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Health Reports

Spring 1998 Volume 9 No. 4

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In This Issue

Research Articles

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In Memoriam

We regret to inform our readers of the sudden death of Dr. Mukund Nargundkar of the Social Survey Methods Division at Statistics Canada, who co-authored "*At risk of first or recurring heart disease*," in this issue.

Research Articles

This section presents in-depth research and analysis in the fields of health and vital statistics.

Multiple medication use among seniors

Wayne J. Millar

Abstract

Objectives

This article examines the prevalence of medication use among Canadian seniors. Indicators of patient-physician and patient-pharmacist communication were also investigated.

Data source

Health Canada-sponsored supplementary questions to the 1994/95 National Population Health Survey (NPHS) were used in this analysis.

Analytical techniques

All estimates were weighted to represent the Canadian population on the date of the survey. Summary rates by sex were age-standardized to the estimated survey population for both sexes. Respondents who reported taking five or more drugs in the two days before their NPHS interview were considered to be multiple-medication users.

Main results

In 1994/95, 10% of Canadians aged 65 to 74, and 13% of those aged 75 and older were multiple-medication users. For certain drug-related information, there was a decline with advancing age in the percent of the population who reported that they received this information from their physician and from their pharmacist.

Key words

professional-patient relations, chronic disease, drug interactions, drug utilization, drug monitoring

Author

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Although medications are intended to be salutary, they can be dangerous, particularly for the elderly. Elderly people are prone to drug-related problems such as inappropriate prescribing, adverse drug reactions and non-compliance with prescribed medications.[1-5] An estimated 10% to 30% of elderly hospital patients are admitted because of medication toxicity.[6-7]

Medication use by the elderly is an important quality-of-care issue related to preventable illness and death.[8-9] One aspect of this issue is the simultaneous use of several medications. In 1994/95, 10% of Canadians aged 65 to 74, and 13% of those aged 75 and older were multiple-medication users; that is, they reported that they had taken five or more drugs during the two days before their interview for the National Population Health Survey (NPHS) (see *Methods*).

Methods

Data source

The National Population Health Survey (NPHS) is a longitudinal survey designed to collect information related to the health of the Canadian population over time. In 1994/95, it surveyed household residents in all provinces and territories, except persons living on Indian reserves, Canadian Forces bases, and in some remote areas. An institutional component of the survey, not included in this analysis, covered long-term residents of hospitals and residential care facilities. A more detailed description of the survey design, sample and interview procedures is found in published reports.[10]

The 1994/95 NPHS non-institutional sample for the provinces consisted of 27,263 households, of which 88.7% agreed to participate. After the application of a screening rule, 20,725 households remained in scope.

One knowledgeable person in every participating household provided general socio-demographic and health information about each household member. In total, data pertaining to 58,439 individuals were collected. (The data base containing these data is called the General file.)

In addition, one randomly selected person in each of the 20,725 participating households was chosen to provide in-depth information about their own health. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to these in-depth health questions was 96.1%, or 17,626 respondents. (The data base containing in-depth health information as well as data from the General file pertaining to these respondents is called the Health file.) In the remaining 2,383 participating households, the randomly selected respondent was younger than age 12. In-depth health information was collected for these individuals as part of the 1994/95 National Longitudinal Survey of Children and Youth.

Of the 17,626 randomly selected respondents aged 12 or older, 14,786 were eligible members of the NPHS longitudinal panel. These respondents were also eligible for the Health Canada supplement. The response rate to these Health Canada-sponsored questions was 90.6%. (The data base containing information from the Health Canada supplement as well as data from the General and Health files pertaining to these respondents is called the Supplement file.)

Of the 17,626 randomly selected respondents aged 12 or older, the remaining 2,840 were sponsored by provincial governments that elected to enlarge the sample size in their province. These respondents will not be followed-up and were not eligible for the Health Canada supplement.

This article analyses data for the 10 provinces from the supplemental Health Canada-sponsored questions. The sample size of the supplement was 13,400 respondents. The sample analyzed in this article was 12,010 respondents aged 20 and older, 2,412 of whom were aged 65 and older.

Analytical techniques

All estimates were weighted to represent the national population on the date of the survey. Summary rates by sex were age-standardized to the estimated survey population for both sexes.

NPHS respondents were asked about their use of specific medications in the month before the survey. The list included: pain relievers; tranquilizers; diet pills; anti-depressants; codeine, Demerol or morphine; allergy medicine; asthma medications; cough or cold remedies; penicillin or other antibiotics; medicine for the heart; medicine for blood pressure; diuretics or water pills; steroids; insulin; pills to control diabetes; sleeping pills; stomach remedies; laxatives; hormones for menopause or aging symptoms; birth control pills; any other medication; or none of the above. Those who reported having taken any medication in the past month were asked to report the number of medications they took in the previous two days. In this article, having taken five or more different medications in those two days is considered multiple medication use. Those who reported not having taken any medication in the past month were not asked the question about medication use in the previous two days. In this analysis, these respondents were assumed to have not taken any medication in the two days before their interview.

Limitations

Self-reports of medication use require accurate recall. Some older respondents may have trouble remembering. This difficulty may be related to the lack of formal employment or regular events that help structure memory. Recall may also be affected by disease, use of alcohol, or the actual use of medications. It has been estimated that older people may under-report the number of drugs they take daily by 20% to 30%.[11,12]

Even light or moderate drinking can place older adults at clinical risk, especially when they are also taking prescription and over-the-counter medications.[13] However, the risk associated with combining medication and alcohol depends on the context, the amount consumed during a drinking episode, and the timing of medication use.

Medication use higher among women

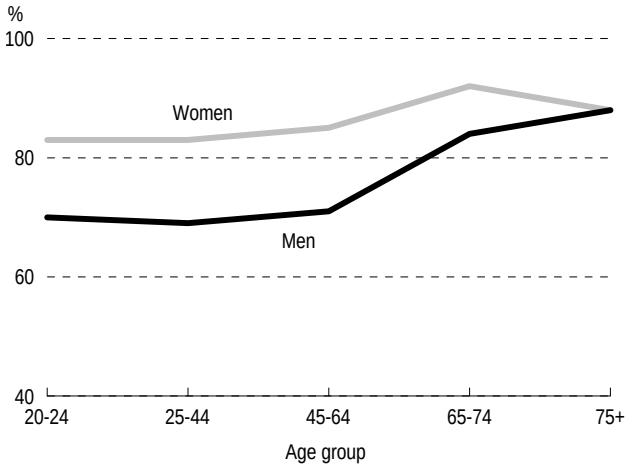
For both sexes, the proportion who reported taking medication in the month before their NPHS interview generally increased with age. The gradient was more pronounced among men than among women (Chart 1). However, in most age groups, a higher proportion of women reported taking medication. Among women, rates rose from 83% to 88% between ages 20 to 24 and age 75 and older. Among men, the corresponding rise was from 70% to 88%.

Previous studies also indicate that women generally use more medications than men,[14,15] and that some of this difference may be attributed to the fact that women visit doctors more often than do men.[16] Moreover, physicians are somewhat more likely to prescribe drugs to women.[17,18]

Pain relievers—number one

The five drugs most commonly taken by people aged 65 and older were pain relievers, blood pressure medications, heart medications, diuretics, stomach remedies, and laxatives (Table 1). Although a higher proportion of senior women took medications in general, there were two exceptions. Heart medications and diabetes pills were used by a larger share of senior men than women.

Chart 1
Percentage who took medication, by sex and age group, provinces, 1994/95



Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Data pertain to the month before the respondents' interview.*

Table 1
Percentage who took medication, by sex and type of medication, population aged 65 and older, provinces, 1994/95

Type of medication	Both sexes	Men	Women
		%	
Pain relievers	60	56	62
Blood pressure	30	24	35
Heart medications	22	24	20
Diuretics	11	7	14
Stomach remedies	11	12	11
Laxatives	10	6	13
Cold/cough	8	8	8
Antibiotic	8	7	9
Sleeping pills	8	6	9
Diabetes pills	7	9	6
Tranquilizers	5	4	6
Asthma	5	6	5
Allergy	4	4	5
Anti-depressants	3	2	4
Codeine/Demerol/morphine	3	2	3
Insulin	3	3	3
Steroids	2	2	2
Hormones	...	...	7
Diet pills	--	--	--
Any other medication	15	13	18

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Data pertain to the month before the respondents' interview. Data are age-standardized to the 1994/95 Canadian population (both sexes).*
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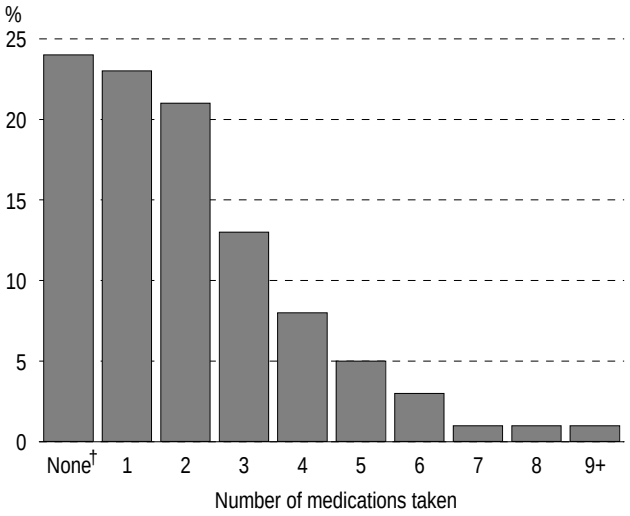
Chart 2
Number of medications taken, population aged 65 and older, provinces, 1994/95



Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Data pertain to the two days before the respondents' interview. Excludes respondents who did not state number of medications taken.*
† Those who reported not having taken any medication in the past month were not asked about medication use in the previous two days. These respondents were assumed to have not taken any medication in the two days before their interview. These responses were coded "zero" and were assigned to the "none" category.

