



Tracking Heart Disease and Stroke in Canada

Stroke Highlights 2011

Acute stroke is a sudden loss of brain function that occurs when the blood flow supplying oxygen to a part of the brain is interrupted.

There are three major types of stroke: ischemic stroke (lack of blood flow to the brain due to a blood clot); intracerebral haemorrhage (bleeding within the brain); and atraumatic subarachnoid haemorrhage (rupture of an aneurysm at the base of the brain that causes bleeding into the lining of the brain).

While all three types can result in a loss of function, they differ with respect to whom they most often affect, their causes, treatments, and outcomes.

Stroke has a substantial impact in Canada.

- In 2009, about 315,000 (1.1%) of Canadians living in the community reported that they suffer from the effects of a stroke¹. This estimate excludes people living in institutions, and it is known that many stroke survivors who require rehabilitative care live in complex continuing care facilities.
- Stroke is a leading cause of death and disability, costing an estimated \$3.6 billion for health care and lost productivity due to premature death and long-term disability in 2000².
- In 2005/06, stroke was recorded as the main reason for 38,341 hospitalizations. Stroke was also recorded as a medical complication in an additional 12,123 hospitalizations^{3,4}.
- In 2007, 11,276 deaths were attributed to stroke. Not only the elderly die from stroke: 1,159 deaths (10.3% of all stroke deaths) occurred in those under age 65 in 2007^{4,5}.
- Hospital and death data under-report the true number of strokes in Canada. For example, current hospital data miss stroke that results in death before a person is able to reach a hospital, as well as silent stroke (that show no symptoms) which may not lead a person to seek medical attention. The Public Health Agency of Canada is expanding its Canadian Chronic Disease Surveillance System to capture these data.

Stroke has a substantial impact on individuals and families.

- Between one-third and two-thirds of stroke survivors will experience a loss of function in physical, cognitive or communication skills that require some form of rehabilitation⁶.
- In 2005/06, 41.7% of individuals hospitalized for stroke were discharged home, 39.5% were transferred to another facility, while 18.3% died in hospital^{3,4}. Rehabilitation helps stroke survivors – whether they are discharged home or to another facility – develop the strength and confidence to live as independently as possible.

Stroke can be prevented.

- The risk of stroke can be greatly reduced by avoiding smoking, participating in regular physical activity, managing stress effectively, choosing healthy nutrition including avoiding sodium, maintaining a healthy weight, and by the early detection and management of conditions such as atrial fibrillation and flutter, high blood pressure, high cholesterol, and diabetes.
- Many Canadians are at risk of having a stroke because of the presence of the following factors:

Proportion (%) of the population age 20+ years with:

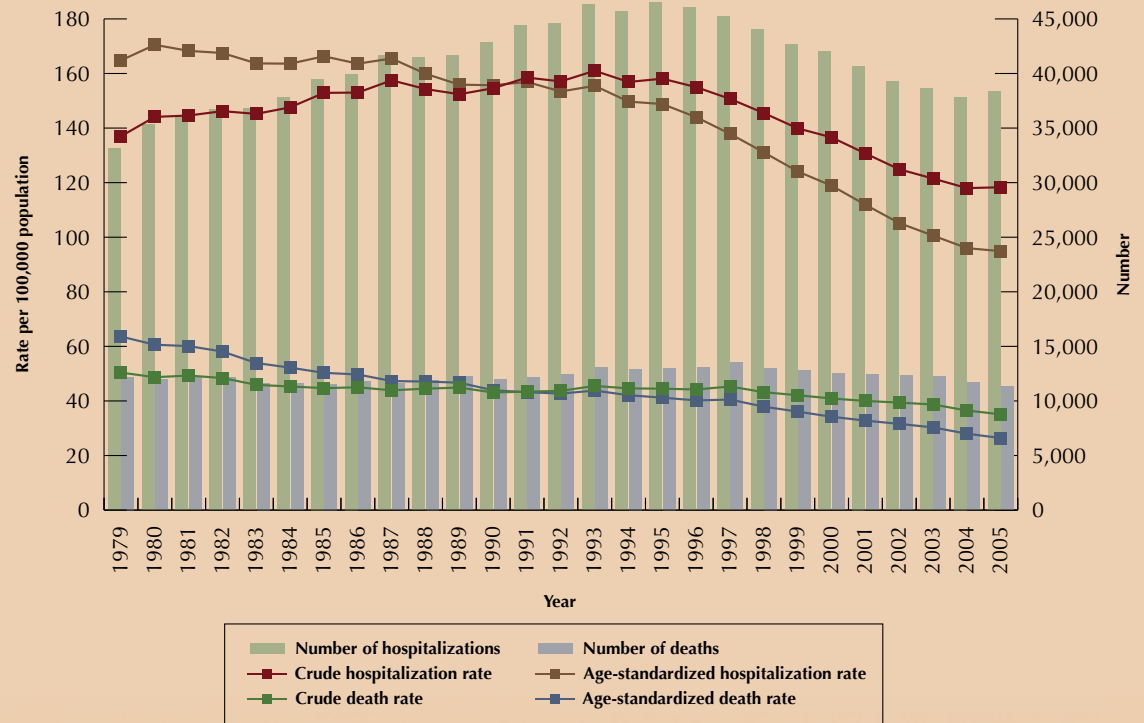
<i>Risk behaviours</i>	<i>%</i>
Smoking (current daily) ⁷	14.1
Physical inactivity (0 ≤ total daily expenditure ≤ 1.5kcal/kg/day) ¹	47.8
Not enough vegetables and fruit (<5 servings daily) ¹	54.9
Salt consumption:	
Does not avoid certain foods because of salt content ¹	43.1
Adds salt to food (excluding cooking)(always or often) ⁸	23.2
Adds salt during cooking or preparation (always or often) ⁸	41.0
Life stress (quite a bit or extremely) ¹	24.1
Regular alcohol consumption ¹	65.1
<i>Underlying health conditions</i>	
Depression (≥2 weeks) ¹	11.4
High blood pressure ⁹	22.7
Overweight (25-30 kg/m ²) ⁸	37.3
Obese (≥30 kg/m ²) ⁸	24.4
Diabetes ¹⁰	8.0
High total blood cholesterol (≥6.2mmol/L) ^{8,11}	13.1
Higher risk ApoA/ApoB ratio ^{8,12}	
Women (≥0.8) ¹³	16.3
Men (≥0.9)	15.6
Heart disease ¹	5.1
Suffers from the effects of a stroke ¹	1.2

