

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

Mortality in New Brunswick

Information about the numbers, distribution and characteristics of deaths in a given population is useful to inform planning, monitoring and evaluation of health and social programs and policies. Indicators about deaths and causes of death provide valuable insights about population health. The

basic way to present information about deaths is by measuring the crude mortality rate, which is the number of deaths in a population during a given period, scaled to the size of that population. In New Brunswick, as elsewhere, data about deaths are derived from the vital events registration system, which is

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- Mortality rates and causes of death
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Figure 1: Crude mortality rates per 10,000 population, by health region, New Brunswick, 2009



legislated to record information on every death – as well as every birth and marriage – in the population. Summary information on these events is collated through Vital Statistics.

In 2009, there were 6,287 deaths among New Brunswick residents recorded through Vital Statistics,¹ for a crude mortality rate of 83.9 per 10,000 population (females: 82.4; males: 85.5). This was slightly less than the previous year, with 6,383 deaths² and a rate of 85.5 per 10,000 population (females: 83.2; males: 87.8).

Figure 1 shows the crude mortality rates by health region based on the latest available data.

Source: Office of the Chief Medical Officer of Health, drawing on mortality data from New Brunswick Vital Statistics and population estimates from Statistics Canada.

Note: Data based on place of residence. Stillbirths were excluded.

Causes of death in New Brunswick

In 2009, the leading cause of death in New Brunswick was malignant neoplasms, more commonly known as cancer, accounting for 30 per cent of all deaths.¹ A previous report published by the New Brunswick Cancer Network revealed lung cancer as having been the leading cause of cancer-related deaths between 2002 and 2006 in both females and males – responsible for more deaths than colorectal, breast and prostate cancers combined – and accounting for about one in four cancer deaths in females and one in three in males.³ A 2011 report from Statistics Canada highlighted that, in 2008 for the first time, cancer was the leading cause of death in every Canadian province and territory.⁴

The second leading cause of death in New Brunswick in 2009 was heart disease (e.g., ischaemic heart disease, hypertensive heart

disease, rheumatic heart disease), accounting for 20 per cent of all deaths, followed by diseases of the respiratory system (e.g., asthma, emphysema, bronchitis, influenza, pneumonia) at nine per cent and cerebrovascular diseases (e.g., stroke) at six per cent.

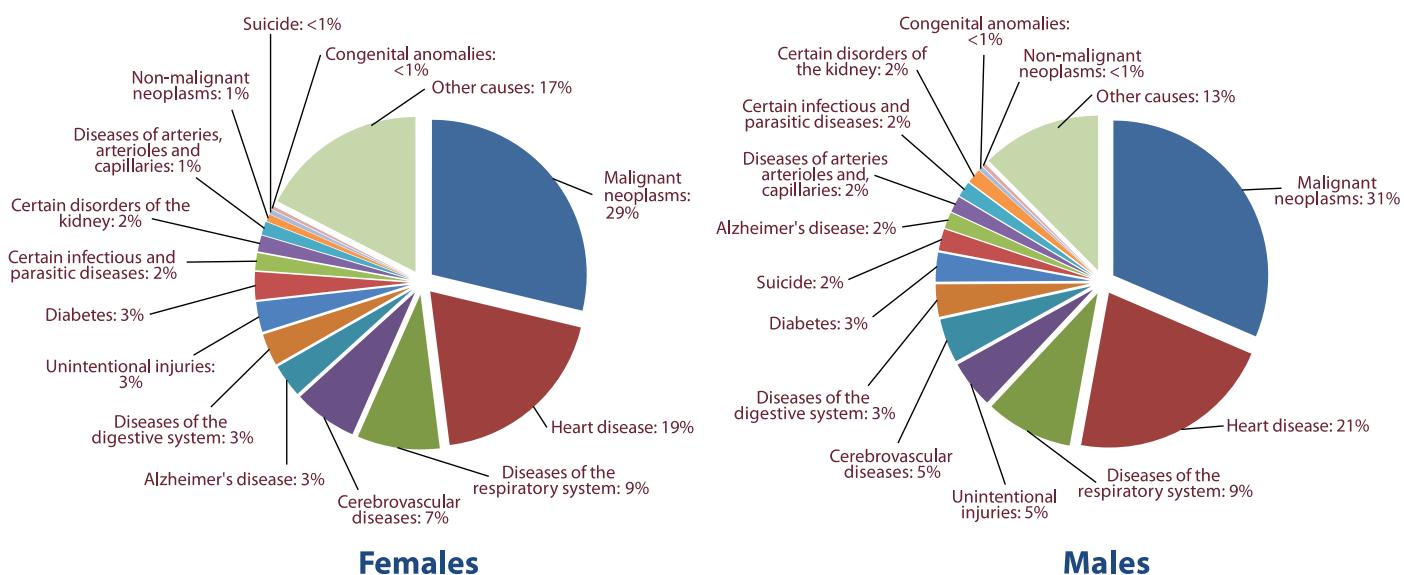
Figure 2 shows the distribution of deaths in New Brunswick according to selected causes of death disaggregated by sex. Information was coded according to the *International Statistical Classification of Diseases and Related Health Problems, 10th revision* (known as ICD-10), a system used to classify diseases, injuries and causes of death.⁵ Some causes were more commonly found among women given their greater longevity, notably Alzheimer's disease, which most often occur later in life. Other causes, including unintentional

injuries and suicide, were more often recorded among men.

In both females and males, three per cent of deaths were attributable to diabetes as the underlying cause. It has been estimated that, in New Brunswick, the mortality rate in adults with diabetes is twice that of those without this disease.⁶

In 2009, infectious and parasitic diseases (e.g., bacterial diseases, sexually transmitted infections, viral infections; excluding influenza, pneumonia and certain localized infections) accounted for two per cent of the overall mortality burden in the province. Disorders of the kidney (e.g., nephritis, nephrosis, renal failure) accounted for another two per cent of deaths.

Figure 2: Percentage distribution of deaths by cause, New Brunswick, 2009



Source: Office of the Chief Medical Officer of Health, drawing on data from New Brunswick Vital Statistics.

Note: Data based on the underlying cause of death. Causes of death coded according to the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10): malignant neoplasms (C00-C97); heart disease (I00-I09, I11, I13, I20-I51); diseases of the respiratory system (J00-J98); cerebrovascular diseases (I60-I69); Alzheimer's disease (G30); diseases of the digestive system (K00-K92); diabetes (E10-E14); unintentional injuries (V01-X59); certain infectious and parasitic diseases (A00-B99); certain disorders of the kidney (N00-N07, N17-N19, N25-N27); diseases of arteries, arterioles and capillaries (I70-I78); non-malignant neoplasms (D00-D48); suicide (X60-X84, Y87.0); congenital anomalies (Q00-Q99).

