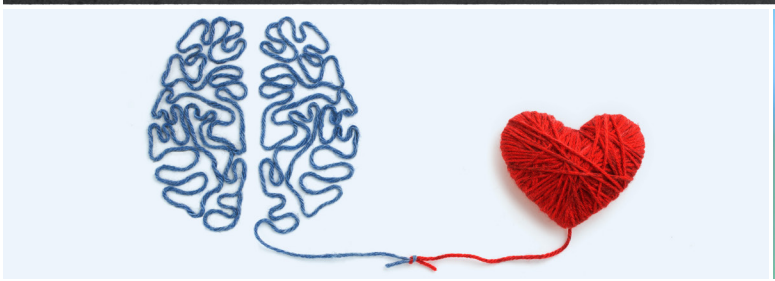

DEMENTIA AND STROKE COMORBIDITY AMONG CANADIANS AGED 65 YEARS AND OLDER

HIGHLIGHTS FROM THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

Dementia and stroke are common and debilitating chronic conditions in Canada. They pose significant health challenges, especially among individuals aged 65 years and older. The risk of developing these conditions, either separately or together (i.e. comorbidity), increases with age.[1–3] Some Canadian studies have investigated comorbid dementia and stroke in specific populations;[4,5] however, there are insufficient data to estimate the prevalence of this comorbidity in the general Canadian population.[6,7]

This factsheet provides new estimates on dementia and stroke comorbidity among Canadians aged 65 years and older, examining the simultaneous presence of dementia and any stroke using data from the Canadian Chronic Disease Surveillance System (CCDSS). The Public Health Agency of Canada (PHAC) uses the CCDSS to conduct national surveillance of 20 chronic conditions, including diagnosed dementia[i] and stroke (**Box 1**, page 7).[8,9]

Dementia refers to a set of symptoms and signs associated with a progressive deterioration of cognitive functions that affect daily activities.[8] It is caused by various diseases and injuries in the brain and vascular system. Alzheimer's disease represents the most common cause of dementia, while vascular dementia is the second most common cause of dementia. However, evidence suggests that mixed dementia, involving any combination of causes but often these two, is also common.[10,11]

A stroke is a sudden loss of brain function caused by a brain blood vessel blockage (ischemic stroke) or rupture (haemorrhagic stroke).[9]

Validated case definitions for diagnosed dementia[12] in individuals aged 65 years and older, and diagnosed stroke[13] in individuals aged 20 years and older, were applied to CCDSS longitudinal data (i.e., April 1, 1996 to March 31, 2017). Among individuals aged 65 years and older still alive in 2016–2017, coexisting dementia and stroke cases (regardless of the order of occurrence) were identified as prevalent comorbid cases. Data are presented for fiscal year 2016–2017. Data from all Canadian provinces and territories, except Saskatchewan, were available for these analyses.

[i] The term "dementia" includes all types of dementia, even when not specifically mentioned.

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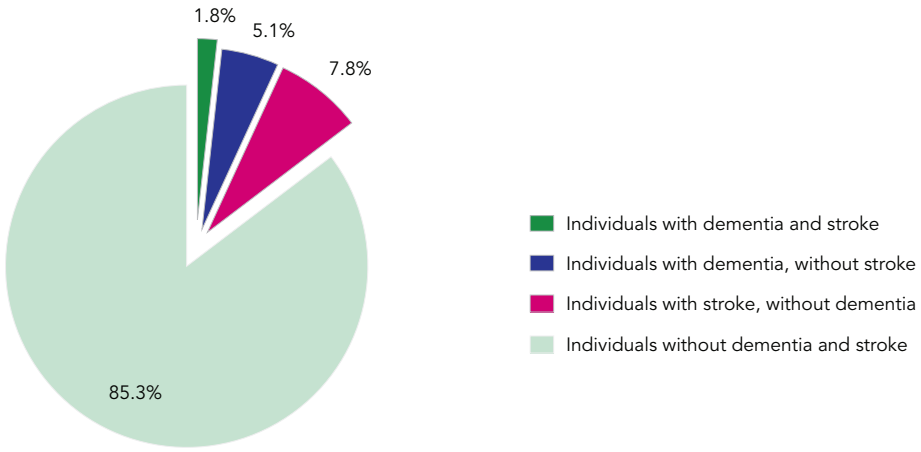
HOW MANY CANADIANS AGED 65 YEARS AND OLDER HAVE BOTH DEMENTIA AND STROKE (PREVALENCE)?

