Epilepsy, Multiple Sclerosis and Parkinsonism Surveillance in Saskatchewan 2015/16

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Purpose:

The purpose of this report is to present key population health indicators related to three neurological conditions (epilepsy, multiple sclerosis and parkinsonism) including prevalence (existing cases in the population), incidence (new cases per year), and all-cause mortality (deceased cases per year) in Saskatchewan.

In this issue:

Background

This snapshot report highlights key population health indicators of three neurological conditions in Saskatchewan: epilepsy, multiple sclerosis (MS), and parkinsonism. These neurological conditions are major causes of disability in Canada. Canadians living with neurological conditions face many long-term challenges, such as reduced function and activity limitations.

This report provides estimates of changes in prevalence counts, and incidence and mortality rates from 2001/02 to 2015/16. It also describes the age- and sex-specific prevalence of the three neurological conditions at the provincial level in 2015/16.

Key Findings

In 2015/16, about 14,600 Saskatchewan residents had at least one of the three neurological conditions of epilepsy, MS, and parkinsonism. Having more than one of these neurological conditions is not common, with about 160 residents (one percent of cases) living with two or three of these conditions.

Epilepsy Trends

From 2001/02 to 2015/16 for residents one year of age and older:

- the number of people living with epilepsy increased each year by an average of 260 cases, for an overall 15-year growth of 66% from about 5,500 people in 2001/02 to about 9,100 people in 2015/16;
- incidence rates (new cases per year) decreased from about 640 (6.4 per 10,000) per year to about 550 (4.8 per 10,000) per year; and
- all-cause mortality rates for people who had epilepsy did not change significantly over time, and were consistently about three times higher than all-cause mortality rates of people without epilepsy.

Multiple Sclerosis Trends

From 2001/02 to 2015/16 for residents 20 years of age and older:

- the number of people living with MS increased each year by an average of 86 cases, for an overall 15-year growth of 63% from about 1,900 people in 2001/02 to about 3,100 people in 2015/16;
- incidence rates decreased from about 200 (2.7 per 10,000) per year to about 150 (1.8 per 10,000) per year; and
- all-cause mortality rates for people with MS decreased slightly but not significantly over time, and were consistently about 2.3 times higher than all-cause mortality rates of people without MS.

Parkinsonism Trends

From 2001/02 to 2015/16 for residents 40 years of age and older:

- the number of people living with parkinsonism increased in most years by an average of 11 cases per year, for an overall 15-year growth of 6.5% from about 2,350 people in 2001/02 to about 2,500 people in 2015/16;
- incidence rates decreased from about 300 (5.7 per 10,000) per year to about 280 (5.1 per 10,000) per year; and
- all-cause mortality rates for people who had parkinsonism decreased slightly but not significantly over time, and were consistently about 2.5 times higher than all-cause mortality rates of people without parkinsonism.

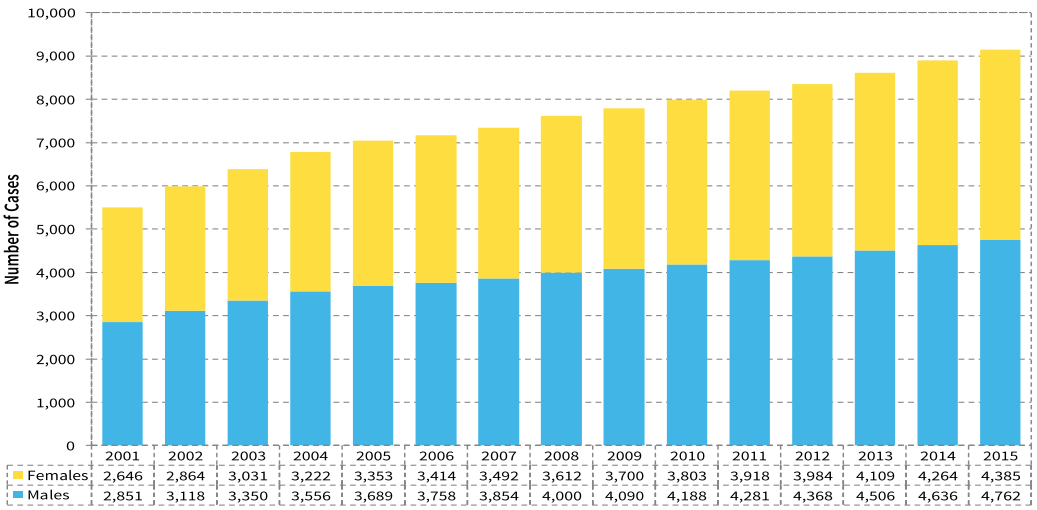
Epilepsy Prevalence

Epilepsy is a brain disorder that produces abnormal bursts of electrical activity in the brain. If uncontrolled, it results in recurrent seizures that vary in:

- frequency (less than one per year to many per day);
- form (different symptoms and signs); and
- duration (a few seconds to a few minutes or longer).

