootDir=CII/&ResultTemplate=CII/CII___&Array_Pick=1&ArrayId=1050501 (accessed November 26, 2009)

PREVALENCE IN ATLANTIC CANADA

Figure 7:
Number of people diagnosed with diabetes in the Atlantic provinces, 2007-2008[13]

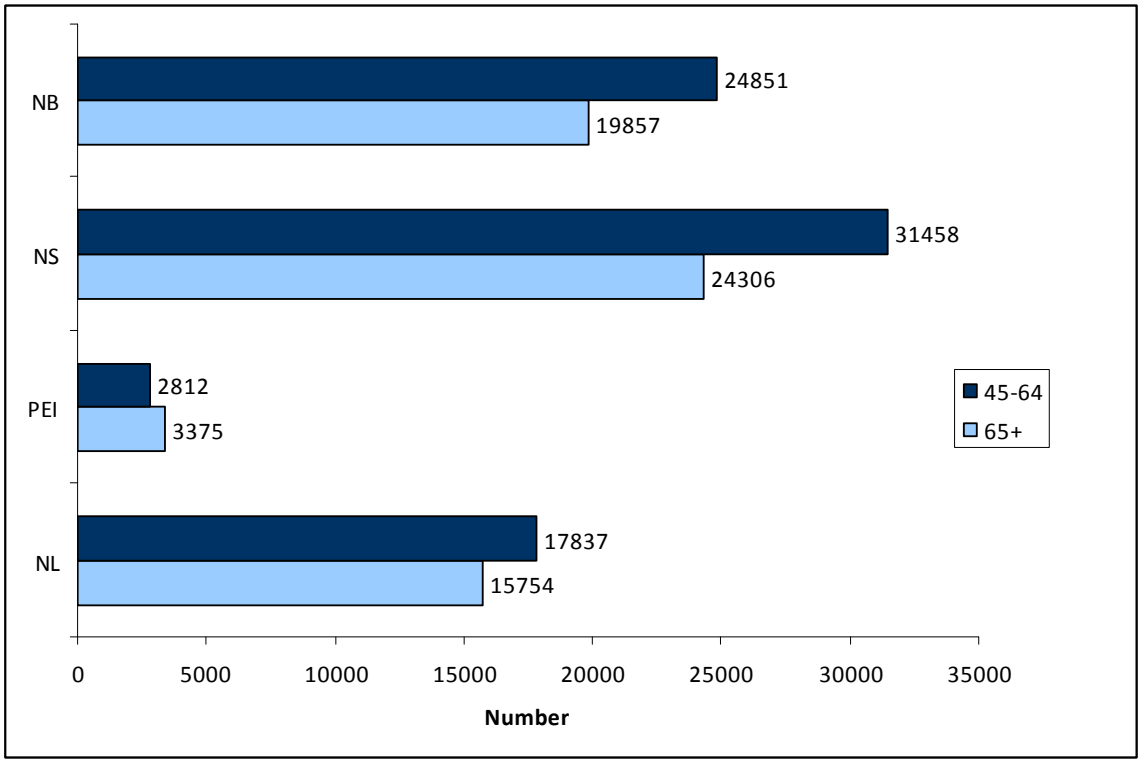


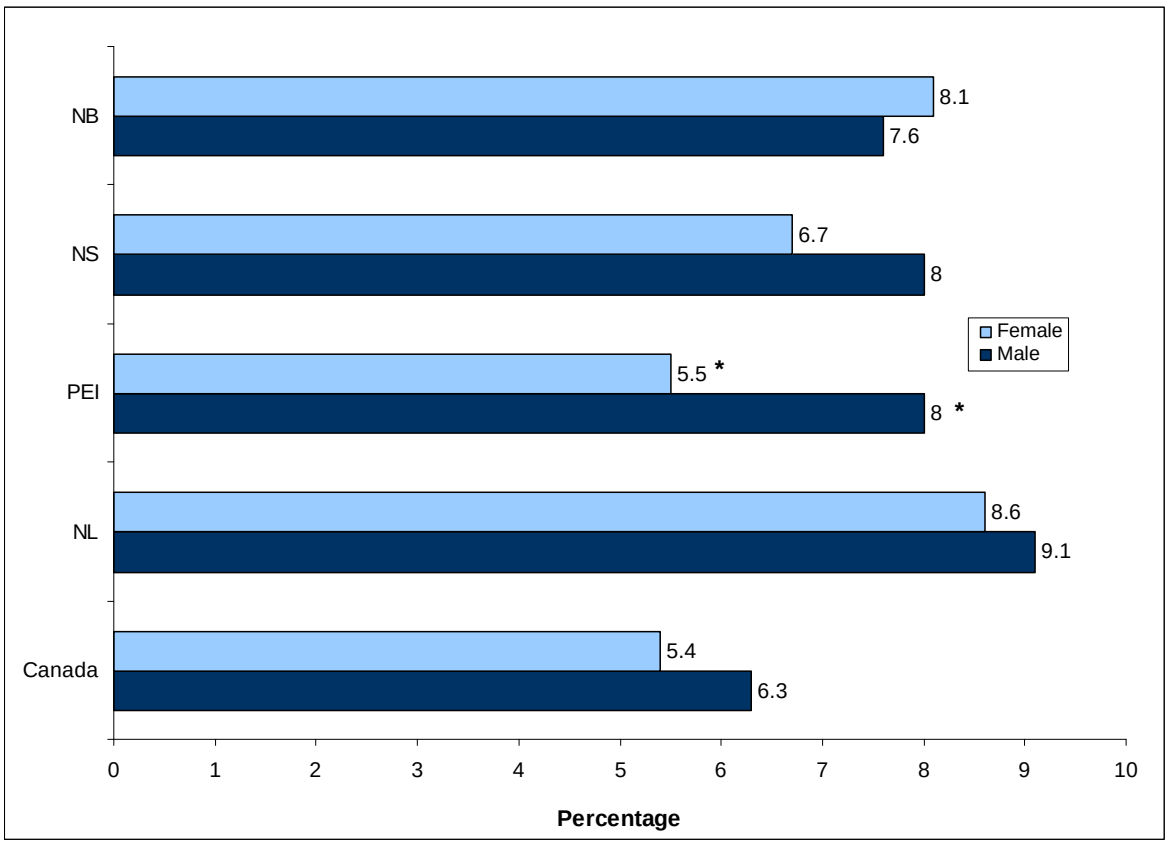
Figure 7 shows that with the exception of Prince Edward Island, a greater number of cases were reported in the 45 to 64 age group. Compare this to Figure 6, which showed that the percentage of people reporting a diagnosis of diabetes was greatest in the oldest age group (65+) for each Atlantic province. The differences between figures 6 and 7 can be understood by examining the age pyramid in Figure 4.

The age pyramid shows that there were more individuals in the 45 to 64 age group compared to the 65+ age group in 2006. Although a higher percentage of the 65+ age group reported a diagnosis of diabetes, because there were fewer people in that age group, the number of cases was actually lower (except in PEI).

[13] Statistics Canada. *Table 105-0502 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 26, 2009. http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&RootDir=CII/&ResultTemplate=CII/CII___&Array_Pick=1&ArrayId=1050501 (accessed November 26, 2009)

SEX

Figure 8:
Prevalence percentage of diagnosed diabetes among people aged 12 and older in the Atlantic provinces and all of Canada, by sex, 2007-2008[14]



In 2007-2008, the prevalence of diabetes in Canada was higher in males (6.3%) than females (5.4%).

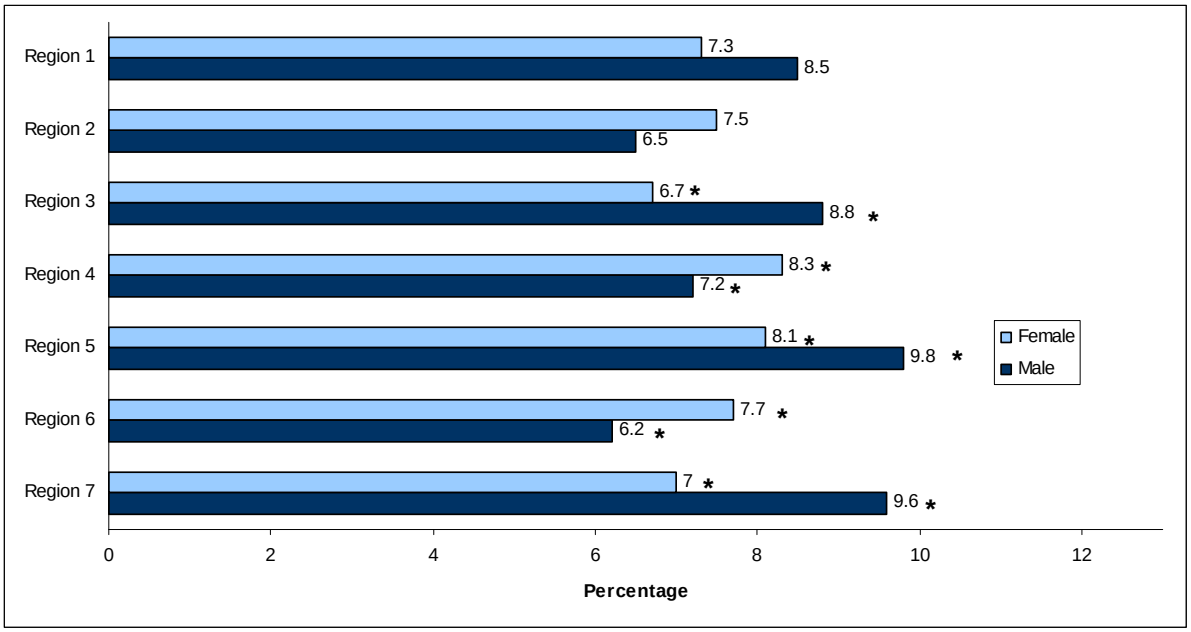
Within each Atlantic province, there were no statistically significant differences between the sexes (based on confidence intervals, not shown).

* These estimates were less precise because of the sampling methods used and should be interpreted with caution.

[14] Statistics Canada. *Table 105-0502 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 26, 2009. http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&RootDir=CII/&ResultTemplate=CII/CII___&Array_Pick=1&ArrayId=1050501 (accessed November 26, 2009)

REGION

Figure 9:
Population of New Brunswick health (%), aged 12 and older, diagnosed with diabetes, by sex and region, 2007-2008[15]



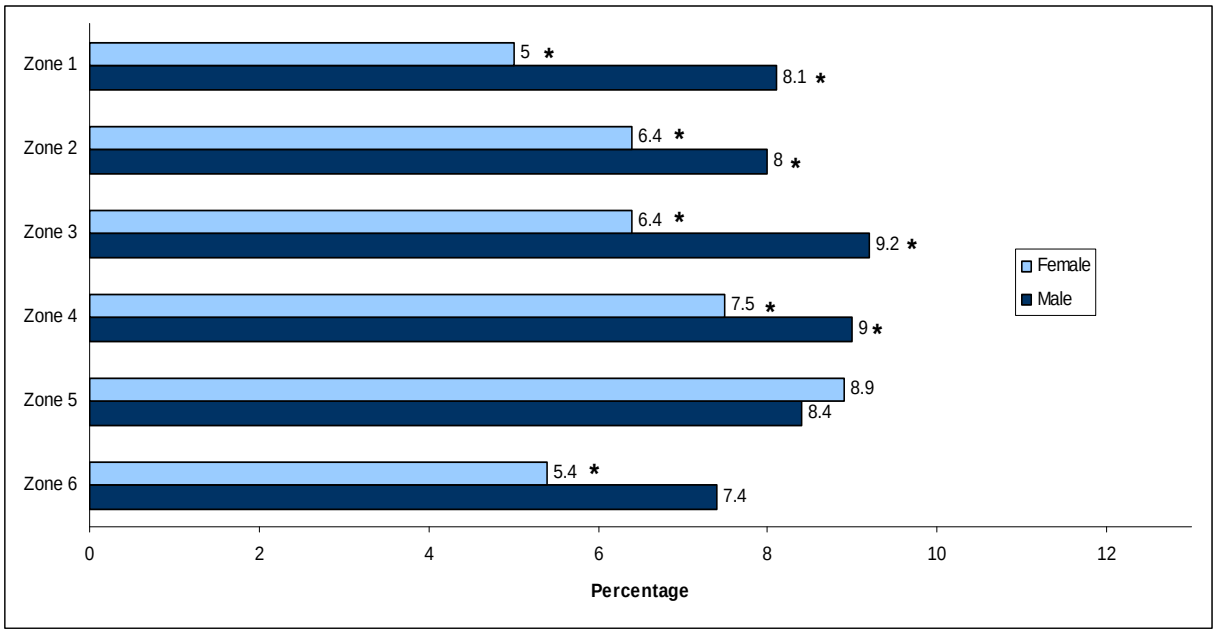
Neither females nor males consistently had a higher rate of diabetes in New Brunswick in 2007-2008. In fact, there were no significant differences between the sexes for any region of New Brunswick in 2007-2008 (based on confidence intervals, not shown).

* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

Note: Maps of the Health Regions (NB), Zones (NS), Counties (PEI) and Regional Integrated Health Authorities (NL) of the four Atlantic provinces (2007 boundaries) can be found in the Appendix of this document.

[15] Statistics Canada. *Table 105-0502 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional,* CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: November 26, 2009)

Figure 10:
Population of Nova Scotia (%), aged 12 and older, diagnosed with diabetes, by sex and zone, 2007-2008 [16]

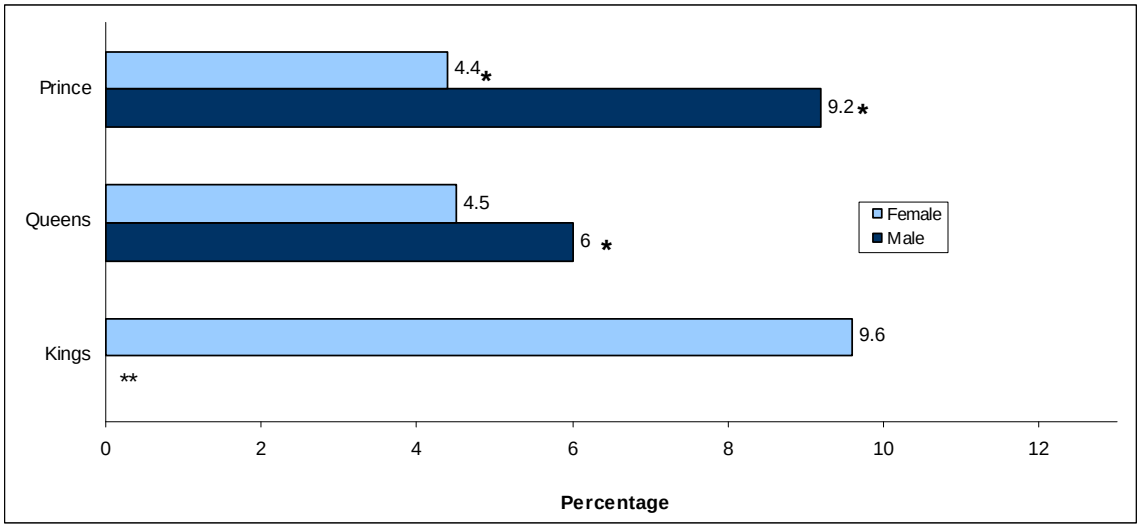


There appears to be large gaps between the sexes in certain zones. For example, zone 1 reported a percentage of 5% for females and 8.1% for males. However, confidence intervals (not shown) reveal that there was no real difference between the sexes in any zone in 2007-2008.

* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

[16] Statistics Canada. *Table 105-0502 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional,* CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: November 26, 2009)

Figure 11:
Population of Prince Edward Island (%), aged 12 and older, diagnosed with diabetes, by sex and county, 2007-2008[17]



In Prince County and Queen County, the rates for males were higher than those for females.

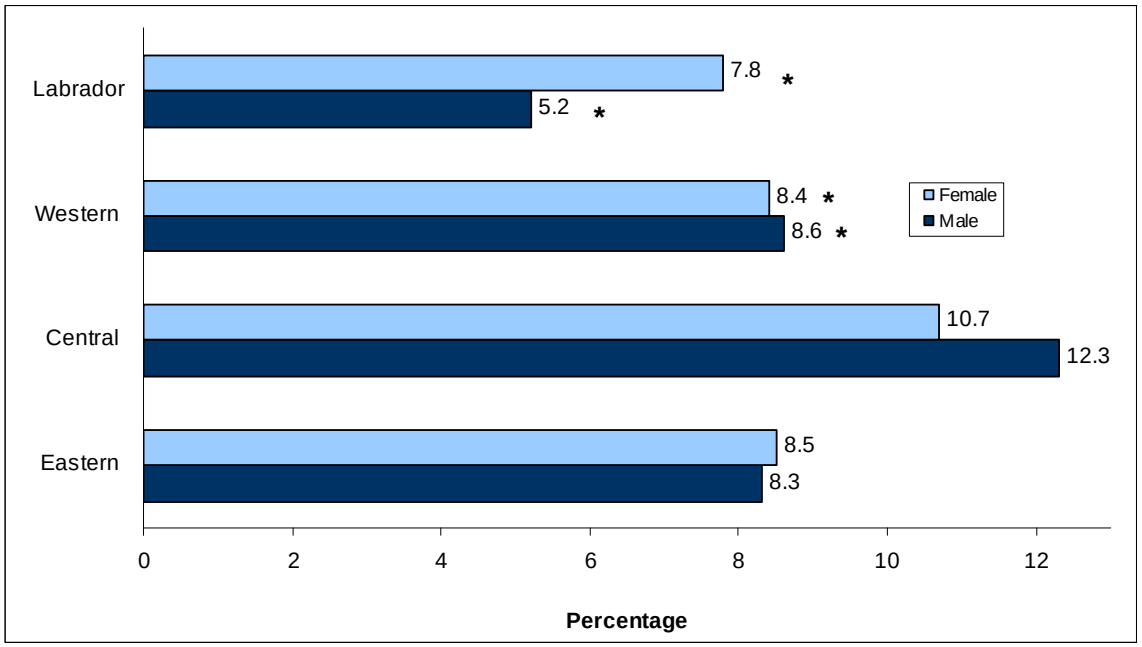
Figure 11 appears to show a higher percentage of females with diabetes in Prince and Queen Counties. However, confidence intervals (not shown) reveal that there was no real difference between the sexes in either county in 2007-2008.

* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

**Due to extreme sampling variability, the estimate for males in Kings County was too unreliable to publish.

[17] Statistics Canada. *Table 105-0502 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional,* CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: November 26, 2009)

Figure 12:
Population of Newfoundland and Labrador (%), aged 12 and older, diagnosed with diabetes, by sex and Integrated Health Authority, 2007-2008[18]



Neither males nor females had a consistently higher rate of diabetes across the Integrated Health Authorities (IHA). In fact, there were no significant difference between the sexes for any IHA of Newfoundland and Labrador in 2007-2008 (based on confidence intervals, not shown).

* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

[18] Statistics Canada. *Table 105-0502 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: November 26, 2009)

RISK FACTOR: OVERWEIGHT AND OBESITY

Excess body weight is an important risk factor for diabetes. In 2009, the Canadian averages for adults aged 18 and older were: overweight (males) 40.2%, (females) 27.2%; obese (males) 19%, (females) 16.7%.[19] These statistics are based on self-reported weight and height. Research has demonstrated that in general, self-reported height is overestimated and self-reported weight is underestimated compared to measured height and weight.[20]

Figures 13 through 21 contain data on the prevalence of overweight and obesity. Body mass index, or BMI is a method used to classify body weight. BMI is calculated as follows: weight in kilograms / (height in metres x height in meters). For example, a person who weighs 66 kilograms and is 1.65 metres in height would have a BMI of 24.2 (66/(1.65x1.65)). This individual would be classified as having a normal bodyweight.

According to the World Health Organization (WHO) and Health Canada guidelines, the index for body weight classification is: less than 18.50 (underweight); 18.50 to 24.99 (normal weight); 25.00 to 29.99 (overweight); 30.00 to 34.99 (obese, class I); 35.00 to 39.99 (obese, class II); 40.00 or greater (obese, class III).[21] The figures in this document do not distinguish between the three different levels of obese due to the lack of available data for the separate categories.

Figures 13 through 17 depict the prevalence of self-reported overweight or obesity by sex. Figures 18 through 21 depict the prevalence of self-reported obesity only by sex. Figure 22 depicts the prevalence of self-reported overweight or obesity among youth.

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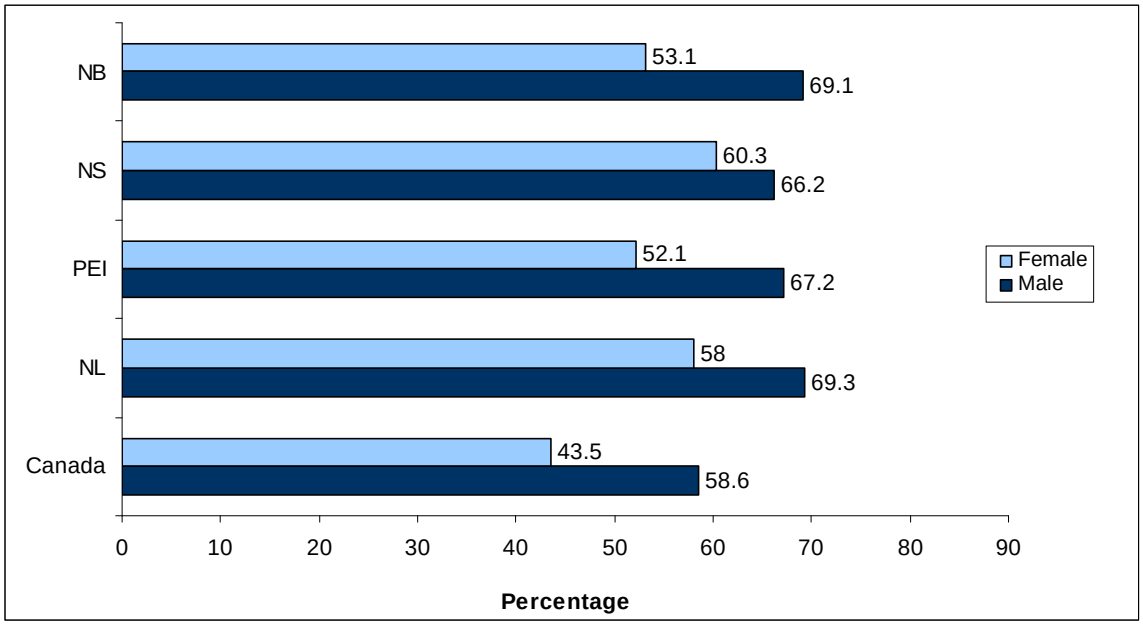
[19] Statistics Canada *Table 105-0501 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional,* CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: May 5, 2010)

[20] S. Connor Gorber, M. Tremblay, D. Moher and B. Gorber, *A comparison of direct vs. self-reported measures for assessing height, weight and body mass index: a systematic review,* Obesity Review 2007 8(4); 307-326.