Older people are more sensitive to drugs that affect the central nervous system.[19,20] Even a single dose of a psychotropic drug has been found to impair psychomotor function in the elderly to a much greater extent than in the young. Consequently, the use of psychotropic drugs has been associated with an increased risk of falls and hip fractures among the elderly.[21,22] According to the 1994/95 NPHS, the percentage of seniors who used tranquilizers in the two days before their interview (6% of women and 4% of men) is relatively small and similar to the rate reported in the 1989 National Alcohol and Drug Survey.[23]

Chronic disease and medication use

Nearly a quarter of all seniors reported taking no medication during the two days before their NPHS interview (Chart 2). However a considerable proportion of seniors were multiple-medication users: 10% of Canadians aged 65 to 74 and 13% of those aged 75 and older took five or more medications in the two days before their interview (Table 2).

Table 2
Number of medications taken, by sex and age group, provinces, 1994/95

	Population	Number of medications taken				
		None†	1	2	3-4	5+
	'000			%		
Both sexes	**20,517**	**54**	**24**	**12**	**8**	**3**
20-44	11,321	65	24	7	3	1
45-64	5,953	48	24	15	10	3
65-74	2,066	26	24	22	19	10
75+	1,178	21	22	20	24	13
Men	**10,004**	**64**	**20**	**8**	**6**	**2**
20-44	5,639	75	18	5	2	1
45-64	2,966	59	22	11	7	1
65-74	934	32	23	18	18	9
75+	465	24	25	15	23	12
Women	**10,514**	**44**	**28**	**15**	**9**	**4**
20-44	5,682	56	31	9	3	1
45-64	2,987	38	26	19	13	5
65-74	1,132	21	25	25	20	10
75+	713	18	21	23	24	14

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Row percentages may not sum to 100% because of rounding. Data pertain to the two days before the respondents' interview. Excludes respondents who did not state number of medications taken.*
† Those who reported not having taken any medication in the past month were not asked about medication use in the previous two days. These respondents were assumed to have not taken any medication in the two days before their interview and were assigned to the "none" category.

Moreover, 20% of seniors who are multiple medication users were also daily drinkers. Alcohol has the potential to interact with at least half of the most commonly prescribed drugs and can exacerbate problems caused by multiple medication use.[24-27]

The presence of chronic diseases implies the use of medications to treat the conditions and the consequent risk of drug interactions.[6,20] As expected, substantial proportions of elderly multiple medication users had been diagnosed with a chronic disease. Among men with a diagnosed chronic

Table 3
Number of medications taken, by sex and diagnosed disease, population aged 65 and older, provinces, 1994/95

	Population	Number of medications taken			
		None†	1-2	3-4	5+
	'000		%		
Both sexes with:					
Heart disease	559	4	26	37	33
Diabetes	372	7	30	32	31
Asthma	164	11	33	33	23
Hypertension	946	5	43	31	21
Chronic bronchitis	230	15	33	34	19
Arthritis	1,311	14	45	26	16
Back problem	586	18	43	25	14
No chronic disease	591	56	39	5	--
Men with:					
Heart disease	264	5	27	36	32
Diabetes	193	9	32	29	30
Asthma	74	14	24	34	28
Chronic bronchitis	120	14	38	25	23
Hypertension	347	8	41	30	21
Arthritis	480	20	39	26	15
Back problem	253	29	37	23	10
No chronic disease	289	61	35	4	--
Women with:					
Heart disease	295	4	25	38	34
Diabetes	180	4	29	34	32
Hypertension	599	3	44	33	21
Asthma	89	7	40	32	21
Back problem	333	10	49	26	16
Arthritis	832	11	49	25	16
Chronic bronchitis	110	16	29	41	14
No chronic disease	302	50	43	6	--

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Row percentage may not sum to 100% because of rounding. Data pertain to the two days before the respondents' interview. Data are age-standardized to the 1994/95 Canadian population (both sexes). Excludes respondents who did not state number of medications taken.*
† Those who reported not having taken any medication in the past month were not asked about medication use in the previous two days. These respondents were assumed to have not taken any medication in the two days before their interview and were assigned to the "none" catelogy.
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condition, the highest prevalence of multiple medication use was among those with heart disease, diabetes, and asthma (Table 3). For women, hypertension and asthma both ranked third.

Seniors tend to receive less information

Good communication about drugs between patients and their physicians and pharmacists is an important component in reducing the negative consequences of medication use. The continuity of these relationships is particularly important. Recent research has shown that the risk of inappropriate drug combinations increases with the number of physicians prescribing medications. The practise of visiting a single primary care physician and a single pharmacy may prevent inappropriate drug combinations.[28]

Table 4
Percentage who always take a list of their prescription drugs to their physician or pharmacist, by age group and sex, provinces, 1994/95

	Both sexes	Men	Women
		%	
Always take list to physician	**14**	**12**	**17**
20-44	10	9	11
45-64	15	10	19
65-74	21	19	22
75+	29	26	31
Always take list to pharmacist	**10**	**8**	**11**
20-44	7	7	7
45-64	9	6	11
65-74	15	11	18
75+	20	17	22

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Based on respondents who reported being prescribed medication in the 12 months before their interview.*

Table 5
Selected indicators of patient-physician communication about medication, by age group and sex, provinces, 1994/95

Physician explained...	Both sexes	Men	Women
		%	
what medication was for	**93**	**93**	**93**
20-44	93	93	93
45-64	93	93	93
65-74	92	92	91
75+	91	93	89
how much and when to take	**82**	**83**	**82**
20-44	83	84	82
45-64	84	85	84
65-74	78	78	77
75+	73	70	75
what medication should do	**81**	**84**	**79**
20-44	83	86	80
45-64	82	86	79
65-74	77	82	73
75+	74	74	74
possible side effects	**55**	**56**	**54**
20-44	56	57	55
45-64	57	58	56
65-74	52	55	50
75+	50	47	51
what not to eat or drink	**55**	**58**	**52**
20-44	55	59	53
45-64	57	60	54
65-74	51	54	48
75+	45	47	43
what activities to avoid	**41**	**45**	**38**
20-44	44	48	42
45-64	41	45	38
65-74	32	35	30
75+	28	32	26

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Based on respondents who reported being prescribed medication in the 12 months before their interview.*

Table 6
Selected indicators of patient-pharmacist communication about medication, by age group and sex, provinces, 1994/95

Pharmacist explained...	Both sexes	Men	Women
		%	
what medication was for	**63**	**63**	**63**
20-44	62	62	62
45-64	64	64	64
65-74	65	67	63
75+	61	57	64
how much and when to take	**72**	**73**	**71**
20-44	75	76	75
45-64	71	73	69
65-74	67	67	66
75+	61	58	62
what medication should do	**57**	**57**	**56**
20-44	57	57	57
45-64	57	58	55
65-74	57	58	56
75+	54	52	56
possible side effects	**58**	**56**	**59**
20-44	59	56	61
45-64	58	56	60
65-74	57	58	56
75+	49	45	52
what not to eat or drink	**61**	**59**	**62**
20-44	64	62	66
45-64	61	60	61
65-74	55	54	56
75+	52	50	54
what activities to avoid	**44**	**44**	**44**
20-44	48	47	49
45-64	43	44	42
65-74	36	39	34
75+	33	33	33

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Based on respondents who reported being prescribed medication in the 12 months before their interview.*

According to the NPHS, the vast majority of seniors maintain ongoing relationships with one physician and one pharmacy. Over 90% of people aged 65 and older reported always visiting the same doctor. Similarly, 90% of seniors reported always using the same pharmacy.

The NPHS asked respondents who had been prescribed a drug in the 12 months before their interview whether they took a list of currently used prescription drugs to the physician or pharmacist. Among people aged 65 to 74, 21% reported that they always take a list to their physician (Table 4). For those aged 75 and older, 29% said that they did so. By comparison, fewer reported always taking a list to their pharmacist: 15% and 20% for people aged 65 to74 and 75 and older, respectively. In both cases, women were more likely than men to report that they always take a list.

The vast majority (93%) of adults who were prescribed a drug stated that the physician explained what the medication was for (Table 5). This was the case for both men and women in all age groups. However, for other drug-related information—how much and when to take the medication, what the medication should do, possible side effects, what not to eat or drink with the drug, and what activities to avoid when using the medication—there was a decline with advancing age in the percent of the population who reported that they received this information from their physician. A similar pattern was found for the information received from pharmacists. However, the percentages were lower for some items of information (Table 6). This differential has been noted in other research.[29]

Physicians and pharmacists presumably exercise their judgement as to when drug-related information should be mentioned. Some people are prescribed a drug for many years and may be well aware of side effects and use recommendations. This may partly explain the decline in information provided about medication use as age increases. As well, respondent recall may be less accurate with advancing age.

Concluding remarks

Developments in information technology may help overcome some of the dangers in multiple medication use. An information system that contains the drugs currently taken by an individual, their drug allergies, and other relevant health information could alert physicians and pharmacists to potential problems.[30] However, a number of logistic and administrative difficulties are associated with the development of such a system.[31] A prescription drug monitoring system implies a central data base that would have to be maintained on an ongoing basis, be quickly responsive to the needs of physicians and pharmacists, and respect the confidentiality of patients.[28]

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At risk of first or recurring heart disease

Helen Johansen, Mukund Nargundkar, Cyril Nair, Greg Taylor and Susie ElSaadany

Abstract

Objectives

The self-reported prevalence of risk factors for heart disease among Canadians with and without heart disease is estimated. The characteristics associated with these risk factors are examined in order to identify groups to be targeted for primary and secondary prevention.

Data source

The data are from the household component of the 1994/95 National Population Health Survey (NPHS).

