

Cardiovascular disease: risk factors in older Canadians

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Special Supplement

Cardiovascular disease is an important cause of death, premature death, morbidity and years of potential life lost in Canada. The various conditions encompassed by this term are the leading causes of disability, loss of productivity and deterioration in quality of life among both men and women in this country. The care of people with these conditions uses up a large share of the budget devoted to health care in all provinces. Estimates suggest that cardiovascular disease costs the Canadian health care system approximately 17 billion dollars annually.¹ Clearly, cardiovascular disease is a major public health problem in Canada, one that creates a heavy burden in social and economic terms.

For countries such as Canada, there is some good news. The rates of cardiovascular disease and associated sequelae have been falling substantially over the past 2 decades, declining as much as 50% in some subpopulations.² This decline has been particularly pronounced for death caused by stroke. Canada has done very well in this regard, and our stroke rates are now among the lowest in the world.³ The reasons for the decline in the rates of cardiovascular disease are far from clear. However, evidence suggests that the reductions result from declines in both the incidence of disease and case fatality rates^{4,5} — the former presumably being the result of preventive efforts and the latter the result of improvements in medical care.

However, we should not take too much comfort from these trends. Despite the declines, cardiovascular disease is still the leading cause of death and disability in men and women, as well as the leading cause of premature death. Perhaps more important is the likely impact of changing demographics in Canada as the population ages. It is worthwhile to note that people at the leading edge of the baby-boom generation are just now entering the years when chronic diseases typically develop. Therefore, even with rates of cardiovascular disease continuing to decline, the absolute numbers of cases of heart disease and stroke will probably increase, perhaps dramatically, in the early part of the next century. If this situation develops, there will almost certainly be a significant increase in the demand for acute care related to these diseases and a concomitant increase in the need for acute care personnel and facilities. These increases will in turn add further to the costs of care in the already financially strained health care sector.

The papers presented in this supplement^{6,7} provide specific information about the epidemiology of cardiovascular disease in older Canadians. The data come from the Canadian Heart Health Surveys database, an integrated data set derived from the provincial heart health surveys, which were conducted in every province of Canada according to a common protocol developed in Nova Scotia.⁸ The establishment and maintenance of this database has been an integral component of the Canadian Heart Health Initiative, a Canada-wide research and development program funded jointly through research grants from the National Health Research and Development Program of Health Canada and program grants from the provincial departments of health. The initiative is a unique undertaking for the prevention and control of heart disease and the promotion of heart health. It uses a public health approach, promoting action on the determinants of heart health through a partnership model, mainly at the community level.⁹

Much has been learned over the past 30 years about the epidemiology of cardiovascular disease, and during this period many of the important risk factors have been identified.¹⁰ As Donald Langille and associates report in this supplement,⁶ large numbers of Canadians 55 to 74 years of age have significantly elevated levels of the individual modifiable risk factors for cardiovascular disease. Research has also shown that cardiovascular disease is a multifactor disorder that results from a com-

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plex interaction of a number of risk factors leading to atherosclerosis and the formation of atheromatous plaque. Langille and associates⁶ also demonstrate that clustering of risk factors is widespread in people 55 to 74 years of age, with over 96% of this population having one or more of the major risk factors for cardiovascular disease. Clearly, widespread risk is at the root of the widespread prevalence of disease in this age group.

One of the major strategies commonly employed for the prevention and management of cardiovascular disease has been educating patients and the public. Although this approach does not guarantee changes in behaviour on the part of individuals, it is generally viewed as an essential ingredient in the process of change. In the other paper in this supplement, Susan Kirkland and colleagues⁷ demonstrate that there is much to be done in this regard. Individual knowledge concerning the risk factors for cardiovascular disease is poor, and it appears that older Canadians do not know enough about cardiovascular disease to help themselves.

Given the results of the analysis presented in this supplement, what should be done with respect to cardiovascular disease and older Canadians?

Epidemiological and community research over the past 30 years has shown, in a convincing manner, that cardiovascular disease is preventable, or at least its occurrence can be postponed.¹¹⁻¹³ These research observations have laid the foundation for a general scientific consensus that enough is known to take action on cardiovascular disease now and that reducing risk levels is cost effective.^{14,15} To reduce risk, effective and practical programs are needed. One of the benefits of targeting cardiovascular disease as an entry point to issues of prevention and control of noncommunicable disease is that many of the risk factors associated with heart disease are also associated with other major chronic diseases such as cancer and diabetes. Therefore, an integrated approach to prevention will have a beneficial impact on many conditions. In addition, from a practical perspective, there is now a large and readily available constituency concerned with cardiovascular disease in Canada who are prepared to come together to address this issue.

Central to activities for controlling cardiovascular disease is the aim not only to extend life expectancy but also to influence health expectancy by improving people's quality of life. In practical terms this means the prevention of premature death and disability — what has been referred to as "squaring the mortality curve and compressing morbidity." There is good evidence to suggest that these goals are indeed attainable and that people who have healthful lifestyles not only live longer, but also suffer less disability and consume fewer health care resources throughout their lives.¹⁶⁻¹⁸

The data presented in this supplement show that there is much to be done if we are to lessen the burden of cardio-

vascular disease among older Canadians. Cardiovascular disease is a public health problem of the first order in this country, one that requires a comprehensive public health approach for its remedy. Such an approach requires that prevention and control become priorities not only for the health care system but also for all sectors of society that have a bearing on health.

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Prevalence of risk factors for cardiovascular disease in Canadians 55 to 74 years of age: results from the Canadian Heart Health Surveys, 1986–1992

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Abstract

Background: By 2016, the proportion of Canadians older than 65 years of age will increase to 16%, and there will be an increase in the absolute number of cases of cardiovascular disease in older Canadians. The Canadian Heart Health Surveys database provides information about this population upon which health policy related to cardiovascular disease can be based. This paper presents for the first time population-based data on the risk factors for cardiovascular disease in older Canadians.

Methods: Canadians from all 10 provinces participated in surveys of cardiovascular risk factors; health insurance registries were used as sampling frames. In each province, probability samples of 2200 adults 18 to 74 years old not living in institutions, on reserves or in military camps were asked to participate in interviews and to undergo testing at clinics for major risk factors for cardiovascular disease.