[21] Statistics Canada *Table 105-0501 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional,* CANSIM (database). Last updated June 29, 2009.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: May 5, 2010)

Figure 13:
Prevalence (%) of self-reported overweight or obesity among male and females of the Atlantic provinces and all of Canada, aged 18 and older, 2008[22]



In 2008, 50.9% of Canadian adults were overweight or obese. When the sexes were examined separately, 43.5% of Canadian women and 58.6% of Canadian men were overweight or obese. In each of the four Atlantic provinces, prevalence rates of overweight or obese were significantly greater than the national prevalence rates for both men and women. Within each province, significantly more men than women were overweight or obese. (Based on confidence intervals, not shown).

Figures 14 through 17 show that in most health regions of the Atlantic Provinces, over half the population was overweight or obese. However, many of the differences between the sexes in Figures 14 to 17 were not statistically significant based on confidence intervals (not shown).

Note: Maps of the Health Regions (NB), Zones (NS), Counties (PEI) and Regional Integrated Health Authorities (NL) of the four Atlantic provinces (2007 boundaries) can be found in the Appendix of this document.

[22] (Source for figures 13, 14, 15, 16, 17, 18, 19, 20, 21, 22) Statistics Canada *Table 105-0502 Health indicator profile, two-year period estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries) and peer groups, occasional*, CANSIM (database). Last updated June 29, 2009. http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm (accessed: November 26, 2009)

Figure 14:
Prevalence (%) of self-reported overweight or obesity among males and females of New Brunswick, aged 18 and older, by region, 2007-2008

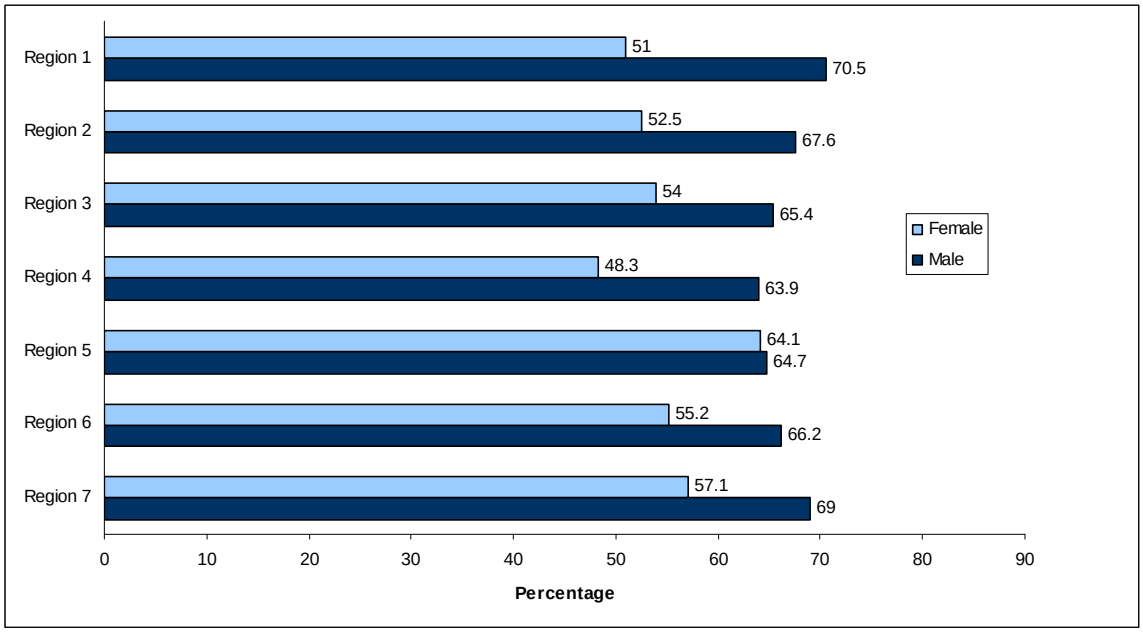


Figure 15:
Prevalence (%) of self-reported overweight or obesity among males and females of Nova Scotia, aged 18 and older, by zone, 2007-2008

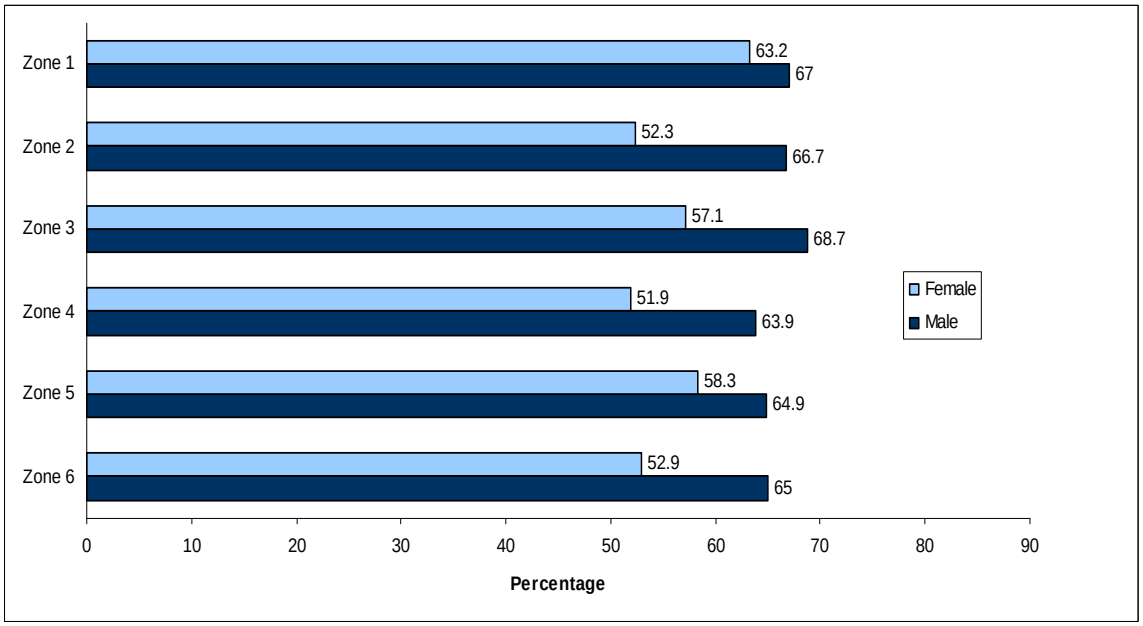


Figure 16:
Prevalence (%) of self-reported overweight or obesity among males and females of Prince Edward Island, aged 18 and older, by county, 2007-2008

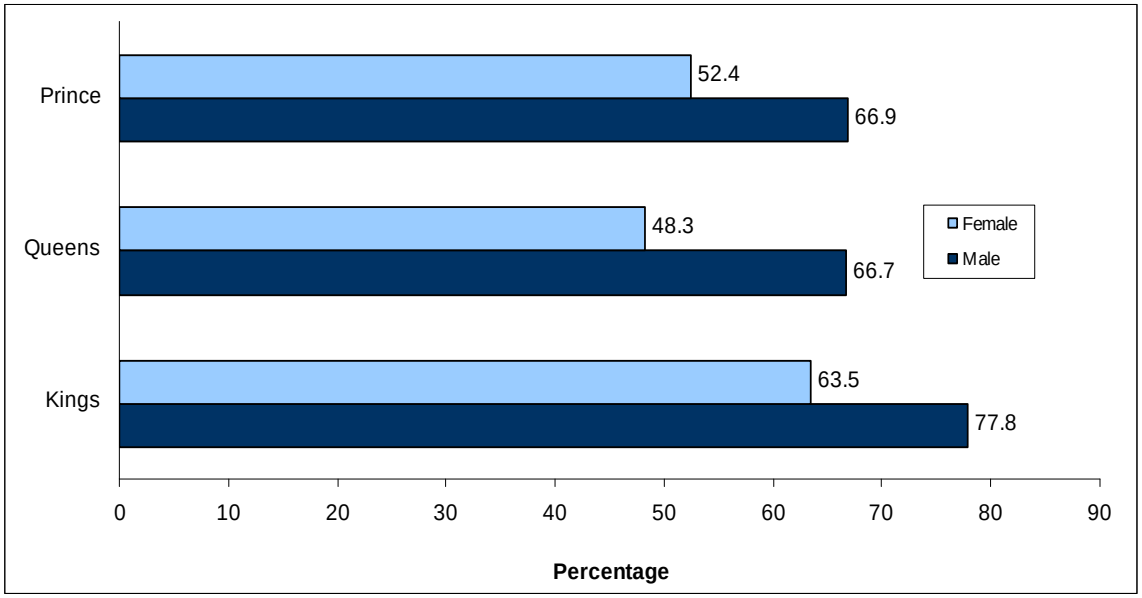


Figure 17:
Prevalence (%) of self-reported overweight or obesity among males and females of Newfoundland and Labrador, aged 18 and older, by Integrated Health Authority, 2007-2008

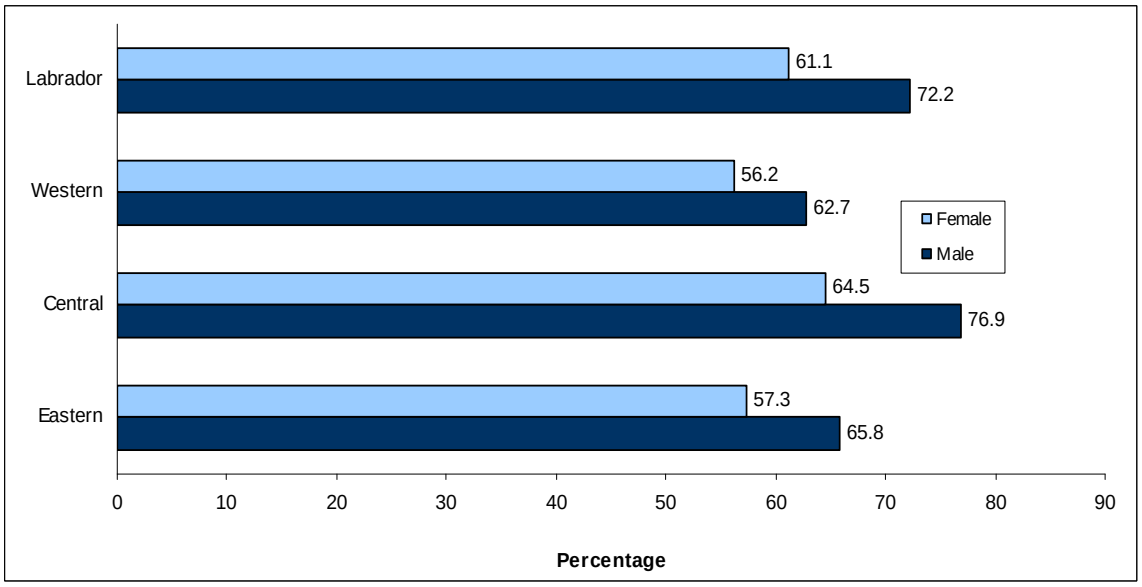
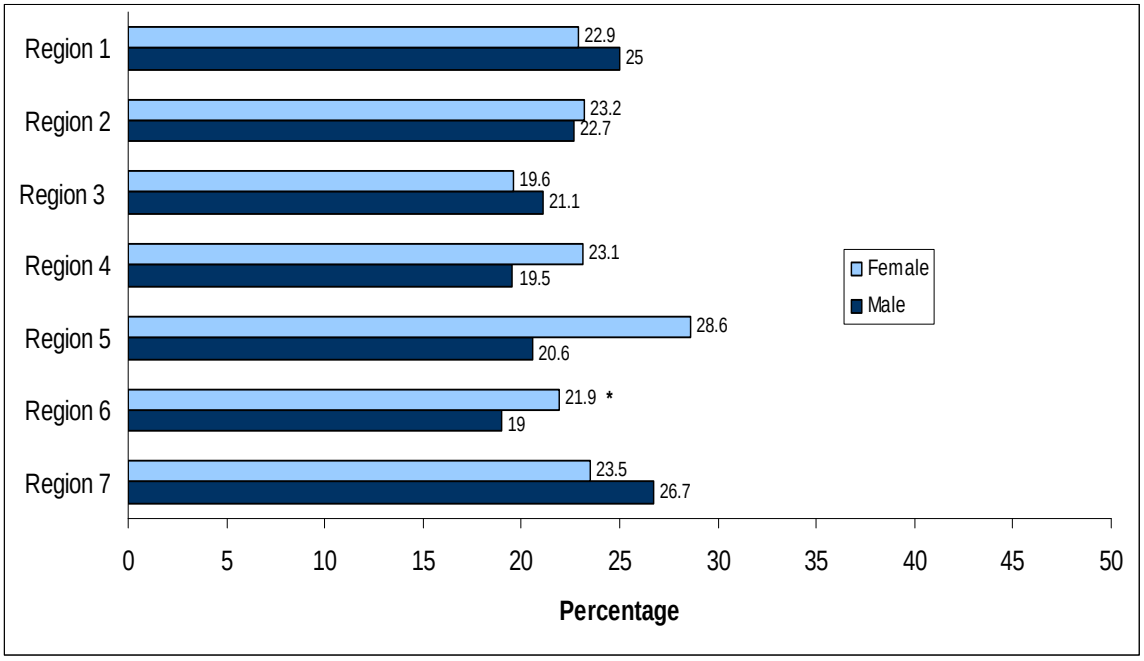


Figure 18:
Prevalence (%) of self-reported obesity among males and females of New Brunswick, aged 18 and older, by region, 2007-2008



Figures 18 though 21 show rates of obesity across the health regions of the Atlantic provinces in 2007-2008. In most regions, the differences between the sexes were not statistically significant. Rates of obesity in most health regions are similar to or higher than the national rates of obesity for men and women (18.1% and 16% respectively).