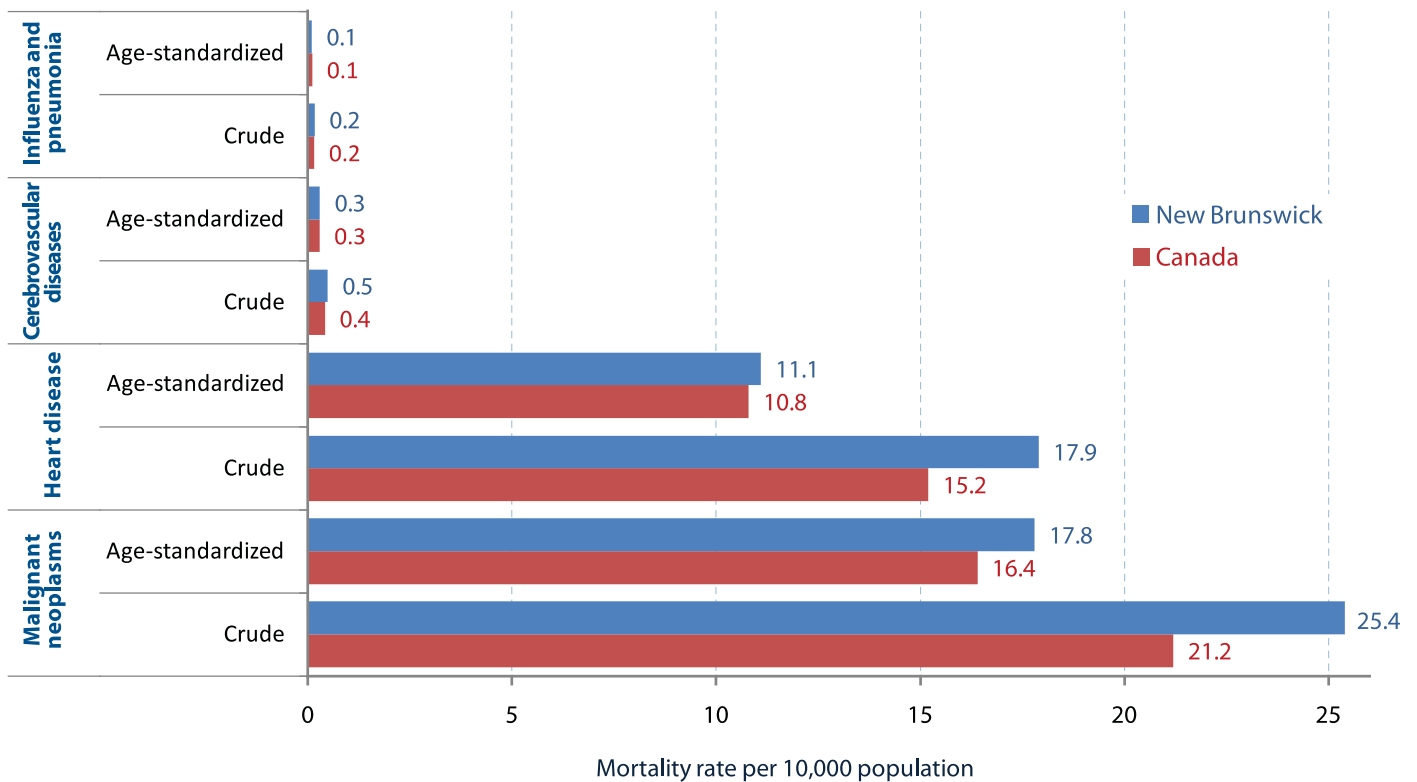
Comparisons with Canada

In 2008, the crude mortality rate in New Brunswick was higher than the Canadian average: 86.4 versus 71.6 per 10,000 population⁷ – a difference of 14.8. Age-standardized mortality rates revealed a much smaller difference: 57.6 and 53.1 per 10,000, respectively⁷ – a difference of 4.5. These differences were partly due to differences in the age structure of the New Brunswick population compared to Canada. Census data from 2006 revealed that

the median age among the New Brunswick population (41.5 years) was older than the national median (39.5 years).⁸ Since most deaths occur among persons in older age groups, one way to enhance comparability of mortality rates is by using age-standardized rates, which are calculated by weighting the number of deaths occurring at different ages against a standard population to discount the effect of age on mortality.

Figure 3 shows crude and age-standardized mortality rates in 2008 for selected causes of death in New Brunswick and Canada. From 2000 to 2008, age-standardized mortality rates generally experienced a downward trend for the 10 leading causes of death across Canada.⁴ Further data about trends in mortality rates for all provinces and territories are in the annex.

Figure 3: Mortality rates due to selected causes, New Brunswick and Canada, 2008



Source: Statistics Canada, *CANSIM Table 102-0552: Deaths and mortality rate, by selected grouped causes and sex (annual)*.

Note: Data based on the underlying cause of death and on place of residence. Causes of death coded according to the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10): malignant neoplasms [C00-C97], heart disease [I00-I09, I11, I13, I20-I51], cerebrovascular diseases [I60-I69], influenza and pneumonia [J09-J18].

