

National Trends in Cardiovascular Care and Outcomes

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The Issue

Cardiovascular disease (CVD), including stroke, is the leading cause of death globally. Each year, thousands of Canadians develop or die from CVD. As the leading reason for hospital admissions in Canada, it is also a major economic burden on the healthcare system.

Previous studies from Western Europe and the United States have identified a steadily declining rate of death from cardiovascular and cerebrovascular diseases (Ford et al. 2007; Levi et al. 2002). However, it is uncertain whether the rate of decline is similar across common cardiovascular conditions such as heart attack, heart failure and stroke. Furthermore, the obesity epidemic has raised concerns that future generations of Canadians might suffer adverse health consequences (many related to CVD) from the rising rates of obesity in society. The increasing cost of treating patients with CVD with new drugs and devices is also putting major strains on provincial healthcare budgets.

A study of national trends in cardiovascular care and outcomes could prove invaluable to decision-makers, clinicians and others involved in planning the future delivery of healthcare services in Canada. Accordingly, a group of over 30 clinician researchers from across Canada, known as the Canadian Cardiovascular Outcomes Research Team (CCORT), conducted a series of studies to evaluate recent national trends in cardiovascular care in Canada. The first three studies from this initiative were published recently, with additional studies nearing completion (Jackevicius et al. 2009; Lee et al. 2009; Tu et al. 2009). Further information about these studies (including a PowerPoint slide collection) and CCORT is available at <http://www.ccort.ca/trends.aspx>.

The CCORT initiative is funded by a Canadian Institutes of Health Research (CIHR) Team Grant in Cardiovascular Outcomes Research. It brings together Canadian experts in cardiology, cardiac surgery, epidemiology, biostatistics, health services research and economics to study important cardiovascular health policy issues. The Institute for Clinical Evaluative Sciences (ICES) serves as the national coordinating centre for CCORT.

The Study

The CCORT investigators recently published, in the *Canadian Medical Association Journal*, a series of three studies (Jackevicius et al. 2009; Lee et al. 2009; Tu et al. 2009) examining national trends on the following topics:

- Rates of death and hospital admissions due to acute myocardial infarction (AMI, i.e., heart attack), heart failure and stroke
- Use of and expenditures for cardiovascular medications in Canada
- Prevalence of risk factors for CVD in Canada including temporal, socio-demographic and geographic factors

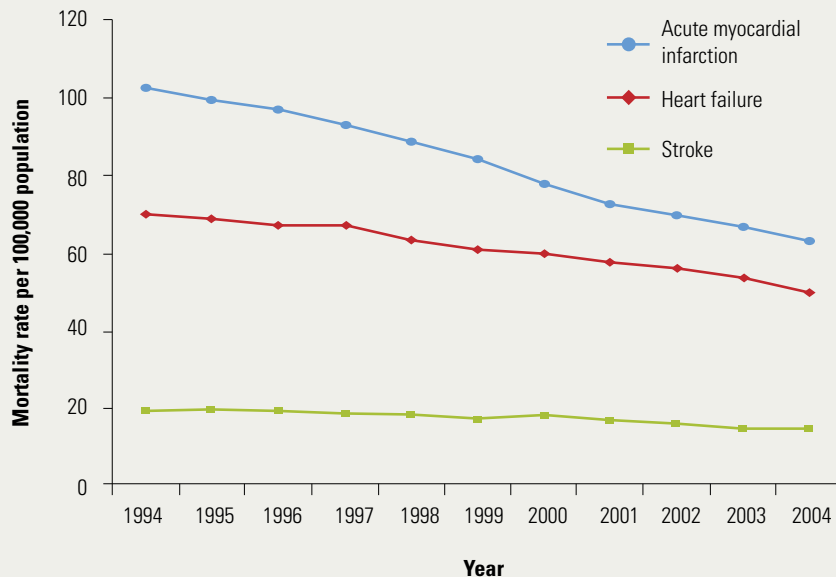
These studies used a variety of national databases including the Canadian Mortality Database from Statistics Canada; the Canadian Institute for Health Information Hospital Morbidity Database; prescription data from the IMS Health Canada CompuScript Audit database; and survey data from the National Population Health Surveys and the Canadian Community Health Surveys – all of which have been described in detail elsewhere (Jackevicius et al. 2009; Lee et al. 2009; Tu et al. 2009).