Canadians living with epilepsy can experience different health and social consequences. With the right care, it is possible to manage epilepsy and limit or even prevent seizures.

Figure 1: Count of Prevalent Epilepsy Cases by Year and Sex (ages 1 year and older), 2001/02 to 2015/16



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Females	2,646	2,864	3,031	3,222	3,353	3,414	3,492	3,612	3,700	3,803	3,918	3,984	4,109	4,264	4,385
Males	2,851	3,118	3,350	3,556	3,689	3,758	3,854	4,000	4,090	4,188	4,281	4,368	4,506	4,636	4,762

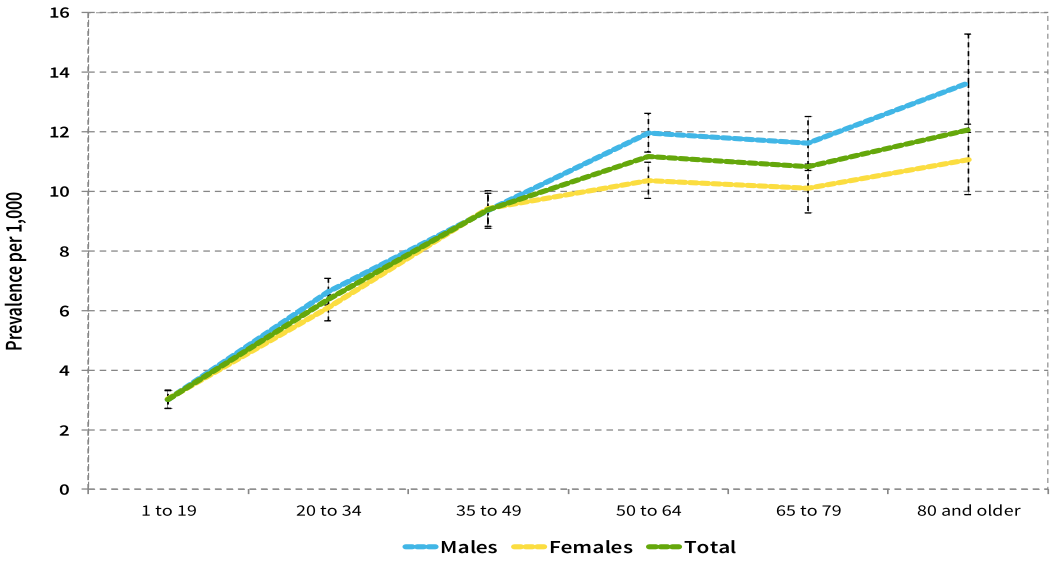
From 2001/02 to 2015/16 for residents one year of age and older:

- the number of people living with epilepsy increased each year by an average of 260 cases, for an overall 15-year growth of 66% from about 5,500 people in 2001/02 to about 9,100 people in 2015/16; and
- in each year there were consistently more males with epilepsy (about 52%) than females (about 48%).

In 2015/16:

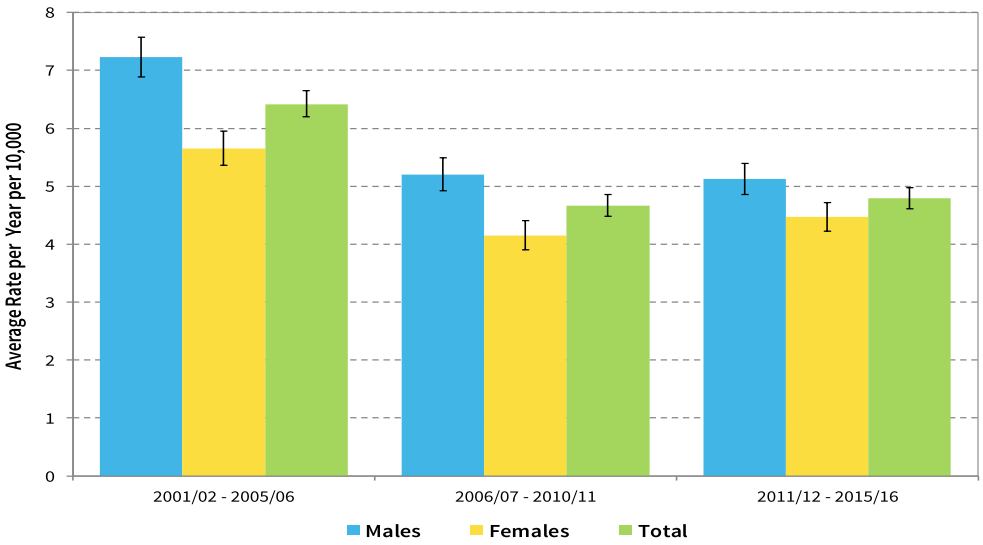
- prevalence of epilepsy increased with age from about 3 per 1,000 aged 1 to 19 years old to about 12 per 1,000 in the age group 80 years and older; and
- there is no difference in epilepsy prevalence between the sexes at ages younger than 50 years; however, from ages 50 years and older male epilepsy prevalence is significantly higher than female.