Results: A total of 2739 men (response rate 70%) and 2617 women (response rate 66%) aged 55 to 74 years participated in the survey and also provided follow-up clinical measurements at the clinic. Overall, 52% of participants were hypertensive, 26% had isolated systolic hypertension, and 30% had a total blood cholesterol level of 6.2 mmol/L or greater. Rates of current smoking were lower in women than men (17% v. 22%). Overall, 87% of men and 78% of women who were current smokers smoked at least 10 cigarettes per day. Only slightly more than half of participants exercised at least once a week for at least 15 minutes, and almost half had a body mass index of 27 or greater. In only 4% was no major risk factor for cardiovascular disease detected.

Interpretation: Significant numbers of older Canadians have one or more major risk factors for cardiovascular disease. Many of these risk factors are amenable to modification.

Canadians are aging rapidly: by the year 2016, the proportion of the population older than 65 years of age will have increased from its current level of 12% to 16%.¹ In Canada cardiovascular disease is the leading cause of death overall — and in those over 65 years of age — and even the decreases in age-adjusted rates of cardiovascular disease that have occurred since the late 1960s do not offset the increases in absolute numbers of cases caused by the increasing age of the population.² Understanding the prevalence of risk factors for cardiovascular disease in older Canadians is therefore of concern to those responsible for health policy and planning. Although there are many risk factors related to cardiovascular disease in the older population,³ this paper is limited to hypertension, dyslipidemia, smoking, lack of exercise and obesity.

Of all the risk factors for cardiovascular disease, high blood pressure, especially high systolic blood pressure, is the best predictor of coronary artery disease,^{4,5} the incidence of which increases dramatically with age.³ Hypertension is also a leading

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risk factor for stroke,^{6,7} the incidence of which also increases rapidly with age.^{8,9} Factors other than hypertension may also be involved in the increase in stroke with age.¹⁰

Increased serum total cholesterol, increased low-density-lipoprotein (LDL) cholesterol and decreased high-density-lipoprotein (HDL) cholesterol are well-established risk factors for ischemic heart disease in middle age.¹¹ However, the degree of risk of ischemic heart disease imposed by altered lipids in older people remains controversial, with some studies refuting the relation¹²⁻¹⁴ and others supporting it.^{15,16}

Although it is well established that smoking is a major risk factor for ischemic heart disease in middle-aged populations,^{17,18} it has been argued that the risk associated with smoking diminishes with age.¹⁹⁻²¹ This argument has been countered by studies demonstrating that smoking in those over 64 years of age is associated with increases in ischemic heart disease^{22,23} and overall death from cardiovascular disease.²⁴

Regular physical activity protects against coronary artery disease,^{25,26} although much of its effect may be through its influence on other risk factors, including blood pressure, lipids and body mass.²⁷ Although the Longitudinal Study of Aging has shown that regular physical activity is beneficial for those over 70 years of age in terms of all-cause mortality,²⁸ the effect of exercise on cardiovascular disease in the older population is less clear.^{29,30}

The association of obesity with cardiovascular disease in younger populations is well established.³¹ Studies of obesity in older people are few, but obesity is linked to other cardiovascular risk factors in older people, including hypertension, altered lipids³² and diabetes.³³ Data from the Cardiovascular Health Study indicated a positive association between heavier weight and cardiovascular disease in those older than 65 years, especially women.³⁴

The current study was carried out as part of the data-gathering process of the Canadian Heart Health Initiative, which collected information concerning heart health risk from Canadians in all 10 provinces. The data presented here describe the prevalence of risk factors in those 55 to 74 years of age.

Methods

The general methodology followed in the provincial heart health surveys, including collection of blood and biochemical testing methods, sample design, training, quality control, and data processing and analysis, has been reported previously.³⁵

All 10 Canadian provinces participated in the Heart Health Surveys, which took place from 1986 to 1992. Sampling in each province consisted of stratified, 2-stage, replicated probability samples of 2200 adults 18 to 74 years old not living in institutions, on reserves or in military camps. Health insurance registries were used as the sampling frames.

For each participant, a trained nurse conducted a 40- to 60-minute home interview, collecting demographic and lifestyle data, as well as information on the participant's level of knowledge and awareness of the risk factors for cardiovascular disease. Participants were asked to attend a clinic within 2 weeks of the initial visit, at which time anthropometric measurements were taken and blood was drawn for analysis.

Anthropometric measurements were taken in the morning with participants dressed in light indoor clothing and no shoes. Height was measured with a tape measure affixed to a wall and a fixed square (to ensure that the marker was level on the top of the subject's head). Participants stood on a hard surface, and height was measured to the nearest centimetre. Weight was measured to the nearest 100 g by means of beam balance scales. Body mass index (BMI) was calculated as weight in kilograms/(height in metres)².

Blood pressure readings were taken with a standard mercury-gravity manometer. A compression cuff based on arm circumference and the diaphragm side of a stethoscope with 37-cm tubing were used. Each participant had been asked not to eat or smoke for a minimum of 30 minutes before the readings were taken and rested quietly for a minimum of 5 minutes before the readings. The person's right arm was held at the level of the heart. The maximum inflation level was determined before the reading was taken. The first and fifth Korotkoff sounds were recorded for the systolic and diastolic pressures respectively; for sounds that continued to 0 mm Hg, the fourth Korotkoff sound was recorded.

A total of 4 readings were taken: at the beginning and end of the home interview and at the beginning and end of the clinic visit. Blood pressure data are based on the mean of these 4 measurements. For participants who did not come to the clinic, the values used are based on the mean of the 2 measurements taken during the home interview.

The lipid data reported here are for participants who had fasted for 8 hours or longer. All plasma lipid analyses were carried out at the J. Alick Little Lipid Research Laboratory, University of Toronto. Throughout the study period this laboratory maintained certification in part III of standardization for cholesterol, triglyceride and HDL cholesterol measurement under the National Heart, Lung, and Blood Institute, Centers for Disease Control Lipid Standardization Program.³⁶ The cut points in the distributions of plasma lipid and lipoprotein that were used to assign risk of coronary artery disease were those derived for adults from the Canadian Consensus Conference on Cholesterol³⁷ and the US National Cholesterol Education Program guidelines.³⁸

To more fully understand the relation between the prevalence of risk factors and age, the data were analysed according to 2 subgroups: participants 55 to 64 years of age and those 65 to 74 years of age.

All reported measures have been weighted to account for the sampling design, and the values in the tables represent population estimates.