According to 2016–2017 fiscal year data from the CCDSS, 6.9% (or 432,000) of individuals 65 years and older were living with dementia and 9.6% (or 602,000) had a stroke since the beginning of the surveillance period in 1996–1997. Overall, in the population aged 65 years and older:

- The prevalence of dementia was higher in women than men (8.0% vs. 5.5%);
- The prevalence of stroke was higher in men than women (10.2% vs. 9.0%).

In 2016–2017, about 1.8% (or 110,000) of individuals aged 65 years and older were living with comorbid dementia and stroke, while 5.1% (or 322,000) were living with dementia, without a stroke, and 7.8% (or 492,000) had a stroke, without dementia (**Figure 1**).

FIGURE 1: Crude prevalence† (%) of dementia and stroke in individuals aged 65 years and older, Canada*, 2016–2017



† Crude rates were based on randomly rounded counts to an adjacent multiple of 10.

* Data from Saskatchewan were not available.

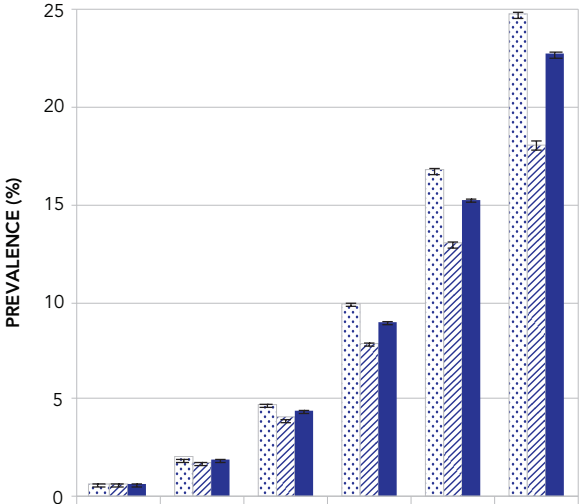
SOURCE: Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, August 2019.

The prevalence of dementia and stroke comorbidity was greater in women than men (1.9% vs. 1.6%) using crude rates; however, this pattern is reversed when using age-standardized rates (1.6% vs. 1.8%) given the age distribution of the senior population.

The prevalence of dementia without stroke increased with age. Women 75 years and older had a higher prevalence of dementia without stroke than men of the same age (**Figure 2a**). The prevalence of stroke without dementia also increased with age, although it increased less rapidly after the age of 85. Regardless of age, stroke without dementia occurred more frequently in men than women (**Figure 2b**).

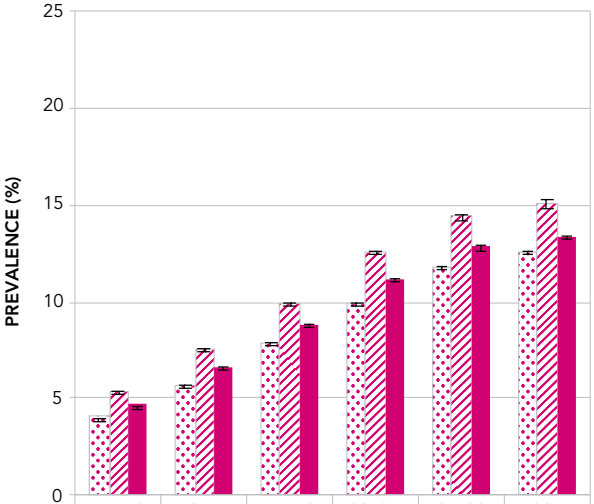
FIGURE 2: Crude prevalence† (%) of individuals aged 65 years and older (a) living with dementia, without stroke and (b) who have had a stroke, without dementia, by age group and sex, Canada*, 2016–2017