Premature mortality in New Brunswick

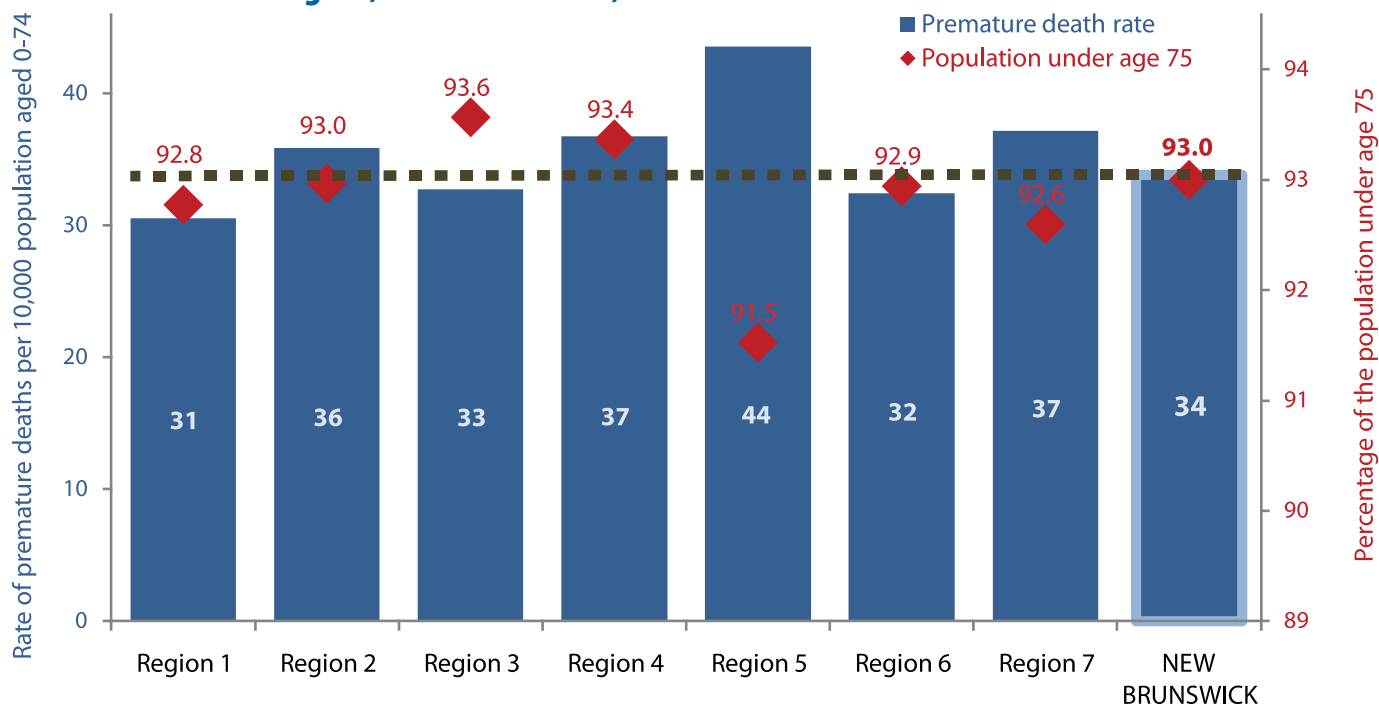
Crude and age-standardized mortality rates are influenced by the higher proportion of deaths occurring in the older age groups. Measures have been developed to reflect the mortality trends of younger age groups. These include measures of premature mortality, which reflect deaths occurring before a predetermined end point, set here at age 75 years (although there is no international consensus on a universal end point). According to Vital Statistics data, 37.8 per cent of the deaths that occurred among New Brunswickers between 2005 and 2009 were premature (females: 29.2 per cent; males: 46.3 per cent), for an average annual rate of 34 premature deaths per 10,000 population

aged 0-74 (females: 26; males: 42 per 10,000).

For the period 2005-2009, the percentage of deaths that occurred prematurely varied across health regions: from 36.3 per cent in region 1 (Moncton area) to 40.5 per cent in region 4 (Edmundston area). Regional variations in mortality patterns can be explained in part by differences in population structure, notably the share of the population aged under 75. Figure 4 shows the rates of premature deaths per 10,000 population aged 0-74 in the seven health regions. The rates were lower than the provincial average in regions 1, 3 and 6; they were higher in regions 2, 4, 5 and 7.

Data from Vital Statistics further revealed differences in the percentage of premature deaths according to urban versus rural places of residence. Relatively fewer of the deaths recorded between 2004 and 2008 occurred before age 75 among urban residents (females: 26.6 per cent; males: 43.4 per cent) compared to their rural counterparts (females: 31.1 per cent; males: 48.2 per cent). Census findings highlight that the share of the rural population in New Brunswick (48.9 per cent) remains much larger than the Canadian average (19.8 per cent).⁸

Figure 4: Rates of premature deaths and proportions of the population under age 75, by health region, New Brunswick, 2005-2009



Source: Office of the Chief Medical Officer of Health, drawing on mortality data from New Brunswick Vital Statistics and population estimates from Statistics Canada.

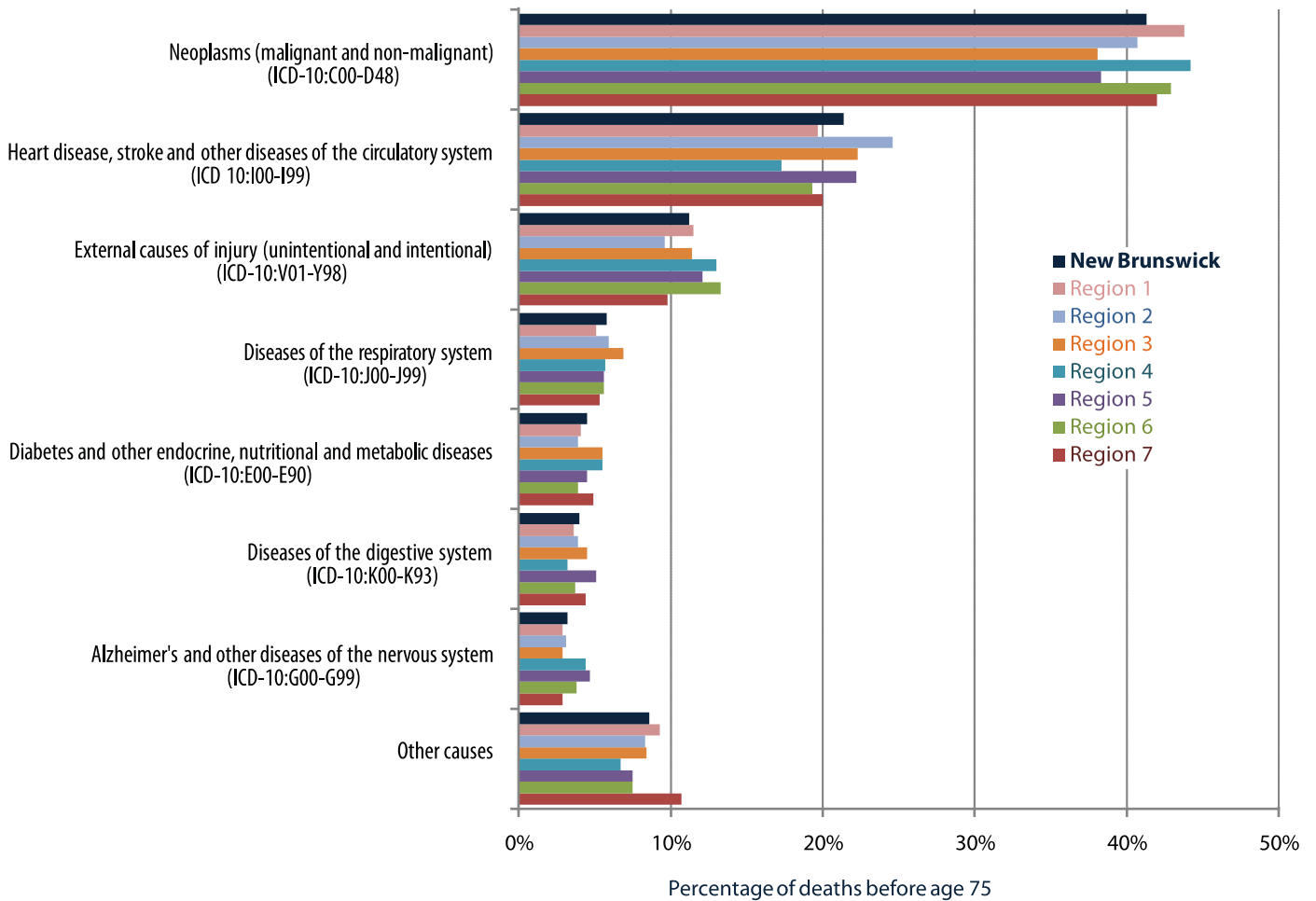
Note: Data based on place of residence. Age-specific population estimates based on the mid-point of the period of observation.