Analytical techniques

For the population aged 20 and older with and without heart disease, bivariate and multiple regression analyses were used to determine associations between four risk factors (smoking, high blood pressure, diabetes, and inactivity) and demographic characteristics and socioeconomic status.

Main results

According to the NPHS, 4.4% of people aged 20 and older reported that they had heart disease. However, many more adults had risk factors for this disease. As well, about one-quarter of those without heart disease and half of those with heart disease had two or more risk factors. To some extent, many of these risks are modifiable. The groups particularly at risk were people older than 35, those with less than high school graduation, those in households with inadequate income, people who consumed three or more drinks a day, and residents of the Atlantic provinces, Quebec and Ontario.

Key words

primary prevention, secondary prevention, risk factors, smoking, high blood pressure, diabetes, inactivity

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Relatively few adult Canadians—4.4% of the population aged 20 and older according to the 1994/95 National Population Health Survey (NPHS)—have heart disease. But many more may eventually develop it because they have medical and lifestyle risk factors that have been related to cardiovascular problems. However, some of these risk factors, notably smoking, high blood pressure, diabetes and inactivity, can be modified or controlled.

Although the death rate for heart disease has declined steadily since 1960, the toll is still considerable. Cardiovascular disease is Canada's leading cause of death.[1] In 1995, it was responsible for 36% of male deaths and 39% of female deaths; ischemic heart disease alone accounted for 22% of male deaths and 20% of female deaths. As well, diseases of the circulatory system account for more hospitalizations than any other illness and are a major cause of disability.[2] Estimates for 1994 of the total annual cost of cardiovascular disease in Canada ranged from $14.1 billion to $20.4 billion.[3]

Methods

Data source

This analysis is based on the household component of the 1994/95 National Population Health Survey (NPHS) for the 10 provinces.[4] An institutional component of the survey, which covered long-term residents of hospitals and residential care facilities, was excluded from the analysis, as were data for the Yukon and the Northwest Territories.

The NPHS non-institutional sample for the 10 provinces consisted of 27,263 households, of which 88.7% agreed to participate. After the application of a screening rule, 20,725 households remained in scope.

One knowledgeable person in every participating household provided general socio-demographic and health information about each household member. In total, data pertaining to 58,439 individuals were collected.

In addition, one randomly selected person in each of the 20,725 participating households was chosen to provide in-depth information about their own health. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to these in-depth health questions was 96.1%, or 17,626 respondents. In the remaining 2,383 participating households, the randomly selected respondent was younger than age 12. In-depth health information was collected for these individuals as part of the 1994/95 National Longitudinal Survey of Children and Youth.

The analysis in this article is based on the 15,759 respondents to the in-depth health questions who were aged 20 and older and who reported their heart disease status.

NPHS respondents were asked if they had any long-term conditions that had been diagnosed by a health professional. A list of conditions, which included heart disease, was read to them (see *Definitions*). Among respondents aged 20 and older, 866 reported having been diagnosed with heart disease; 14,893 had not.

Analytical techniques

Weighted estimates of the prevalence of major risk factors for heart disease were calculated by age, sex, and self-reported heart disease. Weighted logistic regressions were used to characterize populations with risk factors. The sample weights were adjusted so that they average to 1. A p value of <.01 was selected to take design effects into account. This approach permits a less biased estimate of the standard errors. Independent variables were chosen on the basis of their usefulness in describing the population and aiding in the development of health promotion programs. Because of small sample sizes, the variable describing three or more alcoholic drinks per day was not included in the models for those with heart disease. Respondents with information missing for one or more variables were omitted from the multivariate analysis.

Limitations

Because this analysis is cross-sectional, it cannot identify factors that increase the risk of heart disease. The aim is to describe the prevalence of risk factors that have been identified in other studies among people with self-reported heart disease and among those without it.

Data from the NPHS on the presence of heart disease and other conditions are subject to the problems inherent in self-reported information. Specifically, there was no independent source to verify whether people who reported having been diagnosed with heart disease, diabetes, or high blood pressure actually did have those conditions. Moreover, heart disease is a broad term, covered by ICD codes 390 to 398, 402, 404, and 410 to 429.[5] Cardiovascular diseases cover an even wider range: 390 to 459. Thus, respondents' heart problems could range from less serious ones such as acute pericarditis (420) to something much more serious such as acute myocardial infarction (410). In addition, some respondents may have been misclassified because they misunderstood what was meant or did not remember receiving the diagnosis.

The NPHS data used in this analysis were collected from people residing in households. Although a relatively small percentage of the population lives in institutions,[6] their characteristics may differ from those of household residents in ways that would affect the outcomes if the former were included in the analysis. In particular, the prevalence of heart disease and diabetes may be underestimated, as they are more common among institutional residents.[6] And even for the household population, those who participated in the survey may have been healthier and more likely than non-respondents to engage in health-promoting behaviour.

NPHS variables were not designed to address heart disease risk factors. Cholesterol and blood pressure levels were not measured, and height and weight were self-reported. However, NPHS body mass index results are close to actual measurements taken in the Canadian Heart Health Surveys (1986 to 1992).[7] Estimates of the prevalence of smoking in the Heart Health Surveys were also similar to NPHS results.[8] On the other hand, high blood pressure prevalence estimates from the Heart Health Surveys exceeded those derived from the NPHS, probably because they were based on actual measurements rather than on self-reported values and treatment information. As well, the Heart Health Surveys estimated a slightly higher prevalence of diabetes.[8]

This article uses the 1994/95 NPHS to estimate the prevalence of risk factors among the population with and without heart disease (see *Methods* and *Definitions*).

Given the cost of heart disease in both personal and financial terms and the potential for an increase in the number of patients due to the aging of the population, both primary prevention and secondary prevention are of major public health importance. Secondary prevention, which focuses on slowing the progression of established heart disease, is particularly crucial, because people with heart disease are at high risk of having another attack.

Almost a million

In 1994/95, 4.4% of the household population aged 20 and older—an estimated 896,000 people—were reported to have heart disease that had been diagnosed by a health professional. Overall, men were more likely than women to have heart disease (4.7% versus 4.0%).

Heart disease is an affliction of the elderly. People aged 65 and older accounted for six out of ten cases reported to the NPHS. In this age range, 18.6% of men and 15.2% of women reported that they had heart disease.

While fewer than a million Canadians had been diagnosed with heart disease, many more had factors that increase their risk of it: smoking, high blood pressure, diabetes, and an inactive lifestyle. And among those with established heart disease, a large number also reported having these risk factors, which, without modification or treatment, put them in danger of further cardiac problems.[9,10]

Smoking

Smoking has repeatedly been shown to be a risk factor for heart disease, with higher smoking levels associated with greater rates of disease.[11-15] Some of the excess risk of coronary heart disease is eliminated within two to three years of smoking cessation; within 10 to 14 years, the excess risk returns to the level of those who never smoked.[16-19] For people who have heart disease, smoking cessation reduces the risk of future cardiac events.[20-22]

Definitions

Respondents were considered to have *heart disease, diabetes,* or *high blood pressure* if they or their proxy reported that they had any of these conditions "diagnosed by a health professional." The group with high blood pressure also included people who reported taking medication for that condition within the last month.

Respondents were defined as *smokers* if they currently smoked cigarettes daily. One pack of cigarettes is considered to be 25 cigarettes.

To calculate whether the weight of respondents aged 20 to 64 (excluding pregnant women) was suitable for their height, their weight in kilograms was divided by the square of their height in metres to yield their *body mass index (BMI)*. A value greater than 27 indicates that the respondent was overweight. This corresponds, for example, to 138 lbs. or more for someone 5 feet tall (63 kg, 1.5 metres); 167 lbs. or more at 5.5 ft. (76 kg, 1.7 metres); and 199 lbs. or more at 6 feet (90 kg, 1.8 metres).

To derive respondents' level of *physical activity,* their energy expenditure (EE) was estimated for each activity they engaged in during their leisure time. EE was calculated by multiplying the number of times respondents reported an activity over a 12-month period by the average duration in hours and by the energy cost of the activity (expressed in kilocalories expended per kilogram of body weight per hour of activity). To calculate an average daily EE for the activity, the estimate was divided by 365. This calculation was repeated for all leisure time activities reported, and the resulting estimates were summed to provide an aggregate average daily EE. Respondents with an estimated EE below 1.5 were considered physically inactive. This would represent, for example, half an hour a day or less of walking or gardening at low intensity. As an indicator of total activity, this measure is somewhat limited, since it does not account for workplace activity.

Income adequacy was calculated by taking into account household income and the number of people in the household. *Low income* was defined as an annual income of less than $30,000 for five or more persons, less than $20,000 for three or four persons, and less than $15,000 for one or two persons.

Low education was defined as having less than high school graduation.