Results

Response rate

Of 3932 men and 3994 women 55 to 74 years of age who were asked to participate in the survey, 5956 (75%) did so (2981 men [76%] and 2975 women [74%]). Of these, 2739 men (92% [70% overall]) and 2617 women (88% [66% overall]) also visited the clinic. Of men attending the clinic, 904 (33%) were 55 to 64 years of age, and 1835 (67%) were 65 to 74 years of age. Of women attending the clinic, 901 (34%) were 55 to 64 years of age, and 1716 (66%) were 65 to 74 years of age.

Hypertension

When hypertension was defined as systolic blood pressure of at least 140 mm Hg or diastolic blood pressure of at least 90 mm Hg (or both) and/or treatment with blood pressure medication and/or dietary therapy (or any combination of

these criteria), 54% of men and 50% of women were found to have the condition; for both sexes, hypertension was more prevalent in the older age group (Table 1). Older women had the highest prevalence of hypertension (58%). Of participants with hypertension, 52% were receiving neither dietary nor pharmacologic treatment (data not shown). When the definition of hypertension was limited to isolated elevation of systolic blood pressure, 27% of men and 26% of women had the condition (Table 2). In both sexes, isolated systolic hypertension was also more common in the older age group than in the younger age group: 34% of men and 38% of women 65 to 74 years of age had the condition.

Blood lipids

In both age groups, women had higher total blood cholesterol levels than men (Table 3). Overall, 78% of women and 60% of men had a total blood cholesterol level of 5.2 mmol/L or greater, and 38% of women and 20% of men had a total blood cholesterol level of 6.2 mmol/L or greater.

HDL cholesterol levels of less than 0.9 mmol/L were far more common in men than women. For 15% of men in both age groups the level of this form of cholesterol was

less than 0.9 mmol/L, whereas only 2% of women 55 to 64 years of age and 3% of those 65 to 74 years of age had an HDL cholesterol below this level (Table 4).

Overall, more men than women had LDL cholesterol levels of less than 3.4 mmol/L (48% v. 40%). In addition, more women than men had LDL cholesterol levels of 4.1 mmol/L or greater (33% v. 20%) (Table 5).

About 25% of men in both age groups had triglyceride levels of 2.3 mmol/L or greater, whereas slightly fewer women (18% of those 55 to 64 years of age and 20% of those 65 to 74 years of age) had triglyceride measurements at this level or higher (Table 6).

Smoking

The proportion of women who had never been smokers was more than 3 times as great as the proportion of men who had never smoked. However, many men were ex-smokers (60% overall), so rates of current smoking, although lower in women than in men (17% v. 22%), were not dramatically different (Table 7). Overall, 87% of men and 78% of women who were current smokers smoked 10 or more cigarettes per day (data not shown). The proportion of men in the 2 age groups

Table 1: Prevalence of hypertension among Canadians 55 to 74 years of age

Group	Population estimate of % with hypertension*	No. of participants
Men		
Age 55–64 yr	53	981
Age 65–74 yr	56	2000
Total	54	2981
Women		
Age 55–64 yr	43	1004
Age 65–74 yr	58	1971
Total	50	2975
Overall total	52	5956

*Hypertension was defined on the basis of one or more of the following criteria: systolic blood pressure 140 mm Hg or greater or diastolic blood pressure 90 mm Hg or greater (or both); prescription medication for hypertension; or dietary therapy for hypertension.

Table 2: Prevalence of isolated systolic hypertension among Canadians 55 to 74 years of age

Group	Population estimate of % with isolated systolic hypertension*	No. of participants
Men		
Age 55–64 yr	22	981
Age 65–74 yr	34	2000
Total	27	2981
Women		
Age 55–64 yr	16	1004
Age 65–74 yr	38	1971
Total	26	2975
Overall total	26	5956

*Isolated systolic hypertension was defined as systolic blood pressure of 140 mm Hg or greater and diastolic blood pressure less than 90 mm Hg.

Table 3: Total blood cholesterol in Canadians 55 to 74 years of age

Group	Total blood cholesterol, mmol/L; population estimate, %				No. of participants*
	< 5.20	5.20–6.19	6.20–6.49	≥ 6.85	
Men					
Age 55–64 yr	41	41	11	7	843
Age 65–74 yr	38	38	16	7	1713
Total	40	40	13	7	2556
Women					
Age 55–64 yr	22	41	18	18	833
Age 65–74 yr	22	38	18	22	1586
Total	23	40	18	20	2419
Overall total	30	40	16	14	4975

*Totals are less than overall totals for the study because some data were missing for some participants.

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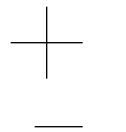


Table 4: Level of high-density-lipid Canadians 55 to 74 years of age

HDL cholesterol

who smoked to this extent was almost equal (88% in the younger age group and 85% in the older age group), whereas fewer older women than younger women did so (74% v. 81%).

Physical activity

Slightly more than half of the participants exercised one or more times per week for more than 15 minutes (Table 8). Men in the older age group were more likely to be physically active to this degree than younger men (57% v. 49%) or than women in both younger and older age groups (53% and 51% respectively).

Body mass index

Almost half of the men and women had a BMI of 27 or more (46% and 45% respectively) (Table 9). For both sexes, the proportion of participants with a BMI above this cut point was lower in the older than in the younger age group.

Multiple risk factors

Table 10 shows the prevalence of multiple risk factors.

Table 5: Level of low-density-lipoprotein (LDL) cholesterol in Canadians 55 to 74 years of age

Group	LDL cholesterol level, mmol/L; population estimate, %			No. of participants*
	< 3.40	3.40–4.09	≥ 4.10	
Men				
Age 55–64 yr	48	34	18	812
Age 65–74 yr	49	29	22	1670
Total	48	32	20	2482
Women				
Age 55–64 yr	41	27	32	817
Age 65–74 yr	38	27	35	1545
Total	40	27	33	2362
Overall total	44	29	27	4844

*Totals are less than overall totals for the study because some data were missing for some subjects.

Table 6: Level of triglycerides in Canadians 55 to 74 years of age

Group	Triglyceride level, mmol/L; population estimate, %			No. of participants*
	< 1.70	1.70–2.29	≥ 2.30	
Men				
Age 55–64 yr	54	22	25	843
Age 65–74 yr	53	23	24	1713
Total	53	22	24	2556
Women				
Age 55–64 yr	66	17	18	833
Age 65–74 yr	54	26	20	1585
Total	60	21	19	2418
Overall total	57	22	21	4974

*Totals are less than overall totals for the study because some data were missing for some subjects.