Figure 5 shows data about selected causes of premature death by health region of New Brunswick. Between 2005 and 2009, cancer was the leading cause of premature mortality in

all health regions, followed by diseases of the circulatory system (e.g., heart disease, stroke) and external causes of injury (including unintentional injuries as a result of motor vehicle

traffic incidents, falls, poisoning, drowning, etc., as well as assaults and intentional self-harm). Another measure of premature

Figure 5: Percentage distribution of premature deaths for selected causes, by health region, New Brunswick, 2005-2009



	Neoplasms	Diseases of the circulatory system	External causes of injury	Diseases of the respiratory system	Endocrine, nutritional and metabolic diseases	Diseases of the digestive system	Diseases of the nervous system	Other causes	TOTAL
New Brunswick	41%	21%	11%	6%	5%	4%	3%	9%	100%
Region 1	44%	20%	12%	5%	4%	4%	3%	9%	100%
Region 2	41%	25%	10%	6%	4%	4%	3%	8%	100%
Region 3	38%	22%	11%	7%	6%	5%	3%	8%	100%
Region 4	44%	17%	13%	6%	6%	3%	4%	7%	100%
Region 5	38%	22%	12%	6%	5%	5%	5%	8%	100%
Region 6	43%	19%	13%	6%	4%	4%	4%	8%	100%
Region 7	42%	20%	10%	5%	5%	4%	3%	11%	100%

Source: Office of the Chief Medical Officer of Health, drawing on data from New Brunswick Vital Statistics.

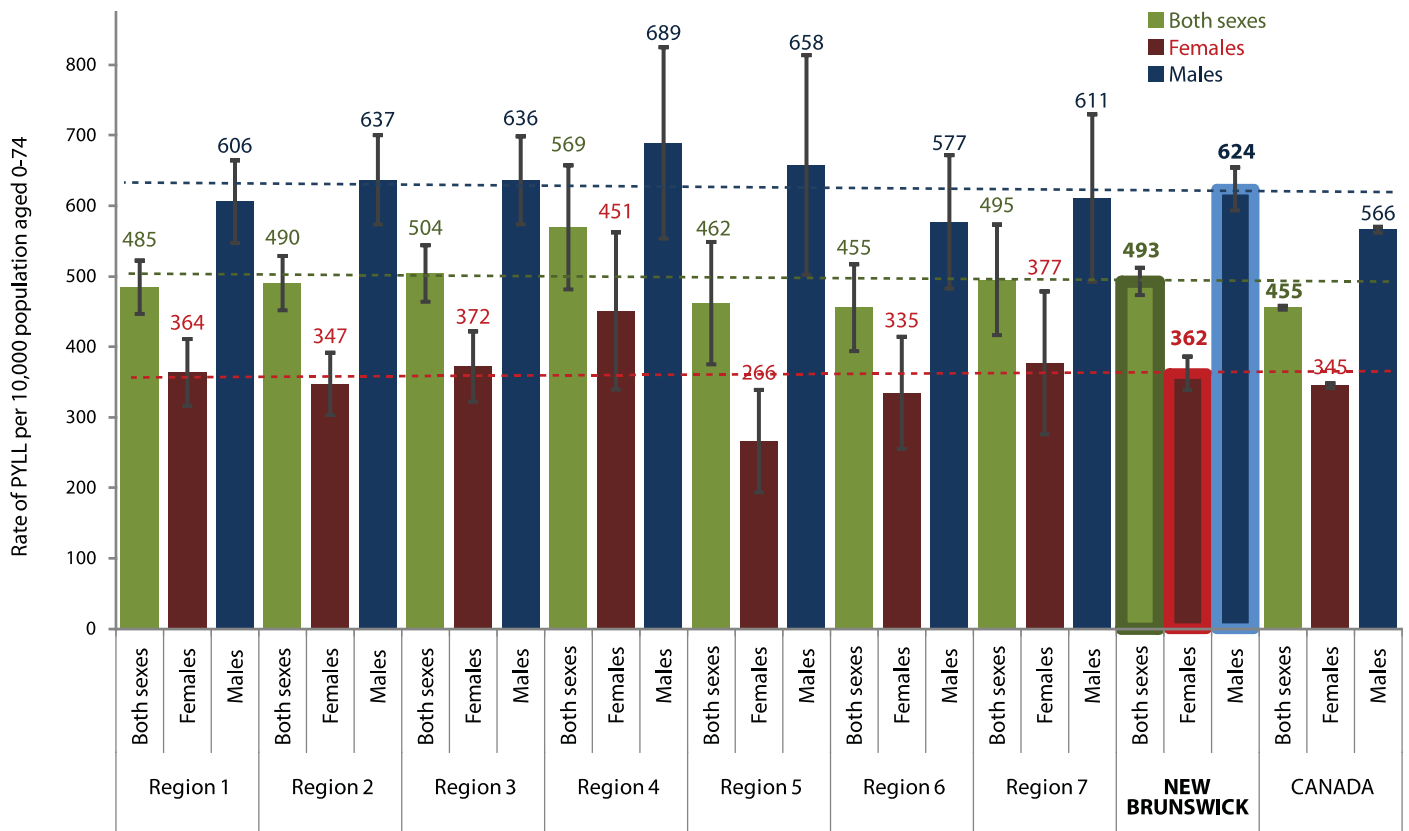
Note: Data based on the underlying cause of death and on place of residence. Causes of death coded according to the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10).