Respondents "not working for pay or profit" or not "working/caring for family for pay or profit" were considered to be *unemployed.*

Respondents in one-person households were considered to be *living alone.*

Table 1
Prevalence of selected risk factors, population aged 20 and older, by presence of self-reported heart disease†, sex and age group, provinces, 1994/95

	Total				Men				Women			
	Total 20+	20-34	35-64	65+	Total 20+	20-34	35-64	65+	Total 20+	20-34	35-64	65+
						'000						
Estimated number‡												
Without heart disease	19,653	6,445	10,502	2,705	9,534	3,163	5,234	1,137	10,119	3,282	5,268	1,568
With heart disease	896	--	315	541	469	--	202	260	427	--	114	280
						%						
Smoking												
Current smoker												
Without heart disease	31	37	31	15	34	38	35	17	29	37	28	14
With heart disease	23	--	36	11	26	--	36	15	19	--	35	--
% of smokers who smoke 1+ pack/day												
Without heart disease	35	25	42	24	41	31	49	31	27	20	34	18
With heart disease	42	--	47	--	48	--	52	--	33	--	--	--
Blood pressure§												
High blood pressure												
Without heart disease	10	1	10	31	8	1	9	25	12	1	11	35
With heart disease	48	--	45	52	44	--	42	47	52	--	50	58
Measured in past year												
Without heart disease	70	64	70	86	62	50	64	86	77	76	75	86
With heart disease	96	--	94	98	95	--	92	98	98	--	97	98
% with high blood pressure not taking medication												
Without heart disease	23	63	29	12	29	--	35	15	20	68	24	10
With heart disease	22	--	23	22	24	--	19	28	21	--	29	17
With diagnosed diabetes												
Without heart disease	3	1	3	10	3	--	3	11	3	--	3	9
With heart disease	15	--	12	17	16	--	--	19	13	--	--	16
Inactive leisure time												
Without heart disease	61	58	62	63	58	54	61	58	64	63	64	67
With heart disease	70	--	62	75	60	--	58	61	81	--	69	86
2 + risk factors††												
Without heart disease	27	23	28	35	27	22	29	32	27	24	27	36
With heart disease	51	--	49	52	46	--	47	45	55	--	53	58

Data source: *1994/95 National Population Health Survey*
† Diagnosed by a health professional
‡ Because of rounding, detail may not add to totals.
§ Diagnosed or taking blood pressure medication
†† Smoking, high blood pressure, diabetes, inactivity
-- Number of respondents is too small to provide a reliable estimate.

According to the 1994/95 NPHS, close to a third (31%) of people aged 20 and older without heart disease were daily cigarette smokers (Table 1). Overall, a slightly higher percentage of men than women smoked, but at age 34 and younger, women were as likely as men to be smokers.

Even among people who had been diagnosed with heart disease, a substantial share —23%—were daily smokers. And of these smokers, 42% smoked more than a pack a day, a larger percentage than was the case for smokers without heart disease.

At ages 35 to 64, over a third of men and women with diagnosed heart disease reported that they smoked. About half of the men in this category smoked more than a pack a day. Such heavy cigarette consumption despite the presence of cardiovascular problems suggests considerable nicotine dependency.[23]

High blood pressure

High blood pressure is a risk factor for heart disease and also increases the risk of death from kidney failure and stroke. Yet blood pressure is modifiable, not only by drugs, but also by non-pharmocologic practices such as the control of obesity, sodium intake, and alcohol consumption.[24,25]

About 10% of Canadians without heart disease had high blood pressure. That is, they reported to the NPHS that a health professional had diagnosed them as having it, or that they had taken blood pressure medication within the past month. Not surprisingly, high blood pressure was much more common among people who had heart disease, with 48% reporting it. For both groups, the prevalence of high blood pressure rose with age.

As have other surveys,[26-28] the NPHS found men with high blood pressure to be less likely than women to be under treatment for it. In fact, about one in five adults who reported having both heart disease and high blood pressure were not taking blood pressure medication. Moreover, men and women aged 65 and older with heart disease and high blood pressure were less likely than their contemporaries who had high blood pressure but not heart disease to be using medication. There may be several explanations for this. They could have been taking heart disease medications that also affect blood pressure, and so were unaware that they were taking blood pressure medication. They could have been using non-pharmocologic methods of treatment. And of course, they truly may not have been under treatment for high blood pressure.

Diabetes

Diabetes is strongly associated with heart disease[29,30] and contributes to premature mortality, usually through heart attack and stroke.[31-34] Diabetes also eliminates women's relative protection from ischemic heart disease: women with diabetes have ischemic heart disease rates similar to those of non-diabetic men.[35]

Multiple risk factor intervention is particularly important for people with diabetes, who are more likely than non-diabetics to have elevated lipid levels, high blood pressure, and obesity.[36-39]

In 1994/95, just 3% of the population aged 20 and older without heart disease reported that they had diabetes. The disease was much more common among those with heart disease: 16% of men and 13% of women. The prevalence of diabetes rose with age among both sexes.

However, it is estimated that only about half the cases of adult onset diabetes, which usually occurs in people who are older than 45 and overweight, are clinically recognized[38,39] and that surveys may underestimate the prevalence of the disease by 50%.[40] In addition, new diagnostic standards have lowered the cut-off on the plasma glucose test from 7.7 mmol/L (140 mg/dl) to 6.9 mmol/L (126 mg/dl). At the higher cut-off, about 20% of those diagnosed with diabetes already had complications. It is now recommended that all adults undergo a blood test for diabetes by age 45 and have additional tests every three years thereafter.[41]

Inactive leisure time

Participation in vigorous physical activity for at least 30 minutes a day has been recommended for cardiorespiratory fitness.[42-45] And for patients who have heart disease, physical rehabilitation enables them to recuperate more quickly and provides better conditions for their reintegration into professional, social, and family life.[46,47]

Yet despite the proven benefits of exercise, the majority of Canadians, with and without heart disease, do not engage in active leisure pursuits. In 1994/95, 61% of adults who did not have heart disease, and 70% of those who did, reported leisure time that would be classified as "inactive." Higher proportions of women than men were inactive.

Physical activity is related to body weight, which is associated with other heart disease risks such as high blood pressure and diabetes. Weight control is, therefore, an important way of reducing these risks.

In 1994/95, a substantial share of people aged 20 to 64 without heart disease—35% of men and 26% of women—were overweight. Among those with heart disease, the corresponding proportions were considerably higher: 56% and 42%.

Multiple risks

Cardiovascular disease is a multi-factorial disease, with the risk increasing exponentially with the number of risk factors present.[14,48-52] Even moderate elevations in more than one factor increase the risk.[53] Thus, people with two or more risk factors are a prime target for health promotion.

Over a quarter (27%) of Canadians who did not have heart disease, and half (51%) of those who did, reported at least two of the four risk factors. In both groups, the percentage with multiple risk factors rose with age.

Table 2
Odds ratios relating selected characteristics to risk factors for heart disease, population aged 20 and older without self-reported heart disease, provinces, 1994/95

	Smoking		High blood pressure		Diabetes		Inactive leisure time		Two or more risk factors	
	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval
Sex										
Men	1.2*	1.1, 1.4	.8*	.7, .9	1.2	.9, 1.6	.7*	.7, .8	1.0	.9, 1.1
Women†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...
Age group										
20-34†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...
35-64	.7*	.7, .8	7.6*	5.5, 10.7	4.3*	2.6, 7.2	1.2	1.0, 1.3	1.2*	1.1, 1.4
65+	.2*	.2, .3	20.1*	14.0, 28.9	11.6*	6.7, 20.2	1.4*	1.2, 1.7	1.4*	1.2, 1.7
Socioeconomic characteristics‡										
Low education	1.7*	1.5, 1.9	1.2	1.0, 1.4	1.3	1.0, 1.8	1.4*	1.3, 1.6	1.8*	1.6, 2.0
Low income	1.6*	1.4, 1.8	1.0	.8, 1.2	1.5*	1.1, 2.0	1.3*	1.1, 1.5	1.4*	1.2, 1.6
Unemployed	1.0	.9, 1.1	1.7*	1.4, 2.1	2.0*	1.4, 2.8	.6*	.6, .7	.9	.8, 1.0
Live alone	1.3*	1.1, 1.5	1.4*	1.2, 1.8	.8	.6, 1.2	.8	.7, 1.0	1.2	1.0, 1.4
Alcohol consumption‡										
3+ drinks/day	2.8*	2.0, 4.0	1.5	.8, 2.6	.6	.2, 2.2	1.2	.9, 1.7	2.4*	1.8, 3.4
Province										
Atlantic	1.4*	1.1, 1.7	1.7*	1.2, 2.4	1.4	.8, 2.6	1.9*	1.5, 2.3	2.0*	1.6, 2.5
Quebec	1.4*	1.2, 1.7	1.2	.9, 1.5	1.4	.9, 2.4	1.9*	1.6, 2.2	1.8*	1.5, 2.2
Ontario	1.1	1.0, 1.3	1.2	.9, 1.6	1.5	.9, 2.4	1.6*	1.4, 1.8	1.4*	1.2, 1.7
Prairies	1.1	.9, 1.3	1.2	.9, 1.6	1.6	.9, 2.7	1.2	1.0, 1.4	1.3	1.0, 1.5
British Columbia†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...

Data source: *1994/95 National Population Health Survey*
Note: *The analyses for smoking, high blood pressure and diabetes were based on 14,278 respondents; for inactive leisure time and two or more risk factors, 13,735 respondents.*
† Reference category for which odds ratio is always 1.00
‡ The reference category is the absence of the characteristic. For example, the reference category for "low income" is "not low income."
··· Figures not applicable
** p <0.01*

For people without heart disease, there was little difference in the percentages of men and women who had multiple risk factors. By contrast, among those with heart disease, a higher percentage of women than men had multiple risks, principally because of the large percentages of women who were inactive and who were aware of having high blood pressure.

Who is at risk of developing heart disease?

Identification of the characteristics of people without heart disease, but with elevated risk factors, can help health promotion efforts target their messages to the groups that would benefit most.

A multivariate regression analysis showed that advancing age increased the odds that people without heart disease would report most of the risk factors (Table 2). The exception was smoking, as younger people were more likely than older people to smoke.