(a) With dementia, without stroke



	65–69	70–74	75–79	80–84	85–89	90+
Women	0.6	1.9	4.7	9.8	16.7	24.7
Men	0.6	1.7	4.0	7.8	12.9	18.0
Total	0.6	1.8	4.4	8.9	15.2	22.7

(b) With stroke, without dementia



	65–69	70–74	75–79	80–84	85–89	90+
Women	4.0	5.7	7.8	9.9	11.8	12.6
Men	5.3	7.5	9.9	12.5	14.4	15.0
Total	4.6	6.6	8.8	11.1	12.8	13.3

† Crude rates were based on randomly rounded counts to an adjacent multiple of 10.

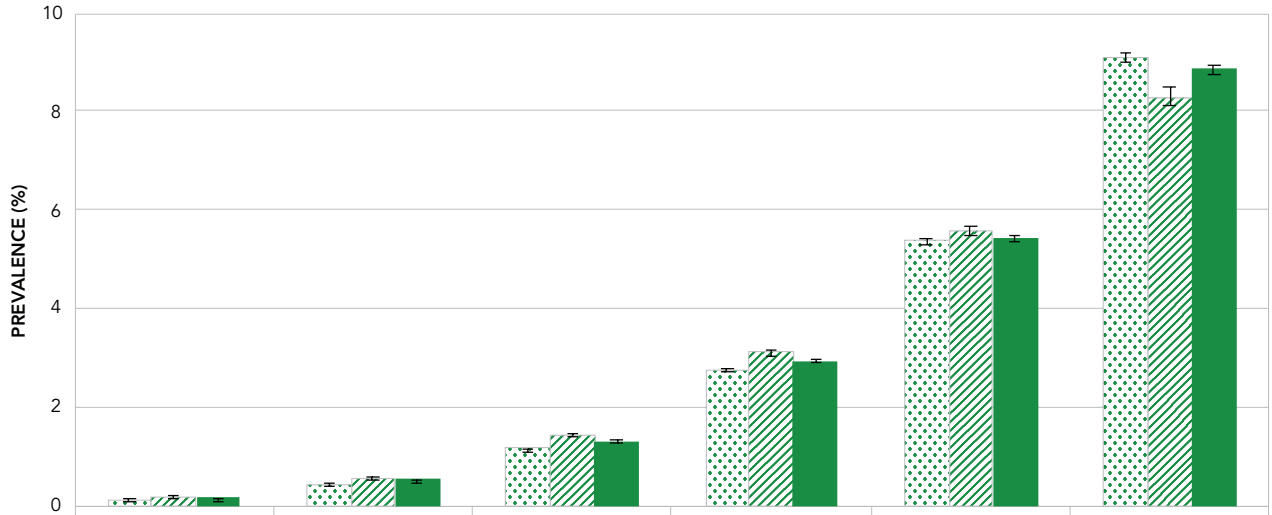
* Data from Saskatchewan were not available.

NOTE: The 95% confidence interval shows an estimated range of values that is likely to include the true prevalence 19 times out of 20.

SOURCE: Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, August 2019.

The prevalence of dementia and stroke comorbidity among individuals aged 65 years and older markedly increased from 0.2% in individuals aged 65 to 69 years old to 8.9% in those aged 90 years and older (**Figure 3**). The crude prevalence of dementia and stroke comorbidity was greater in males until 90 years of age, where the crude prevalence was greater in women (9.1%) than men (8.3%). This sex pattern observed in the crude rates may be explained by the greater number of women than men surviving to the oldest age groups.

FIGURE 3: Crude prevalence† (%) of dementia and stroke comorbidity in individuals aged 65 years and older, by age group and sex, Canada*, 2016–2017



	65–69	70–74	75–79	80–84	85–89	90+
Women	0.1	0.4	1.2	2.8	5.4	9.1
Men	0.2	0.6	1.5	3.1	5.6	8.3
Total	0.2	0.5	1.3	2.9	5.5	8.9

† Crude rates were based on randomly rounded counts to an adjacent multiple of 10.

* Data from Saskatchewan were not available.

NOTE: The 95% confidence interval shows an estimated range of values that is likely to include the true prevalence 19 times out of 20.

