

A population health bulletin published by the Office of the Chief Medical Officer of Health

## Obesity in New Brunswick

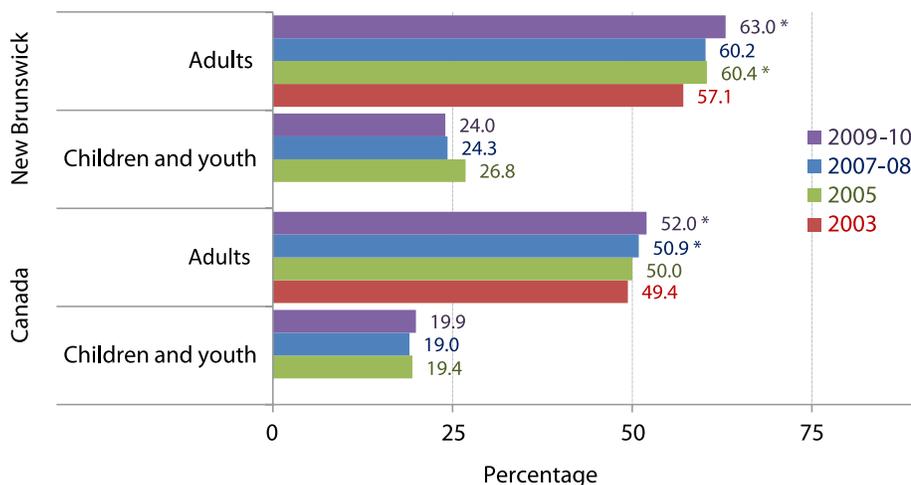
Over the past three decades, the number of New Brunswick’s children, adolescents and adults who are overweight or obese has increased substantially, mirroring a national and worldwide phenomenon. In Canada, the prevalence of obesity among adults and youth roughly doubled between 1981 and 2009 [1]. Dramatic increases in obesity prevalence have been particularly pronounced among children [2]. The World Health Organization reports that globally, obesity has more than doubled since the early 1980s. The organization estimates that more than one in ten of the world’s adult population is obese. In 2010, about 43 million children under the age of five were overweight or obese [3]. A wide range of genetic, lifestyle, social, cultural and environmental factors contribute to changes in obesity prevalence.

### In this issue:

- Prevalence of overweight and obesity
- Health implications
- Contributing factors

In New Brunswick, 63.0 per cent of adults aged 18 and older (an estimated 351,400 individuals) and 24.0 per cent of children and youth aged 12-17 (10,700 individuals) are overweight or obese, based on height and weight data collected in the 2009-10 Canadian Community Health Survey (CCHS) [4]. As seen in Figure 1, the rate of overweight and obesity in adults was significantly higher in 2009-10 than what was observed in 2007-08 (60.2 per cent;  $p < 0.05$ ). A large part of this observed increase was attributable to a larger percentage of adults who were obese in 2009-10 (28.0 per cent) compared to 2007-08 (22.4 per cent) [4].

Figure 1: Trends in the rates of overweight and obesity among adults (18 years and older) and children and youth (12 to 17 years), New Brunswick and Canada, 2003-2010



Source: Statistics Canada, *Canadian Community Health Survey*.

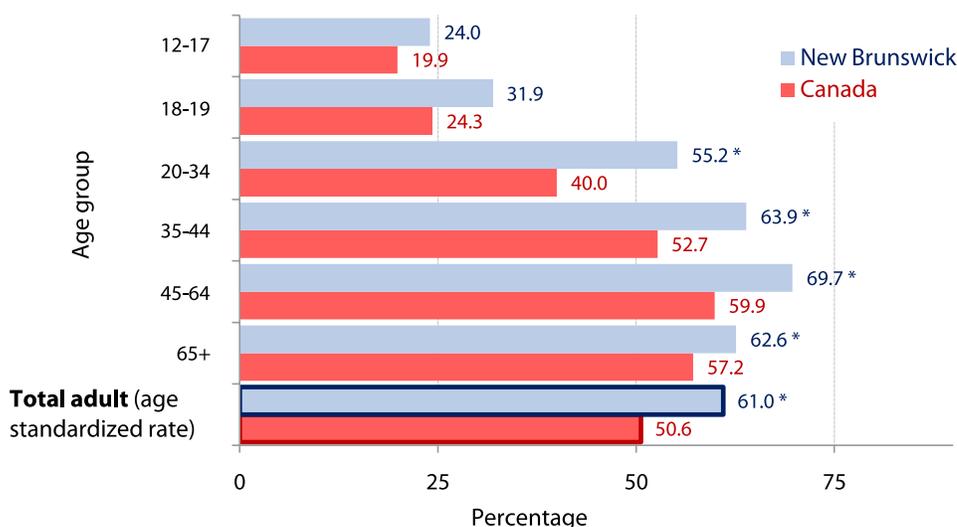
Note: \* = statistically different from the previous reference period ( $p < 0.05$ ).

Survey sample size for New Brunswick for the 2003 CCHS round: 4,737; for the 2005 round: 4,905; for the 2007-08 combined annual rounds: 5,278; for the 2009-10 combined annual rounds: 4,598. Data on overweight and obesity based on self-reported height and weight and classified according to health risk using internationally accepted cut-off points for body mass index (excluding pregnant women).