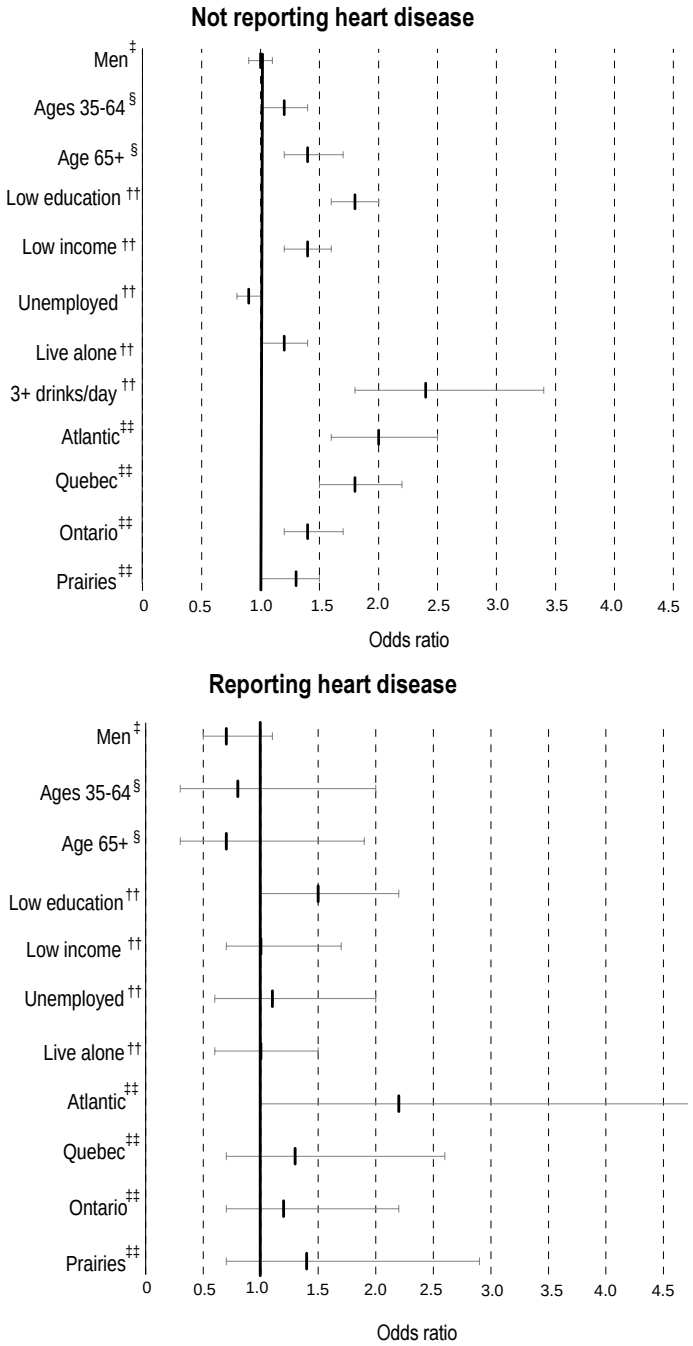
Differences between men and women in their odds of having risk factors were generally not great, although men had significantly higher odds of being smokers and lower odds of being inactive during their leisure time.

Risk factors among people without heart disease tended to be associated with low socioeconomic status. Residents of low-income households, compared with those in other households, had significantly high odds of having three of the four risk factors, and as a result, multiple risk factors (Chart 1). The exception was high blood pressure, which was not significantly related to income.

Income and education are generally correlated, so it is reasonable that people with a low level of education also had elevated odds of smoking, having inactive leisure, and having multiple risk factors.

Being unemployed was significantly and positively associated with high blood pressure and diabetes, perhaps because these conditions can interfere with employment. By contrast, unemployment was negatively associated with inactive leisure.

Chart 1
99% confidence intervals for odds ratios of having two or more risk factors,† population aged 20 and older, by self-reported heart disease, provinces, 1994/95



Source: *1994/95 National Population Health Survey*
Note: *Because of small sample sizes, the variable describing three or more alcoholic drinks per day was not included in the models for those with heart disease.*
† Smoking, high blood pressure, diabetes, inactivity
‡ Reference category is women.
§ Reference category is ages 20-34.
†† Reference category is absence of characteristic.
‡‡ Reference category is British Columbia.

People who lived alone had high odds of smoking and having high blood pressure.

High alcohol consumption—three or more drinks a day—was significantly associated with smoking. This level of drinking was also related to increased odds of having multiple risk factors.

After adjusting for other characteristics such as age, education and income, the odds of having most risk factors tended to be high in the Atlantic Provinces, compared with British Columbia. Quebec residents had significantly high odds of smoking, having inactive leisure, and having multiple risks factors. Ontario residents had significantly high odds of inactivity and having multiple risk factors.

Secondary prevention

When other variables were controlled, relatively few characteristics were significantly associated with risk factors among people already diagnosed with heart disease. While this is due primarily to a smaller sample size, it could also reflect changes that occurred because of having heart disease (for example, quitting smoking and drinking) and participation in rehabilitation programs.

High blood pressure was the only risk factor significantly and positively associated with advancing age among people with heart disease: the odds were at least ten times greater at ages 35 to 64 and at 65 and older than at 20 to 34 (Table 3). However, because of the small number of respondents, the confidence intervals for these odds ratio are very wide. As well, older people had significantly lower odds of smoking than did younger people.

Compared with women, men with heart disease had significantly low odds of having inactive leisure pursuits. However, the odds of having other risk factors did not differ significantly by sex.

Table 3
Odds ratios relating selected characteristics to risk factors for heart disease, population aged 20 and older with self-reported heart disease, provinces, 1994/95

	Smoking		High blood pressure		Diabetes		Inactive leisure time		Two or more risk factors	
	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval	Odds ratio	99% confidence interval
Sex										
Men	1.6	1.0, 2.7	.7	.4, 1.0	1.3	.7, 2.2	.4*	.3, .7	.7	.5, 1.1
Women†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...
Age group										
20-34†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...
35-64	.2*	.1, .5	11.4*	2.2, 59.3	2.8	.3, 24.5	.6	.2, 1.9	.8	.3, 2.0
65+	.0*	.0, .1	12.8*	2.5, 66.2	3.2	.4, 27.9	1.2	.4, 3.6	.7	.3, 1.9
Socioeconomic characteristics††										
Low education	1.6	1.0, 2.6	.9	.6, 1.4	1.5	.8, 2.5	1.4	.9, 2.2	1.5	1.0, 2.2
Low income	1.2	.7, 2.1	1.1	.7, 1.8	.9	.5, 1.8	1.1	.7, 2.0	1.0	.7, 1.7
Unemployed	1.0	.6, 2.0	1.8	1.0, 3.2	1.6	.6, 3.8	.6	.3, 1.2	1.1	.6, 2.0
Live alone	1.1	.6, 2.1	.7	.4, 1.1	1.0	.5, 2.1	1.2	.7, 2.2	1.0	.6, 1.5
Province										
Atlantic	1.1	.4, 3.1	1.5	.7, 3.4	.7	.2, 2.0	2.9*	1.1, 7.4	2.2	1.0, 5.1
Quebec	1.2	.5, 2.7	1.0	.5, 2.0	.7	.3, 1.6	2.6*	1.2, 5.5	1.3	.7, 2.6
Ontario	1.0	.5, 2.2	1.2	.7, 2.2	.6	.3, 1.3	1.9	1.0, 3.6	1.2	.7, 2.2
Prairies	1.1	.5, 2.7	1.5	.7, 3.0	.6	.2, 1.5	1.3	.6, 2.7	1.4	.7, 2.9
British Columbia†	1.0	...	1.0	...	1.0	...	1.0	...	1.0	...

Data source: *1994/95 National Population Health Survey*
Note: *The analyses for smoking, high blood pressure, and diabetes were based on 826 respondents; for inactive leisure time and two or more risk factors, 784 respondents. Because of small sample sizes, the variable describing three or more alcoholic drinks per day was not included in the models for those with heart disease.*
† Reference category for which odds ratio is always 1.00
†† The reference category is the absence of the characteristic. For example, the reference category for "low income" is "not low income."
··· Figures not applicable
** p <0.01*

The association between risk factors and socioeconomic status was not great among people with heart disease. Low education, low income, and living alone were not significantly associated with any risk factor.

Province of residence was related only to inactive leisure, with the odds rising from west to east.

Implications

A healthy lifestyle can lower the risk of developing heart disease or slow the progression of established heart disease. But according to the National Population Health Survey, many Canadians are not taking adequate measures to protect themselves. Most are inactive during their leisure time, and substantial proportions are daily smokers. In addition, there is some doubt that high blood pressure and diabetes are being detected and adequately treated.

The prevalence of risk factors among the population not diagnosed with heart disease suggests that a large number of people may face such problems in the future. And among people with heart disease, risk factors such as smoking and inactive leisure could lead to further problems.

The prevalence of risk factors also implies some lack of knowledge about their potential consequences. For example, only about half of Canadians are aware that smoking is a risk factor for heart disease.[8]

Moreover, as noted earlier, surveys such as the NPHS may underestimate the population with diabetes by as much as 50%. Because there are usually no overt symptoms, blood pressure may rise for many years without the individual being aware of it.

But the fact that these risk factors are controllable is cause for some optimism. Health promotion efforts may be able to influence individuals to modify their behaviour, and thereby, reduce their risk of premature disability and death. The profile of those with significantly elevated risk factors for heart disease, notably multiple risks, might be taken into account in the design and development of intervention programs. The people with multiple risks tend to be older, have less education and low income, and live in the Atlantic Provinces, Quebec or Ontario.

Special programs may be needed to reach the elderly who constitute the majority of people with heart disease. The NPHS showed that among people aged 65 and older with heart disease, 11% smoked, 17% reported diabetes, 52% reported high blood pressure, and 75% had inactive leisure pursuits. However, relatively little is known about the effectiveness of risk modification for the secondary prevention of heart disease among older people,[54] and evidence indicates that they tend to enroll in rehabilitation programs at substantially lower rates than do younger patients.[55]

There is a potential to reduce the risk of heart disease or prevent further cardiovascular problems through regular exercise, keeping blood pressure in the normal range, not smoking, avoiding weight gain, and for those who have diabetes or a tendency toward it, careful monitoring. However, this can only occur if the people most at risk receive the messages and act upon them.