- High blood pressure is a key risk factor for stroke. In 2006/07, 5.8 million Canadians age 20 years and older had been diagnosed with high blood pressure. More than one in five adults with high blood pressure (22.7%) also had diabetes^{4,10}.
- Diabetes is a key risk factor for many chronic diseases, and rates have been increasing over time. In 2006/07, 2.1 million people were living with diagnosed diabetes in Canada. In 2006/07 alone over 200,000 Canadians were newly diagnosed with diabetes^{4,11}.
- Control of high blood pressure is improving – in 2007-2009, of Canadians with high blood pressure, two-thirds had control over their blood pressure through medication¹⁴. However, a continued focus on prevention is needed.

- Currently, 9.5% of the Canadian population are being treated with lipid-lowering drug therapy. Among the adult Canadian population who are not being treated with lipid-lowering medications, 33.8% have optimal low-density lipoprotein – cholesterol (LDL-C) levels (<2.59 mmol/L), 50.7% have sub-optimal LDL-C levels (2.59 - <4.14 mmol/L), and 15.5% have uncontrolled high or very high LDL-C levels (≥ 4.14 mmol/L)⁸. Current recommendations indicate that individuals with LDL-C levels ≥ 5.0 mmol/L should be treated with lipid-lowering medications¹⁵. With sub-optimal LDL-C levels (>3.5 mmol/L), management strategies to reduce the risk of stroke depend on an individual's risk score which takes into account a combination of factors such as age, diabetes, smoking, blood pressure, cholesterol, high-density lipoprotein – cholesterol (HDL-C) levels, and/or body mass index¹⁵.

Hospitalizations and deaths due to stroke have been declining over time.

Number and rate of hospitalizations and deaths due to stroke, Canada, 1979-2005^{3,5}

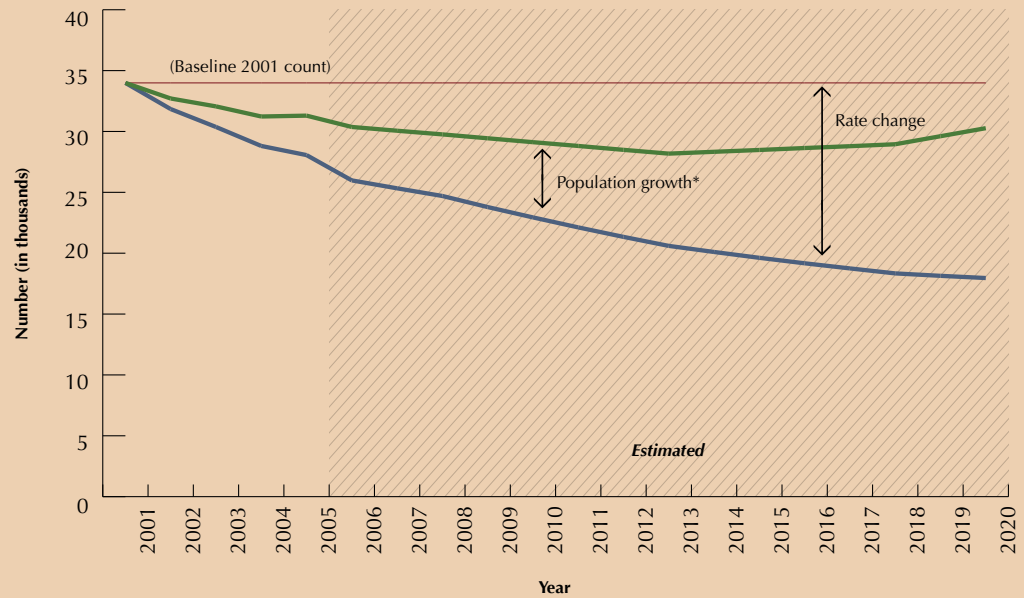


Notes:

