

## New Brunswick Health Indicators

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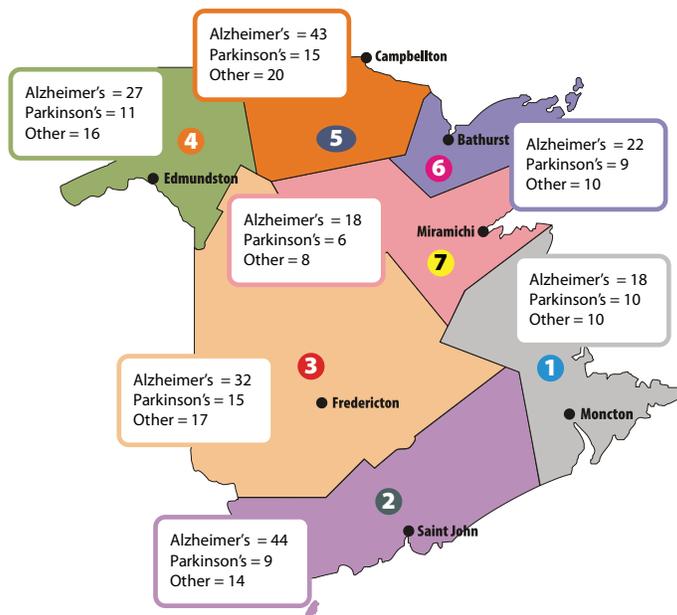
### Neurodegenerative diseases in New Brunswick

Neurodegenerative diseases are chronic, progressive disorders of the central nervous system, characterized by the steady loss of neurons in the brain and spinal cord, affecting mental abilities or motor abilities. They represent one of the leading causes of disability in the Canadian population<sup>1</sup>. The most prevalent neurodegenerative diseases are Alzheimer's disease and Parkinson's disease. Others include multiple sclerosis, motor neuron diseases (e.g., amyotrophic lateral sclerosis, also known as ALS or Lou Gehrig's disease), Huntington's disease and a large number of rarer diseases.

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Figure 1: Number of individuals hospitalized with Alzheimer's, Parkinson's or selected other neurodegenerative diseases per 10,000 population, by health region, New Brunswick, 2008



Signs and symptoms of neurodegenerative disease may vary among individuals, and prognosis varies depending on the type of disease and the age of onset. As with other health conditions, the onset of mental or physical symptoms among individuals can result in help-seeking, diagnosis and treatment, including, in some cases, hospitalization. In 2008, 3,979 New Brunswickers (53 per 10,000 population) had been hospitalized with diagnosed Alzheimer's disease, Parkinson's disease, multiple sclerosis, motor neuron disease or Huntington's disease. The rate of persons hospitalized for Alzheimer's disease was 29 per 10,000, and the rate for Parkinson's disease was 11 per 10,000. Figure 1 shows the breakdown of these rates by health region. These numbers should be interpreted with caution, especially for regions with smaller populations.

Data from multiple sources (e.g., health-care utilization records, death records, population-based surveys and records from community support groups) show that neurodegenerative diseases are a

**Source:** Office of the Chief Medical Officer of Health, using medical services data on inpatient hospitalizations (including hospital stays for acute care, chronic and long-term care, and rehabilitation) and population estimates from Statistics Canada.

**Note:** Data refer to New Brunswick residents hospitalized at least once with diagnosed Alzheimer's, Parkinson's, multiple sclerosis, motor neuron disease or Huntington's disease. Cases coded according to the *International Classification of Diseases and Related Health Problems, 10th revision (ICD-10-CA)*.

significant public health problem, but there are still important gaps in understanding many issues about their nature, incidence, prevalence, treatment and impacts. The causes are generally not well known; depending on the type of disease, genetic, environmental, toxic, viral or personal risk factors may be implicated<sup>2,3</sup>. Most of these diseases have no known cure or treatment available to reverse the deterioration, although some treatments may help improve symptoms or keep them from getting worse for a limited time.

Depending on the condition, life expectancy for persons affected by neurodegenerative disease may remain essentially the same compared to the general population or it may be severely reduced. Based on Vital Statistics data, 214 New Brunswickers (or 2.9 per 10,000 population) died from Alzheimer's disease or Parkinson's disease in 2008, out of a provincial total of 6,450 deaths among residents (or 86.4 per 10,000 population)<sup>4</sup>.