SOURCE: Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, August 2019.

WHAT ARE THE MORTALITY RATES (DUE TO ANY CAUSE OF DEATH) AMONG CANADIANS AGED 65 YEARS AND OLDER WITH DEMENTIA AND STROKE?

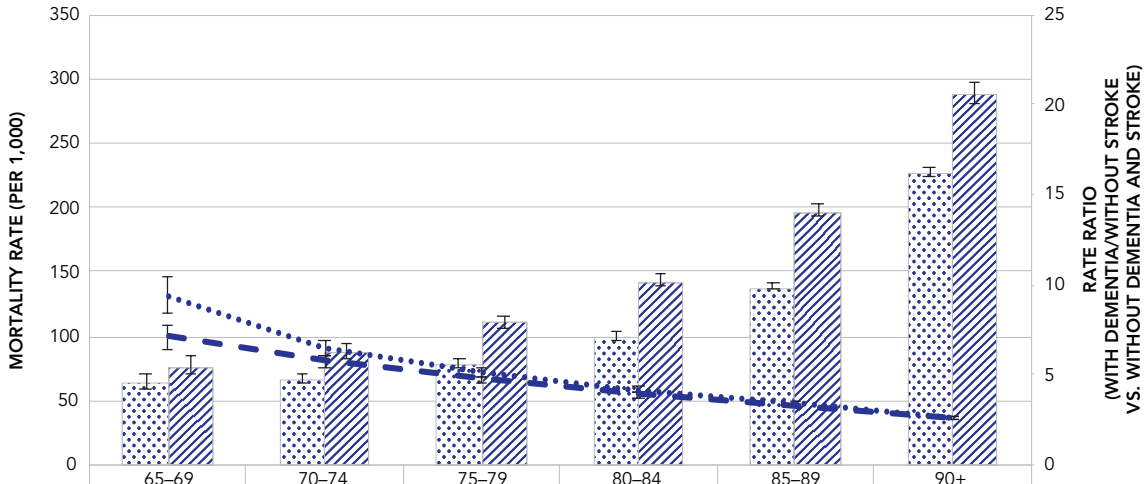
As expected, all-cause mortality rates increased with age regardless of the disease combination and were higher among older men than older women (**Figure 4**). Overall, the age-standardized all-cause mortality rate was 6.9 times greater in individuals aged 65 years and older with both conditions compared to those without the two conditions (150.5 per 1,000 vs. 21.8 per 1,000). The age-standardized rate ratio was higher among women (7.8) than among men (6.1) (data not shown).

All-cause mortality rates were higher in persons with stroke/without dementia, persons with dementia/without stroke and persons with both conditions when compared to persons without dementia and stroke. However, the rate ratios decreased with age, which may be explained by the increase in general mortality. As people age, they are more likely to die of any cause.

In individuals living with dementia, without stroke (**Figure 4a**), rate ratios were similar between sexes across all age groups, except in the youngest. Rate ratios among those who had a stroke, without dementia (**Figure 4b**) and those living with dementia and stroke comorbidity (**Figure 4c**) were greater in women than men for all age groups, except the oldest.