Figure 2: Epilepsy - Prevalence by Sex and Age-group, 2015/16



Epilepsy Incidence and Mortality

Figure 3: Epilepsy - Five-year Average Age-standardized Incidence Rates by Sex, 2001/02-2005/06 to 2011/12-2015/16



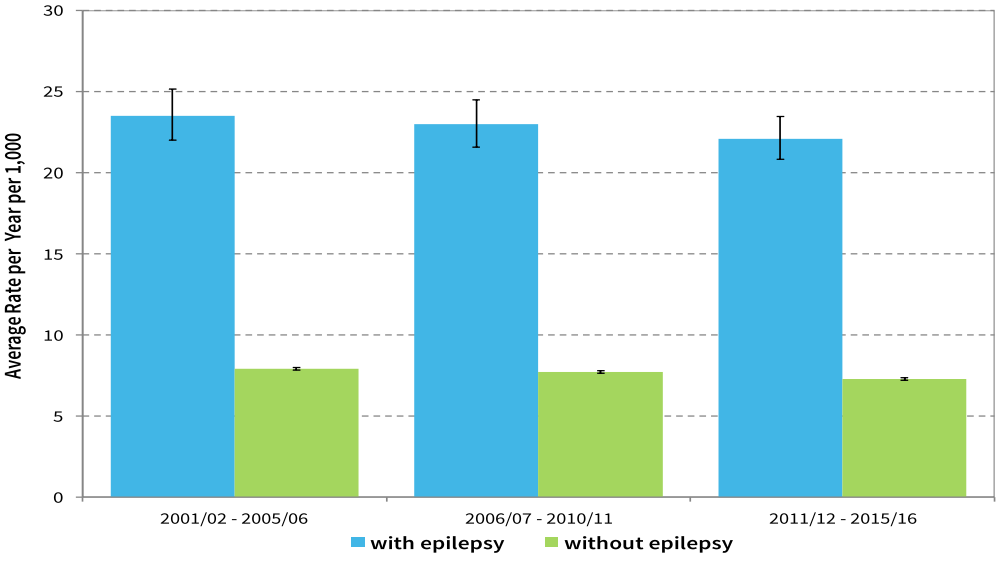
From 2001/02-2005/06 to 2011/12-2015/16 for residents aged one year and older, epilepsy incidence rates (new cases per year):

- decreased from about 640 (6.4 per 10,000) per year to about 550 (4.8 per 10,000) per year;
- decreased by about 21% for females and about 29% for males; and
- were significantly higher for males than for females in all three 5-year periods.

From 2001/02-2005/06 to 2011/12-2015/16 for residents aged one year and older, all-cause mortality rates for people who had epilepsy:

- did not change significantly over time; and
- were consistently about three times higher than all-cause mortality rates of people without epilepsy.

Figure 4: Epilepsy - Five-year Average All-cause Age-standardized Mortality Rates by Disease Status, 2001/02-2005/06 to 2011/12-2015/16



Case Definition

For surveillance purposes, the epilepsy case definition requires that an individual have:

- three or more physician claims, with at least 30 days between each claim, with an ICD-9 code 345 within two years;
- OR for individuals aged 20 years and over:
- one or more inpatient hospital separations with a code of ICD-9 345.0, 345.1, 345.4, 345.5, 345.6, 345.7, 345.8, 345.9 or ICD-10-CA G40 in any diagnostic field of the hospital separation record.

The epilepsy case definition applies to ages one year and older.

Multiple Sclerosis Prevalence

Multiple sclerosis (MS) is a disease of the central nervous system (CNS). The immune system attacks myelin (protective covering of the nerves) in the brain, spinal cord, and optic nerves, which disrupts communication between the CNS and the rest of the body.