Increasing numbers of cases of neurodegenerative diseases are often found in aging populations. Observations of greater incidences of certain neurodegenerative diseases in recent decades may be partly due to improvements in diagnostic methods and case ascertainment<sup>5</sup>. Some diseases with neuropsychiatric sequelae (notably, dementia) may now be diagnosed with fair certainty through medical history, neuropsychological tests, brain imaging and other clinical tests. Post-mortem examination of the brain is required for a definitive diagnosis, however.

The Public Health Agency of Canada routinely investigates 80 to 100 suspected cases of Creutzfeldt-Jakob disease (CJD) and a few suspected cases of variant CJD annually, with an average of about 35 of these cases being confirmed as CJD by pathology and other comprehensive medical reviews<sup>6</sup>.

According to the Canadian Institute for Health Information, the annual

direct health-care costs, including hospital care, physician care and drug expenditures, for four neurodegenerative diseases – Alzheimer's, Parkinson's, multiple sclerosis and ALS – were estimated at \$786 million in Canada, with an additional \$2.227 billion in annual indirect morbidity and mortality costs<sup>3</sup>. The World Health Organization reports that, "a large body of evidence shows that policy-makers and health-care providers may be unprepared to cope with the predicted rise in the prevalence of neurological and other chronic disorders and the disability resulting from the extension of life expectancy and aging of populations globally."<sup>7</sup>

## Alzheimer's disease

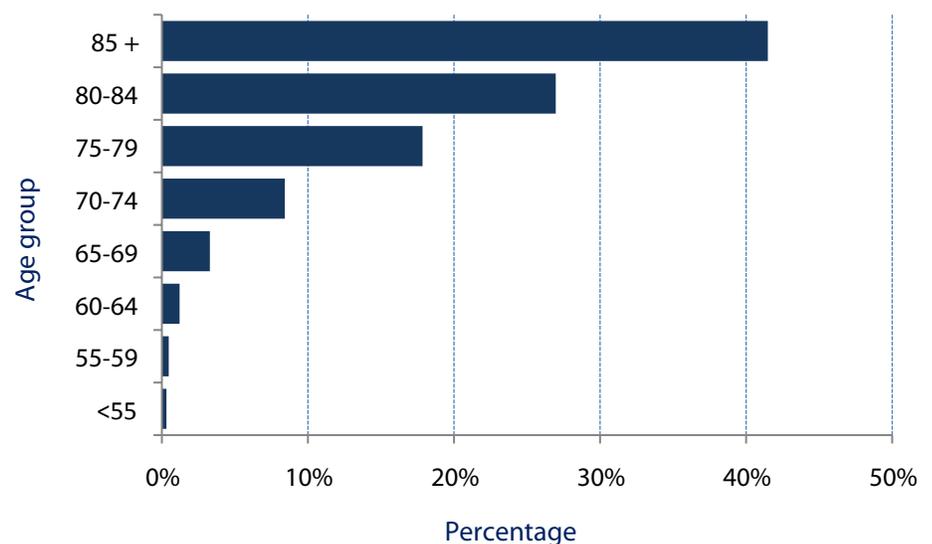
Alzheimer's disease, the most common cause of dementia, is characterized by slow, progressive loss of brain functions<sup>3</sup>. In 2008, 2,186 New Brunswickers (29 per 10,000 population) had been hospitalized with Alzheimer's disease. Most persons hospitalized at least once for the disease between 2004 and 2008 were 75 or

older (86 per cent) and females (65 per cent). Figure 2 shows the age distribution of persons admitted to hospital with a diagnosis of Alzheimer's disease.

The 2008 crude mortality rate for Alzheimer's disease in New Brunswick was 2.3 per 10,000 population, higher than the Canadian average of 2.0<sup>4</sup>. The observed difference may be explained in part by differences in age structure; census data from 2006 reveal that the median age among the New Brunswick population (41.5 years) was older than the national median (39.5 years)<sup>8</sup>. The age-standardized mortality rates, used to control for the effect of age on mortality, were similar in both jurisdictions, with 1.3 deaths per 10,000 population in 2008<sup>4</sup>.

The age-standardized mortality rate for Alzheimer's disease was higher among female New Brunswickers than males (1.4 versus 1.2 in 2008)<sup>4</sup>, linked to the higher risk among women of developing the disease, partly because they live longer than men<sup>3</sup>. More data on mortality rates for Alzheimer's disease by gender and across Canada are in the annex.