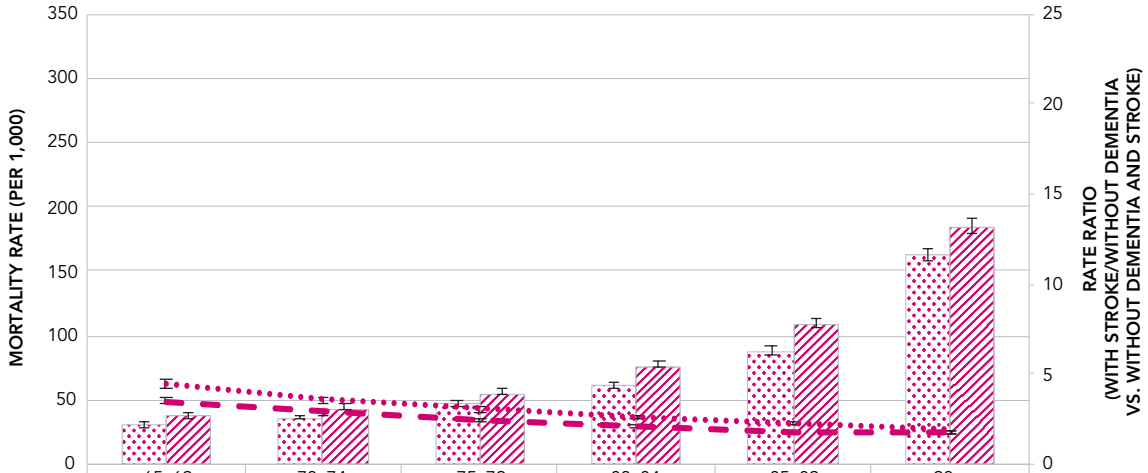
FIGURE 4: Crude all-cause mortality rates[†] and rate ratios in individuals aged 65 years and older (a) living with dementia, without stroke, (b) who have had a stroke, without dementia and (c) living with dementia and stroke comorbidity, compared to those without dementia and stroke comorbidity, by age group and sex, Canada[*], 2016–2017

(a) With dementia, without stroke



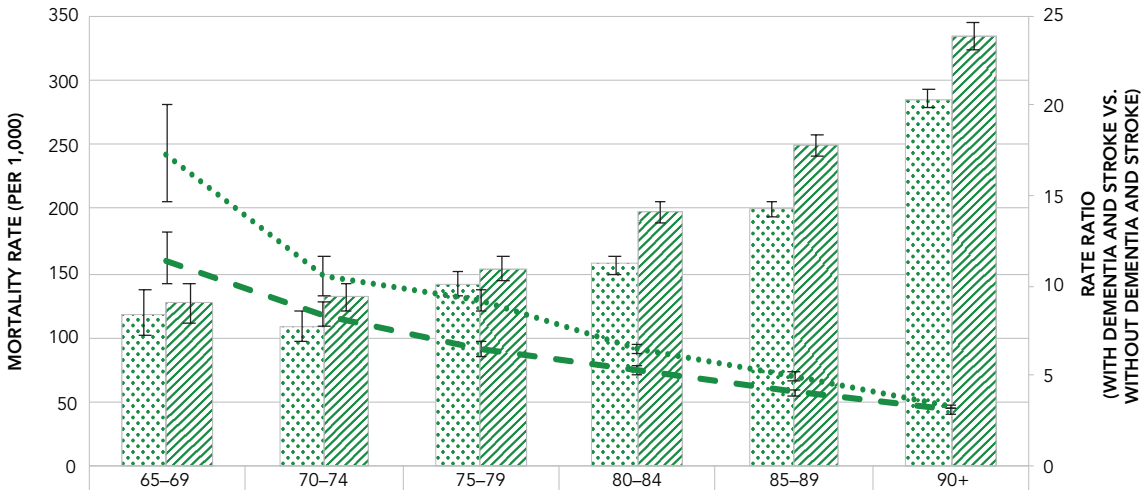
	65–69	70–74	75–79	80–84	85–89	90+
Mortality rate – Women	64.5	67.2	79.0	100.4	138.7	227.2
Mortality rate – Men	77.7	89.1	111.2	143.0	197.5	288.8
Rate Ratio – Women	9.4	6.5	5.1	4.2	3.5	2.6
Rate Ratio – Men	7.1	5.7	4.7	3.9	3.3	2.7

(b) With stroke, without dementia



	65–69	70–74	75–79	80–84	85–89	90+
Mortality rate – Women	30.7	36.3	47.0	61.2	88.6	162.8
Mortality rate – Men	38.0	44.6	56.1	77.5	109.5	184.6
Rate Ratio – Women	4.5	3.5	3.1	2.5	2.2	1.9
Rate Ratio – Men	3.5	2.9	2.4	2.1	1.8	1.7

(c) With dementia and stroke comorbidity



	65–69	70–74	75–79	80–84	85–89	90+
Mortality rate – Women	115.9	108.9	141.6	156.2	199.9	285.0
Mortality rate – Men	127.0	129.8	154.1	196.5	249.6	333.7
Rate Ratio – Women	16.9	10.5	9.2	6.5	5.0	3.3
Rate Ratio – Men	11.6	8.4	6.5	5.4	4.1	3.1

† Crude rates were based on randomly rounded counts to an adjacent multiple of 10.