* This estimate is less precise because of the sampling methods used and should be interpreted with caution.

Figure 19:
Prevalence (%) of self-reported obesity among males and females of Nova Scotia, aged 18 and older, by zone, 2007-2008

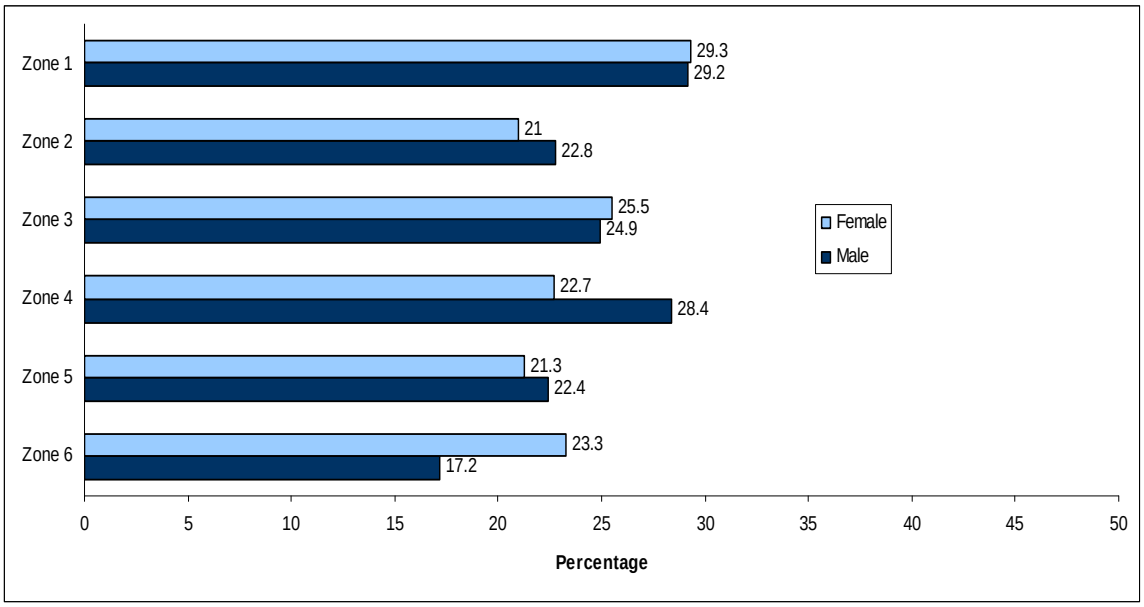
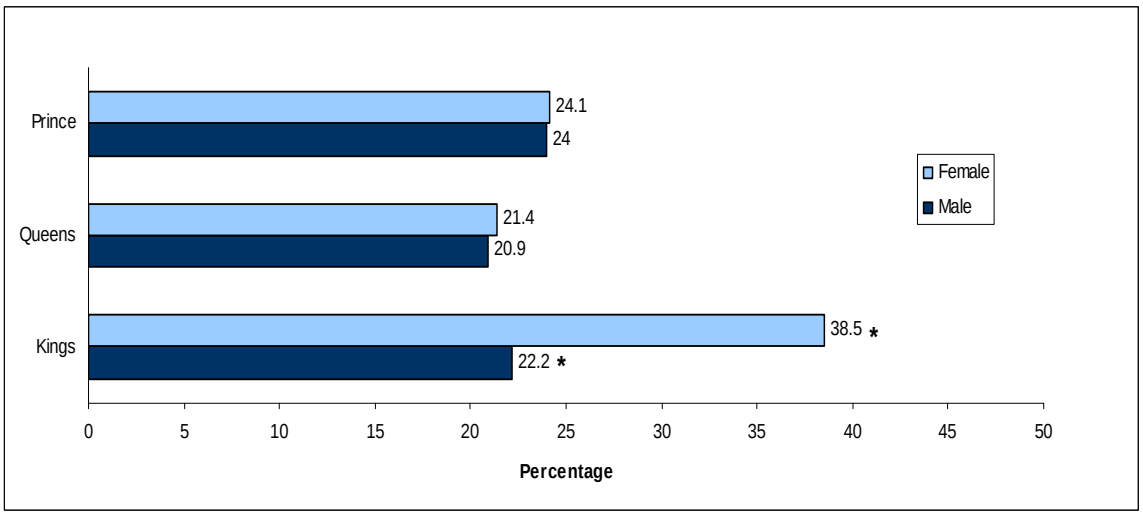


Figure 20:
Prevalence (%) of self-reported obesity among males and females of Prince Edward Island, aged 18 and older, by county, 2007-2008



* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

Figure 21:

Prevalence (%) of self-reported obesity among males and females of Newfoundland and Labrador, aged 18 and older, by Integrated Health Authority, 2007-2008

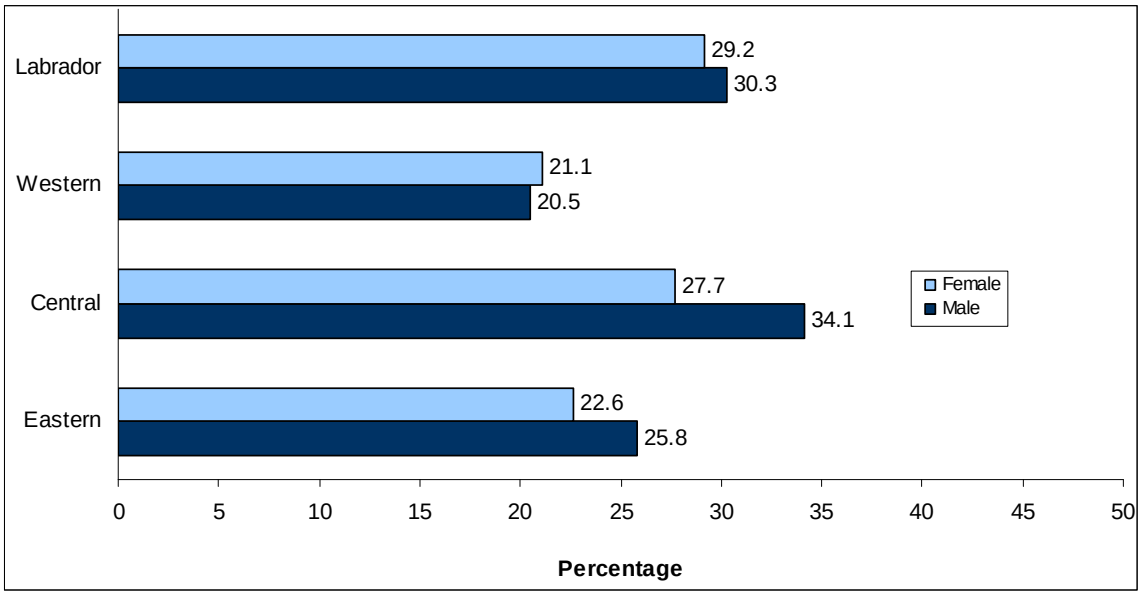


Figure 22:
Prevalence (%) of self-reported overweight or obesity among youth aged 12 to 17 in the Atlantic Provinces and Canada, 2007-2008

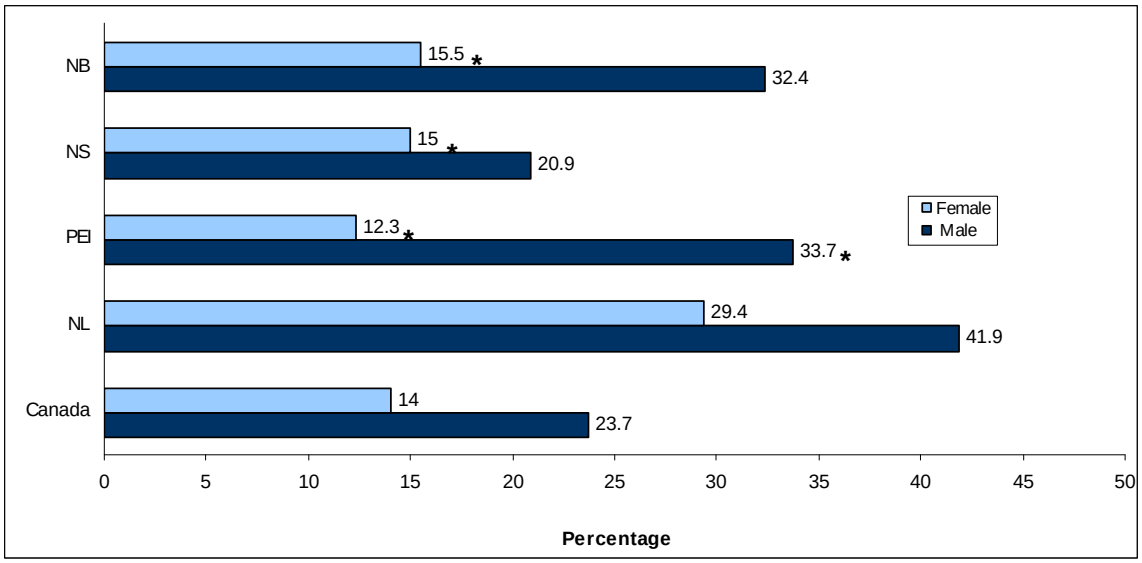
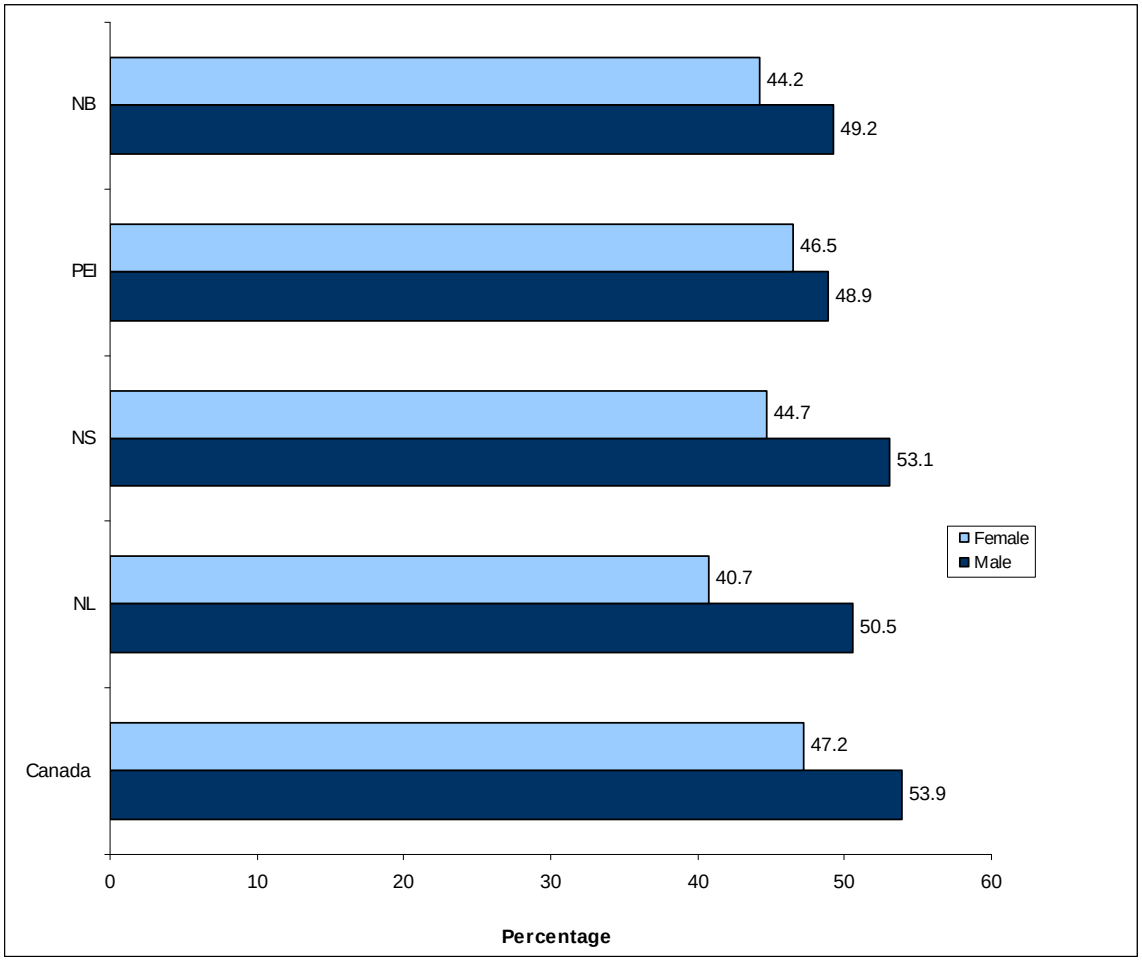