Only 4% of participants had none of the 5 selected risk factors: hypertension (defined on the basis of blood pressure of 140/90 mm Hg or higher or treatment for hypertension), dyslipidemia (defined as total blood cholesterol of 5.2 mmol/L or greater or HDL cholesterol less than 0.9 mmol/L or LDL cholesterol 3.4 mmol/L or greater or triglycerides 2.3 mmol/L or greater), regular smoking, sedentary lifestyle or excess weight (BMI of 25 or greater). Almost half (49%) had 3 or more of these risk factors. Although the prevalence of 3 or more concurrent risk factors decreased slightly with age in men, it increased with age in women: 51% of women 65 to 74 years of age but only 43% of those 55 to 64 years of age had 3 or more of the risk factors.

Interpretation

This study found that significant numbers of Canadian men and women 55 to 74 years of age had risk factors for cardiovascular disease. Overall, 52% were hypertensive, 26% had isolated systolic hypertension, and 30% had levels of total blood cholesterol at which intensive dietary intervention is recommended (6.2 mmol/L or greater).³⁷ Fifteen percent of men had an HDL cholesterol level that made them candidates for intervention (less than 0.9 mmol/L). Overall, 56% of participants had an LDL cholesterol level of 3.4 mmol/L or greater, and 21% had a triglyceride level

Table 7: Smoking status of Canadians 55 to 74 years of age

Group	Smoking status; population estimate, %				No. of participants
	Never smoked	Ex- smoker	Current smoker	Occasional smoker	
Men					
Age 55–64 yr	15	59	24	1	981
Age 65–74 yr	16	62	19	2	2000
Total	16	60	22	2	2981
Women					
Age 55–64 yr	48	32	18	1	1004
Age 65–74 yr	48	35	16	2	1971
Total	48	34	17	2	2975
Overall total	33	46	19	2	5956

Table 8: Extent of regular exercise among Canadians 55 to 74 years of age

Group	Population estimate of % who exercise regularly*	
	No. of participants	
Men		
Age 55–64 yr	49	981
Age 65–74 yr	57	2000
Total	53	2981
Women		
Age 55–64 yr	53	1004
Age 65–74 yr	51	1971
Total	52	2975
Overall total	52	5956

*Regular exercise was defined as one or more sessions per week, for at least 15 minutes per session.

of 2.3 mmol/L or greater, levels at which dietary intervention is recommended for adults.³⁷ In addition, many participants had more than 1 of the 5 major risk factors for cardiovascular disease.

Hypertension, thought to be the most significant of these risk factors,⁴ was untreated in 52% of those in whom it was present. In both sexes, participants in the older age group were more likely to have hypertension defined on the basis of systolic blood pressure of 140 mm Hg or greater or diastolic blood pressure of 90 mm Hg or greater or drug or dietary therapy (or some combination of these criteria). Of the 26% who had isolated systolic hypertension (140 mm Hg or greater), a greater proportion were in the older age group. This pattern is typical of developed countries, where systolic blood pressure rises throughout life and declines much later than diastolic blood pressure, which generally rises until the sixth decade and then levels off or declines.³⁹ The benefits of treating isolated systolic hypertension in elderly people, in terms of both nonfatal stroke and myocardial infarction, have been demonstrated in clinical trials,^{40,41} as have the benefits of treating elevated systolic and diastolic blood pressure in reducing stroke, myocardial infarction and total mortality rate.^{42,43} The decline in death from ischemic heart disease and stroke in the United States since the 1970s,⁴⁴ including a decline in death of elderly people caused by stroke, is to a large extent attributable to better diagnosis and control of hypertension.^{45,46} The number of those with undiagnosed or untreated hypertension, especially the approximately 26% of both sexes with isolated systolic hypertension, is significant, especially given the extent to which Canadians are unaware of their hypertension.⁴⁷

Significant proportions of participants had total blood cholesterol equal to or greater than 6.2 mmol/L, the level at which the Canadian Consensus Conference on Cholesterol recommends intervention for those over 30 years of age.³⁷ This problem was more common in

women than in men. Fewer women than men had HDL cholesterol levels below 0.9 mmol/L (3% v. 15%), but women were more likely than men to have LDL cholesterol levels equal to or greater than 3.4 mmol/L (60% v. 52%). Although the relation between total blood cholesterol and cardiovascular disease in the older population remains somewhat unclear,¹²⁻¹⁶ altering lipids in older people is thought by some to be effective in reducing cardiovascular disease.⁴⁸ Trials of reductase inhibitors in younger people have shown that lowering lipids can reduce mortality rate.^{49,50} In addition, it has been argued that because the risk of death from ischemic heart disease and stroke increases with increasing age,^{3,8} the number of deaths attributable to cholesterol problems may be greater in absolute terms and may justify intervention.^{51,52}

Many older Canadians continue to smoke cigarettes, despite evidence that stopping smoking can be of benefit to older people. Jajich and associates²² studied a population of 2674 men and women over the age of 65 in the United States and found that the higher risk of death from coronary artery disease among cigarette smokers was reduced to the same level as that of nonsmokers 1 to 5 years after cessation of smoking. A review of the literature concerning smoking in older adults concluded that overall risk of death was lower for ex-smokers than for current smokers within 1 to 2 years after smoking cessation and approached that of never-smokers after 15 or 20 years.⁵³ There is also evidence that in people older than 55 years of age who have had coronary artery surgery, smoking cessation is associated with a decrease in the risk of myocardial infarction or death, with no decline in benefit with increasing age.⁵⁴

Almost 50% of those taking part in this study, both men and women, reported little or no exercise. Paffenbarger and associates,²⁵ in a study of male Harvard alumni,

Table 9: Body mass index (BMI) of Canadians 55 to 74 years of age

Group	BMI,* population estimate, %			No. of participants†
	< 25.0	25.0-26.9	≥ 27.0	
Men				
Age 55-64 yr	28	22	50	896
Age 65-74 yr	37	23	40	1806
Total	32	23	46	2702
Women				
Age 55-64 yr	38	14	49	889
Age 65-74 yr	43	17	40	1683
Total	40	15	45	2572
Overall total	36	19	45	5274

*BMI = weight in kilograms/(height in metres)².

†Totals are less than overall totals for the study because some data were missing for some subjects.