Figure 2: Age distribution of persons hospitalized with Alzheimer's disease, New Brunswick, 2004-2008



**Source:** Office of the Chief Medical Officer of Health, using medical services data on inpatient hospitalizations (including acute care, chronic and long-term care, and rehabilitation).

**Note:** Data refer to age at first hospitalization among individuals receiving inpatient care for Alzheimer's disease at least once during the period of observation.

Based on data from the Canadian Study of Health and Aging, the median duration of survival with Alzheimer's disease and other dementia is 6.6 years<sup>9</sup>. Compared to other chronic conditions, Alzheimer's disease has been assessed to have the most serious impact on health-related quality of life in older adults<sup>10</sup>. According to Canadian studies, family members and friends are the main source of care for individuals with Alzheimer's disease who live in the community, providing up to 85 per cent of the care provided<sup>11</sup>. The annual costs to society of caring for persons with Alzheimer's disease have been estimated between \$9,451 for mild disease and \$36,794 for severe disease, with institutionalization accounting for up to 84 per cent of the cost<sup>12</sup>. As more baby boomers begin to reach age 65 in Canada and New Brunswick during the next decade, it is expected there will be a large increase in the incidence of Alzheimer's disease and other forms of dementia unless dramatic new preventative measures emerge<sup>13</sup>.

For more information about Alzheimer's disease and related resources, visit the Alzheimer Society of New Brunswick, [www.alzheimernb.ca](http://www.alzheimernb.ca).

## Parkinson's disease

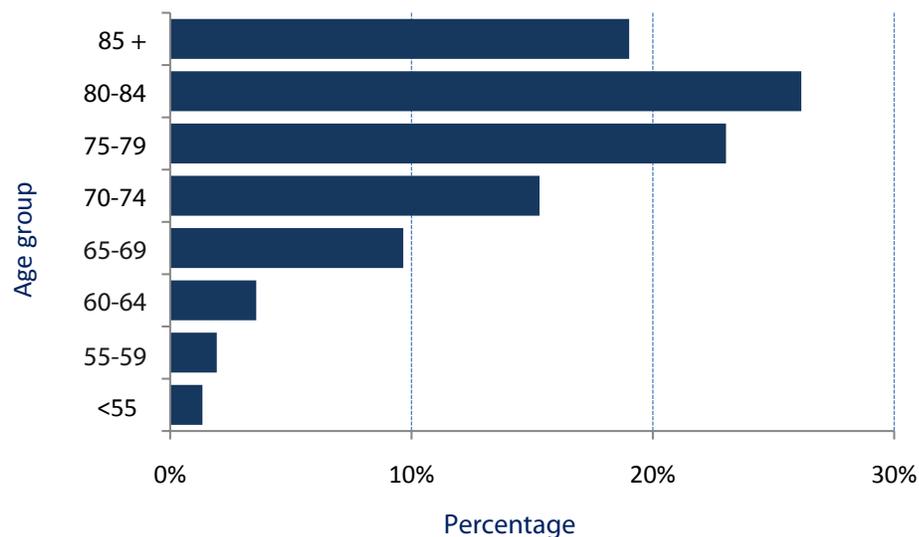
Parkinson's disease is a slowly progressing neurodegenerative disease that affects muscle movement and control, leading to severe limitations in daily activity and quality of life<sup>3</sup>. In 2008, 812 New Brunswickers (11 per 10,000 population) had been hospitalized with Parkinson's disease. Most persons that received hospital care for the disease between 2004 and 2008 were 75 or older (68 per cent) and males (58 per cent). Figure 3 shows the age distribution of persons hospitalized at least once with Parkinson's disease during the five-year period.

The 2008 age-standardized mortality rate attributable to Parkinson's disease for New Brunswick was 0.4 per 10,000 population (females: 0.3; males: 0.5), comparable to the national average of 0.4 (females: 0.3; males: 0.6)<sup>4</sup>. More data on mortality rates for Parkinson's disease across Canada are in the annex.

The latest data reveal that the average annual number of deaths due to Parkinson's disease in New Brunswick was higher than the number recorded a decade earlier (42 during the period 2007-2009 versus 33 during 1998-1999)<sup>14-18</sup>. This trend may be related to an aging population. Most deaths due to Parkinson's disease occur among those 75 or older (85 per cent between 2007 and 2009)<sup>14-16</sup>. While the total population in New Brunswick experienced a slight decrease in numbers between 1999 and 2009, the number of New Brunswickers 75 or older increased by nearly 20 per cent.