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Smoking prevalence, quit attempts and successes

Megan Stephens and Jason Siroonian

Abstract

Objectives

This article provides a brief overview and update of Canadian smoking trends since 1966. It presents the characteristics of daily smokers who have successfully quit as well as those who have tried to quit but continue to smoke daily.

Data sources

The time series smoking data are from a variety of surveys. The analyses pertaining to individuals who tried to quit smoking and those who successfully quit are based on a Health Canada-sponsored supplement to the 1994/95 National Population Health Survey (NPHS).

Main results

In contrast to the overall trend, smoking rates among teens have been rising in the 1990s. Approximately 16% of daily smokers reported that they had recently stopped smoking. The majority of former daily smokers indicated that their main reason for quitting was concern about their future health. The vast majority reported that they had gone cold turkey. About four in ten daily smokers reported that they had tried, unsuccessfully, to quit smoking in the 12 months before their NPHS interview.

Key words

smoking prevalence, amount smoked, smoking quit-attempts, smoking cessation, smoking quit-method, smoking quit rates

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Smoking is widely acknowledged as one of the most important yet preventable causes of illness and death. The World Health Organization estimated that in 1995, 2.1 million people in industrialized countries would die from tobacco-related diseases.[1] In Canada, approximately 45,000 deaths were attributable to smoking in 1991. This number is projected to increase to almost 47,000 deaths in the year 2000.[2] Consequently, the development of public-health programs aimed at reducing the current smoking rate and preventing the initiation of new smokers has become a focus of concern for both governmental and non-governmental agencies.[3]

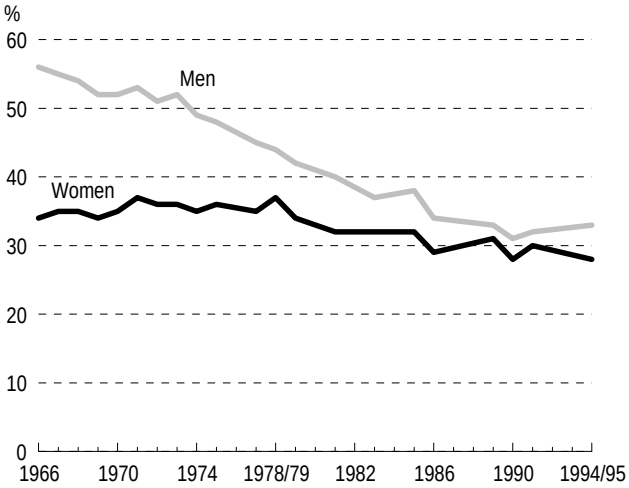
This article provides a brief overview and update of Canadian smoking trends since 1966 based on data from a variety of surveys. Using data from the 1994/95 National Population Health Survey (NPHS), it presents new information on the characteristics of daily smokers who have successfully quit, as well as those who have attempted to quit but continue to smoke daily (see *Methods* and *Definitions*).

Although there have been several studies of smoking cessation based on non-random or small sample populations,[4] the 1994/95 NPHS was one of the first national surveys to explore the quit attempts and successes of smokers. (The Survey on Smoking in Canada, sponsored by Health Canada and conducted by Statistics Canada in 1994/95, also included detailed questions on smoking cessation.)

Current smoking rate down overall, up among teens

The proportion of Canadians who currently smoke has decreased considerably since the mid-1960s. In 1966, 45% of those aged 15 and older were smokers (daily and occasional combined). Almost three decades later, this percentage had dropped to 31%.

Chart 1
Prevalence of current smoking, by sex, population aged 15 and older, provinces, 1966 to 1994/95



Data sources: *Various surveys (see Methods)*

Methods

Data sources

The time series smoking data in this article are from the Canadian Smoking Habits Surveys (1966 to 1977, 1979, 1981 and 1983),[5,6] the Canada Health Survey (1978/79),[7] the General Social Survey, Cycle 1 (1985),[8] the National Alcohol and Other Drugs Survey (1989),[9] the Health Promotion Survey (1990),[10] the General Social Survey, Cycle 6 (1991),[11] and the National Population Health Survey (1994/95)[12] (see *Appendix*).

The 1994/95 National Population Health Survey (NPHS) provincial, non-institutional sample consisted of 27,263 households, of which 88.7% agreed to participate. After the application of a screening rule, 20,725 households remained in scope.

One knowledgeable person in every participating household provided general socio-demographic and health information about each household member. In total, data pertaining to 58,439 individuals were collected. (The data base containing this information is called the General file.)

In addition, one randomly selected person in each of the 20,725 participating households was chosen to provide in-depth information about their own health. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to these in-depth health questions was 96.1%, or 17,626 respondents. (The data base containing in-depth health information as well as data from the General file pertaining to these respondents is called the Health file.) In the remaining 2,383 participating households, the randomly selected respondent was younger than age 12. In-depth health information was collected for these individuals as part of the 1994/95 National Longitudinal Survey of Children and Youth.

Of the 17,626 randomly selected respondents aged 12 or older, 14,786 were eligible members of the NPHS longitudinal panel. These respondents were also eligible for the Health Canada supplement. The response rate to the Health Canada-sponsored questions was 90.6%. (The data base containing information from the Health Canada supplement as well as data from the General and Health files pertaining to these respondents is called the Supplement file.)

The remaining 2,840 of the 17,626 randomly selected respondents aged 12 or older were sponsored by provincial governments that elected to enlarge the sample size in their province. These respondents will not be followed-up and were not eligible for the Health Canada supplement.

Limitations

Because estimates of smoking prevalence were derived from several surveys, the resulting time series should be considered with caution. Each survey has a unique design, question order, wording, coverage, and response rate. Therefore, the time series is subject to variability that may relate to these factors and not simply to changes in smoking behaviour (see *Appendix*).

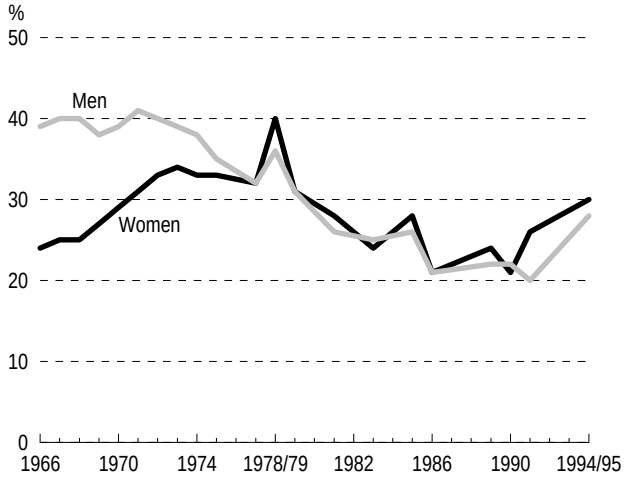
Quit attempts may be overestimated because some NPHS respondents may have provided what they perceived to be a socially desirable response. That is, they may have indicated that they attempted to quit when they had not.

According to the NPHS, there were approximately 6.9 million current smokers aged 15 and older in 1994/95.

The decline in the prevalence of current smoking was more pronounced among men than women (Chart 1). As a result, the gap in smoking prevalence by sex has narrowed. In 1966, the current smoking rate for men exceeded the rate for women by 22 percentage points. By 1994/95, this gap was reduced to 5 percentage points.

The prevalence of smoking among teens is to some degree a harbinger of future smoking rates. By 1990, the prevalence of current smoking among 15- to 19-year-olds had fallen to 21%—the lowest rate recorded for this age group since 1966. The following year, the rate began to rise and by 1994/95 was 28%. Teen smoking rates increased among both sexes in the 1990s, but the trend was slightly more pronounced among females. This reversed the situation in the late 1960s and early 1970s when smoking among young men had exceeded the rate for young women (Chart 2).

Chart 2
Prevalence of current smoking, by sex, population aged 15 to 19, provinces, 1966 to 1994/95



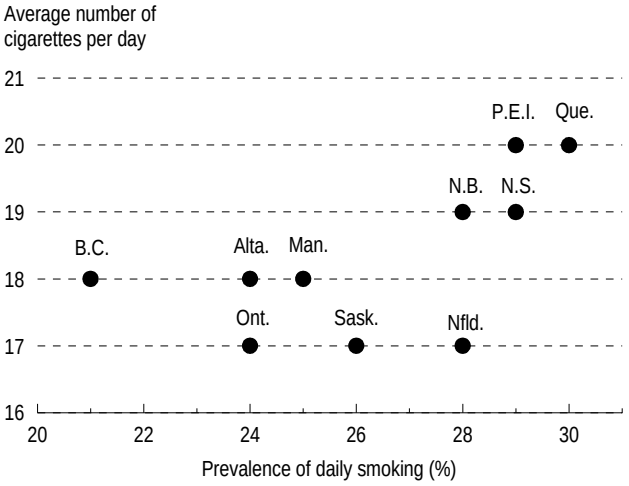
Data sources: *Various surveys (see Methods)*

Smoking heaviest in Quebec and P.E.I.

In 1994/95, daily smoking was more prevalent in some provinces than in others. The amount smoked per day also varied slightly by province. For example, in Quebec and Prince Edward Island, a high percentage of the population smoked daily (Chart 3). Moreover, they tended to be somewhat heavier smokers, smoking 20 cigarettes per day on average. By contrast, British Columbia had a notably lower prevalence of daily smoking, and their average daily cigarette consumption was also comparably lower.

Although trends in provincial smoking rates are difficult to interpret, certain patterns are clear. Since 1966, the current smoking rate in Quebec has always been above the national average and, for the most part, has been the highest of all the provinces. The provinces west of Quebec have generally had current smoking rates below the national average. In particular, British Columbia has had one of the lowest current smoking rates in Canada since the late 1970s (data not shown).