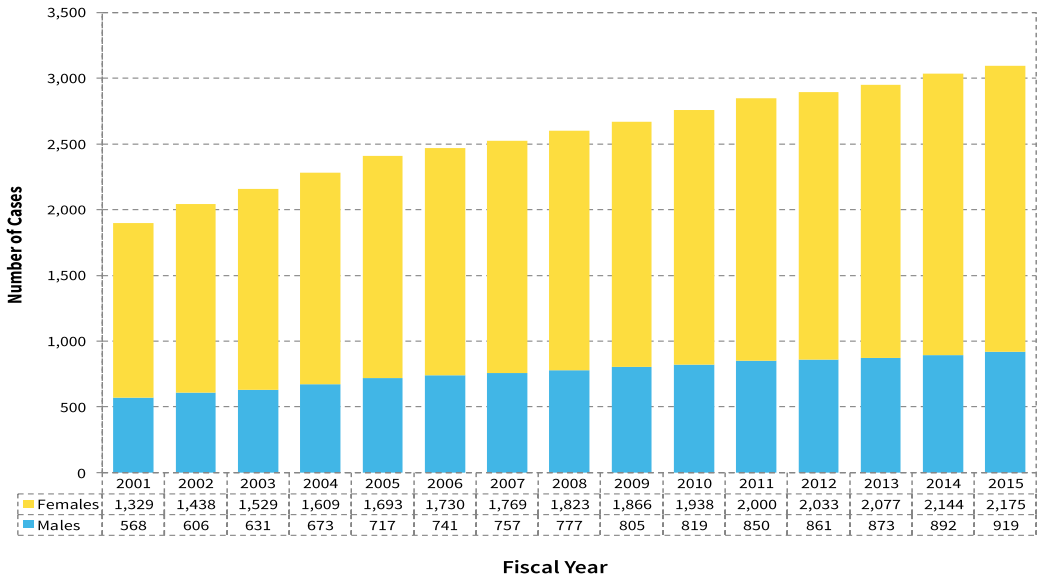
MS is unpredictable, often occurring in a pattern of relapses and remissions. There is currently no cure for MS, but treatments are available to decrease the frequency and severity of relapses and to ease MS symptoms.

Symptoms may include:

- walking difficulties;
- vision problems;
- weakness or clumsiness;
- abnormal sensation (e.g., tingling, numbness);
- fatigue;
- mood and cognitive changes; and
- pain.

MS causes are not fully understood, but genetics combined with other factors may play a role.

Figure 5: Count of Prevalent Multiple Sclerosis Cases by Year and Sex (ages 20 years and older), 2001/02 to 2015/16



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Females	1,329	1,438	1,529	1,609	1,693	1,730	1,769	1,823	1,866	1,938	2,000	2,033	2,077	2,144	2,175
Males	568	606	631	673	717	741	757	777	805	819	850	861	873	892	919

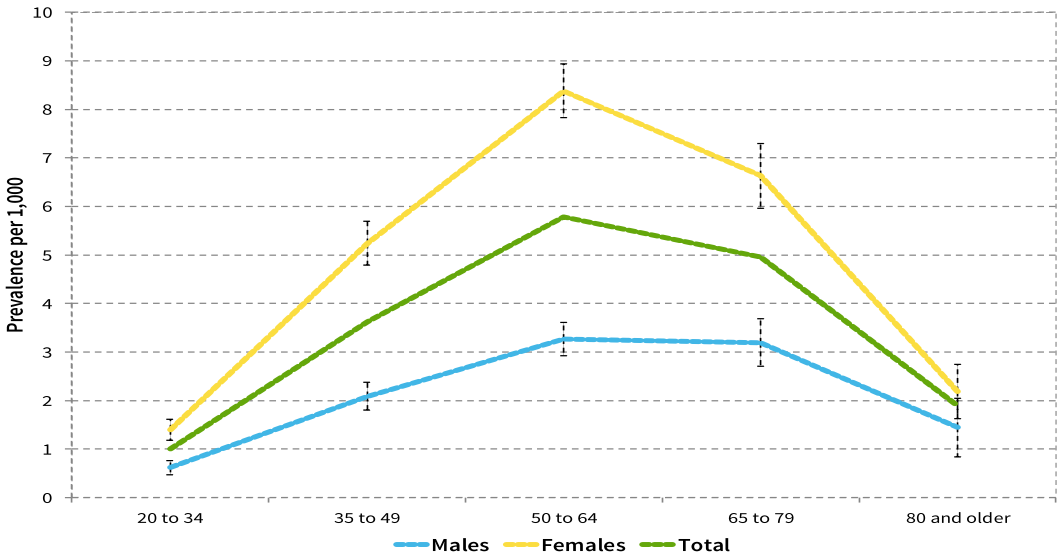
From 2001/02 to 2015/16 for residents 20 years of age and older:

- the number of people living with multiple sclerosis (MS) increased each year by an average of 86 cases, for an overall 15-year growth of 63% from about 1,900 people in 2001/02 to about 3,100 people in 2015/16; and
- in each year there were consistently more than twice as many females with MS (about 70%) than males (about 30%).