- Standardized to the 1991 Canadian population.
- Note that the coding scheme for this condition changed in 2000/2001, and this may influence trends.
- Hospitalizations are based on the most responsible diagnosis for the length of stay in hospital.
- Prior to 1993/94, hospitalizations only included the ten Canadian provinces. Nunavut hospitalization data not available in 2002/03.

- The aging of the population resulted in a rise in stroke hospitalizations and deaths until the early 1990s. Since then, despite the continued aging of the population, the number and rate of hospitalizations and deaths have steadily declined in all age groups and for both men and women.
- In addition to the general decline in hospitalizations over time, the number of return visits to hospital for stroke has declined as well.
- The decline in hospitalizations and subsequent strokes may be the result of success in preventive measures but may also be influenced by changes in patterns of care, such as the management and care of minor stroke, transient ischemic attacks, and stroke patients in community-based programs rather than in hospital.

Projected trend in hospitalizations due to stroke, Canada, 2001-2020^{3,16}



* Aging within the 60+ population itself has a very small contribution.

Notes:

- Based on a population age 60+ years.
- Projections based on trend analysis for disease rate, population growth, and aging of the population.
- Actual morbidity data were available to 2005.

- Largely influenced by the number of baby boomers becoming seniors, the past decrease in stroke hospitalizations is projected to flatten out and possibly increase in the future^{3,16}.

More information on stroke can be found in the 2009 Tracking Heart Disease and Stroke in Canada report published by the Public Health Agency of Canada.

www.phac-aspc.gc.ca

- 1 Canadian Community Health Survey (2009 annual data) (Statistics Canada). Data are self-reported and for respondents age 20+ except for overall stroke statistic which is based on a population age 12+.
- 2 Economic Burden of Illness in Canada (2000 data) (Public Health Agency of Canada).
- 3 Hospital Morbidity Database (2005-2006 data) (Canadian Institute for Health Information).
- 4 Note that data bias may occur due to changes in and improved accuracy of coding.
- 5 Vital Statistics Database (2007 data) (Statistics Canada).
- 6 Canadian Institute for Health Information (2009). Factors predicting discharge home from inpatient rehabilitation after stroke. *Analysis in Brief*. URL http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_2070_E&cw_topic=2070&cw_rel=AR_2891_E (accessed May 18, 2010).
- 7 Canadian Tobacco Use Monitoring Survey (2009 data) (Statistics Canada). Data are self-reported and for respondents age 20+.
- 8 Canadian Health Measures Survey (2007-2009 data) (Statistics Canada). Data are for respondents age 20+ and are based on measured data where applicable.
- 9 Public Health Agency of Canada (2010). Report from the Canadian Chronic Disease Surveillance System: Hypertension in Canada, 2010. Ottawa: Public Health Agency of Canada; 2010. 26p. URL: <http://www.phac-aspc.gc.ca/cd-mc/cvd-mcv/ccdss-snsmc-2010/index-eng.php> (accessed January 10, 2011).
- 10 Public Health Agency of Canada (2009). Report from the National Diabetes Surveillance System: Diabetes in Canada, 2009. Ottawa: Public Health Agency of Canada; 2009. 26p. URL: <http://www.phac-aspc.gc.ca/publicat/2009/ndssdic-snsddac-09/index-eng.php> (accessed January 10, 2011).
- 11 US Department of Health and Human Services. (2001). National Cholesterol Education Program: ATP III Guidelines At-A-Glance Quick Desk Reference. NIH publication number 01-3305.
- 12 Walldius G, Jungner I. (2006). The apoB/apoA-I ratio: a strong, new risk factor for cardiovascular disease and a target for lipid-lowering therapy – a review of the evidence. *Journal of Internal Medicine*; 259: 493-519.
- 13 High sampling variability; interpret with caution.
- 14 Wilkins K, Campbell NR, Joffres MR, McAlister FA, Nichol ME, Quach S, *et al.* (2010). Blood pressure in Canadian adults. *Health Reports*;21(1).
- 15 Genest J, McPherson R, Frohlich J, *et al.* (2009). 2009 Canadian Cardiovascular Society/Canadian guidelines for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease in the adult – 2009 recommendations. *Can J Cardiol* 25(10): 567-579.
- 16 Projections were obtained using Nordpred software which fits an age-period cohort model to predict future rates. Estimated rates are multiplied by population projections published by Statistics Canada to obtain the estimated number of discharges.