The burden of Parkinson's disease may magnify as the population continues to age<sup>1</sup>. Between 2010 and 2036, based on Statistics Canada's medium-growth projection scenario, the number of New Brunswickers 75 or older is expected to grow by 147 per cent, versus 10 per cent for the total population<sup>19</sup>.

Figure 3: Age distribution of persons hospitalized with Parkinson's disease, New Brunswick, 2004-2008



**Source:** Office of the Chief Medical Officer of Health, using medical services data on inpatient hospitalizations (including hospital stays for acute care, chronic and long-term care, and rehabilitation).

**Note:** Data refer to age at first hospitalization among individuals receiving inpatient care for Parkinson's disease at least once during the period of observation.

For more information about Parkinson's disease and related resources, visit the Parkinson Society – Maritime region, [www.parkinsonmaritimes.ca](http://www.parkinsonmaritimes.ca).

## Multiple sclerosis

Multiple sclerosis results from the inflammation and damage of nerve cells of the brain and spinal cord. It is the most common disabling neurological condition affecting young adults<sup>3</sup>. According to the World Health Organization, Canada lies among the world's high-frequency zones for multiple sclerosis<sup>20</sup>. In New Brunswick, 10 persons in 10,000 had received hospital care for multiple sclerosis in 2008. Most persons hospitalized at least once between 2004 and 2008 were 35 to 64 (74 per cent) and females (68 per cent).

Figure 4 shows the age distribution of persons hospitalized with multiple sclerosis in New Brunswick according to medical services records. An analysis of data from the Canadian Community Health Survey, based on self-reports among a sample of Canadians, indicated a similar pattern: the prevalence of multiple sclerosis tends to increase with age to a point and then decline<sup>21</sup>. After controlling for effects of population age structure, the study demonstrated a higher

prevalence of the disease in the Atlantic region as well as the Prairies compared to the national average.

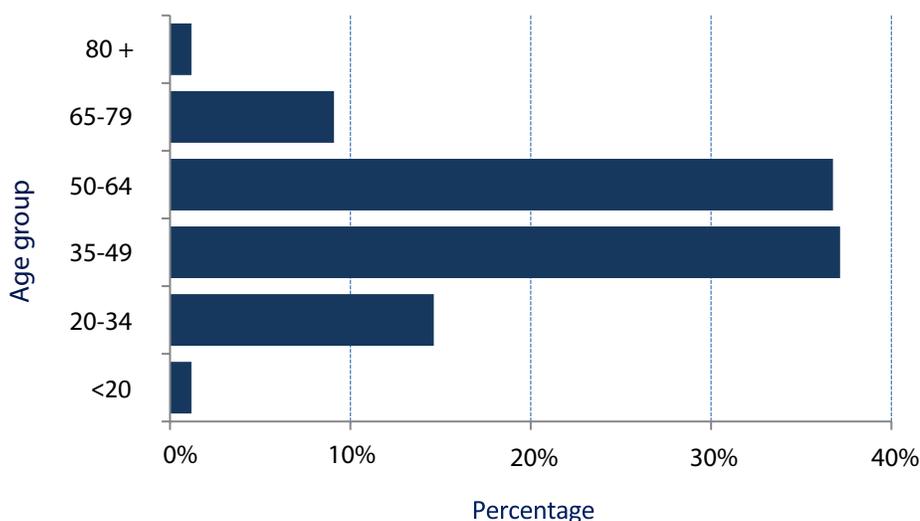
According to the National Rehabilitation Reporting System, the average age among Canadians receiving in-patient rehabilitation is about 20 years younger for those with multiple sclerosis than among all rehabilitation clients<sup>22</sup>. Such findings may mean the orientation of health-care and rehabilitation goals for persons with multiple sclerosis might be different than for other groups; for example, favouring helping the affected individuals resume and continue participation in family and vocational roles in the community.

New Brunswick Vital Statistics reveal an annual average of 9 deaths (0.1 per 10,000 population) attributable to multiple sclerosis between 2007 and 2009. According to an analysis of clinical care data from another Canadian jurisdiction, patients with multiple sclerosis are expected to live about six years less than the general population<sup>23</sup>.

For more information about multiple sclerosis and related resources, visit the Multiple Sclerosis Society of Canada – Atlantic region: <http://mssociety.ca/atlantic>.