Table 10: Prevalence of selected risk factors* for cardiovascular disease among Canadians 55 to 74 years of age

Group	No. of risk factors; population estimate, %				No. of participants†
	0	1	2	3-5	
Men					
Age 55-64 yr	3	13	29	55	807
Age 65-74 yr	5	16	30	49	1648
Total	4	14	30	52	2455
Women					
Age 55-64 yr	4	16	37	43	811
Age 65-74 yr	3	17	30	51	1523
Total	3	16	34	47	2334
Overall total	4	15	32	49	4789

*The 5 risk factors considered for this analysis were hypertension, dyslipidemia, smoking, lack of exercise and obesity.

†Totals are less than overall totals for the study because some data were missing for some subjects.

found that in the cohort 65 to 74 years of age, the risk of a coronary event in the least active group was twice that of the most active group. A recent study involving a US health maintenance organization found that people older than 65 years of age who walked more than 4 hours per week had a lower risk of admission to hospital for cardiovascular disease; this finding was more pronounced in women.⁵⁵ Recently, it has been demonstrated that leisure time physical activity in multiethnic elderly city residents of both sexes is associated with a lower incidence of ischemic stroke.⁵⁶

Clinical trials have shown that older people can undertake exercise programs successfully,⁵⁷ and exercise has many benefits for older people, including delay in the onset of frailty.³ In addition, exercise may have a beneficial effect, at least in middle-aged and older men, through weight loss.^{27,58} Excess weight and obesity are thought to constitute an independent risk factor for cardiovascular disease⁵⁹ and are linked to other cardiovascular risk factors, including high blood pressure, lipid abnormalities and diabetes.^{32,33} In this study, about 45% of both men and women had a BMI equal to or greater than 27, a level associated with increased risk of cardiovascular disease.⁵⁹ Given the potential for weight reduction to affect other risk factors and given that obesity is so prevalent, weight control deserves high priority as a preventive measure,⁴⁸ and increasing physical activity is one way to reduce this risk factor.^{27,58}

Almost 50% of participants in this study had 3 or more major risk factors for cardiovascular disease. These risk factors are known to act synergistically rather than additively,⁶⁰ which should engender increased concern over the results of this study.

Conclusion

The data that have been presented here indicate that many older Canadians have risk factors for cardiovascular disease, the leading cause of death in Canada. Cardiovascular disease resulted in an estimated 294 000 years of life lost in 1995, third after injuries and cancer.² Recent analysis of secular trends in risk factor levels and improvements in treatment has demonstrated the significant impact of prevention on the decline in death from coronary artery disease.⁶¹ It has been postulated that in Western societies with relatively low death rates, prevention efforts can have a greater effect on cumulative lifetime disability (morbidity) than on mortality.⁶² Thus, concerted action on the risk factors for cardiovascular disease in both mid and late life can perhaps lead most importantly to a “compression” of the period of morbidity in the last years of life,⁶³ which would result in improved quality of life for Canada’s increasingly older population.⁶⁴

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Knowledge and awareness of risk factors for cardiovascular disease among Canadians 55 to 74 years of age: results from the Canadian Heart Health Surveys, 1986–1992

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Abstract

Background: Cardiovascular disease is the leading cause of death and disability in older people, who account for an increasing proportion of Canada's population. Knowledge and awareness of risk factors is essential for changes in behaviour, yet little is known about these issues in older people. The Canadian Heart Health Surveys database provides a unique resource to examine knowledge and awareness of cardiovascular risk factors in older Canadians.

Methods: This descriptive cross-sectional study used data from the Canadian provinces' Heart Health Initiative, for the years 1986 to 1992. Sampling within each province consisted of stratified, 2-stage, replicated probability samples; 4976 people 55 to 74 years of age were included in the present analysis. Knowledge and awareness of cardiovascular risk factors was determined from the survey question "Can you tell me what are the major causes of heart disease or heart problems?" Blood pressure was measured during a home visit; anthropometric and blood measurements were obtained during a clinic visit. Cardiovascular health status was determined by self-reporting.

Results: Smoking and stress or worry were mentioned as major causes of heart disease by the greatest proportion of participants (41% and 44% respectively); hypertension was mentioned by only 16%. Men and women did not differ in their awareness of high blood cholesterol (cited by 23% of participants), smoking (41%), excess weight (30%) or lack of exercise (28%) as causes of heart disease. A greater proportion of women than men were aware of hypertension (19% v. 12%) and heredity (31% v. 17%) as major causes of heart disease. Awareness of risk factors was consistently lower in the older age group (65–74 v. 55–64 years). Among women, there was greater awareness of the respective risk factors as causes of heart disease among those who were smokers (60% v. 35% of nonsmokers), those who had a body mass index (BMI) of 25 or greater (38% v. 24% of those with a BMI less than 25) and those who were hypertensive (22% v. 17% of those without hypertension). Those who had experienced a heart attack had greater awareness of the major causes of heart disease than those who had not; this pattern was stronger among women than among men. Of those in whom elevated cholesterol level was identified during the course of the study, 62% of men and 67% of women were unaware of their cholesterol status. Of those in whom high blood pressure was diagnosed, 43% of men and 33% of women were unaware of their hypertensive status.

Interpretation: Awareness of the major causes of cardiovascular disease is low among older Canadians, especially among men and in those 65 to 74 years of age.

Cardiovascular disease is the leading cause of death and disability in older Canadians¹ and constitutes a major public health concern because of the rapidly increasing size of this segment of the population.² The primary risk factors for cardiovascular disease have been well documented and studied extensively, but the relevance of these risk factors in older populations has been the subject of some debate. De-

spite the propensity for the prevalence of most of the risk factors to increase with age,³⁻⁶ findings from initial studies have led to the perception that the influence of risk factors on the development of heart disease wanes beyond middle age.⁷⁻¹¹ In addition, questions have been raised as to whether preventive measures initiated after years of exposure to risk factors can be efficacious in older people and whether preventive measures can be implemented effectively in this population.^{7,12}

Modification of cardiovascular risk factors requires a change in lifestyle habits and behaviours. Knowledge and awareness of risk factors is an essential component of behaviour change; however, there is little information on knowledge and awareness of risk factors within the older population. The Canadian Heart Health Surveys database provides a unique resource to examine these issues in people 55 to 74 years of age.

Methods

The general methodology followed in the provincial heart health surveys, including collection of blood and biochemical testing methods, sample design, training, quality control, and data processing and analysis, has been reported previously.¹³

All 10 Canadian provinces participated in the Heart Health Initiative, which took place from 1986 to 1992. Sampling in each province consisted of stratified, 2-stage, replicated probability samples of 2200 adults 18 to 74 years old not living in institutions, on reserves or in military camps. Health insurance registries were used as the sampling frames.