Figure 22 shows that among youth, a higher proportion of males than females in Canada were overweight or obese in 2007-2008. The proportion of youth in Newfoundland and Labrador who were overweight or obese was significantly higher than the Canadian averages for males and females alike: 29.4% of females and 41.9% of males in Newfoundland and Labrador compared to 14% of females and 23.7% of males across Canada. The prevalences for Prince Edward Island, Nova Scotia and New Brunswick were, for the most part, not statistically different from the Canadian prevalence (based on confidence intervals, not shown).

* These estimates are less precise because of the sampling methods used and should be interpreted with caution.

RISK FACTOR: PHYSICAL ACTIVITY

Figure 23:
Percentage of Atlantic Canadians who are active or moderately active during their leisure time, age 12 and older, by sex and province, 2007-2008[23]



Across Canada in 2007-2008, 47.2% of females and 53.9% of males reported being active or moderately active during their leisure time. Although most results from the Atlantic provinces were not significantly different from the Canadian rates, there were two exceptions. Females of Newfoundland and Labrador were about 7% less active than Canadian females as a whole. Males of Prince Edward Island were about 5% less active than Canadian males as a whole.

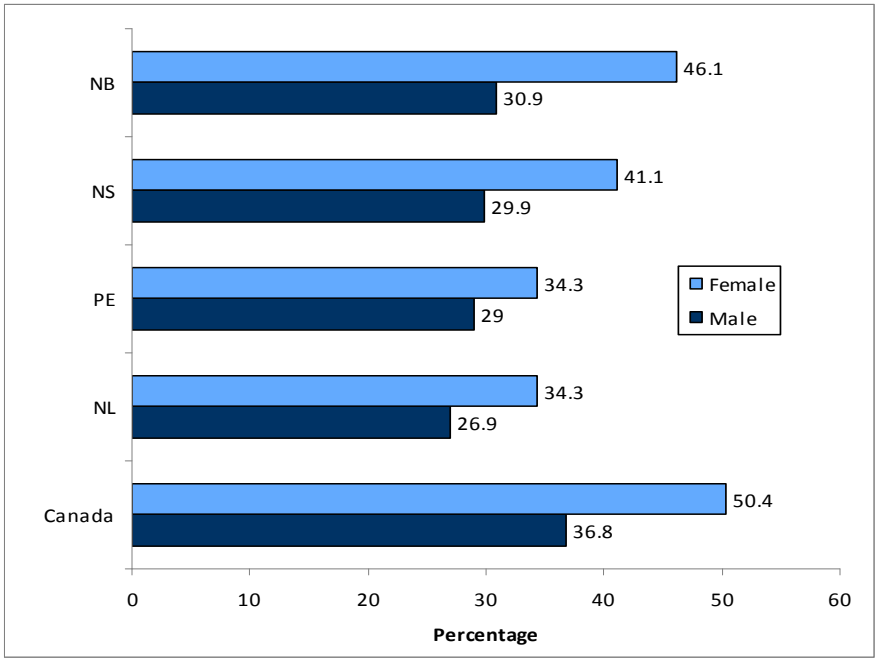
[23] Statistics Canada. *Table 105-0502 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries), occasional*, CANSIM (database). http://cansim2.statcan.gc.ca/cgi-win/cnsm cgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm (accessed: May 5, 2010)

The risk of developing type 2 diabetes is significantly reduced in people who participate in regular physical activity in addition to maintaining a healthy body weight and eating a healthy diet. For those who are living with diabetes, regular physical activity helps to maintain a healthy body weight and can contribute to effective self-management of diabetes.[24]

[24] *Diabetes in Canada: Highlights from the National Diabetes Surveillance System 2004-2005*. p 2.

RISK FACTOR: FRUIT AND VEGETABLE CONSUMPTION

Figure 24:
Percentage of people aged 12 and older who reported consuming 5 or more servings of fruits and vegetables per day in the Atlantic provinces and Canada, 2007-2008 [25]



In 2007-2008, more females than males in the Canadian population reported consuming five or more servings of fruits vegetables per day (50.4% compared to 36.8%).

Males and females of the Atlantic provinces consumed significantly fewer fruits and vegetables compared to the overall Canadian male and female populations. This difference was most striking for females of Prince Edward Island and Newfoundland and Labrador who consumed 16% fewer fruits and vegetables compared to Canadian females as a whole.

The risk of developing type 2 diabetes is significantly reduced in people who maintain a healthy weight, eat a healthy diet and engage in regular physical activity. For those who are living with diabetes, a healthy diet that includes several servings of fruits and vegetables helps to maintain a healthy body weight and can contribute to effective self-management of diabetes.[26]

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[25] Statistics Canada. *Table 105-0502 Health indicator profile, annual estimates, by age group and sex, Canada, provinces, territories, health regions (2007 boundaries), occasional*, CANSIM (database). http://cansim2.statcan.gc.ca/cgi-win/cnsm cgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm (accessed: May 5, 2010)

[26] *Diabetes in Canada: Highlights from the National Diabetes Surveillance System 2004-2005*. p 2.

INCOME AND DIABETES

Recent evidence from Canada supports a larger body of international work that shows an association between diabetes and income.[27, 28, 29] Using data from the Canadian Community Health Survey, researchers revealed that the highest prevalence of type 2 diabetes is found among the least affluent and least educated men and women in Canada.[30] While it is possible that in some cases, living with diabetes affects one's ability to work and consequently leads to less income, new evidence suggests that there is a clear association between low income and new cases of diabetes. Using data collected over 14 years through the National Population Health Survey, researchers found that significantly more new cases of diabetes developed in the least affluent groups compared to the most affluent. [31]

> "*Level of income shapes overall living conditions, affects psychological functioning, and influences health-related behaviours such as quality of diet, extent of physical activity….and excessive alcohol use. In Canada, income determines the quality of other social determinants of health such as food security, housing, and other basic prerequisites of health.*"[32]

Real disposable income increased in all four Atlantic Provinces between 1981 and 2004. However, the gap between rich and poor has increased in all four provinces during the same time period.[33] Canada's tradition of strong social policy contributes to the health of the Canadian population by helping to establish and maintain a minimum standard of living. Although Canada curently lacks a national plan for poverty reduction, Newfoundland and Labrador, Nova Scotia and New Brunswick have all implemented poverty reductions strategies of their own.[34]

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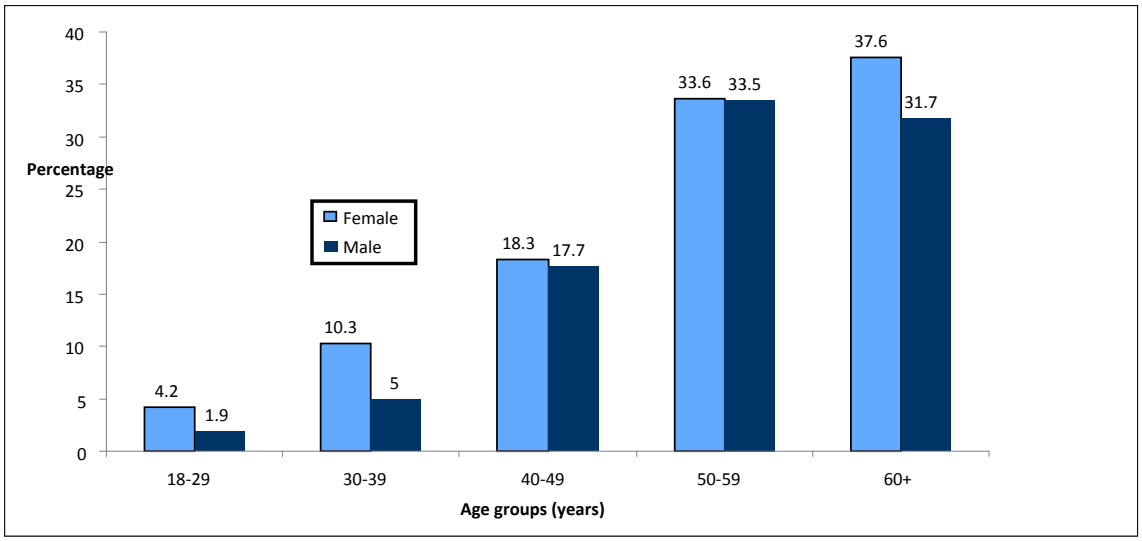
[27] M.G. Marmot, G.D. Smith, S. et al., *Health inequalities among British civil servants: the Whitehall II study*, Lancet 1991; 337: 1387–1393.
[28] F.L. Brancati, P.K. Whelton, L.H. Kuller, M.J. Klag, *Diabetes mellitus, race, and socioeconomic status. A population -based study*, Ann Epidemiol 1996; 6: 67–73
[29] Agardh EE, Ahlbom A, Andersson T, Efendic S, Grill V, Hallqvist J et al. *Socio-economic position at three points in life in association with type 2 diabetes and impaired glucose tolerance in middle-aged Swedish men and women*, Int J Epidemiol 2007; 36: 84–92.
[30] Nancy Ross, Heather Gilmour, and Kaberi Dasgupta, *14-year diabetes incidence: The role of socio-economic status*, Statistics Canada, Health Reports 2010; 21 (3): 19-28.
[31] K. Dasgupta, S. Khan and N.A. Ross, *Type 2 diabetes in Canada: concentration of risk among most disadvantageed men but inverse social gradient across groups in women*, Diabetes Medicine 2010; 27: 522-531.
[32] J. Mikkonen and D. Raphael, *Social Determinants of Health: The Canadian Facts*, Toronto: York University School of Health Policy and Management, 2010.
[33] CommunityAccounts.ca, Accessed September 2010.
[34] The Standing Senate Committee on Social Affairs, Science and Technology *In from the margins: A call to action on poverty, housing and homelessness*, 2009, http://www.parl.gc.ca/40/2/parlbus/commbus/senate/com-e/citi-e/rep-e/rep02dec09-e.pdf, accessed September 2010.