Chart 3
Prevalence of daily smoking and amount smoked by daily smokers aged 15 and older, provinces, 1994/95



Data source: *1994/95 National Population Health Survey, Health file*

About one in four Canadians is a former daily smoker

The benefits of smoking cessation have been extensively documented. According to the U.S. Department of Health and Human Services, within a year of quitting, a person's risk of developing heart disease drops to half that of a smoker.[13] Between

five and fifteen years after quitting, the chance of developing lung cancer decreases by almost half, and the risk of dying from cancer is similar to that of someone who has never smoked.[13]

In 1994/95, nearly one in four Canadians was a former daily smoker. The quit rate, that is, the number of former daily smokers as a proportion of all people who smoke daily or who have ever smoked daily, was 47%.

Approximately 16% of smokers reported that they had recently quit (Table 1). Recent quit rates were highest among those aged 65 and older. Because the 1994/95 NPHS asked former daily smokers their age when they had quit smoking and not the date when they had quit, the terms "recent" and "recently" refer to a difference in ages, as opposed to a period of time. In this article, recent quitters are former daily smokers who reported that they had quit when they were one to five years younger; that is, the difference between their age at the time of their interview and their age when they had quit equals one to five inclusively (see *Definitions*).

Majority of quitters go cold turkey

The majority of former daily smokers cited concern about future health as their main reason for quitting (55%). This is consistent with results from other surveys. The 1975 Smoking Habits Survey indicated that the majority of smokers who had quit successfully (62% of males and 56% of females) reported that they gave up smoking for health reasons.[14] Similarly, the 1994/95 Survey on Smoking in Canada found that the most commonly cited

Table 1
Recent quit rate, by province and by sex and age group, daily and former daily smokers aged 15 and older, 1994/95

	Recent quitters†	Daily smokers	Total	Recent quit rate
	'000	'000	'000	%
Total	**1,151**	**5,832**	**6,983**	**16**
Newfoundland	28	117	145	20
Prince Edward Island	6	31	37	15
Nova Scotia	31	208	239	13
New Brunswick	35	162	197	18
Quebec	307	1,762	2,069	15
Ontario	404	2,043	2,446	17
Manitoba	49	209	258	19
Saskatchewan	43	194	237	18
Alberta	102	510	613	17
British Columbia	145	596	741	20
Males	**595**	**3,046**	**3,642**	**16**
15-24	--	438	482	--
25-44	310	1,564	1,874	17
45-64	158	841	999	16
65+	84	202	286	29
Females	**556**	**2,786**	**3,341**	**17**
15-24	96	497	593	16
25-44	270	1,403	1,673	16
45-64	127	697	824	15
65+	62	189	251	25

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Because of rounding, detail may not add to totals.*
† Former daily smokers who recently quit
-- Cell size is too small to provide a reliable estimate.

Definitions

To classify smokers, the NPHS asked following questions:

Q1. "At the present time do/does...smoke cigarettes daily, occasionally or not at all?"
Q2. "Have/has you/he/she ever smoked cigarettes at all?"
Q3. "Have/has you/he/she ever smoked cigarettes daily?"

Daily smokers are those who answered "daily" to Q1.
Occasional smokers are those who answered "occasionally" to Q1.
Current smokers include both daily and occasional smokers.
Former daily smokers are those who answered "not at all" to Q1, "yes" to Q2, and "yes" to Q3.

To examine recent smoking cessation attempts and successes, new concepts were developed for this analysis, based on the following questions:

Q4. "Have you tried to quit smoking in the last 12 months?"
Q5. "At what age did you quit smoking daily?"

The *rate of quit attempts* is the number of daily smokers who answered "yes" to Q4 as a proportion of all daily smokers.
Recent quitters include former daily smokers whose reported age at the time of their NPHS interview, less the age reported for Q5, equals one to five inclusively. Because there is a high recidivism rate, smoking cessation was defined as having quit when at least a year younger.
The *recent quit rate* is the number of recent quitters as a proportion of all daily smokers and recent quitters combined.

reason for quitting was concern about future health (32%), followed by concern about current health (25%).[15]

The use of treatments that help to relieve withdrawal symptoms, such as nicotine patches or chewing gum, was not common among former daily smokers. The vast majority of them reported that they had gone cold turkey (89%). Again, this is in line with previous studies. According to the 1975 Smoking Habits Survey, 75% of successful male quitters and 77% of successful female quitters reported that they had used "no aid" in their smoking cessation.[14] The 1994/95 Survey on Smoking in Canada indicated that 89% of all former smokers reported that they had quit cold turkey.[15] A literature review of smoking cessation research confirmed that over 80% of people who managed to successfully quit smoking did so without the help of formal treatment or special programs.[4]

Table 2
Rate of quit attempts, by province and by sex and age group, daily smokers aged 15 and older, 1994/95

	Attempted to quit†	Daily smokers	Rate of quit attempts
	'000	'000	%
Total	**2,376**	**5,832**	**41**
Newfoundland	48	117	41
Prince Edward Island	13	31	42
Nova Scotia	95	208	46
New Brunswick	67	162	41
Quebec	626	1,762	36
Ontario	847	2,043	41
Manitoba	85	209	40
Saskatchewan	86	194	45
Alberta	223	510	44
British Columbia	286	596	48
Males	**1,162**	**3,046**	**38**
15-19	91	213	43
20-24	97	226	43
25-44	609	1,564	39
45-64	316	841	38
65+	51	202	25
Females	**1,214**	**2,786**	**44**
15-19	143	210	68
20-24	186	287	65
25-44	559	1,403	40
45-64	268	697	39
65+	57	189	30

Data source: *1994/95 National Population Health Survey, Supplement file*
Note: *Because of rounding, detail may not add to totals. Because of non-response to the supplemental question about quit attempts, the rate of quit attempts may be underestimated in Quebec and Alberta. For the same reason, the rate may also be underestimated for men aged 20-24 and women aged 25-44.*
† Daily smokers who reported that they tried to quit smoking during the 12 months before their interview

Four in ten daily smokers attempted to quit in previous year

Although not all smokers are successful in their attempt to quit, many reported that they had tried. About four in ten (41%) current smokers—2.4 million—reported that they had tried unsuccessfully to quit in the 12 months before their NPHS interview (Table 2).

The rate of quit attempts was higher for teens and young adults than for older smokers. There were also differences by sex. At younger ages, a greater proportion of female smokers reported that they had tried to quit in the previous year. At age 25 and older, differences by sex in the rate of quit attempts were less notable.

Similar to the recent quit rates, smokers in Quebec had the lowest rate of quit attempts, and smokers in British Columbia had the highest. Interestingly, although Nova Scotians had a high prevalence of daily smoking and a low recent quit rate, the province ranked second in the rate of quit attempts.

Concluding remarks

The process of quitting smoking is decidedly complex. For example, "The Stages of Change Model" proposes that there are five stages to quitting: precontemplation, contemplation, preparation, action, and maintenance.[4] NPHS data indicate that many Canadians have progressed through the first four and are currently in the maintenance stage. In 1994/95, nearly one in four Canadians was a former daily smoker. However, many smokers have not yet managed to successfully quit, but have tried to do so and are likely in the contemplation, preparation, and/or action stages. In 1994/95, four in ten daily smokers reported that they had tried to quit during the 12 months before their NPHS interview.

This article provides an overview of successful quitters and of smokers who have tried to quit but continue to smoke. However, it does not address the many factors that affect smokers' decisions to quit and their chances of success. Analysis of the 1994/95 NPHS shows that the majority of smokers start in adolescence, and that this affects the amount that they will smoke and their odds of quitting later in life (see *Age of smoking initiation: Implications for quitting* in this issue).

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Appendix

Canadian Smoking Habits Survey: 1966-1977, 1979, 1981, 1983

The Canadian Smoking Habits Survey (CSHS) was conducted annually between 1966 and 1977, and biannually between 1977 and 1983. The survey was implemented by Statistics Canada on behalf of the Department of Health and Welfare and carried out as a supplement to Statistics Canada's Labour Force Survey.

The CSHS surveyed between 21,000 and 40,000 Canadians aged 15 and older, depending on the survey year. The sample population did not include people living in institutions, members of the armed forces, people living on Indian reserves, or residents of the Northwest Territories or the Yukon. Data were collected primarily by telephone interviews, and proxy respondents were accepted.

Much of the CSHS data is based on proxy reports as opposed to self-reported data. It is impossible to determine what proportion of the data came from proxy respondents in the early years of the survey,

but in 1983, the figure was 51%. The proportion of proxy reports was particularly high for those aged 15 to 19. Some parents responding on behalf of their children may have been unaware of their children's smoking behaviour. Consequently, this survey may underestimate smoking prevalence among teens.

Canada Health Survey, 1978/79

The Canada Health Survey (CHS) was conducted jointly by Health and Welfare Canada and Statistics Canada. It covered the non-institutionalized population, but excluded people living in the Northwest Territories, the Yukon, and on Indian reserves. Smoking data were collected through the Lifestyle and Health Questionnaire, which was completed by respondents aged 15 and older. The total sample size was 20,726, and the response rate was 87%.

The charts presented in this article highlight the fact that CHS data differ substantially from other smoking data collected around 1978/79. Part of the difference in smoking prevalence may result from an underestimation of smoking prevalence stemming from the use of proxy reporting in the CSHS. This difference may also reflect the fact that CHS respondents were asked to complete the questionnaire on their own, rather than through a telephone interview.

General Social Survey (Cycle 1), 1985

Statistics Canada's General Social Survey (GSS) collected information on the non-institutionalized population with the exception of residents of the Northwest Territories and the Yukon. Households were selected using random digit dialling and respondents between the ages of 15 and 64 were surveyed over the telephone. Respondents aged 65 and older were interviewed in person. The total sample size was 11,200 respondents. The response rate was 83% for telephone interviews and 87% for personal interviews. Proxy reporting was not accepted.