mortality is the potential years of life lost (PYLL), which is an estimate of the average number of years a person would have lived if he or she had not died prematurely. This indicator gives more weight to deaths that occur at younger ages, especially in childhood and adolescence, which are for the most part preventable. Figure 6 shows the rate of PYLL for New Brunswick,

its health regions, and Canada between 2005 and 2007. The higher PYLL for New Brunswick (493 years per 10,000 population aged 0-74) compared to Canada (455 years per 10,000 population)⁹ reflects some combination of a greater number of premature deaths and younger ages at death. While certain upward or downward shifts in estimated PYLL may have been initially observed

across health regions, it should be noted that rates for smaller geographical areas are associated with higher degrees of variability because of the smaller populations involved. Differences in the age-standardized rates of PYLL among the seven health regions were not statistically significant compared to the provincial rate ($p < 0.05$).

Figure 6: Age-standardized rates of potential years of life lost, by sex and health region, New Brunswick and Canada, 2005-2007



Source: Statistics Canada, CANSIM Table 102-4309 - Mortality and potential years of life lost, by selected causes of death and sex, three-year average, Canada, provinces, territories, health regions.

Note: Potential years of life lost were calculated using the population aged 0 to 74, and age-standardized using the 1991 Canadian census population structure. Vertical bars on the chart represent the 95% confidence interval for each data point. Rates of PYLL with wide confidence intervals should be interpreted with caution.

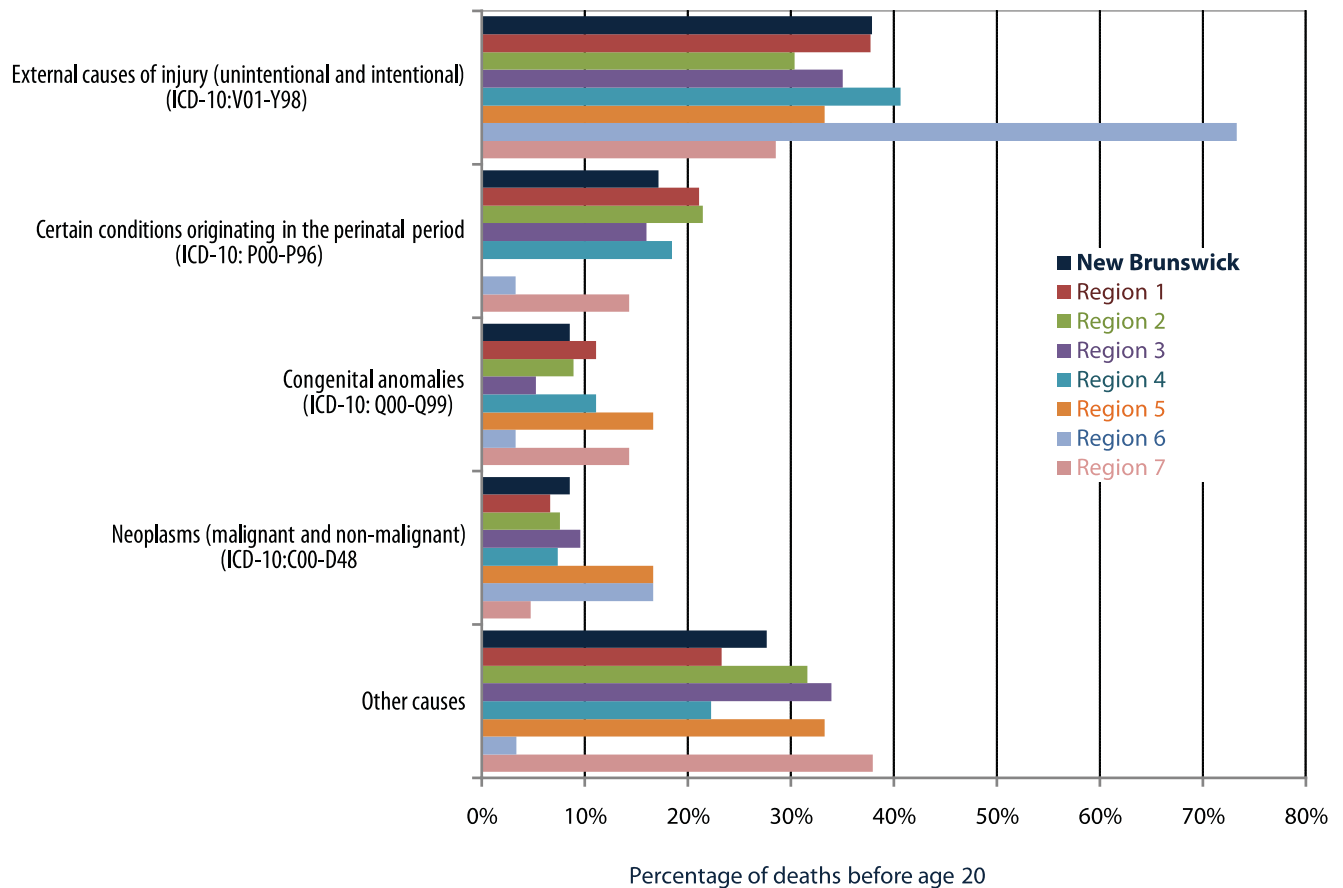
Mortality among infants, children and youth

In 2009, one per cent of deaths in New Brunswick involved persons younger than age 20.¹ Although younger persons experience lower mortality rates than older individuals, they are more susceptible to death due to injuries.¹⁰ Figure 7 shows

information about selected causes of death among infants, children and youth by health region for the period 2005-2009. Over one-third of deaths among New Brunswickers from birth to age 19 were attributable to unintentional and intentional injuries. Other leading

causes of death were complications of pregnancy and childbirth, congenital anomalies and cancer. The actual number of deaths being relatively small, numbers should be interpreted and compared with caution, especially for the least populous health regions.