For each participant, a trained nurse conducted a 40- to 60-minute home interview, collecting demographic and lifestyle data, as well as information on the person's level of knowledge and awareness of the risk factors for cardiovascular disease. Knowledge and awareness were assessed from unprompted responses to the survey question "Can you tell me what are the major causes of heart disease or heart problems?" Blood pressure readings were taken with a standard mercury-gravity manometer at the beginning and end of the home interview. The first and fifth Korotkoff sounds were recorded for systolic and diastolic pressures respectively; for sounds that continued to 0 mm Hg, the fourth Korotkoff sound was recorded. Participants were asked to attend a clinic within 2 weeks of the initial visit, at which time anthropometric measurements were taken and blood was drawn for analysis.

The cut points in the distributions of plasma lipid and lipoprotein that were used to assign risk of coronary artery disease were those derived for adults from the Canadian Consensus Conference on Cholesterol¹⁴ and the US National Cholesterol Education Program guidelines.¹⁵ High total blood cholesterol was defined on the basis of one or more of the following 3 criteria: total blood cholesterol of at least 5.2 mmol/L, prescription medication for high blood cholesterol or dietary therapy for high blood cholesterol. Hypertension was defined on the basis of one or more of the following 3 criteria: mean systolic blood pressure of at least 140 mm Hg or mean diastolic blood pressure of at least 90 mm Hg (or both); current treatment with prescription medicine for elevated blood pressure; or nonpharmacological treatment for elevated blood pressure (weight control or reduction of sodium or salt intake [or both]).

Data are presented for subjects who attended the clinic, who had fasted for 8 hours, and who had valid data for the selected risk factors and valid responses for the knowledge questions. A total of 4976 people between the ages of 55 and 74 years are included in the present analysis; they represent the approximately 4 million Canadians in this age group at the time the data were collected. All reported measures have been weighted to account for the sampling design, and values in the tables represent population estimates. Given that this study used population-based survey data with large sample sizes, most of the differences would be statistically significant. For this reason, the results of tests of significance are not reported.

Results

Table 1 documents general knowledge and awareness of 6 risk factors (high blood cholesterol, hypertension, smoking, heredity, excess weight and lack of exercise) as major causes of heart disease. Men and women did not differ in awareness of high blood cholesterol (23% overall), smoking (41% overall), excess weight (30% overall) and lack of exercise (28% overall) as major causes of heart disease. However, a greater proportion of women than men were aware of hypertension (19% v. 12%) and heredity (31% v. 17%) as major causes of heart disease. For these 6 risk factors, smoking was mentioned as a cause of heart disease by the greatest proportion of participants (41% overall), and hypertension was mentioned by the lowest proportion (16% overall). There was consistently lower awareness of all factors as major causes of

Table 1: Awareness among Canadians 55 to 74 years of age of high blood cholesterol, hypertension, smoking, heredity, excess weight and lack of exercise as major causes of heart disease

Group	Cause of heart disease; population estimate of % with awareness*						No. of participants
	High blood cholesterol	Hypertension	Smoking	Heredity	Excess weight	Lack of exercise	
Men							
Age 55-64 yr	24	13	49	19	27	32	843
Age 65-74 yr	19	12	37	16	28	24	1714
Total	22	12	44	17	28	29	2557
Women							
Age 55-64 yr	25	22	39	34	33	33	833
Age 65-74 yr	23	16	38	27	30	21	1586
Total	24	19	39	31	32	28	2419
Overall total	23	16	41	24	30	28	4976

*Awareness of cardiovascular risk factors was determined from the open-ended survey question "Can you tell me what are the major causes of heart disease or heart problems?"

heart disease in the older age category (65 to 74 years). This difference was most pronounced for men regarding smoking (49% of those 55–64 years old v. 37% of those 65–74 years old) and for women regarding lack of exercise (33% of those 55–64 years old v. 21% of those 65–74 years old).

Table 2 documents general knowledge and awareness of 6 additional risk factors (poor diet, excess fats, excess salt, high-cholesterol foods, stress or worry, and overwork) as major causes of heart disease. These factors generally have less prominence in epidemiological models of heart disease, in part because of their interdependence with other factors. Again, these proportions reflect factors mentioned, unprompted, by participants. Interestingly, the proportion of participants who mentioned stress or worry as a major cause

of heart disease (44% overall) was greater than the proportion with awareness of any other factor, including smoking. Although women were more aware than men of stress as a cause of heart disease (48% v. 39%), for each sex there was no difference between the 2 age groups. More women than men were aware of poor diet as a factor in heart disease (43% v. 31%); this difference was largely attributable to awareness among women in the younger age group.

Knowledge and awareness of the major causes of heart disease were then investigated according to characteristics of the population, to see if these characteristics had an influence. Potential influence was first examined according to risk factor status (Table 3). Having the risk factor in question did not substantially alter awareness of that factor as a major cause of

Table 2: Awareness among Canadians 55 to 74 years of poor diet, excess fats, excess salt, high-cholesterol foods, stress or worry, and overwork as major causes of heart disease

Group	Cause of heart disease; population estimate of % with awareness*						No. of participants
	Poor diet	Excess fats	Excess salt	High-cholesterol foods	Stress or worry	Overwork	
Men							
Age 55–64 yr	31	24	8	13	39	21	843
Age 65–74 yr	30	18	6	9	39	25	1714
Total	31	22	7	11	39	23	2557
Women							
Age 55–64 yr	49	17	6	8	48	17	833
Age 65–74 yr	36	23	5	9	47	21	1586
Total	43	20	6	8	48	19	2419
Overall total	37	21	6	10	44	21	4976

*Awareness of cardiovascular risk factors was determined from the open-ended survey question "Can you tell me what are the major causes of heart disease or heart problems?"

Table 3: Awareness among Canadians 55 to 74 years of age of high blood cholesterol, hypertension, smoking and excess weight as major causes of heart disease, according to risk factor status

Risk factor	Risk factor and awareness* status; population estimate, %					
	Risk factor present			Risk factor absent		
	% aware	% unaware	No. of participants	% aware	% unaware	No. of participants†
High blood cholesterol‡						
Men	22	78	1672	22	78	884
Women	23	77	1907	29	71	512
Total	23	77	3579	24	76	1396
Hypertension‡						
Men	14	86	1390	11	89	1167
Women	22	78	1361	17	83	1058
Total	18	82	2751	14	86	2225
Smoking§						
Men	46	54	507	44	56	2049
Women	60	40	373	35	65	2046
Total	52	48	880	39	61	4095
Excess weight¶						
Men	27	73	1748	29	71	783
Women	38	62	1479	24	76	909
Total	33	67	3227	27	73	1692

*Awareness of cardiovascular risk factors was determined from the open-ended survey question "Can you tell me what are the major causes of heart disease or heart problems?"