The 2009-10 rate of adult overweight and obesity was significantly higher in New Brunswick compared to the Canadian average (52.0 per cent), and higher than that for 11 of the 13 Canadian provinces and territories (except Newfoundland and Labrador) [4]. Part of this difference may be attributable to differences in the age structure of the population. As shown in Figure 2, prevalence of obesity generally increases with age, with the exception of the oldest age group. New Brunswick's population is older than Canada's: census data from 2006 reveal that the median age in New Brunswick (41.5 years) was older than the national median (39.5 years) [5]. However, age structure alone does not fully account for the difference in obesity rates. Adjusting for variations in population age structure, the 2010 age-standardized rate of adults who are overweight or obese in New Brunswick remained significantly higher than the national rate (61.0 versus 50.6 per cent) (Figure 2) [6].

The CCHS estimated that about one-quarter (24.0 per cent) of New Brunswick's children and youth aged 12 to 17 were overweight or obese in 2009-10. This rate was not statistically different from the 2007-08 rate (24.3 per cent), which in turn was similar to what was observed in 2005 (26.8 per cent) (Figure 1). Taking into account sampling variability, the 2009-10 provincial rate for children and youth overweight and obesity was not statistically different ( $p < 0.05$ ) from the national average (Figure 2). The rate for New Brunswick was the 8th lowest out of the 13 Canadian provinces and territories [4]. Rates were significantly higher than the national average in Yukon (36.1 per cent), Newfoundland and Labrador (31.3 per cent) and Nova Scotia (25.9 per cent); they were significantly lower in British Columbia (16.8 per cent) and Quebec (17.6 per cent).

**Figure 2:** Rates of overweight and obesity among the population 12 years and older, by age group and age-standardized, New Brunswick and Canada, 2009-2010



**Source:** Statistics Canada, *Canadian Community Health Survey, 2009-2010*.

**Note:** \* = statistically different from the Canadian rate ( $p < 0.05$ ).

Data based on self-reported height and weight and classified according to health risk using internationally accepted cut-off points for body mass index (excluding pregnant women). Rates by age group based on the CCHS 2009-2010 combined annual rounds. Age-standardized rates based on the CCHS 2010 round for the population 18 years and older and calculated using the 1991 Canadian Census population structure.

Figure 3 shows rates of overweight and obesity among children, youth and adults by health region. Numbers should be interpreted with caution due to sample size limitations, especially for regions with smaller populations. Using 95 per cent confidence intervals to illustrate the degree of variability associated with each rate, the observed rates for the health regions among adults (18 years and older) and among children and youth (12 to 17 years) were not statistically different from the respective provincial averages [4].

More data on overweight and obesity in New Brunswick, Canada and around the world are in the annex. There are different ways to measure and define “overweight” and “obesity”. The rates presented here are primarily based on self-reports of height and weight to calculate body mass index (BMI), a commonly used measure of obesity at the population level; they may differ compared to direct measures of excess body mass, elevated body fat-to-muscle ratio, or abdominal obesity [7, 8].

Nevertheless, the survey estimates revealed some significant patterns: prevalence of overweight and obesity were higher among New Brunswick’s adult population than the national average and increasing over time, but the levels among children and youth – while disconcertingly high from a public health perspective – were similar for New Brunswick and Canada in general and had remained relatively stable in recent years.

Overweight and obesity are known to have important impacts on both physical and psychosocial health; they are also largely preventable. Given the tendency for obese children to remain obese as adults, it is argued the obesity epidemic will not subside any time soon unless aggressive actions are implemented quickly and widely aimed at preventing or reducing childhood obesity including addressing risk factors at the individual, community and broader societal levels [1, 2, 9].

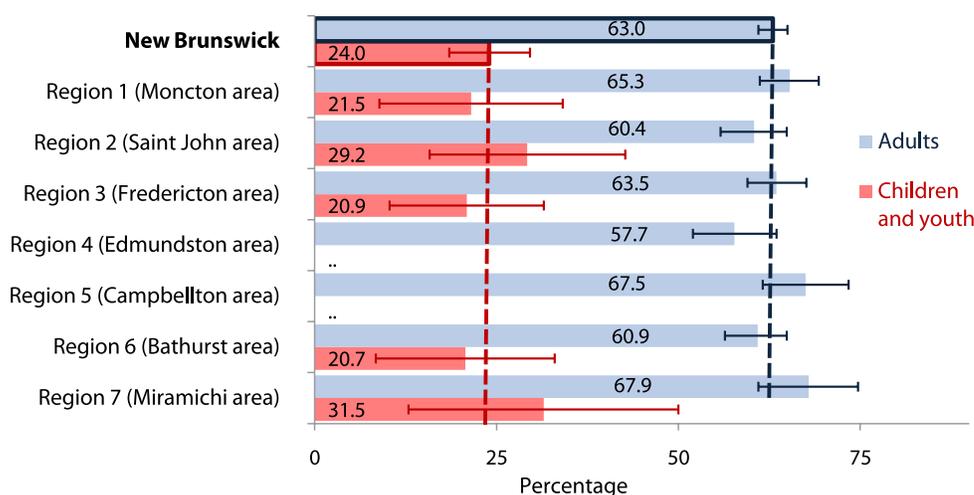
## Health implications of overweight and obesity

Overweight and obesity are not synonymous with poor health outcomes, but they are significant contributors to increased morbidity and mortality, especially among the severely obese. Overweight and obesity are the fifth leading risk for mortality worldwide, accountable for at least 2.8 million deaths each year [3].