Figure 7: Percentage distribution of deaths before age 20 for selected causes, by health region, New Brunswick, 2005-2009



	External causes of injury	Perinatal conditions	Congenital anomalies	Neoplasms	Other causes	TOTAL
New Brunswick	38%	17%	9%	9%	28%	100%
Region 1	38%	21%	11%	7%	23%	100%
Region 2	30%	22%	9%	8%	32%	100%
Region 3	35%	16%	5%	10%	34%	100%
Region 4	41%	19%	11%	7%	22%	100%
Region 5	33%	0%	17%	17%	33%	100%
Region 6	73%	3%	3%	17%	3%	100%
Region 7	29%	14%	14%	5%	38%	100%

Source: Office of the Chief Medical Officer of Health, drawing on data from New Brunswick Vital Statistics.

Note: Data based on the underlying cause of death and on place of residence. Causes of death coded according to the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10).

In 2009, 38 deaths (or half of deaths before age 20) occurred among New Brunswickers in their first year of life.¹ This number translates to an infant mortality rate of 5.2 per 1000 live births. Infant mortality rate is used worldwide as an indicator of population health and the effectiveness of health care and public health initiatives. Across Canada, broad public health improvements and social investments during the past century have resulted in substantial progress on health outcomes in the earliest stages of the life course and for the population as a whole.¹⁰ As seen in Figure 8, the New Brunswick infant mortality rate is similar to the national average. At the

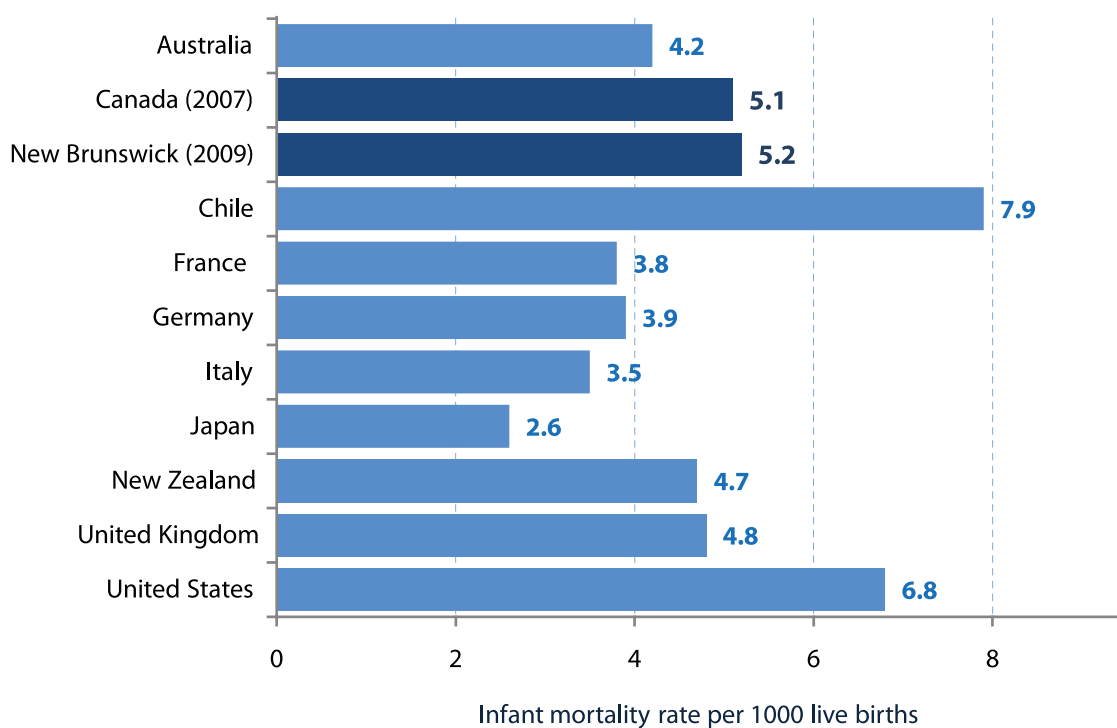
same time, it falls below the rate observed in some countries and higher than that in others. Differences in clinical practices and data capture around the world mean infant mortality rates should be interpreted with caution. In particular, data about live births for Canada and the United States include very premature babies with lower chances of survival, which results in higher recorded mortality compared to other countries.¹¹

While infant mortality has decreased steadily in New Brunswick during the last several decades, some communities remain more vulnerable than others. Based on Vital Statistics data, the average

infant mortality rate during the period 2000-2009 was much higher among residents of First Nations communities (12.2 per 1000 births) compared to the provincial average. However, the numbers of deaths and births are very small so rates must be interpreted with caution.

Other Canadian jurisdictions have also recorded infant mortality rates more than twice as high among First Nations people compared to non-First Nations people, partly due to causes such as sudden infant death syndrome, infection and external causes of injury; and linked to differences in socio-economic status and living conditions.¹²

Figure 8: Infant mortality rates, New Brunswick, Canada and selected countries, 2007-2009



Source: For New Brunswick: Office of the Chief Medical Officer of Health, drawing on data from Vital Statistics (births and deaths among non-residents excluded). For Canada and other countries: Human Resources and Skills Development Canada, *Indicators of Well-being in Canada: Family Life—Infant Mortality* (<http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=2>); Organization for Economic Cooperation and Development, *OECD Health Data 2011* (http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT).

Life expectancy and health-adjusted life expectancy

A popular summary measure of mortality is life expectancy at birth, which represents the expected number of years of life among a group of people born in a given year, if mortality at each age remains constant in the future. In New Brunswick, the average baby born in 2008 is expected to live 80.2 years (females: 82.7; males: 77.6), up from 77.6 years (females: 80.7; males: 74.4) for those born 15 years earlier.¹³