CULTURAL IDENTITY: ABORIGINAL

Figure 25:
Percentage of self-reported diabetes among First Nations adults living <u>on-reserve,</u> by selected age group and sex, 2002-2003[35]



In 2002-2003, 19.7% of First Nations adults living on-reserve reported having been diagnosed with diabetes. The prevalence of diabetes was lowest among 18- to 29-year-olds (3.0%) and doubled each decade to a high of about one in three adults among those 50 years and older. More First Nation women than men reported a diagnosis of diabetes. This is the opposite of the overall Canadian rates for women and men.

Being overweight or obese is a risk factor for type 2 diabetes. Of First Nations people living on-reserve, 31.1% of women and 41.8% of men were considered to be overweight. An additional 31.8% of men and 41.1% of women were deemed to be obese.[36]

The 2003 Canadian Community Health Survey reported that the prevalence of self-reported diabetes among aboriginal populations living <u>off-reserve</u> in 2003 was 6.7%. The prevalence of diabetes among the non-aboriginal population of Canada for the same year was 4.5%.[37]

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[35] First Nations Information Governance Committee. *First Nations Regional Longitudinal Health Survey, Our Voice, Our Survey, Our Reality: Selected Results from RHS Phase 1*. March 2007, p. 13.
[36] FNIGC. *First Nations Regional Longitudinal Health Survey,(RHS); Results for Adults, Youth and Children Living in First Nations Communities.* March 2007, Second Edition.
[37] Source: Statistics Canada, 2008, Health Indicators, Vol 20, no. 4, pp. 1-98.

Figure 26:
Percentage of Aboriginal Canadians with Registered Indian Status living on-reserve, Canada and the Atlantic Provinces, 2006[38]

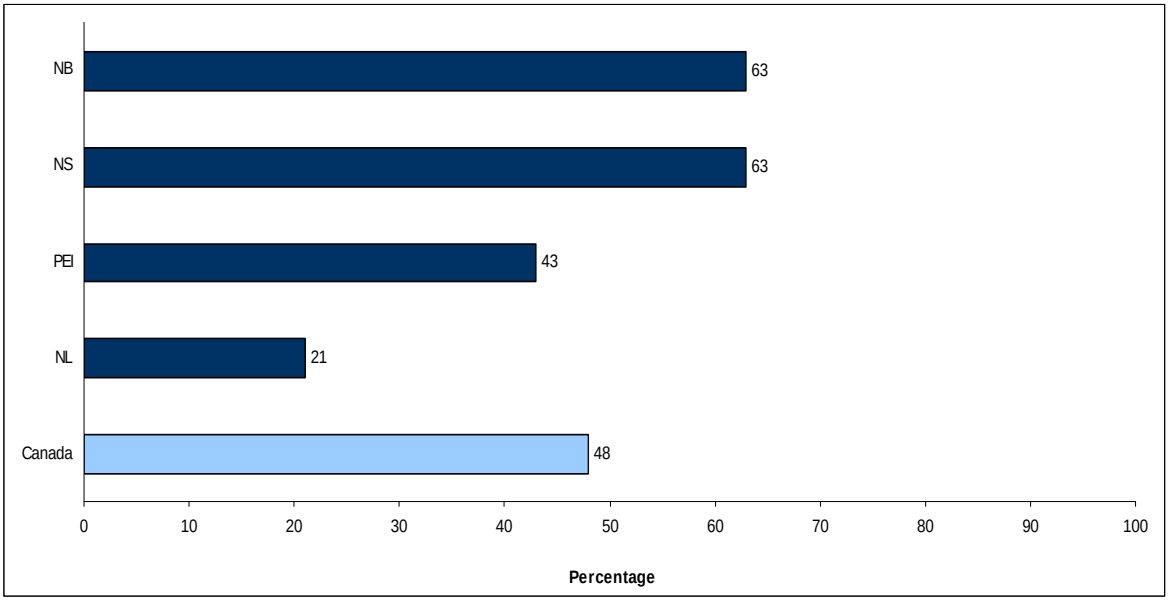


Table 1:

Number of individuals with Registered Indian Status, 2006 Census, on-reserve and off-reserve. [39]

	NL	PEI	NS	NB
Males	3,180	410	5,860	5,250
Females	3,425	515	6,565	5,610

Figure 26 and Table 1 provide a picture of the proportion of people with Registered Indian Status who live on or off reserve. Due to data limitations and the fact that data for on-reserve and off-reserve aboriginal populations were collected using different surveys, comparisons of the data for on-reserve and off-reserve populations should be made with caution.

[38] Statistics Canada, *Aboriginal population profile, 2006 Census.* Statistics Canada. http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=92-594-X. (accessed January 4, 2010).
[39] Statistics Canada, *Aboriginal identity population by province and territory (2006 Census)* (table). *Summary Tables*. Last updated September 30, 2009.

CULTURAL IDENTITY: AFRICAN NOVA SCOTIAN

Table 2:
Incidence rate ratios for circulatory disease, diabetes mellitus[40] and psychiatric disorders for people of African descent living in Preston, Nova Scotia, and for seven comparison communities, relative to the provincial population as a whole[41]

Indicator of care	Community; incidence rate ratio (95% confidence interval)	
	Preston	Comparison communities
Circulatory disease		
Overall diagnosis	1.19 (1.08–1.29)	1.00 (0.97–1.01)
Family physician visits	1.21 (1.11–1.33)	0.99 (0.96–1.01)
Specialist visits	1.23 (1.06–1.40)	1.05 (1.00–1.08)
Hospital admissions	0.92 (0.69–1.21)	1.08 (1.00–1.12)
Diabetes mellitus		
Overall diagnosis	1.43 (1.21–1.64)	0.99 (0.93–1.01)
Family physician visits	1.42 (1.22–1.63)	0.94 (0.88–0.96)
Specialist visits	1.97 (1.59–2.34)	1.32 (1.22–1.37)
Hospital admissions	NR	1.16 (0.92–1.45)
Psychiatric disorders		
Overall diagnosis	1.13 (1.06–1.20)	0.88 (0.86–0.89)
Family physician visits	1.13 (1.06–1.20)	0.87 (0.84–0.87)
Specialist visits	0.75 (0.62—0.89)	0.71 (0.66–0.74)
Mental health service visits	0.56 (0.45–0.68)	0.81 (0.76–0.84)
Hospital admissions	NR	1.12 (0.98–1.18)

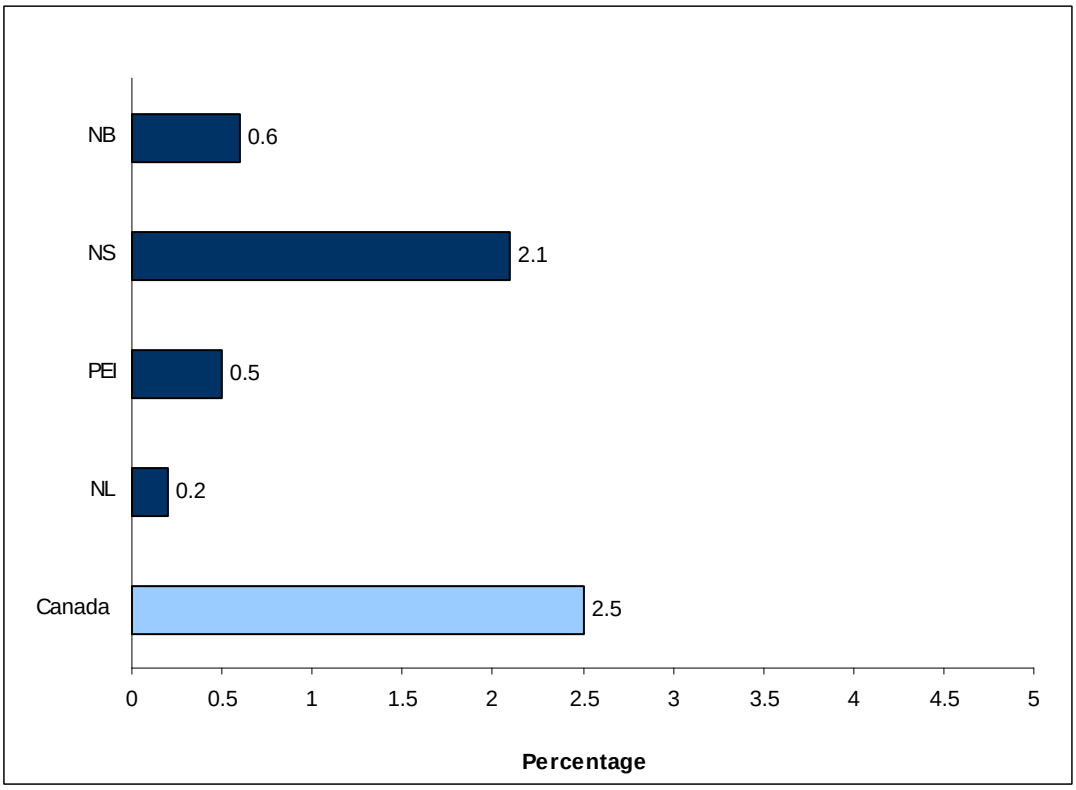
Note: NR = not reported because of the small number of observations (< 30).

In 2008, the incidence rate for diabetes in the primarily African-Nova Scotian community of Preston was roughly 40% higher than in the province as a whole, and the incidence rate was also higher than those of the comparison communities (which had predominantly white populations of similar socio-economic status).

Visits to family physicians and specialists were more frequent among those residents of Preston with chronic conditions compared to the general population of Nova Scotia. This higher frequency was generally consistent with the higher levels of diabetes (and other chronic conditions). This suggests that the Preston population was receiving equitable access to health services.

[40] Diabetes mellitus includes Type 1 and Type 2 diabetes.

Figure 27:
Black population of Atlantic Canada, (%), 2006[42]



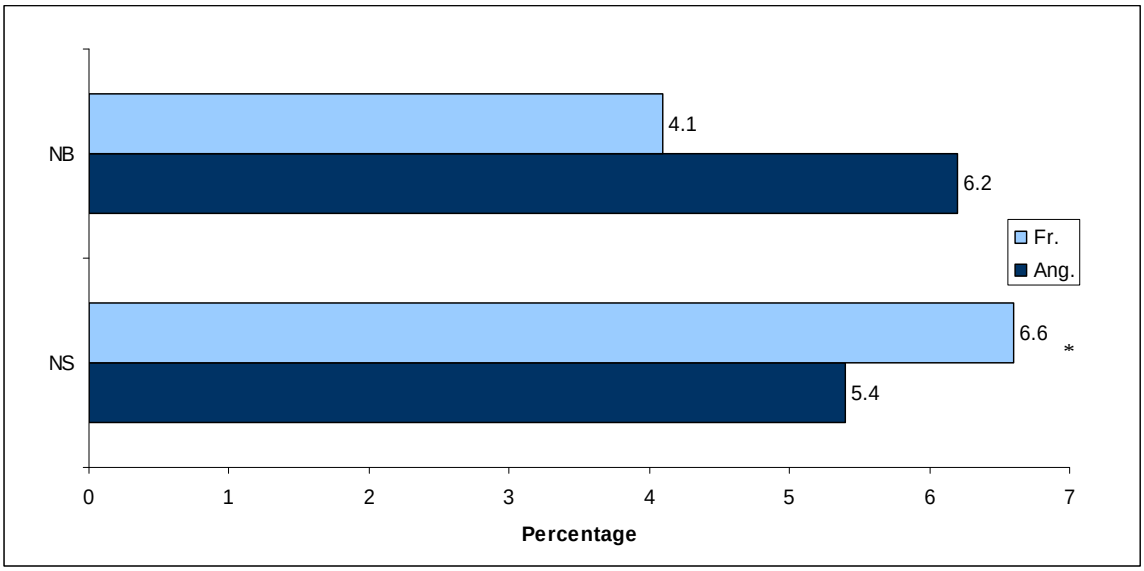
In 2006, blacks accounted for almost one-half (48.0%) of visible minorities in Halifax, NS. They represented 3.6% of the total population in Halifax. The vast majority (9 of 10) of blacks in Halifax were Canadian-born. This was the highest proportion of Canadian-born blacks in any census metropolitan area in Canada.[43]

In 2006 an estimated 7.5% of Halifax's population belonged to a visible minority group. While this proportion was below the national level of 16.2%, it was higher than any other census metropolitan areas in the Atlantic region, such as Saint John, NB (3.1%), Moncton, NB (2.0%) or St. John's, NL (1.9%).