In adults, overweight and obesity are risk factors for cardiovascular diseases (mainly heart disease and stroke), type 2 diabetes and some cancers (colorectal, kidney, breast, pancreatic, endometrial and ovarian) [1, 3]. Obesity has been linked to increased risk of high blood pressure, elevated blood cholesterol, high blood levels of triglycerides, low back pain and other bone and joint problems, asthma and other respiratory problems, gall bladder disease, skin infections, sleep apnea, depression and other psychosocial consequences. In women, obesity can lead to complications in pregnancy and delivery as well as increased risk of perinatal morbidity and mortality [10, 11]. One study attributed almost one in ten premature deaths among Canadians aged 20-64 in 2000 to overweight and obesity, with the problem particularly pronounced in Eastern Canada [12]. Considering both the direct costs to the health care system (i.e., hospital care, pharmaceuticals, physician care and institutional care) and indirect costs as a result of lost productivity, it has been estimated that adult obesity cost the Canadian economy approximately \$4.6 billion in 2008, up about 19 per cent from \$3.9 billion in 2000 [1].

Children and adolescents who are obese are at increased risk of respiratory problems, fractures, insulin resistance, hypertension and early markers of cardiovascular disease [1, 3]. Excessive weight gain in young girls can lead to early onset of puberty with its consequences on childhood development and psychosocial health [13]. Childhood obesity is also associated with important future health implications: higher chance of obesity, morbidity and premature death in adulthood [1, 3, 14].

Figure 3: Rates of overweight and obesity among adults (18 years and older) and children and youth (12 to 17 years) by health region, New Brunswick, 2009-2010



**Source:** Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

**Note:** .. = value suppressed due to small sample size.

Data based on self-reported height and weight and classified according to health risk using internationally accepted cut-off points for body mass index (excluding pregnant women). Sample size for New Brunswick was 4,218 adults and 351 children and youth. Horizontal lines on the chart refer to the 95 per cent confidence intervals for each rate.

Overweight and obesity in particular is the most important risk factor for type 2 diabetes and its complications [15]. The World Health Organization attributes 44 per cent of the global diabetes burden to overweight and obesity [3]. In New Brunswick, where adult obesity rates are higher than the national average, the age-standardized prevalence rate of diabetes was statistically higher than the Canadian rate in 2007 [16]. The increase in obesity among children and youth observed across the country during the past three decades has been associated with the emergence of type 2 diabetes in youth, whereas this was previously viewed as an adult-onset disease [15]. New Brunswick's prevalence rate of diabetes (types 1 and 2) among children and adolescents aged 1-19 increased by 12 per cent between 2002 and 2007 [16].

Data from New Brunswick Vital Statistics covering the period 2008-10 revealed an average of 11 deaths per year (1.5 per 100,000 population) with obesity and other hyperalimentation as the underlying cause of death, up from an average of 7 deaths per year (1.0 per 100,000 population) in 2000-2002 [17]. Most of these deaths occurred at ages 45 and older. It should be noted, however, that obesity is rarely listed as the main cause of death among obesity-related deaths.

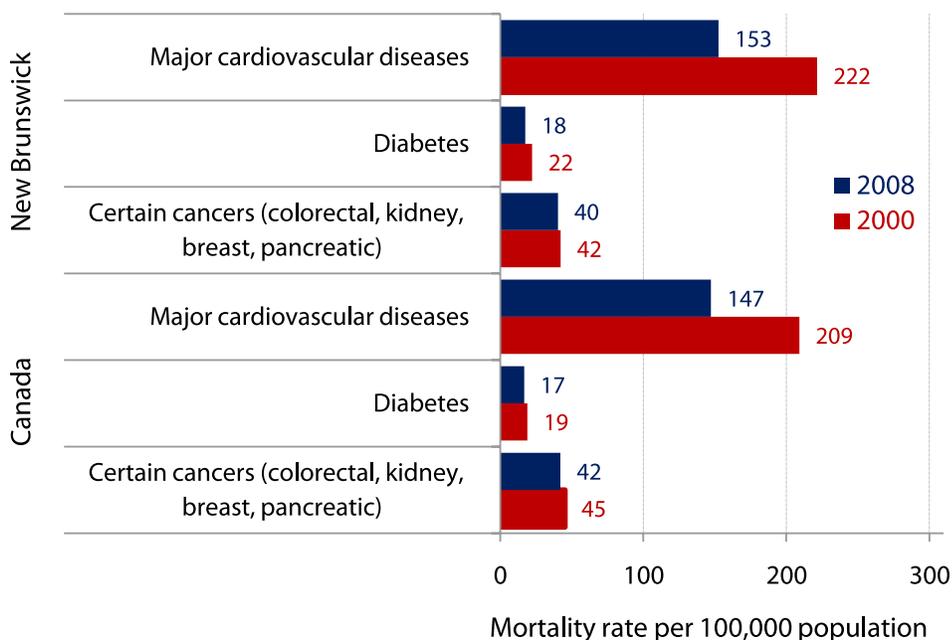
A number of studies using nationally representative data have demonstrated significant relationships between more extreme levels of obesity and increased mortality, including mortality due to cardiovascular disease and cancer [18, 19]. In New Brunswick, the 2008 crude mortality rates for the following selected non-communicable diseases were higher than the national average:

- major cardiovascular diseases: 244.9 versus 209.1 per 100,000 population;
- diabetes mellitus: 26.6 versus 22.6 per 100,000 population;
- colorectal, kidney, breast and pancreatic cancers: 58.0 versus 54.9 per 100,000 population [20].