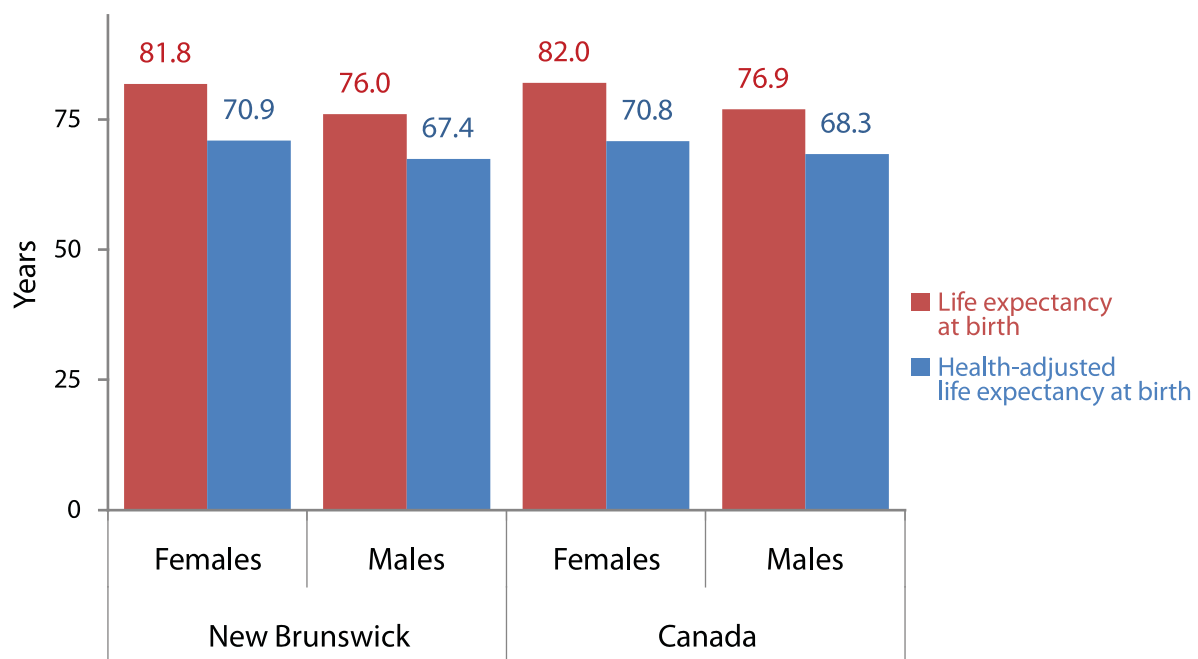
For the period 2005-2007, life expectancy at birth is about one year greater among residents in health regions 1 and 6 (80.9 and

81.0 years, respectively) and a half-year less in health regions 2, 3 and 4 (79.6, 79.5 and 79.3 years, respectively) compared to the provincial average of 80.0 years. There was no statistical difference from the provincial estimate ($p < 0.05$) for the same period for residents of health regions 5 and 7 (79.2 and 80.0 years, respectively).¹⁴

Not all gains in life expectancy achieved in recent decades can be expected to be lived in good health. The health-adjusted life expectancy (HALE) for New Brunswickers born in 2001, assuming the current morbidity and mortality conditions,

has been estimated by Statistics Canada to be 70.9 years for females and 67.4 years for males, which are 10.9 and 8.6 years less than overall life expectancy for women and men, respectively.¹⁵ In other words, although females have a higher life expectancy than males born in the same year, they are expected to spend a smaller proportion of their life in good health (87 per cent versus 89 per cent). The gap between HALE and life expectancy was found to be similar for New Brunswick compared to the Canadian average (Figure 9).

Figure 9: Life expectancy and health-adjusted life expectancy by sex, New Brunswick and Canada, 2001



Source: Statistics Canada, CANSIM Table 102-0121 - Health-adjusted life expectancy, at birth and at age 65, Canada and provinces, occasional.

Note: Health-adjusted life expectancy measured using a health utility index to weigh years lived in good health higher than years lived in poor health.

About the data sources

Counts of deaths and live births were collated by the Office of the Chief Medical Officer of Health using data from Vital Statistics. Data about causes of death were based on the underlying cause, defined as either the disease, condition or injury that initiated the train of events leading directly to death, or the circumstances of the incident or violence that produced the fatal injury. Causes of death were coded by Statistics Canada according to ICD-10 definitions.⁵ Data based on place of residence excluded deaths and births among non-residents.

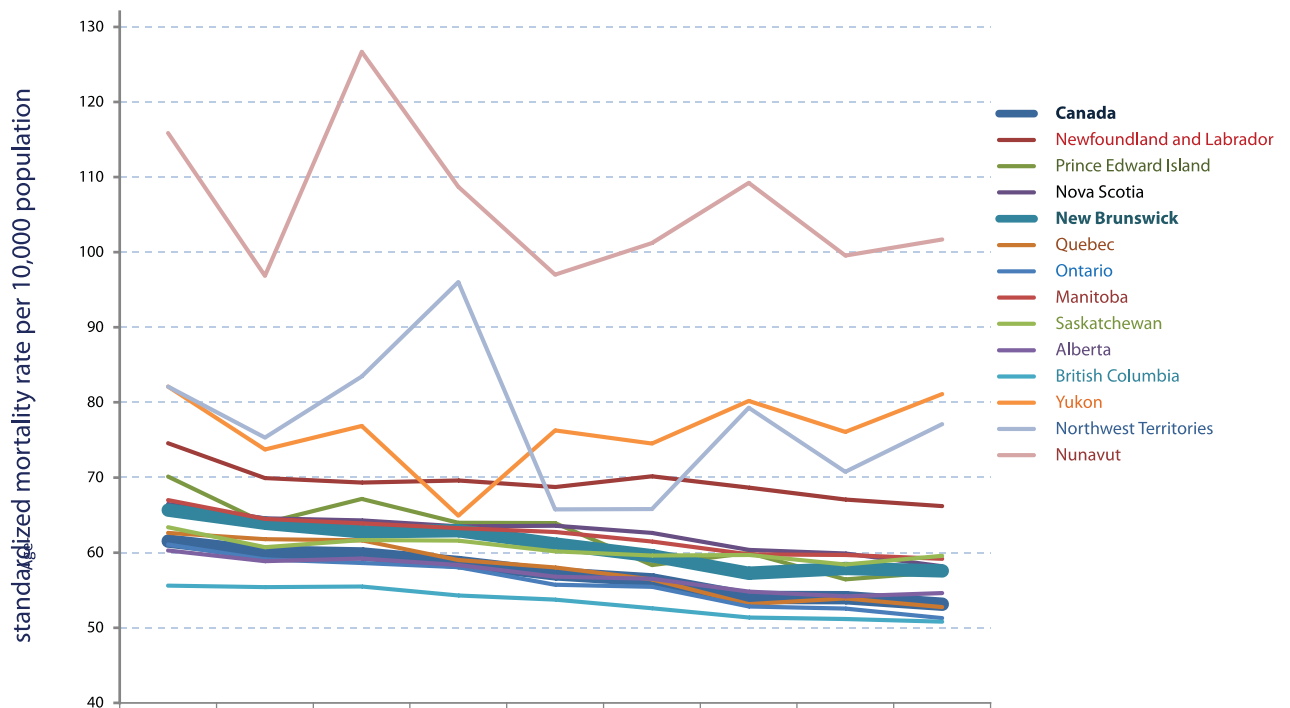
New Brunswick population estimates used in calculating mortality rates were based on population estimates for the province by census subdivision produced by Statistics Canada covering the period 1996 to 2010. These estimates are based on 2006 census counts and adjusted for census net undercoverage. Updates to the population count methodology mean comparisons with previously published population-based rates must be made with caution.