In 2015/16:

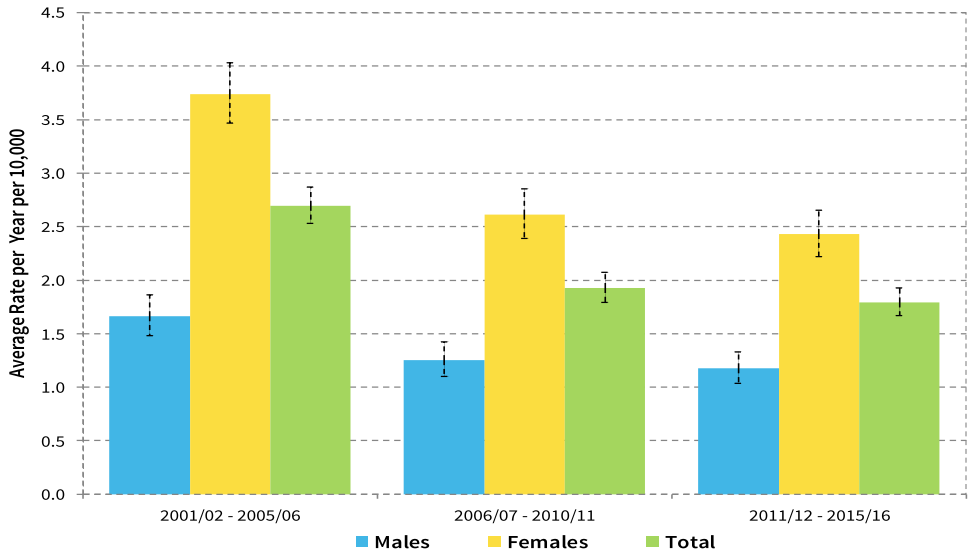
- prevalence of MS increased with age from about 1 per 1,000 aged 20 to 34 years old to almost 6 per 1,000 in those aged 50 to 64 years, and then decreased to about 2 per 1,000 in the age group 80 years and older; and
- MS prevalence was significantly higher for women than for men in all age groups; with largest difference (5 per thousand) in the group 50 to 64 years.

Figure 6: Multiple Sclerosis - Prevalence by Sex and Age-group, 2015/16



Multiple Sclerosis Incidence and Mortality

Figure 7: Multiple Sclerosis - Five-year Average Age-standardized Incidence Rates by Sex, 2001/02-2005/06 to 2011/12-2015/16



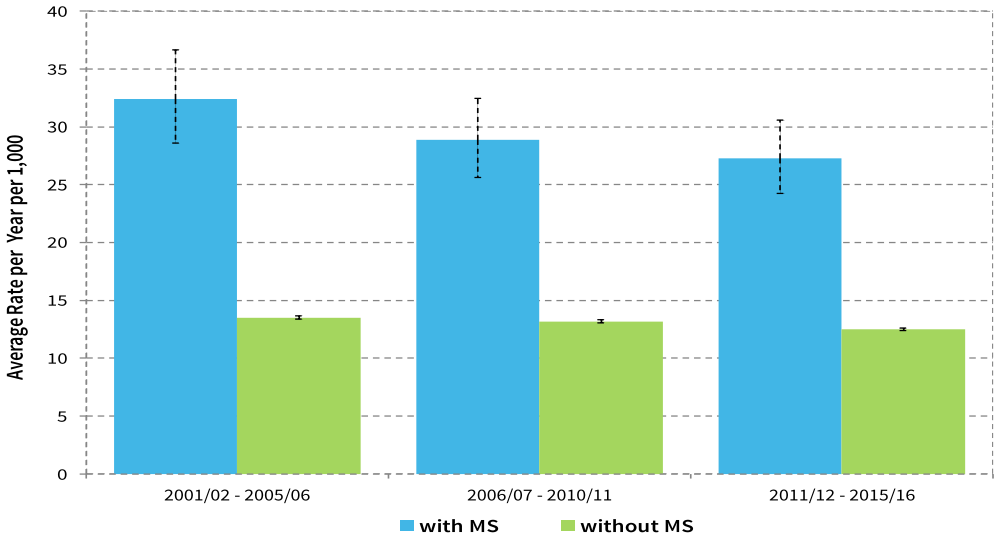
From 2001/02-2005/06 to 2011/12-2015/16 for residents aged 20 years and older, MS incidence rates (new cases per year):

- decreased from about 200 (2.7 per 10,000) per year to about 150 (1.8 per 10,000) per year;
- decreased by about 35% for females and about 29% for males; and
- were significantly higher for females than for males in all three 5-year periods.

From 2001/02-2005/06 to 2011/12-2015/16 for residents aged 35 years and older, all-cause mortality rates for people who had MS:

- decreased slightly but not significantly over time; and
- were consistently about 2.3 times higher than all-cause mortality rates of people without MS.

Figure 8: Multiple Sclerosis - Five-year Average All-cause Age-standardized Mortality Rates by Disease Status, 2001/02-2005/06 to 2011/12-2015/16



Case Definition

For surveillance purposes, the multiple sclerosis (MS) case definition requires that an individual has EITHER:

- one or more inpatient hospital separations with a code of ICD-9 340 or ICD-10-CA G35 in any diagnostic field of the hospital separation record; OR
- five or more physician claims, with ICD-9 code 340 within two years.

The MS case definition applies to ages 20 years and older.

PARKINSONISM PREVALENCE

Parkinsonism is an umbrella term that includes Parkinson's disease, secondary parkinsonism and atypical parkinsonism. While the majority of parkinsonism cases are due to Parkinson's disease, cases also arise due to other neurological disorders, medication side effects, or toxins.