* Data from Saskatchewan were not available.

NOTE: The 95% confidence interval shows an estimated range of values that is likely to include the true prevalence 19 times out of 20.

SOURCE: Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, August 2019.

WHAT ARE THE RISK FACTORS ASSOCIATED WITH DEMENTIA AND STROKE?

Many factors are associated with the development and progression of dementia, or having a stroke. Non-modifiable risk factors for developing dementia or stroke include age, sex, family history and ethnicity.[10,14–16]

Lifestyle factors, such as healthy eating, physical activity, limiting excessive alcohol intake and smoking cessation, can be protective in delaying or reducing the risk of dementia or stroke.[10,14–16] Further, having a secondary school education and being socially engaged has been shown to be protective against dementia.[10,16] Conditions like hypertension, elevated blood cholesterol, obesity, diabetes, depression, atrial fibrillation and other cardiac conditions are associated with a higher likelihood of developing dementia or having a stroke.[14–18]

There are multiple interactions between dementia and stroke that are not yet fully understood. Similarities in their modifiable risk factors, in particular hypertension which is highly prevalent and involved in the development of both conditions, may provide insight into potential strategies to prevent or delay the development or progression of both conditions.[19,20]

BOX 1: WHAT'S IN THE DATA?

The data used in this publication are from the Canadian Chronic Disease Surveillance System (CCDSS), a collaborative network of provincial and territorial chronic disease surveillance systems, led by the Public Health Agency of Canada (PHAC). The CCDSS identifies chronic disease cases from provincial and territorial administrative health databases, including physician billing claims, hospital discharge abstract records, and drug prescription records linked to provincial and territorial health insurance registry records using a unique personal identifier. Data on all residents eligible for provincial or territorial health insurance are captured in the health insurance registries. Data from Saskatchewan were not available for these analyses.

DEFINITION OF DIAGNOSED DEMENTIA, INCLUDING ALZHEIMER'S DISEASE, IN THE CCDSS

Canadians aged 65 years and older are identified as having diagnosed dementia, including Alzheimer's disease, if they have: at least one hospitalization record or at least three physician claims in a two-year period (with at least 30 days between each claim) with an ICD-9 or ICD-10 code for dementia, including Alzheimer's disease; or at least one anti-dementia prescription drug record.

DEFINITION OF DIAGNOSED STROKE IN THE CCDSS

Canadians aged 20 years and older are identified as having had a stroke if they have: at least one hospitalization record or at least two physician claims in one year with an ICD-9 or ICD-10 code for a stroke. Data presented in this publication are limited to individuals aged 65 years and older.

For more information on CCDSS disease case definitions, please visit: https://health-infobase.canada.ca/ccdss/publication/CCDSS_Case_Definitions_DataCubes_v2018_en.xlsx.

A DEMENTIA STRATEGY FOR CANADA: TOGETHER WE ASPIRE

The national dementia strategy has three objectives: prevent dementia; advance therapies and find a cure; and improve the quality of life of people living with dementia and caregivers. **Surveillance and data** is one of the five pillars supporting these objectives. Advancing surveillance of dementia and its comorbidities will offer a more accurate picture of their impact in Canada.

To learn more about the Strategy, visit:
https://www.canada.ca/en/public-health/services/publications/diseases-conditions/dementia-strategy.html.

HOW TO LEARN MORE ABOUT DEMENTIA AND STROKE

VISIT

www.canada.ca/en/public-health/services/diseases/dementia.html

www.canada.ca/en/public-health/services/diseases/heart-health/stroke.html

GET DATA

https://health-infobase.canada.ca/ccdss/data-tool/

MORE

www.alzheimer.ca

www.who.int/topics/dementia/en

www.heartandstroke.ca

www.strokebestpractices.ca/recommendations/mood-cognition-and-fatigue-following-stroke

ACKNOWLEDGEMENTS

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