[42] Statistics Canada. *Ethnocultural Portrait of Canada Highlight Tables. 2006 Census*. Statistics Canada. http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97-562/index.cfm?Lang=E (accessed January 4, 2010)
[43] Statistics Canada. *Ethnocultural Portrait of Canada Highlight Tables. 2006 Census*. Statistics Canada. http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97-562/index.cfm?Lang=E (accessed January 4, 2010)

CULTURAL IDENTITY: FRANCOPHONE

Figure 28:
Population of New Brunswick and Nova Scotia (%) diagnosed with diabetes, by mother tongue, 2003[44]



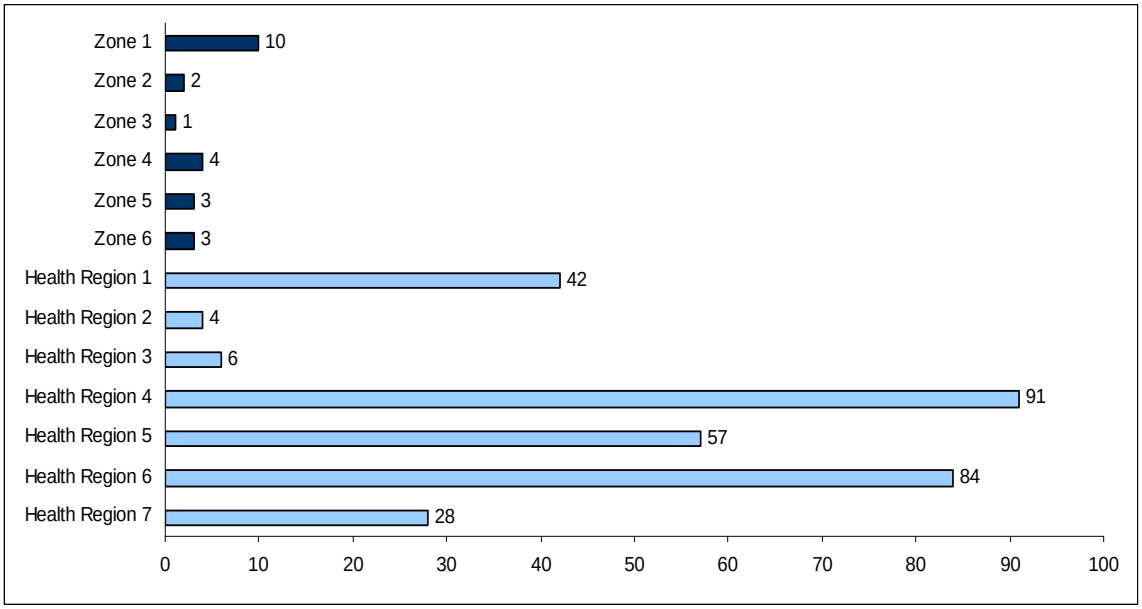
"Mother tongue" refers to the first language learned at home in childhood and still understood by the individual at the time of the census.

Confidence intervals (not shown) indicated that there were no statistically significant differences in diabetes rates detected between the four groups: New Brunswick francophones, New Brunswick anglophones, Nova Scotian francophones or Nova Scotian anglophones.

* This estimate (6.6%) was less precise because of the sampling methods used and should be interpreted with caution. In addition, due to the very small number of francophones on PEI and NL, their diabetes rates were not available for comparison with those of the anglophone population.

[44] Statistics Canada., *Table 105-0111 Health indicator profile, two year period estimates, by age group and sex, Canada, provinces, territories, health regions (2003 boundaries) and peer groups, occasional*, CANSIM (database). Last updated July 17, 2007.
http://cansim2.statcan.gc.ca/cgi-win/cnsmcgi.exe?Lang=E&CNSM-Fi=CII/CII_1-eng.htm
(accessed: November 26, 2009)

Figure 29:
Population (%) within health zones (Nova Scotia) and health regions (New Brunswick) who identify their mother tongue as French, 2006[45]



In three health regions in New Brunswick more than half the population identified their mother tongue as French (Health Regions 4, 5 and 6). In Nova Scotia, the highest percentage of people who identified their mother tongue as French was in Zone 1 (10%).The health regions of PEI and NL had populations of less than 5% who identified their mother tongue as French with the exception of Prince County, PEI at 8% (not shown).

Table 3:

Number of people who identified their mother tongue as English or French on the 2006 Census, by province.[46]

	NB	NS	PEI	NL
English	463,190	832,105	125,265	488,405
French	232,980	32,540	5,345	1,885

[45] Statistics Canada, *Community Profiles, 2006 Census*. http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?lang=eng&catno=92-591-X (accessed January 4, 2010).
[46] Corbeil, Jean-Pierre and Blaser, Christine, 2006, *The Evolving Linguistic Portrait, 2006 Census*:, Demography Division, Statistics Canada. http://www12.statcan.gc.ca/english/census06/analysis/language/pdf/97-555-XIE2006001.pdf (accessed: November 26, 2010)

CONCLUSION

In 2009, approximately 6% of the Canadian population had been diagnosed with diabetes. The age-standardized prevalence of diagnosed diabetes across Canada will have increased by 33% between 2006 and 2011.

This scan provided detailed information about the state of diabetes in the Atlantic provinces:

- In 2009, Newfoundland and Labrador and Nova Scotia had significantly higher prevalences of diabetes compared to all of Canada. The prevalences of diabetes in Prince Edward Island and New Brunswick were similar to the Canadian rate of 6%.

- Across all age groups in the Atlantic provinces, the oldest age group (65+) had the highest percentage of individuals who had been diagnosed with diabetes by a health professional.

- In each of the four Atlantic provinces, prevalence rates of overweight or obesity were significantly greater than the national prevalence rates for both men and women.

- Within each Atlantic province, significantly more men than women were overweight or obese.

- The proportion of youth in Newfoundland and Labrador who were overweight or obese was significantly higher than the Canadian averages for males and females alike.

- Across Canada in 2007-2008, 47.2% of females and 53.9% of males reported being active or moderately active during their leisure time. Rates of leisure time activity were similar for Atlantic Canadians.

- Males and females of the Atlantic provinces consumed significantly fewer fruits and vegetables compared to the overall Canadian male and female populations.

- The incidence rate for diabetes mellitus in the primarily African-Nova Scotian community of Preston was roughly 40% higher than in the province as a whole in 2008. The incidence rate was also higher than those of seven comparison communities (which had predominantly white populations of similar socio-economic status).

The Public Health Agency of Canada is committed to working to prevent diabetes and reducing the risk factors that contribute to this disease across all segments of society. To accomplish this goal, PHAC encourages public health capacity-building projects, contributes to public health knowledge development initiatives, and funds community-based organizations that share this mission.

The following are four funding programs currently supported by PHAC Atlantic that include diabetes prevention and/or support for those living with the disease in their mandate:

- **Canadian Diabetes Strategy** which provides funding to community organizations that are actively involved in work that contributes to preventing diabetes

- **Healthy Living Fund** supports time-limited, specific activities that work to increase the number of Canadians who are physically active, eating healthily and maintaining healthy weights

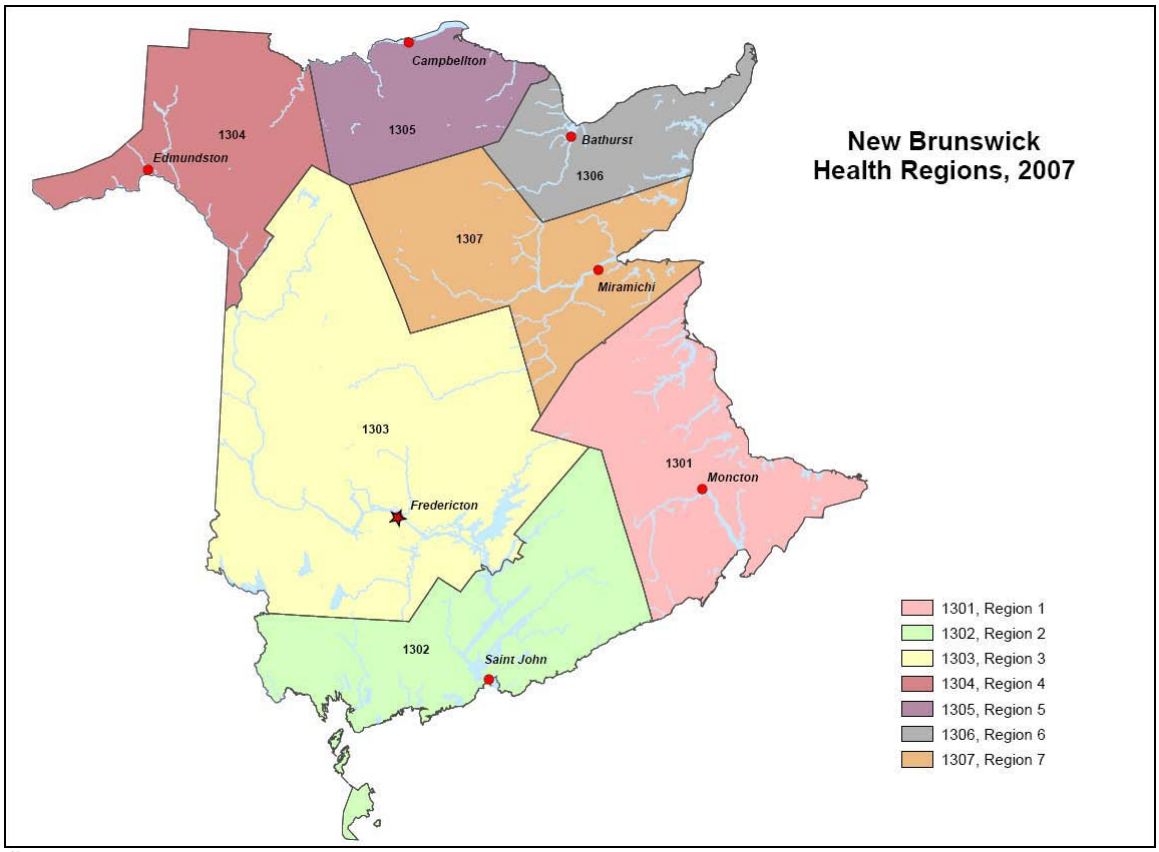
- **Aboriginal Head Start** (AHS) is an early intervention funding program for Aboriginal children and their families living in urban and northern communities. AHS works to empower parents and guardians to increase control over and improve their health. This includes taking charge of the components of a healthy lifestyle that can help reduce the risk of diabetes as part of a holistic approach to health.