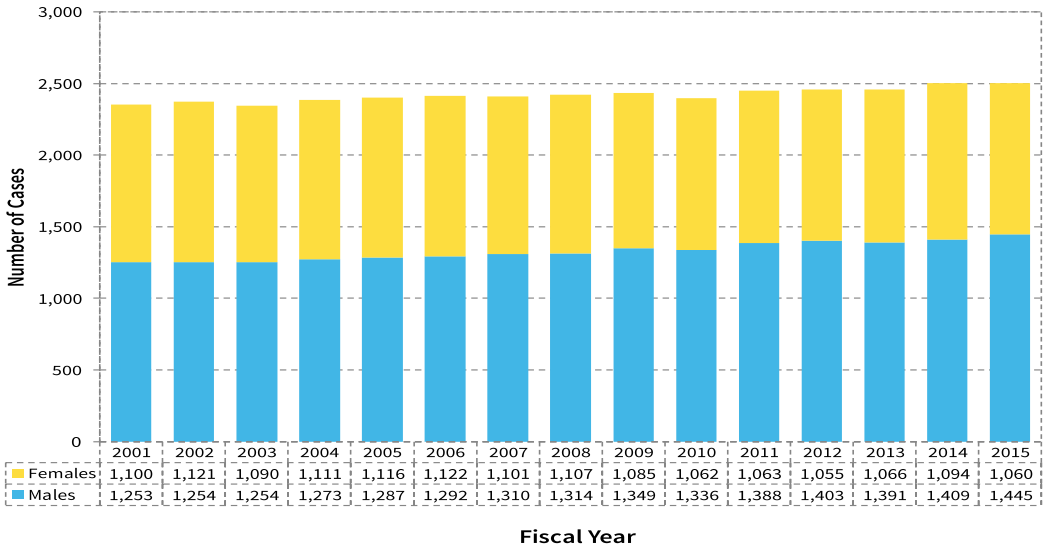
Parkinsonism refers to a set of signs and symptoms usually characterized by the following motor features:

- rigidity and tremor;
- bradykinesia (abnormal slowness of movement); or
- postural instability.

In addition, individuals living with parkinsonism often experience non-motor symptoms such as:

- pain;
- mood disorders;
- sleep problems;
- cognitive impairment or dementia;
- constipation;
- urinary incontinence;
- sexual dysfunctions; and
- reduced sense of smell.

Figure 9: Count of Prevalent Parkinsonism Cases by Year and Sex (ages 40 years and older), 2001/02 to 2015/16



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Females	1,100	1,121	1,090	1,111	1,116	1,122	1,101	1,107	1,085	1,062	1,063	1,055	1,066	1,094	1,060
Males	1,253	1,254	1,254	1,273	1,287	1,292	1,310	1,314	1,349	1,336	1,388	1,403	1,391	1,409	1,445

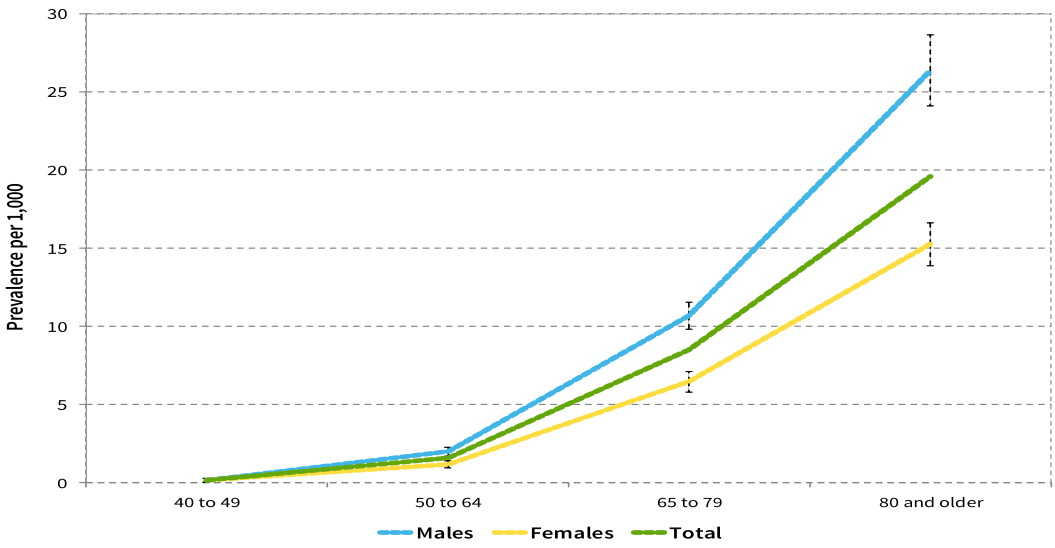
From 2001/02 to 2015/16 for residents 40 years of age and older:

- the number of people living with parkinsonism increased in most years by an average of 11 cases per year, for an overall 15-year growth of 6.5% from about 2,350 people in 2001/02 to about 2,500 people in 2015/16; and
- in each year there were consistently more males with parkinsonism (about 55%) than females (about 45%).