†High blood cholesterol was defined on the basis of one or more of the following criteria: blood cholesterol level 5.2 mmol/L or greater, prescription medication for high blood cholesterol or dietary therapy for high blood cholesterol (specifically salt or sodium restriction).

‡Hypertension was defined on the basis of one or more of the following criteria: systolic blood pressure 140 mm Hg or greater or diastolic blood pressure 90 mm Hg or greater (or both); prescription medication for hypertension; or nonpharmacologic treatment for hypertension.

§Smokers were defined as smoking at least one cigarette per day.

¶Excess weight was defined as body mass index (weight in kilograms/[height in metres]²) equal to or greater than 25.

heart disease among men. For women, however, having the risk factor in question did make a difference in their awareness. Greater awareness of the condition or behaviour as a risk factor was noted for women who were smokers (60% v. 35% of nonsmokers), those whose body mass index was 25 or greater (38% v. 24% of those with body mass index less than 25) and those who were hypertensive (22% v. 17% of those without hypertension). Women with a high blood cholesterol level had lower awareness of this condition as a major cause of heart disease (23% v. 29% of those whose cholesterol was not elevated). The pattern of lower knowledge or awareness in the older age category was maintained (data not shown).

When knowledge and awareness were further examined according to the cardiovascular health status of the population, a divergent pattern emerged (Table 4). Participants who had experienced a heart attack or stroke were compared with those who had not previously experienced a heart attack, stroke or other heart disease. With few exceptions, those who had experienced a heart attack were more aware of the major causes of heart disease than the heart-healthy population; this pattern was stronger for women than for men. Awareness of smoking and lack of exercise as

factors in heart disease was highest for both men and women who had experienced a heart attack. Conversely, among people who had experienced a stroke, awareness of the major causes of heart disease was generally lower than among those without previous cardiovascular disease. An exception to this pattern was awareness of hypertension, which was higher among both men and women who had experienced a stroke than among those without previous cardiovascular disease (20% v. 11% for men and 22% v. 19% for women). Similarly, awareness of smoking as a risk factor was higher among men who had experienced a stroke than among those without previous cardiovascular disease (47% v. 42%), and awareness of lack of exercise was higher among women who had had a stroke than among those who had not had any heart disease (37% v. 27%). Awareness of lack of exercise as a cause of heart disease was substantially lower among men with stroke than among men without previous cardiovascular disease (12% v. 30%); awareness of high blood cholesterol, smoking and heredity as causes of heart disease was substantially lower among women who had experienced stroke than among women without any previous cardiovascular disease. As can be seen in Table 5, having ex-

Table 4: Awareness among Canadians 55 to 74 years of age of high blood cholesterol, hypertension, smoking, heredity, excess weight and lack of exercise as major causes of heart disease, according to heart disease status

Sex and heart disease status	Cause of heart disease; population estimate of % with awareness*						No. of participants†
	High blood cholesterol	Hypertension	Smoking	Heredity	Excess weight	Lack of exercise	
Men							
Heart attack	14	12	52	21	23	39	364
Stroke	20	20	47	10	23	12	147
No cardiovascular disease	23	11	42	18	28	30	1776
Women							
Heart attack	26	24	54	14	38	41	155
Stroke	11	22	27	24	29	37	98
No cardiovascular disease	24	19	39	32	33	27	1843

*Awareness of cardiovascular risk factors was determined from the open-ended survey question "Can you tell me what are the major causes of heart disease or heart problems?"
 †Total numbers of men and women are less than the overall totals for this study because there were 2 additional categories, the data for which are not included in this table.

Table 5: Awareness among Canadians 55 to 74 years of age of poor diet, excess fats, excess salt, high-cholesterol foods, stress or worry, and overwork as major causes of heart disease, according to heart disease status

Sex and heart disease status	Cause of heart disease; population estimate of % with awareness*						No. of participants†
	Poor diet	Excess fats	Excess salt	High-cholesterol foods	Stress or worry	Overwork	
Men							
Heart attack	36	24	18	15	44	29	364
Stroke	14	26	4	17	28	18	147
No cardiovascular disease	29	23	5	10	38	22	1776
Women							
Heart attack	34	21	5	22	51	16	155
Stroke	45	26	9	14	34	15	98
No cardiovascular disease	45	19	6	8	47	19	1843

*Awareness of cardiovascular risk factors was determined from the open-ended survey question "Can you tell me what are the major causes of heart disease or heart problems?"
 †Total numbers of men and women are less than the overall totals for this study because there were 2 additional categories, the data for which are not included in this table.

perienced a heart attack increased awareness among men of all secondary factors as causes of heart disease. This pattern was not consistent for women nor for those who had experienced a stroke.

People with high blood cholesterol and hypertension may be unaware of their own risk factor status. Table 6 displays the prevalence of awareness of high blood cholesterol and hypertension according to treatment status. Of those in whom high blood cholesterol was discovered during the survey, 62% of men and 67% of women were unaware of their cholesterol status. Five percent of those who were aware of their high cholesterol were undergoing treatment and the condition was controlled, 24% were undergoing treatment but the condition was uncontrolled, and in 6% the condition was neither treated nor controlled. Minimal differences were noted between age groups and sexes. When only those with cholesterol level of at least 6.2 mmol/L were examined (1849 participants), the proportion who were unaware of their status dropped to 38% for men and 48% for women (data not shown). Of those 55 to 74 years of age in whom hypertension was diagnosed during the survey, 43% of men and 33% of women were unaware of their hypertensive status. Only a small proportion of older adults with hypertension were aware of the condition,

were undergoing treatment and had their hypertension controlled (11% of men and 19% of women). Thirty percent of men and 35% of women were aware of their hypertension and were being treated but the condition was not controlled; 16% of men and 13% of women were aware of their high blood pressure but it was neither treated nor controlled.