- **Innovation Strategy (IS)** provides funding to community groups to support the development, adaptation, implementation and rigorous evaluation of promising interventions to increase and strengthen population health, reduce health inequalities and deal with public health issues of a complex nature.

This document was created to serve as a tool to inform those stakeholders who wish to understand the epidemiology of diabetes and selected risk factors in Atlantic Canada.

APPENDIX

MAPS OF GEOGRAPHICAL HEALTH REGIONS IN ATLANTIC CANADA



47

In 2008, New Brunswick transitioned to two Regional Health Authorities (RHA). RHA A replaces RHA 1 Beauséjour (Moncton), RHA 4 (Edmundston), RHA 5 (Campbellton) and RHA 6 (Bathurst). RHA B replaces RHA 1 South East (Moncton), RHA 2 (Saint John), RHA 3 (Fredericton), and RHA 7 (Miramichi).[48] Statistics Canada continues to use 2007 boundaries as shown on the map of New Brunswick above.

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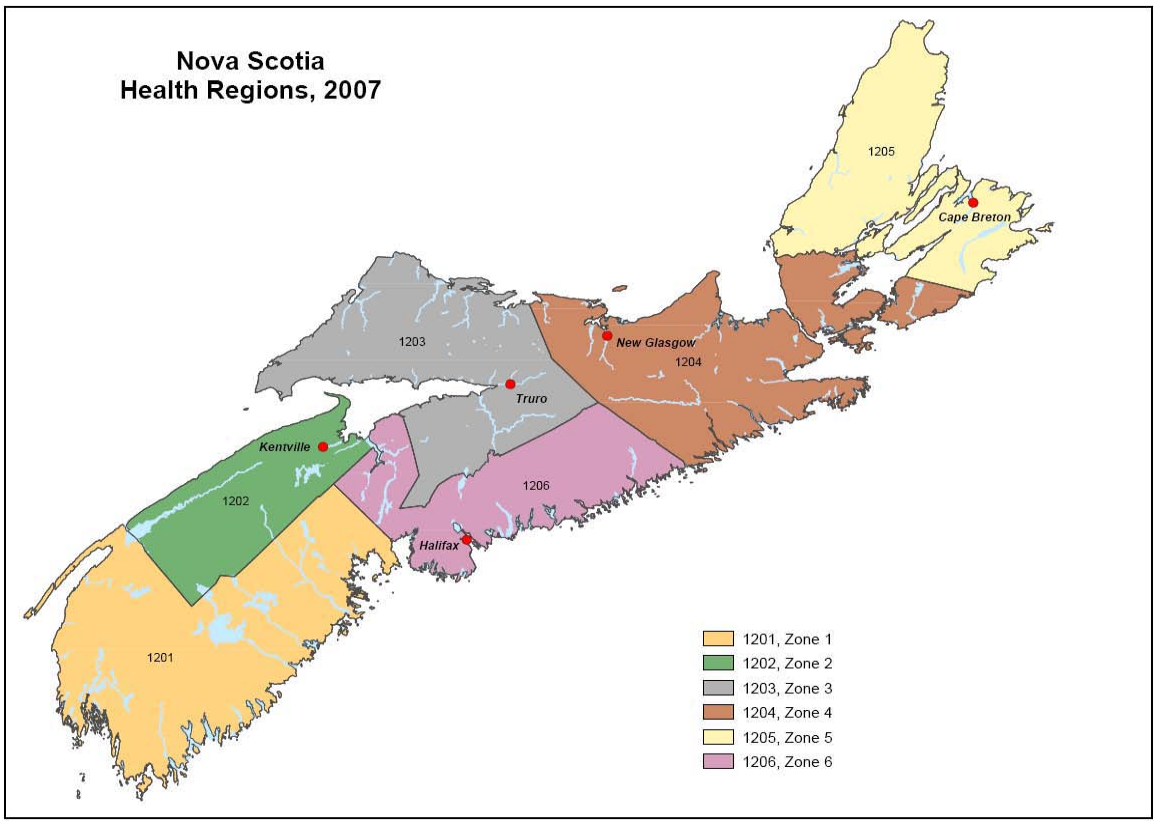
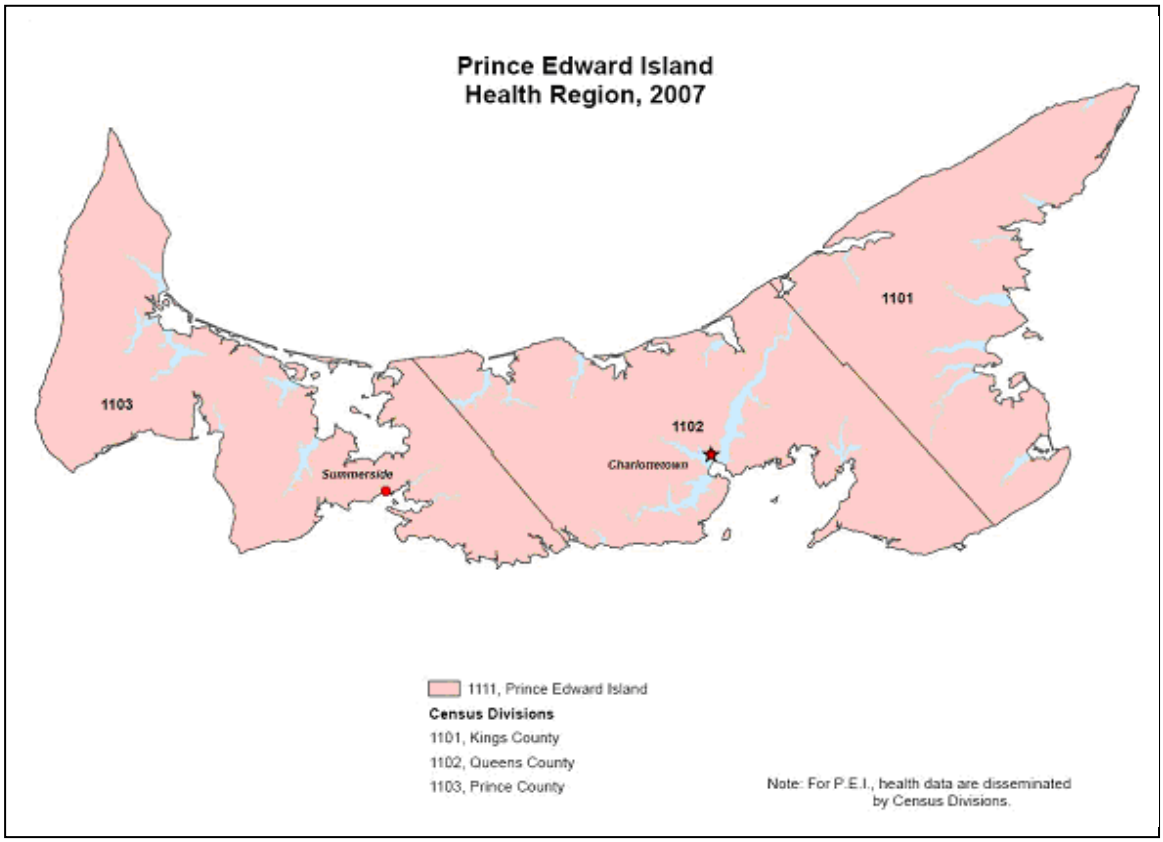
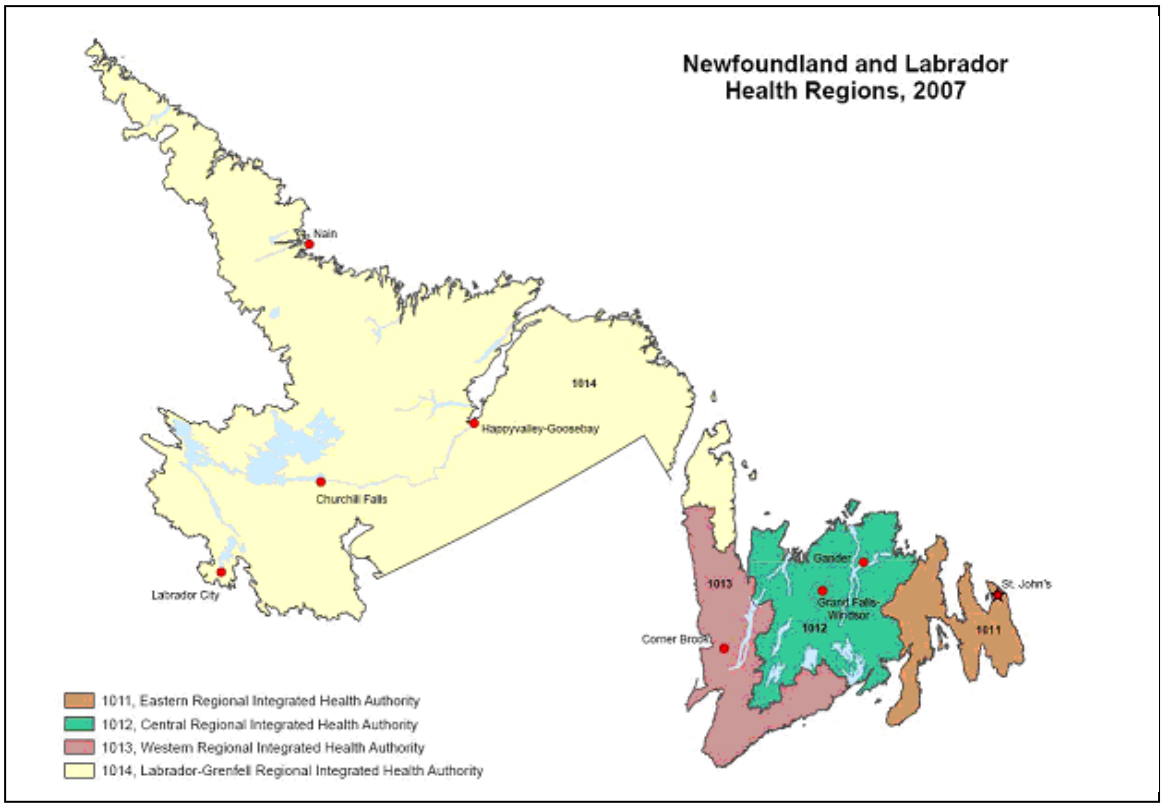
[47] Source for all maps in Appendix: Statistics Canada, 2008, Health Indicators, no. 1 pp. 83-87. ***Statistics Canada information is used with the permission of Statistics Canada. Users are forbidden to copy the data and redisseminate them, in an original or modified form, for commercial purposes, without permission from Statistics Canada. Information on the availability of the wide range of data from Statistics Canada can be obtained from Statistics Canada's Regional Offices, its World Wide Web site at www.statcan.gc.ca, and its toll-free access number 1-800-263-1136.***

[48] http://app.infoaa.7700.gnb.ca/gnb/Pub/EServices/ListServiceDetails.asp?ServiceID1=9435&ReportType1=All


Nova Scotia
Health Regions, 2007
1205
Cape Breton
1203
New Glasgow
1204
Truro
Kentville
1206
1202
Halifax
1201
1201, Zone 1
1202, Zone 2
1203, Zone 3
1204, Zone 4
1205, Zone 5
1206, Zone 6


Prince Edward Island
Health Region, 2007
1101
1103
1102
Charlottetown
Summerside
1111, Prince Edward Island
Census Divisions
1101, Kings County
1102, Queens County
1103, Prince County
Note: For P.E.I., health data are disseminated by Census Divisions.


Newfoundland and Labrador
Health Regions, 2007
Nain
1014
Happyvalley-Goosebay
Churchill Falls
Labrador City
1013
Gander
Grand Falls-
Windsor
1012
Corner Brook
1011
St. John's
1011, Eastern Regional Integrated Health Authority
1012, Central Regional Integrated Health Authority
1013, Western Regional Integrated Health Authority
1014, Labrador-Grenfell Regional Integrated Health Authority