As shown in Figure 4, once controlling for the differences in age structure, a large part of the provincial-national gap was attenuated—or reversed as in the case of cancer. In New Brunswick as in Canada, after discounting the effects of population aging, mortality rates for many non-communicable diseases remained steady, even receding somewhat between 2000 and 2008 [20].

Decreases in the death rates for cardiovascular diseases across the country have been attributed to reductions of some of the major risk factors, notably reduced tobacco use, as well as more effective detection, management and control of high blood pressure and dyslipidemia. It remains uncertain whether increasing rates of obesity in the population will change this downward trend [21].

Figure 4: Age-standardized mortality rates due to selected causes, New Brunswick and Canada, 2000 and 2008



**Source:** Statistics Canada, *Canadian Vital Statistics, Birth and Death Databases*, and annual population estimates.

**Note:** Data are based on place of residence and rates are age-standardized using the 1991 Canadian census population structure. Causes of death coded according to the *International Classification of Diseases and Related Health Problems, 10th revision*: major cardiovascular diseases [I00-I78], diabetes mellitus [E10-E14] and selected malignant neoplasms [C18-C21, C25, C50, C64-C65].

## Contributing factors to overweight and obesity

Overweight and obesity are closely associated with diet and physical inactivity, but are also driven by more distal factors such as socioeconomic status, ethnicity and community characteristics [1]. Increasing the levels of healthy eating and physical activity among children and adolescents in New Brunswick are key goals of the provincial wellness strategy [22], and in line with World Health Organization's global strategy to reduce the burden of non-communicable diseases [9]. For one, it has been documented that young people who eat fruit and vegetables more frequently are less likely to be overweight or obese [7]. As seen in Figure 5, fewer than half (46.3 per cent) of children and youth in New Brunswick are eating fruit and vegetables at least five times per day according to 2009-10 CCHS data. The percentage was lowest in Region 7 (Miramichi area) at 33.6 per cent, which was significantly lower than the national figure of 49.2 per cent ( $p < 0.05$ ) [4].

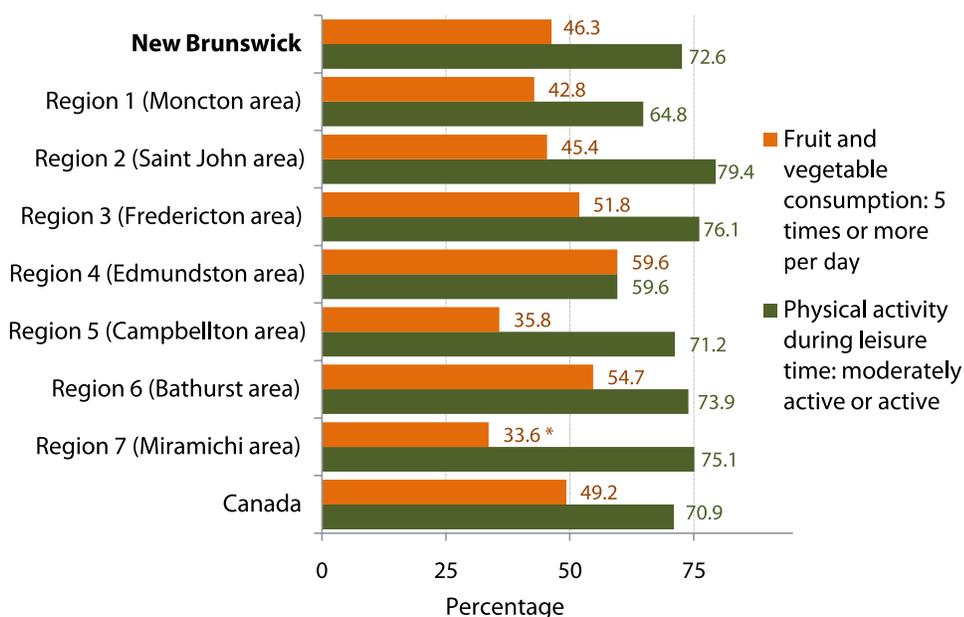
The latest findings from the New Brunswick Student Wellness Survey (NBSWS) further reveal markers of poor nutrition. In 2009-10, a majority of students in grades 6-12 reported eating candy, chocolate or other sweets (73 per cent) or consuming sweetened non-nutritious beverages such as soft drinks (62 per cent) on the day preceding the survey. Many students (21 per cent) reported drinking sweetened non-nutritious beverages three times or more per day [23]. Among students in grades 4-5, 75 per cent reported in 2010-11 eating candy, sweets, chips or fries and 56 per cent consuming sweetened non-nutritious beverages on the day preceding the survey (19 per cent three or more times per day) [24]. Information was not available on portion sizes.