For information about the New Brunswick Multiple Sclerosis Assistance Program, visit [www.gnb.ca/0162/programs/MS/index-e.asp](http://www.gnb.ca/0162/programs/MS/index-e.asp).

Figure 4: Age distribution of persons hospitalized with multiple sclerosis, New Brunswick, 2004-2008



**Source:** Office of the Chief Medical Officer of Health, using medical services data on inpatient hospitalizations (including acute care, chronic and long-term care, and rehabilitation).

**Note:** Data refer to age at first hospitalization among individuals receiving inpatient care for multiple sclerosis at least once during the period of observation.

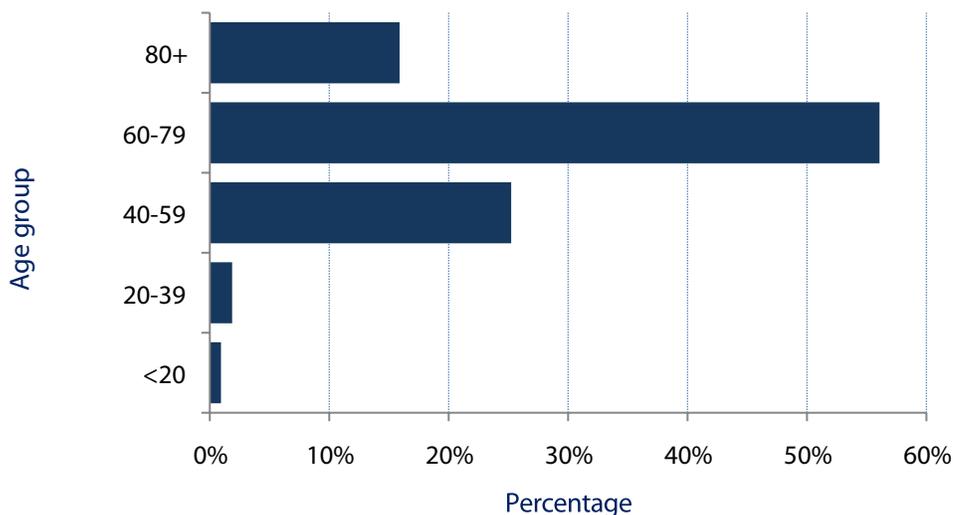
## Motor neuron diseases

Motor neuron diseases are a group of progressive disorders characterized by the destruction of motor neurons, the cells that control essential voluntary muscle activity such as speaking, walking, swallowing and breathing; the symptoms that result from this damage vary by the disease subtype<sup>2</sup>. Common motor neuron diseases include ALS, primary lateral sclerosis, progressive bulbar palsy and spinal muscular atrophy. Some diseases, such as primary lateral sclerosis, are not fatal and progress slowly. Others, such as ALS and some forms of spinal muscular atrophy, are often fatal. Health Canada reports that 80 per cent of people with ALS die within five years of diagnosis<sup>24</sup>.

Medical services data indicate that 2 in 10,000 New Brunswickers had been hospitalized with a diagnosed motor neuron disease in 2008. Between 2004 and 2008, men were more frequently hospitalized for motor neuron disease (56 per cent) than women – a pattern consistent with other jurisdictions showing higher occurrence of symptoms of the disease among men than women<sup>2</sup>.

As seen in Figure 5, most persons hospitalized at least once between 2004 and 2008 with a motor neuron disease were 40 to 79 (81 per cent). Nonetheless, motor neuron diseases can strike at any age. Higher incidences of ALS and other motor neuron diseases have been observed in different parts of the world with increasing age. The age of peak incidence is not yet clear, however<sup>5</sup>.

Figure 5: Age distribution of persons hospitalized with motor neuron disease, New Brunswick, 2004-2008



**Source:** Office of the Chief Medical Officer of Health, using medical services data on inpatient hospitalizations (including acute care, chronic and long-term care, and rehabilitation).

**Note:** Data refer to age at first hospitalization among individuals receiving inpatient care for motor neuron disease at least once during the period of observation.

For more information about ALS and related resources, visit the ALS Society of New Brunswick, [www.alsnb.ca](http://www.alsnb.ca).

For age-appropriate education and resources about ALS for children and teens, visit [www.als411.ca](http://www.als411.ca).

For more information about spinal muscular atrophy and related resources, visit Families of SMA Canada, <http://curesma.ca>.