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Annex: Age-standardized mortality rates among Canadian provinces and territories

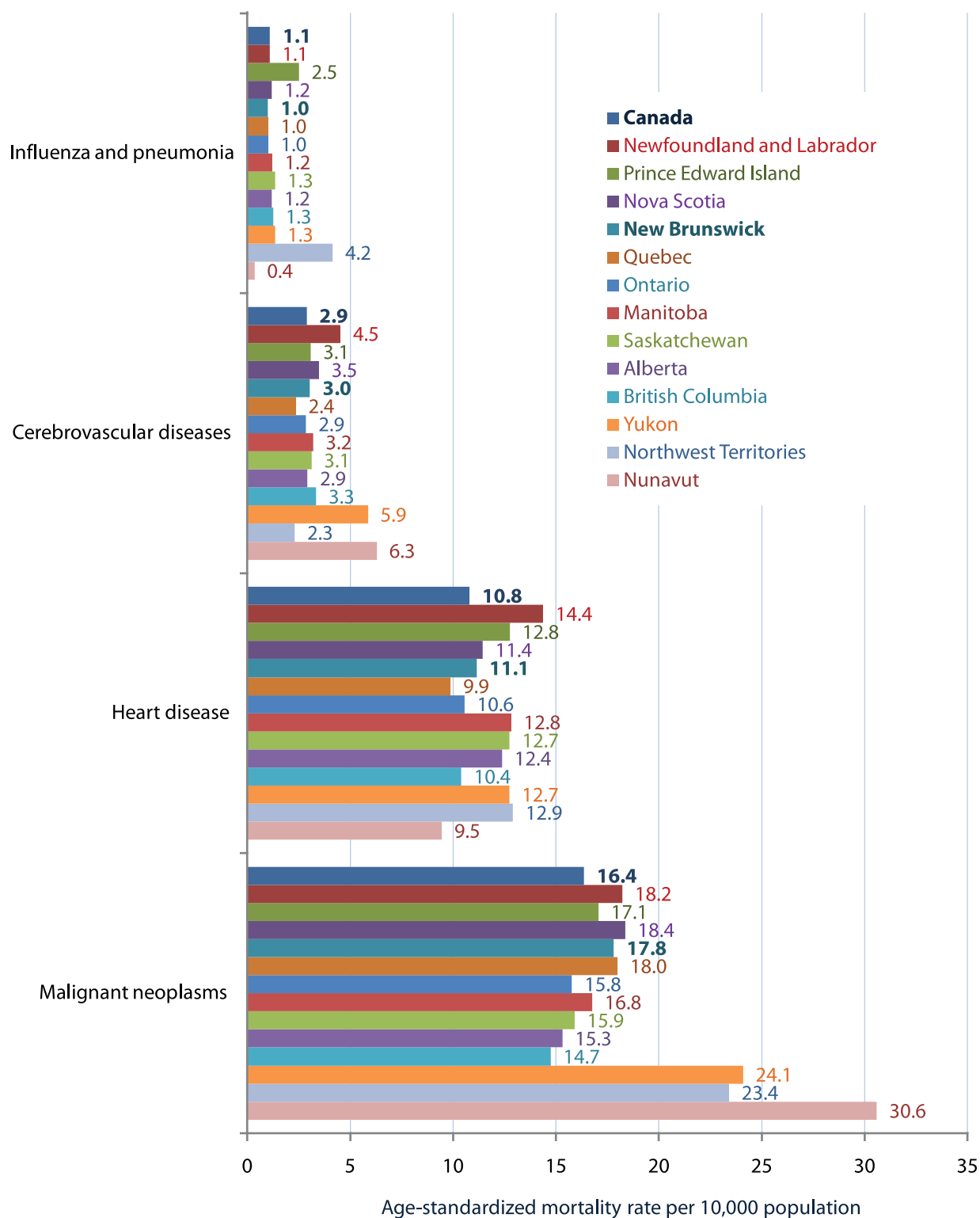
Figure A.1: Trends in age-standardized mortality rates per 10,000 population, Canada, provinces and territories, 2000-2008



	2000	2001	2002	2003	2004	2005	2006	2007	2008
Canada	61.6	60.1	59.8	58.7	57.2	56.4	54.1	54.0	53.1
Newfoundland and Labrador	74.6	69.9	69.3	69.6	68.7	70.2	68.7	67.1	66.2
Prince Edward Island	70.1	63.9	67.2	64.0	63.9	58.4	60.0	56.4	57.4
Nova Scotia	66.5	64.6	64.3	63.5	63.6	62.6	60.4	59.9	58.2
New Brunswick	65.7	63.9	62.8	62.9	61.1	59.6	57.3	57.9	57.6
Quebec	62.6	61.8	61.6	59.0	58.0	56.4	53.1	53.9	52.8
Ontario	61.1	59.1	58.6	58.1	55.7	55.5	52.8	52.6	51.3
Manitoba	67.0	64.5	63.9	63.2	62.7	61.5	59.8	59.7	59.2
Saskatchewan	63.4	60.7	61.7	61.6	60.2	59.6	59.7	58.4	59.6
Alberta	60.3	58.9	59.2	58.3	56.8	56.5	54.8	54.2	54.6
British Columbia	55.6	55.4	55.5	54.3	53.7	52.6	51.4	51.2	50.8
Yukon	82.1	73.7	76.9	64.9	76.3	74.5	80.2	76.1	81.1
Northwest Territories	82.1	75.3	83.5	96.0	65.8	65.8	79.3	70.8	77.1
Nunavut	115.9	96.9	126.7	108.7	97.0	101.2	109.2	99.6	101.7

Source: Statistics Canada, *CANSIM Table 102-0552: Deaths and mortality rate, by selected grouped causes and sex (annual)*.
Note: Data based on place of residence and rates age-standardized using the 1991 Canadian census population structure.

Figure A.2: Age-standardized mortality rates due to selected causes, Canada, provinces and territories, 2008



Source: Statistics Canada, CANSIM Table 102-0552: Deaths and mortality rate, by selected grouped causes and sex, Canada, provinces and territories (annual).

Note: Data based on the underlying cause of death and on the place of residence. Causes of death coded according to the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10): malignant neoplasms [C00-C97], heart disease [I00-I09, I11, I13, I20-I51], cerebrovascular diseases [I60-I69], influenza and pneumonia [J09-J18].