Key Findings

Trends in Rates of Death and Hospital Admissions, 1994–2004

The overall age-sex standardized rate of death from CVD in Canada declined 30% from 360.6 per 100,000 population in 1994 to 252.2 per 100,000 in 2004. During this same period, death rates fell 38.1% for AMI, 28.2% for stroke and 23.5% for heart failure (Figure 1). Age-sex standardized rates of hospital admissions decreased 27.6% for stroke and 27.7% for heart failure but only 9.2% for AMI. However, in-hospital case-fatality rates declined the most for AMI, 33.1%, compared with 8.9% and 8.1% for stroke and heart failure, respectively.

For the first time, more women than men died from CVD in 2000. By 2004, 50.5% of all CVD deaths occurred in women.

Figure 1. Death rates from acute myocardial infarction, heart failure and stroke, in Canada, 1994–2004

Source: Tu et al. 2009.

Bottom Line

This study represents good news for Canadians as national death rates for CVD are declining. However, the increasing proportion of CVD deaths in women highlights the need for increased education and research focused on CVD in women.

Cardiovascular drug expenditures could reach \$10.6 billion in Canada by 2020 if current trends prevail.

Trends in Use of and Expenditures for CVD Medications, 1996–2006

Medications, a key component of primary and secondary prevention of CVD, reduce cardiac morbidity and mortality. At the same time, they constitute one of the largest cost components of the healthcare system. In 2004, for example, Canadians spent more on CVD medications than on any other medication category. Over the decade 1996–2006, costs rose over 200% to more than \$5 billion (Figure 2). Of this, statins (a class of medication used to lower blood cholesterol levels) accounted for almost 40% of the expenditures. The use of newer medications such as angiotensin receptor blockers (ARBs) and statins outpaced the use of older medications such as nitrates, while patented medications outpaced generics.

Several factors are driving drug expenditures including an increased use of patented drugs (as opposed to generics), an aging and growing population, an increasing prevalence of CVD risk factors and an expansion of the indications for these medications. Cardiovascular drug expenditures could reach \$10.6 billion in Canada by 2020 if current trends prevail, raising concerns regarding the sustainability of such levels of spending.

Bottom Line

Medications to prevent and treat heart disease are used by and, more importantly, are beneficial for many Canadians; one in five prescriptions is for a cardiovascular medication

(Jackevicius et al. 2009). However, cardiovascular drug expenditures rose dramatically over the past decade. Ensuring appropriate and cost-effective use, including more lower-cost generic medications, and support for healthier lifestyle habits could potentially help slow the rate of rise in drug costs.