## Other neurodegenerative diseases

Many other rare disorders also fall under the umbrella of neurodegenerative diseases.

In 2008, one in 10,000 New Brunswickers had been hospitalized with Huntington's disease according to provincial medical services data. This figure is similar to national prevalence estimates for the disease<sup>1</sup>. While Huntington's disease is a hereditary and fatal illness, symptoms can vary between individuals and tend to be noticeable later in adulthood. In New Brunswick, most persons hospitalized at least once for the disease between 2004 and 2008 were 50 to 74 years old (67 per cent) at the time of the first hospitalization. According to New Brunswick Vital Statistics, the annual mortality rate due to Huntington's disease was 0.04 per 10,000 between 2007 and 2009.

Neurosyphilis is a neurodegenerative disorder that may occur in persons who have had untreated syphilis for many years. Prognosis can change based on the type of neurosyphilis and how early in the course of the disease people are diagnosed and treated<sup>2</sup>. Although syphilis is less common than other sexually transmitted infections, its resurgence in Canada and New Brunswick<sup>25</sup> may impact the rate of neurosyphilis. According to New Brunswick Vital Statistics, one death was attributable to neurosyphilis in New Brunswick between 2007 and 2009<sup>14-16</sup>.

Prion diseases (or transmissible spongiform encephalopathies) are rare and fatal neurodegenerative diseases characterized by progressive brain dysfunction, affecting humans and certain animals. In humans, the most common prion disease is Creutzfeldt-Jakob disease, affecting about one in one million persons each year<sup>6</sup>. The classical form of CJD is divided into three classifications based on how the disease is caused: sporadic, genetic or iatrogenic. Sporadic CJD, which occurs with

no known cause, accounts for more than 90 per cent of CJD cases in Canada. At least 7 per cent of cases are linked to inherited genetics. Iatrogenic CJD is caused by accidental transmission by contact with infected tissue during medical procedures and has occurred only a few times in Canada. Another form of the disease, variant CJD, was first recognized in the United Kingdom in 1996 and is linked to eating beef products contaminated with bovine spongiform encephalopathy (popularly known as “mad cow” disease). The Public Health Agency of Canada reports a total of 552 CJD cases in Canada from 1994 to 2011; 15 of them were in New Brunswick, representing 2.7 per cent of all cases nationally<sup>6</sup>. There have been no cases of variant CJD linked to eating Canadian beef<sup>26</sup>.

For more information about Huntington’s disease and related resources, visit the Huntington Society of Canada, [www.huntingtonsociety.ca](http://www.huntingtonsociety.ca).

For information about testing and treatment services for syphilis in New Brunswick, visit, [www2.gnb.ca/content/gnb/en/departments/ocmoh/cdc/content/syphilis\\_symptomsandfacts/testing\\_and\\_treatingsyphilis.html](http://www2.gnb.ca/content/gnb/en/departments/ocmoh/cdc/content/syphilis_symptomsandfacts/testing_and_treatingsyphilis.html).

For information about the Canadian Creutzfeldt-Jakob Disease Surveillance System, including resources for families and physicians, visit the Public Health Agency of Canada, [www.phac-aspc.gc.ca/hcai-iamss/cjd-mcj/cjdss-eng.php](http://www.phac-aspc.gc.ca/hcai-iamss/cjd-mcj/cjdss-eng.php).

disorders associated with a syndrome (e.g., dementia) for which the underlying cause was due to a disease of the brain which was undiagnosed at the time the care was received.

Information about deaths attributable to neurodegenerative diseases was collated by the OCMOH drawing on causes of death data from New Brunswick Vital Statistics. Data were tabulated according to the underlying cause of death, which is defined as the disease, condition or injury that initiated the train of events leading directly to death.

Data about diseases and causes of death were coded according to the *International Classification of Diseases and Related Health Problems*, 10th revision: Alzheimer’s disease (code G30), Parkinson’s disease (G20), multiple sclerosis (G35), motor neuron disease (G12.2) and Huntington’s disease (G10)<sup>27</sup>.

Population estimates used in this report were drawn from post-censal demographic estimates for New Brunswick updated annually by Statistics Canada (data received April 2011).