In 2015/16:

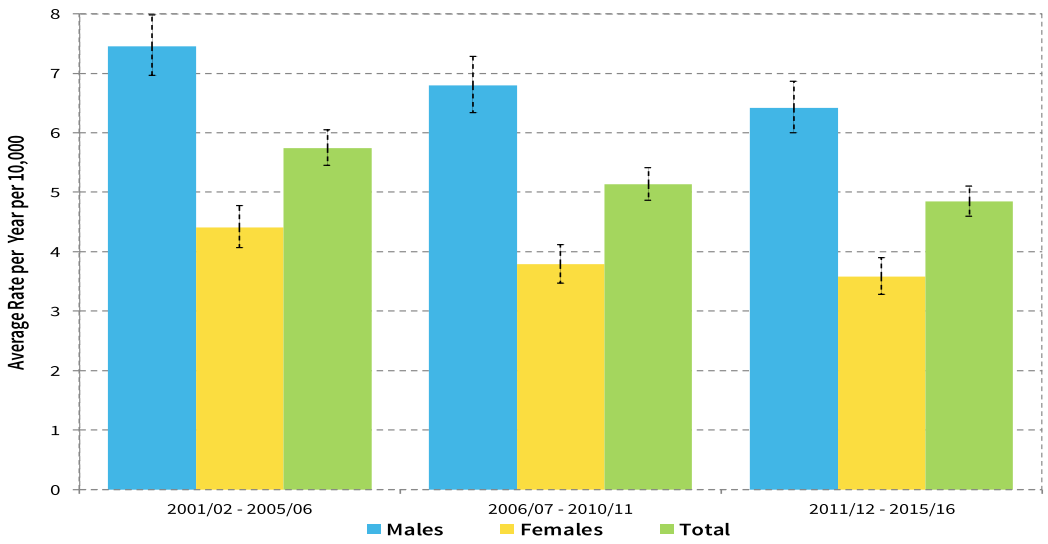
- prevalence of parkinsonism increases almost hundredfold with age from about 0.2 per 1,000 aged 40 to 49 years old to about 20 per 1,000 in the age group 80 years and older; and
- the difference between male and female parkinsonism prevalence grows with age. There is no significant difference in parkinsonism prevalence between the sexes for at ages younger than 65 years; however, from ages 65 years and older male parkinsonism prevalence is significantly higher than female.

Figure 10: Parkinsonism - Prevalence by Sex and Age-group, 2015/16



Parkinsonism Incidence and Mortality

Figure 11: Parkinsonism - Five-year Average Age-standardized Incidence Rates by Sex, 2001/02-2005/06 to 2011/12-2015/16



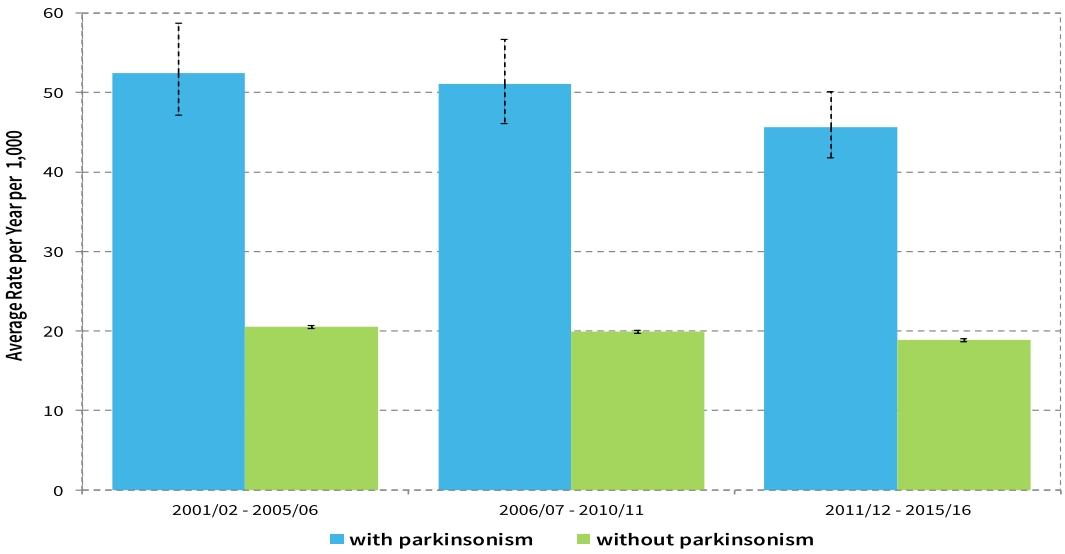
From 2001/02-2005/06 to 2011/12-2015/16 for residents aged 40 years and older, parkinsonism incidence rates:

- decreased from a five-year average of about 300 (5.7 per 10,000) per year to about 280 (5.1 per 10,000) per year;
- decreased by about 19% for females and about 14% for males; and
- were significantly higher for men than for women in all three five-year periods.