Some studies have shown that physical activity can prevent obesity in children and adolescents. Others have been inconclusive, likely related to the difficulties of measuring overall energy expenditure resulting from usual daily activities in a survey [7]. It is widely acknowledged that

decreasing levels of physical activity among populations are partly due to lifestyle changes with reduced time spent on physical activity during leisure time and an increase in sedentary behaviour at home, school and work. According to the 2009-10 CCHS, 72.6 per cent of New Brunswick's children and youth reported engaging in daily leisure-time physical activity (i.e., excluding activity at school and work), which is about the same as the national rate (70.9 per cent) (Figure 5). Based on findings from the NBSWS, 57 per cent of students in grades 6-12 reported doing at least one hour of moderate to vigorous-intensity physical activity

per day [23], as recommended by the Public Health Agency of Canada [25]. Thirty-nine per cent reported participating in competitive sports and 37 per cent in school-organized non-competitive activities [23]. Among students in grades 4-5, 77 per cent reported being physically active either before school, at recess or at lunch and 58 per cent were active right after school [24]. Conversely, 60 per cent of students in grades 6-12 and 75 per cent of students in grades 4-5 usually spent more than two hours per day in sedentary routines such as watching television, playing video games and using computers (not for school) [23, 24].

Figure 5: Diet and physical activity among children and youth aged 12-19, by health region, New Brunswick, Canada, 2009-2010



Source: Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

Note: \* = statistically different from the Canadian rate ( $p < 0.05$ ).

Data on fruit and vegetable consumption based on self-reports of foods usually consumed at home and away from home. Data on physical activity refer to leisure time activities, that is, those not related to work or school.

Early infant nutrition can also influence health and development in childhood and adulthood, starting with the contribution of breastfeeding to optimal physical growth [9, 26]. Meta-analyses of epidemiological studies have concluded that breastfeeding modestly reduces the risk of obesity in childhood and in later life [27-29]. In New Brunswick, the breastfeeding initiation rate among newborns was 76 per cent in 2011, up from 70 per cent eight years earlier (Figure 6). The rate varied somewhat across health regions, highest in Regions 3 and 6 (Fredericton and Bathurst areas, respectively) and lowest in Region 7 (Miramichi area). A provincial study of infant feeding patterns indicated the rate of exclusive breastfeeding (i.e., feeding only breast milk without any additional food or drink) among newborns in hospital was just over half the breastfeeding initiation rate [30]. The rate of exclusive breastfeeding at six months of age, as recommended for healthy term

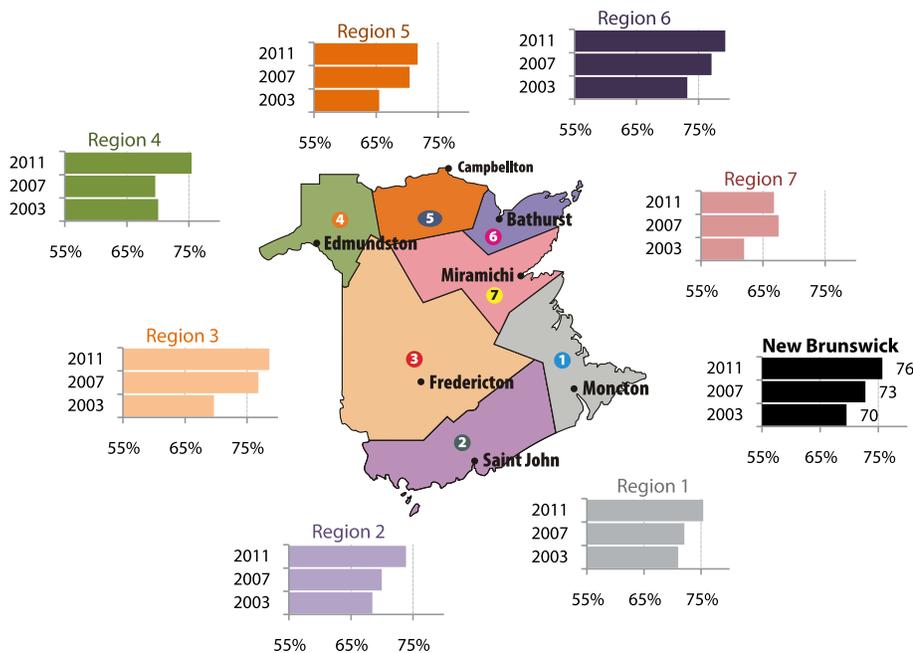
infants, was 19 per cent in New Brunswick based on 2009-10 CCHS findings, significantly less than the national average of 26 per cent ( $p < 0.05$ ) [4].

While the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended, globally there has been an increased intake of foods that are high energy-dense but nutrient-poor (often high in fat and sugars) and a decrease in physical activity levels. These changes are associated with wider societal and environmental changes: the global food system is producing more processed, affordable and effectively marketed food; and lifestyles are becoming increasingly sedentary due to the nature of many forms of work, changing modes of transportation and increasing urbanization [3, 31]. Evidence indicates that while obesity is affecting populations worldwide, in developed countries it tends to be disproportionately greater in disadvantaged groups [31]. A number

of Canadian studies have described a higher prevalence of obesity among adults with lower levels of education, residents of rural areas and Aboriginal populations [1, 8]. While results from studies of associations between children's socio-economic status and obesity have been inconsistent, one investigation did find greater likelihood of overweight or obesity among Canadian children and adolescents in households where no member had more than a high school diploma compared to those in households where at least one member had graduated from a postsecondary institution [7]. According to 2006 census data, New Brunswick had the smallest proportion of all provinces whose working age population 25-64 years had completed some form of postsecondary education [5]. Census data also showed that the median family income in New Brunswick, while increasing over time, remained less than the national median. Low income is negatively associated with food security and consistent access to sufficient nutritious food to meet dietary needs for an active and healthy life [26].