## About the data sources

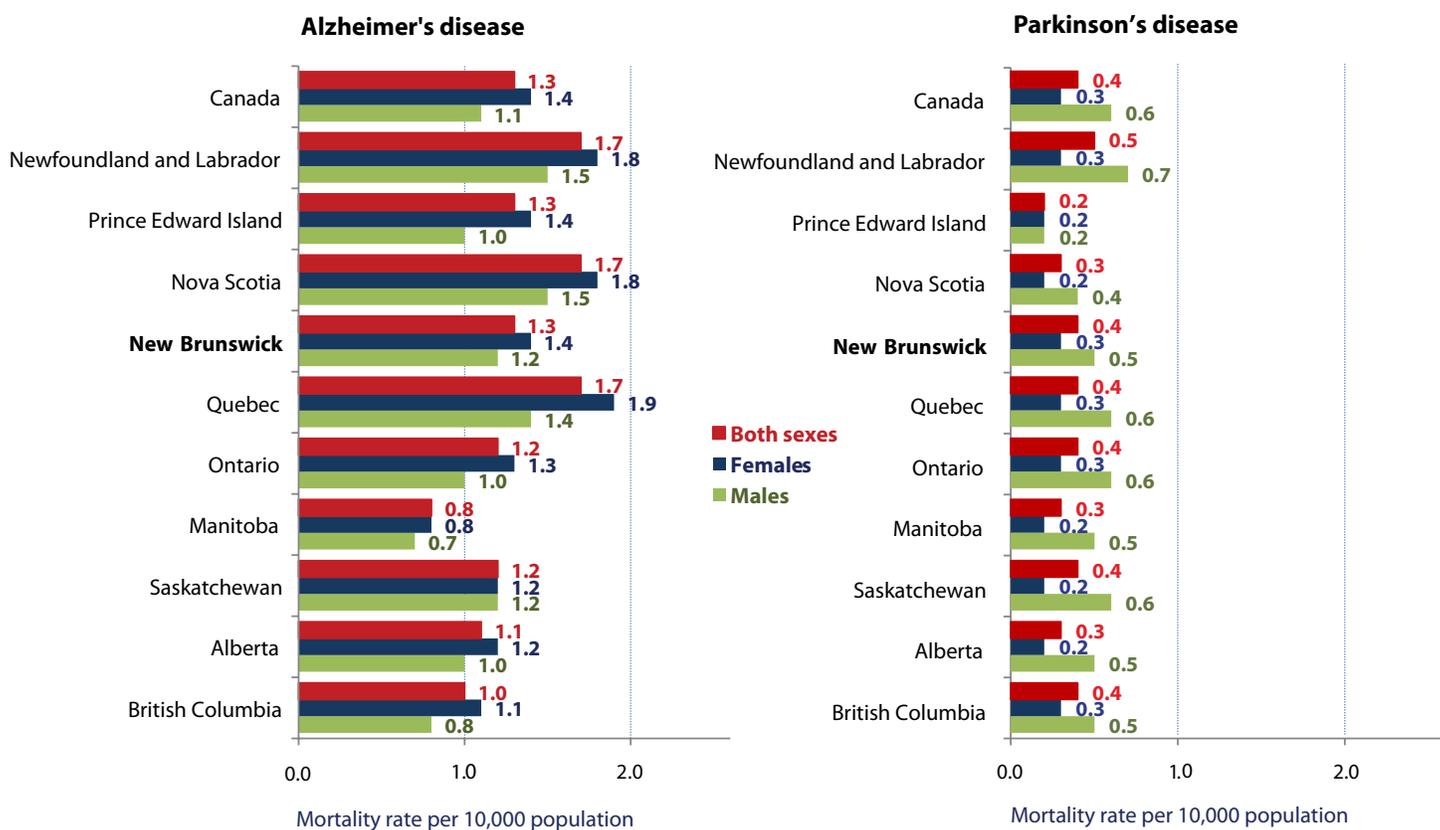
Data for New Brunswick about hospitalizations attributable to neurodegenerative diseases were collated by the Office of the Chief Medical Officer of Health (OCMOH), drawing on custom extractions of anonymized records on inpatient hospitalizations (including acute care, chronic and long-term care, and rehabilitation). Information was not captured for residents who were not admitted for hospital care in the province, hospital stays among non-residents or persons hospitalized with mental and behavioural

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## Annex: Mortality rates due to selected neurodegenerative diseases across Canada

Figure A.1: Age-standardized mortality rates due to Alzheimer's and Parkinson's diseases by sex, Canada and provinces, 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 are based on the underlying cause of death and on place of residence. 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*: Alzheimer's disease [G30], Parkinson's disease [G20-G21].

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