From 2001/02-2005/06 to 2011/12-2015/16 for residents aged 50 years and older, all-cause mortality rates for people who had parkinsonism:

- decreased slightly but not significantly over time; and
- were consistently about 2.5 times higher than all-cause mortality rates of people without parkinsonism.

Figure 12: Parkinsonism - Five-year Average All-cause Age-standardized Mortality Rates by Disease Status, 2001/02-2005/06 to 2011/12-2015/16



Case Definition

For surveillance purposes, the parkinsonism case definition requires that an individual have:

- two or more physician claims, with at least 30 days between the first and the second claim, with ICD-9 code 332 within one year.

The parkinsonism case definition applies to ages 40 years and older.

Technical Notes

Method

Chronic disease estimates are based on the infrastructure and case definitions of the Canadian Chronic Disease Surveillance System (CCDSS), with support of the Public Health Agency of Canada. This method is based on linkage of administrative data sources including:

- person health registration system which includes all residents eligible for Saskatchewan health benefits;
- hospital services which include data on hospital inpatient separations for beneficiaries; and
- medical services which include physician and nurse practitioner service claims for beneficiaries.

Hospital diagnoses are coded according to the International Classification of Diseases system levels ICD-9 or ICD-10-CA. All but five Saskatchewan hospitals started coding with ICD-10-CA in 2001/02, which accounted for 70% of hospital separation records that year. All Saskatchewan hospitals were coding with ICD-10-CA in 2002/03.

Calculations

Age standardization allows comparisons to be made among groups of people with different age distributions, or comparisons over time. To adjust for differences in population age distributions and the resulting effect on rates, incidence and mortality rates were age-adjusted using the 2011 Canadian population as a reference. Adjustment was done via the direct method, using five-year age groups to age 85 years and older.

To facilitate comparisons, 95% confidence intervals (CIs) of all age-standardized rates were calculated for rates greater than zero. The CI includes the true value for the estimated rate 19 times out of 20. A rate difference was considered statistically significant if there was no overlap of confidence intervals.

Limitations

Persons with physician-diagnosed chronic conditions may not be captured if they receive their care in a setting where services are not billed on a fee-for-service basis. Services delivered by physicians in salaried or contractual arrangements are not captured if the service information is not submitted through “shadow billing”.

Any system which tracks lifelong diseases over many years on an individual basis will tend to accumulate false positives. This is because a case, once identified, is carried forward from year to year. Even if false positives are extremely rare, they will inevitably comprise an increasing proportion of reported cases over time.

Provincial administrative data exclude full-time members of the Canadian Forces and inmates of federal correctional facilities, and prior to April 1, 2013 Royal Canadian Mounted Police, whose health benefits are covered by federal jurisdiction.

Definitions

Prevalence

Prevalence is the total number of people known to be living with a disease at any time during a specific period. Prevalence provides an estimate of the burden of disease at a given time, and is widely used in public health monitoring and planning for services and programs, setting objectives and targets and comparing disease status over person, place and time. Prevalence is influenced by both the number of new cases and the duration of a disease. A high prevalence of a disease may reflect a high incidence where new cases rapidly occur, or prolonged duration, where those with the condition survive for a long time. Conversely, a low prevalence may indicate fewer new cases or a shorter survival of those with a chronic disease.

Incidence

Incidence refers to the number of new cases detected in the population at risk for the disease during a specific period. Incidence rates provide information about the risk of developing a disease. Incidence rates can be influenced by many health determinants, including non-modifiable and modifiable risk factors such as smoking and obesity, or exposure to primary, secondary, and tertiary prevention. Changing clinical diagnostic criteria and physician billing practices may cause significant short-term fluctuations in incidence estimates. Random year to year variation of incidence rates may obfuscate systematic long-term changes; therefore, five-year average rates are presented to help detect potential trends.

All-cause Mortality

Mortality refers to the proportion of a population that dies during a specified time period. This measure refers to deaths of people regardless of the cause of death. Dates and fact of death are based on the demographic data of the person health registration system. Risk of death is often elevated in people with chronic diseases compared to people without chronic diseases. Assessment of elevated death risk is accomplished by dividing the age-standardized rate of people with disease by the age-standardized rate of people without disease.

If the result is around one it indicates little to no elevated risk, whereas for example a result of 1.5 indicates an increased death risk of 50%. Mortality is based on all causes of death and not just deaths caused by a specific disease of interest. Random year to year variation of mortality rates may obfuscate systematic long-term changes; therefore, five-year average rates are presented to help detect potential trends.