Scientific knowledge about overweight and obesity is still evolving and incomplete [1]. While the patterns involved are complex and risk factors interconnected, the latest data and evidence offer valuable insights into the problem in New Brunswick and within the national and global contexts. Prevention of excessive weight gain across the life span requires a mix of collaborative strategies and mechanisms, addressing the many societal, lifestyle and biological factors that often act in concert with one another [32]. Many promising policies and strategies for prevention of obesity among children, adolescents and adults aim to address the food environment (including restaurants and retail food stores as well as school, childcare and workplace settings), built environment (design of communities for physical activity) and socioeconomic environment (linking health inequalities to the degree of relative social inequality) that contribute to obesogenic environments. The evidence is strong that once childhood obesity

Figure 6: Trends in the rates of breastfeeding initiation, by health region, New Brunswick, 2003-2011



**Source:** Office of the Chief Medical Officer of Health, drawing on data from the Public Health Priority Assessment.

**Note:** Data refer to the initial feeding method of newborns in hospital captured through health administrative records covering the fiscal year as part of a universal screening program.

is established, it is difficult to reverse and tracks through to adulthood [33]. Strategies that have been identified as successful for preventing childhood obesity are largely based on embedding support for the benefit of all children in eating healthier foods and being active in everyday practices in homes, schools, child care settings, the health system and the wider community, in order to achieve long-term sustainable impacts [1, 3, 33, 34].

### Key points:

- In 2009-2010, 63 per cent of adult New Brunswickers and 24 per cent of children and youth were overweight or obese.
- Levels of overweight and obesity among children and youth were similar for New Brunswick and Canada in general, and remained relatively stable between 2005 and 2010, but patterns differed for the adult age groups.
- The adult obesity rate in New Brunswick was significantly higher than the national average, even after taking into account differences in population age structure.
- Fewer than half of New Brunswick's children and youth were eating fruits and vegetables at least five times per day in 2009-2010, and less than three-quarters engaged in daily leisure-time physical activity.
- The rate of breastfeeding among newborns, an important determinant of optimal physical growth in childhood and in later life, has increased in New Brunswick from 2003 to 2011; however, exclusive breastfeeding at six months remained less prevalent than the national average.
- Prevention of overweight and obesity requires addressing not only the immediate risk factors, but also the underlying social, economic and environmental conditions that can contribute to changes in obesity prevalence at the population level.

## Technical notes

Data on overweight and obesity for New Brunswick and Canada presented in this report were primarily based on findings from the Canadian Community Health Survey, conducted periodically by Statistics Canada since 2000-01. The CCHS targets all Canadians aged 12 and older. Its coverage is approximately 98 per cent in the provinces; residents of institutions, First Nations and Crown Lands, and certain remote regions and full-time members of the Canadian Forces are excluded. The survey is designed to provide reliable estimates of key population health indicators at the sub-provincial level of the health regions. Since 2007, CCHS data have been released on an annual basis; previously, data were collected from a larger sample of respondents every two years. In order to achieve more accurate estimates for smaller populations, in this report most analyses were based on data pooled together from the two years' 2009 and 2010 samples.

Overweight and obese categories were developed based on the BMI, which is calculated by dividing an individual's weight (kilograms) by height (metres) squared. Drawing on international standards developed by the World Health Organization, a BMI between 25.0 and 29.9 kg/m<sup>2</sup> is considered to be in the overweight class and a BMI of 30.0 kg/m<sup>2</sup> or more is obesity for adults aged 18 and older (excluding pregnant women). Since 2005, overweight and obese categories for children and youth have been classified on the basis of cut-offs for BMI centile curves established by the International Obesity Task Force (known as the Cole method) with specific ranges by age and sex [1, 3, 7].

The latest CCHS rounds used self-reported height and weight for calculating BMI, a practice that may underestimate the prevalence of overweight and obesity among adolescents and adults [7]. The last time that height and weight were directly measured of a sample of children, adolescents and adults across Canada with findings representative at the provincial level was in 2004, as part of the CCHS's cycle focusing on nutrition.

The BMI classification system is used extensively to monitor the prevalence of obesity by placing individuals in weight categories based on health risk. While other indicators of adiposity exist, the data for their measurement are more complex to collect in large population-based surveys. Analyses show a high correlation between BMI and certain other indicators, notably waist circumference, thereby suggesting that BMI is a strong proxy for assessing obesity-related risk factors for disease [35].