Interpretation

Few published studies have addressed awareness and knowledge of the major causes of heart disease among elderly people. Results from the present study for the Canadian population 55 to 74 years of age indicate that awareness of risk factors for cardiovascular disease in this group is generally low, particularly among older men. But does awareness in older Canadians differ substantially from awareness in the population as a whole? In an earlier publication that analysed data from the Heart Health Initiative for the entire age range (18 to 74 years), MacDonald and associates¹⁶ reported on the proportions of men and women mentioning selected risk factors as causes of heart disease. The only factor for which there was a marked difference in awareness from the present study was lack of exercise: awareness was much higher in the gen-

Table 6: Awareness of high blood cholesterol and hypertension among Canadians 55 to 74 years of age with either of these conditions, according to treatment and control of the conditions*

Condition and group	Awareness and status of treatment and control;† population estimate, %				No. of participants
	Aware of condition			Unaware of condition	
	+Trt, +C	+Trt, -C	-Trt, -C		
High blood cholesterol					
<i>Men</i>					
Age 55-64 yr	7	25	9	59	529
Age 65-74 yr	8	21	5	65	1028
Total	7	23	7	62	1557
<i>Women</i>					
Age 55-64 yr	3	22	7	68	613
Age 65-74 yr	3	27	5	65	1217
Total	3	24	6	67	1830
<i>Overall total</i>	5	24	6	65	3387
Hypertension					
<i>Men</i>					
Age 55-64 yr	12	32	16	41	404
Age 65-74 yr	10	28	16	46	985
Total	11	30	16	43	1389
<i>Women</i>					
Age 55-64 yr	23	34	15	28	385
Age 65-74 yr	15	37	11	37	976
Total	19	35	13	33	1361
<i>Overall total</i>	15	33	14	38	2750

*Information on treatment status was missing for one participant with hypertension, and information on treatment status was missing for 192 participants with high cholesterol.

†Treatment and control are coded as follows: +Trt = participant receiving treatment for condition in the form of prescription medication or dietary therapy (or both); -Trt = participant not receiving any treatment for condition; +C = condition controlled (i.e., total blood cholesterol less than 5.2 mmol/L for participants with high cholesterol condition, systolic blood pressure less than 140 mm Hg and diastolic blood pressure less than 90 mm Hg for participants with hypertension); -C = condition uncontrolled (i.e., total blood cholesterol 5.2 mmol/L or more for participants with high cholesterol condition, systolic blood pressure 140 mm Hg or greater or diastolic blood pressure 90 mm Hg or greater for participants with hypertension).

eral population (44% of men and 41% of women) than in the older age groups. The prevalence of awareness was only slightly higher than that found in the present study for the variables high blood cholesterol (25% of both men and women), hypertension (18% of men and 21% of women), smoking (47% of men and 46% of women), obesity (28% of men and 34% of women) and stress (41% of men and 47% of women). Congruent with our findings, smoking and stress were the risk factors most often mentioned; awareness of the physiological risk factors — high blood cholesterol and hypertension — were mentioned least often. Women tended to have a better knowledge than men of the factors causing heart disease, a finding maintained in the older age groups. Thus, it would appear that knowledge and awareness of the causes of heart disease in older Canadians are not dramatically different from those of younger age groups in terms of their ranking, but may be slightly lower in terms of the level of awareness. It is important to observe, however, that neither study included 75 years of age or older.

The finding that awareness of smoking as a cause of heart disease is high among older age groups, as in the general population, may reflect the success of public health interventions and health promotion messages regarding smoking targeted to wide audiences in the last few decades. The decrease in prevalence of smoking with increasing age and the significant proportion of ex-smokers, as reported by Langille and colleagues³ and supported by others¹⁷ could also be an indication of effective health promotion. In contrast, despite the fact that participants consistently and repeatedly reported stress or worry as a major factor causing cardiovascular disease, public health efforts have largely ignored this condition as a risk factor for cardiovascular disease.

Awareness of high blood cholesterol and hypertension as causes of heart disease was low; less than 25% of the subjects in this study named these factors. This finding is consistent with those for the general population.¹⁶ In addition, MacDonald and colleagues¹⁶ found that awareness of these physiological factors was lower among people with less education. Coupled with the findings that a large proportion of the older population has hypertension, an even larger proportion has elevated cholesterol levels and a large proportion of these people are unaware of their condition, these figures are particularly disturbing.

The low prevalence of knowledge and awareness of hypertension as a factor in cardiovascular disease is surprising in light of health professionals' efforts in case-finding for hypertension among the elderly: in the 1995 Nova Scotia Health Survey, 92% of men and 96% of women over the age of 65 reported having had their blood pressure checked within the previous year.¹⁸ This survey also found a large decrease in awareness over time of hypertension as a major cause of heart disease, but no change in awareness of high blood cholesterol. This leads to speculation that the public may have been misled by the health messages we commu-

nicate about hypertension. An understanding of risk factors as disease endpoints in and of themselves, such as has been promoted for hypertension, may also detract from an understanding of them as risk factors for more serious outcomes, such as cardiovascular disease.

Susceptibility and personal salience of information as determinants of health behaviour have previously been characterized in the Health Belief Model.¹⁹ Among women, the presence of a risk factor increased awareness relative to their counterparts without the risk factor, and greater awareness of most factors was noted for both women and men who had experienced a heart attack.

The reported lower knowledge and awareness of risk factors in the older age group in this study may reflect an attitude of the general population, which is not strongly refuted by health practitioners, that management of risk factors is less important in older people than in younger people. This may also be the result of a cohort effect on knowledge and awareness, given the cross-sectional nature of the data. People may be more susceptible to public health messages at an age when they think the messages are relevant to them and may maintain the values of that "era." Thus, the older age groups may have established their knowledge and awareness about the risk factors for cardiovascular disease at an earlier time, when less emphasis was placed on interventions for risk factors. Targeting health promotion messages directly to older Canadians may be crucial to altering perceptions and promoting changes in behaviour.

Against the backdrop of a greater prevalence of cardiovascular disease and its precursors in the elderly population, the present study documents that awareness of the major causes of cardiovascular disease is low among older Canadians, is worse among men than among women, and is lowest among those 65 to 74 years of age. We now have evidence that the potential benefits of altering risk factor profiles in elderly people can be substantial, particularly in terms of smoking cessation^{20,21} and hypertension control.^{22,23} Declines over time in deaths from cardiovascular disease have encompassed older people as well as middle-aged people, which provides encouraging signs that instituting preventive measures can have an impact at all ages. Advocating and supporting the prevention of cardiovascular disease at all ages can lead not only to an improvement in the quality of life for people in their later years, but also to a decrease in the social and economic burden on health care systems presented by an expanding elderly population.

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