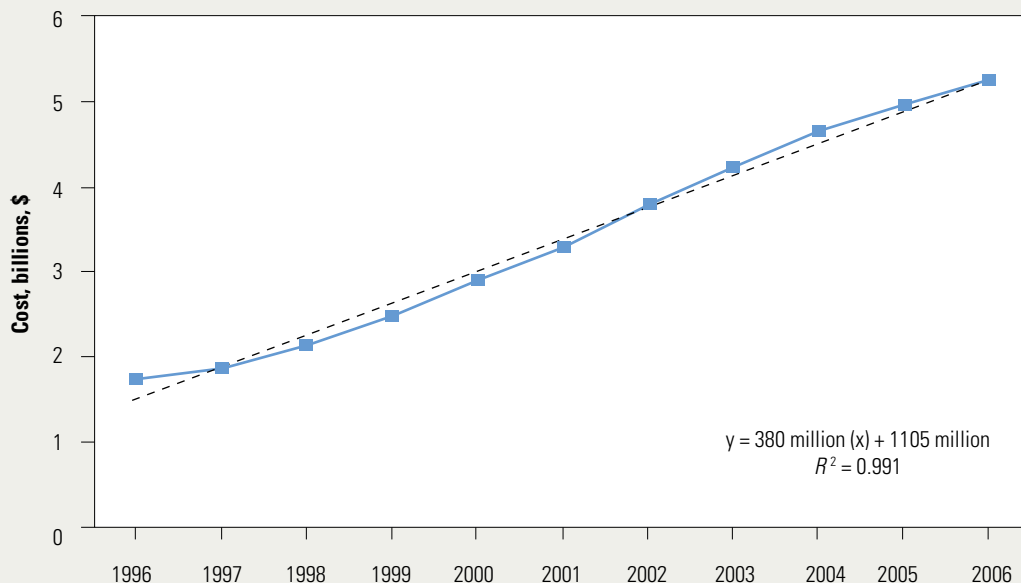
Trends in CVD Risk Factors, 1994–2005

An analysis of Canadian health survey data on those aged 12 years and older revealed that approximately 1.29 million Canadians reported having heart disease in 2005, representing increases of 19% for men and 2% for women relative to 1994. Rates of heart disease (as diagnosed by a physician and as self-reported during the survey process) were higher among respondents of lower socio-economic status than among those in higher-income categories during each year of the study.

The prevalence of key risk factors for heart disease (hypertension, diabetes, obesity) increased substantially over the study period. Rates of hypertension nearly doubled, and rates of diabetes and obesity (BMI ≥ 30) both increased significantly. In 2005, an estimated 5.2 million Canadians had hypertension, 1.3 million had diabetes and 3.8 million were obese.

Obese respondents were more likely to report greater increases in rates of diabetes (61%) and hypertension (80%). These risk factor trends were consistent across all provinces. The continuing rise in hypertension suggests that there may be a

Figure 2. Expenditures on cardiovascular disease medications, in Canada, 1996–2006



Source: Jackevicius et al. 2009.

large group of Canadians with as-yet undiagnosed hypertension. Smoking rates, in contrast, have declined but remain high as an estimated 5.9 million Canadians smoked in 2005.

Perhaps most worrying was the finding that cardiovascular risk factors are rising faster among those under age 50. Risk factor prevalence can serve as an early warning of the future incidence of heart disease, with earlier onset of risk factors and disease meaning potentially longer and more intense treatment requirements.

Bottom Line

Rates of hypertension, diabetes and obesity are markedly rising, especially among younger Canadians. Smoking rates, while on the decline, remain high. CVD risk factor prevalence is higher among those of lower socio-economic status.

What Do These Findings Mean?

These findings indicate a number of trends:

- CVD death rates are declining.
- Patients with CVD are getting older.
- Heart disease affects both men and women; however, a greater understanding of its course and optimal treatment in women are needed.
- Heart failure, which often develops in those who survive a heart attack, continues to present a challenge as mortality rates remain high.

- Medical intervention via procedures to treat blocked heart arteries and medications such as statins are effective for managing patients with heart attacks. However, escalating drug costs necessitate efforts focused on prevention, risk factor management via lifestyle changes and the cost-effective use of medications proven effective in primary and secondary prevention. Increased scrutiny of newer drug classes may also be warranted as they are typically more expensive and often do not outperform existing medications.
- The prevalence of heart disease and certain risk factors are increasing in Canada.
- More Canadians, particularly those under age 50, are reporting CVD risk factors such as diabetes, hypertension and obesity. Higher rates are found among those of lower socio-economic status. This suggests the recent decline in the CVD death rates may be short-lived as those currently reporting increased risk factors progress to develop CVD as they move into middle and old age.

Future Research

Areas requiring further research include (1) CVD prevention, risk factor reduction, diagnostic tools and disease management, including efforts focused on heart failure and on women; and (2) ongoing nationwide surveillance of trends in risk factors, mortality rates, hospital admissions, therapy and medication use.

Conclusion

CVD continues to affect a growing number of Canadians. Despite downward trends in CVD death rates over the past decade, the rapid rise in drug expenditures and substantial increases in the prevalence of risk factors among younger Canadians warrant urgent action by policy makers.

The recent decline in the CVD death rates may be short-lived as those currently reporting increased risk factors progress to develop CVD as they move into middle and old age.

Enhanced efforts directed toward primary prevention, emphasizing a healthy diet and physical activity beginning in the young, are needed to reduce early adulthood obesity and diabetes. Provision of affordable preventative strategies such as smoking cessation therapy to at-risk groups should also be a priority. **HQ**

Acknowledgement

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