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## **More information and resources for individuals, families, health professionals and organizations on healthy body weights:**

*It's your health: Obesity* (Health Canada): <http://hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/obes-eng.php>

*Protecting your children from the health risks of obesity* (Health Canada): <http://www.healthycanadians.gc.ca/init/kids-enfants/obesit/index-eng.php>

Childhood Obesity Foundation: <http://www.childhoodobesityfoundation.ca>

*Our Health Our Future: a national dialogue on healthy weights*: <http://ourhealthourfuture.gc.ca>

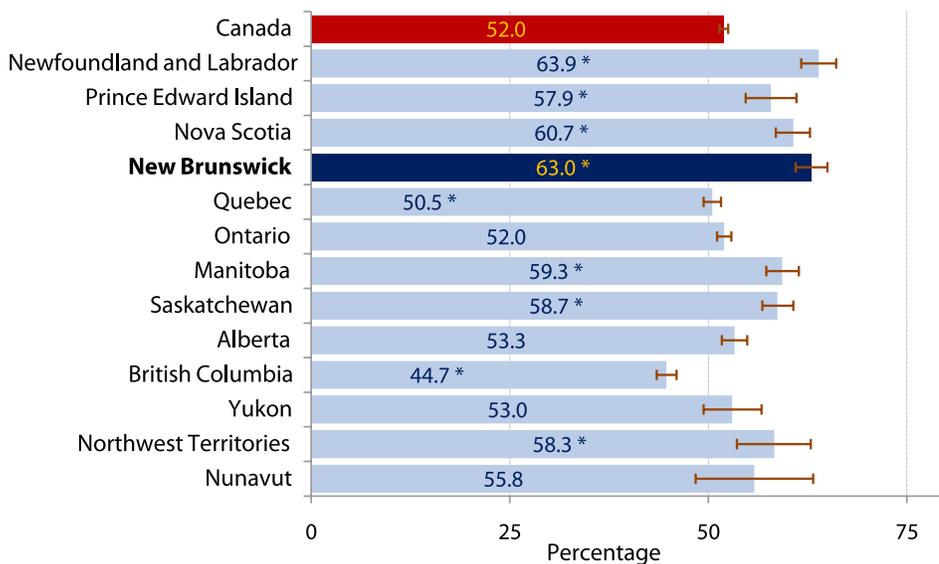
*Clinical practice guidelines on the management and prevention of obesity in adults and children* (Canadian Medical Association): [www.cmaj.ca/cgi/content/full/176/8/S1/DC1](http://www.cmaj.ca/cgi/content/full/176/8/S1/DC1)

Healthy Eating Physical Activity Coalition of New Brunswick: <http://hepac.ca>

Canadian Obesity Network: <http://www.obesitynetwork.ca/>

## Annex: Overweight and obesity in New Brunswick, Canada and around the world

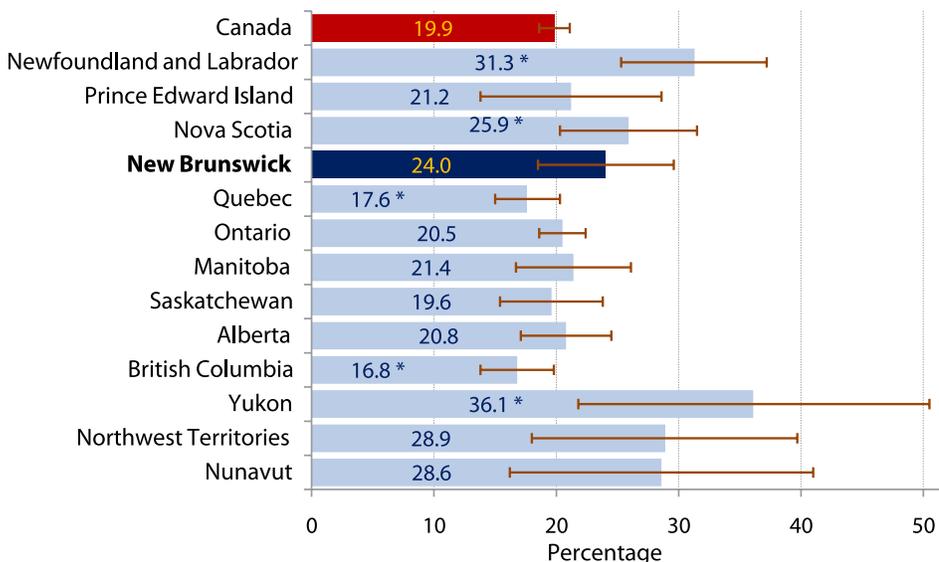
Figure A.1 : Rates of overweight and obesity among adults 18 years and older, Canada, provinces and territories, 2009-2010



**Source:** Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

**Note:** \* = statistically different from the Canadian rate ( $p < 0.05$ ).  
Data based on self-reported height and weight and classified according to health risk using internationally accepted cut-off points for body mass index (excluding pregnant women).  
Horizontal lines on the chart refer to the 95 per cent confidence intervals for each rate.

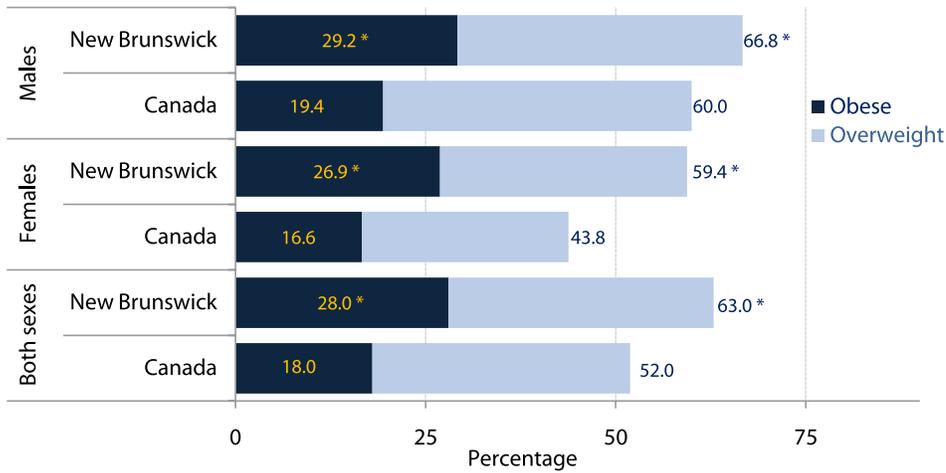
Figure A.2 : Rates of overweight and obesity among children and youth aged 12-17, Canada, provinces and territories, 2009-2010



**Source:** Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

**Note:** \* = statistically different from the Canadian rate ( $p < 0.05$ ).  
Data based on self-reported height and weight and classified according to age- and sex-specific health risk using internationally accepted cut-off points for body mass index.  
Horizontal lines on the chart refer to the 95 per cent confidence intervals for each rate.

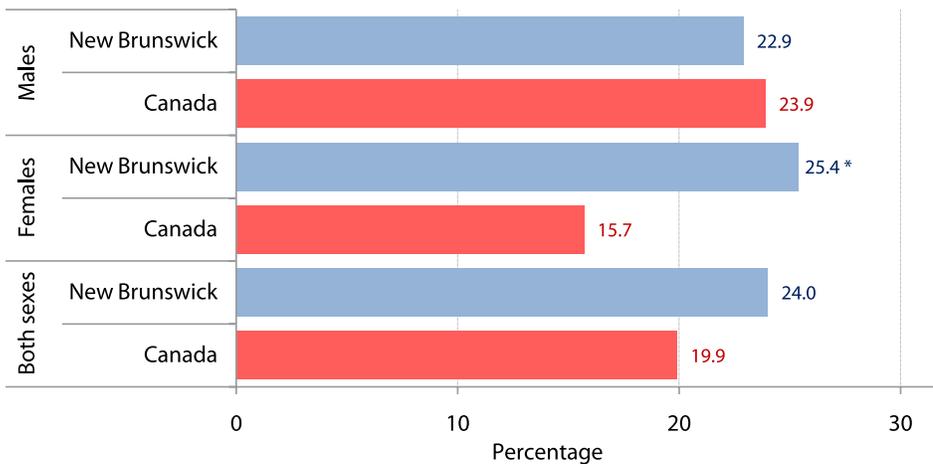
Figure A.3: Rates of overweight and obesity among adults 18 years and older by sex, New Brunswick and Canada, 2009-2010



Source: Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

Note: \* = statistically different from the Canadian rate ( $p < 0.05$ ).

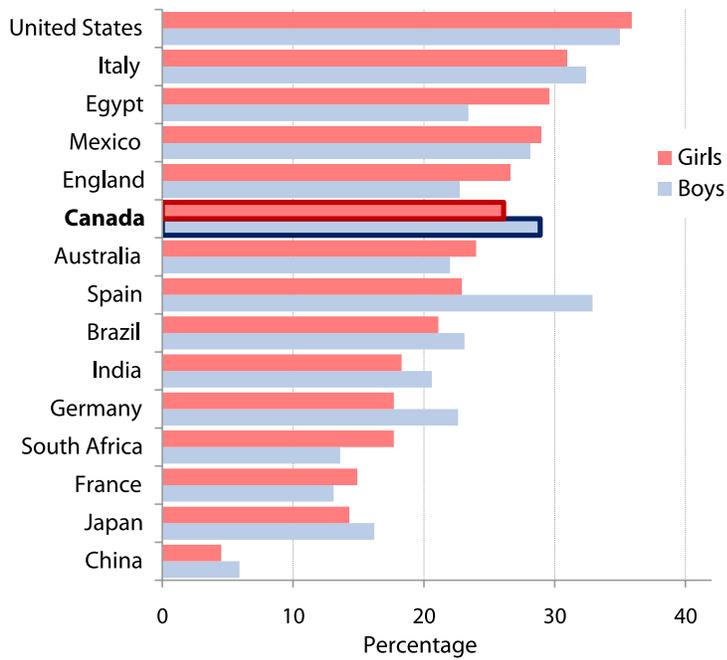
Figure A.4: Rates of overweight and obesity among children and youth aged 12-17 by sex, New Brunswick and Canada, 2009-2010



Source: Statistics Canada, *Canadian Community Health Survey, 2009-2010* (combined annual rounds).

Note: \* = statistically different from the Canadian rate ( $p < 0.05$ ).

Figure A.5: Rates of overweight and obesity among children and youth, by sex, selected countries



**Source:** International Association for the Study of Obesity, *Prevalence data: global child overweight* ([www.iaso.org/publications/trackingobesity](http://www.iaso.org/publications/trackingobesity)).

**Note:** Data from various national sources and refer to different age groups between 2 and 17 years, and different reference periods between 2000 and 2008. Rates for Canada are for children and youth aged 6-17 based on 2004 data.

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