National Alcohol and Other Drugs Survey, 1989

The National Alcohol and Other Drugs Survey (NADS) was conducted by Statistics Canada on behalf of Health and Welfare Canada . The survey covered the non-institutionalized population with the exception of residents of the Northwest Territories and the Yukon. Data were collected through telephone interviews with 11,634 respondents aged 15 and older. The response rate was 79%. Proxy reporting was not accepted.

Health Promotion Survey, 1990

The Health Promotion Survey was conducted by Statistics Canada and sponsored by Health and Welfare Canada. The survey covered the non-institutionalized population with the exception of residents of the Northwest Territories and the Yukon. Random digit dialling was used to select households from which the sample of 13,792 respondents aged 15 and older was drawn. The response rate was 78%. Proxy reporting was not accepted.

General Social Survey (Cycle 6), 1991

The 1991 GSS target population was comprised of non-institutionalized Canadians aged 15 and older, living in the ten provinces. Random digit dialling was used to select a sample of 11,924 respondents that included an over-sampling of people aged 65 and older. The response rate was 80%. No proxy reporting was accepted.

Age of smoking initiation: Implications for quitting

Jiajian Chen and Wayne J. Millar

Abstract

Objectives

The effect of an early age of smoking initiation on cigarette consumption and on the probability of quitting is analyzed for people aged 21 to 39.

Data source

The data are from Statistics Canada's 1994/95 National Population Health Survey. The findings in this article are based on 3,449 randomly selected respondents aged 21 to 39 who were or had ever been daily smokers.

Analytical techniques

Logistic regression was used to analyze the association between age of smoking initiation and heavy cigarette consumption (more than 20 a day). Survival analysis techniques were used to study the relationship between age of smoking initiation and smoking cessation for men and women. Cox proportional hazard models were used to control for potential confounding factors such as education, household income, depression, chronic stress, self-esteem, and amount smoked.

Main results

Among 21- to 39-year-olds, smoking initiation during early adolescence was associated with greater daily cigarette consumption and a lower cumulative probability of quitting.

Key words

tobacco use, adolescent behaviour, age of onset, depression, psychological stress

Authors

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Cigarette smoking has long been recognized as a major public health problem and the single most preventable cause of death.[1-8] Quitting, however, confers almost immediate health benefits.[9,10] Therefore, the factors associated with starting to smoke and stopping have important public-health implications.

Past research has shown that the earlier individuals begin daily smoking, the more cigarettes they are likely to smoke, and the less likely they are to quit.[11-13] Using data from the 1994/95 National Population Health Survey (NPHS), this article, too, shows an association between age of starting to smoke and smoking dependence among 21- to 39-year-olds, where smoking dependence is measured by the number of cigarettes smoked per day and by the probability of smoking cessation (see *Methods* and *Limitations*). This analysis adjusts for several potential confounding factors: education, household income, and the presence of depression, chronic stress and low self-esteem.

Methods

Data source

This analysis is based on the household component of Statistics Canada's 1994/95 National Population Health Survey (NPHS) for the 10 provinces. An institutional component of the survey, which covered long-term residents of hospitals and residential care facilities, was excluded from the analysis, as were data for the Yukon and the Northwest Territories.

The 1994/95 NPHS non-institutional sample for the provinces consisted of 27,263 households, of which 88.7% agreed to participate. After the application of a screening rule, 20,725 households remained in scope.

One knowledgeable person in every participating household provided general socio-demographic and health information about each household member. In total, data pertaining to 58,439 individuals were collected. In addition, one randomly selected person in each of the 20,725 participating households was chosen to provide in-depth information about their own health. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to these in-depth health questions was 96.1%, or 17,626 respondents. In the remaining 2,383 participating households, the randomly selected respondent was younger than age 12. (In-depth health information was collected for these individuals as part of the 1994/95 National Longitudinal Survey of Children and Youth). A more detailed description of the survey design, sample, and interview procedures is available in published reports.[14]

To reduce bias caused by incomplete information for younger age groups, selection due to smoking-related mortality, and recall errors for older age groups, only respondents aged 21 to 39 are examined here. Limiting the analysis to this relatively small age group may also have reduced differences between birth cohorts in smoking behaviour, in societal attitudes about the acceptability of smoking, and in the types of cigarettes smoked.[13,15] The sample size was 3,449 respondents (Appendix, Table A).

Respondents were asked to report their current smoking status: *At the present time, do you smoke cigarettes daily, occasionally, or not at all?* Those who indicated that they smoked cigarettes daily were asked at what age they had started. Current daily smokers were also asked how many cigarettes they smoked a day.

Respondents who were not current daily smokers were asked: *Have you ever smoked cigarettes at all?* Those who answered "yes" were asked: *Have you ever smoked cigarettes daily?* If they had, they were asked: *At what age did you begin to smoke cigarettes daily?* and *How many cigarettes did you usually smoke each day?*

Former daily smokers were asked: *At what age did you stop smoking (cigarettes) daily?* Their age at the onset of daily smoking and their age at the time they quit were used to estimate the duration of daily smoking in years. Since there is a high recidivism rate in the first year of quitting, smoking cessation was defined as having quit for at least a year.[13,15,16]

Smokers who smoked more than 20 cigarettes a day were considered to be heavy smokers. The analysis of heavy smoking is restricted to current daily smokers, while the analysis of smoking cessation pertains to current and former daily smokers.

For this analysis, respondents' completed education was divided into three categories: less than high school graduation, high school graduation or some postsecondary studies, and college or university graduation.

Respondents' household income was divided into quintiles, based on household size. The two lowest quintiles were combined to form the group considered to have inadequate income.

The NPHS collected information on psychological as well as physical health. Three psychological variables were included in this analysis: chronic stress, self-esteem, and depression (see *Psychological variables*).

Analytical techniques

Logistic regression was used to estimate the probability of smoking more than 20 cigarettes a day as a function of the age of starting to smoke, adjusting for other potentially confounding factors. The LOGISTIC procedure of SAS was used in the analysis.[17] To obtain unbiased estimates of the logistic regression coefficients and less biased standard errors, the sample was weighted using sample survey weights re-scaled to average 1.

To assess the association between age at smoking initiation and stopping, the product-limit (Kaplan-Meier) life table method was used to estimate the probability of smoking cessation as a function of the time since the onset of daily smoking. Quitting was treated as a once-in-a-lifetime event, analogous to mortality. The data analyses were performed with the LIFETEST procedure in SAS.[17] The survival function S(t) was calculated as the proportion of respondents in the cohort who had not quit smoking after having smoked for t years. The complement of the survival function, 1-S(t), is the cumulative probability of smoking cessation at time t. Respondents who still smoked at the time of the survey or who had quit daily smoking for less than one year were considered censored; that is, they remained in the analysis as an unknown outcome, in statistical terms, a censored observation.

Cox proportional hazard models were used to model the hazard of smoking cessation as a function of age at smoking initiation. Additional variables in the model include education, household income, major depressive episode, chronic stress, low self-esteem, and number of cigarettes smoked per day.[18] Because of differences in male and female smoking behaviour, separate models were fitted for men and women. The data analyses were performed with the PHREG procedure in SAS.[17]

For the Cox proportional regression analysis, re-scaling the sample weight to average 1 is not possible using the PHREG procedure in SAS.[17] This is because the procedure excludes any observations with a weight less than 1.

The standard errors obtained using the original sample weights are usually too small. Therefore, to obtain less biased estimates of the standard error of the regression cœfficient, the standard error obtained by fitting the model using the original weights was multiplied by an inflation factor. The inflation factor was defined as the square root of the ratio of the estimated population size to the sample size. These adjusted standard errors were used to calculate confidence intervals.[19] This adjustment procedure does not take into account other aspects of the survey design. Consequently, the results should be interpreted with caution.

Majority began in teens

Most smokers begin daily smoking in their teens. In 1994/95, 16% of 21- to 39-year-olds who had ever smoked daily reported that they had started to do so at age 13 or younger; 55% reported ages 14 to 17; and 15%, ages 18 or 19 . Just 14% had started daily smoking at age 20 or older.

Heavy smoking

Starting to smoke at an early age was associated with heavy smoking in later life, that is, more than 20 cigarettes a day (Table 1). The odds of being a heavy smoker were significantly greater for those who began in early adolescence, compared with those who started at age 20 or older.

Table 1
Odds ratios for heavy smoking,† current daily smokers aged 21 to 39, provinces, 1994/95

Independent variable	Odds ratio	95% confidence interval
Age at onset		
13 or younger	2.47*	1.65, 3.70
14-17	2.33*	1.63, 3.32
18-19	1.13	.73, 1.75
20-39‡	1.00	...
Sex		
Men	1.98*	1.62, 2.41
Women‡	1.00	...
Education		
Less than high school graduation	1.53*	1.16, 2.02
High school graduation/some postsecondary	1.06	.84, 1.35
College or university graduation‡	1.00	...
Major depressive episode§		
Yes	1.30	.93, 1.80
No‡	1.00	...
High chronic stress		
Yes	1.28*	1.04, 1.58
No‡	1.00	...
Low self-esteem		
Yes	.86	.65, 1.15
No‡	1.00	...

Data source: *1994/95 National Population Health Survey*
Note: *The analyses were based on 2,088 respondents who provided information for all variables.*
† More than 20 cigarettes a day
‡ Identifies reference category, for which the odds ratio is always 1.00.
§ In 12 months before NPHS interview. Despite the positive association between major depressive episode and self-esteem, the results of the analysis are similar to those presented here when either of these variables is deleted from the model.
... Figures not applicable
** p <0.05*

A number of other factors were linked with heavy smoking. The odds were greater for men than for women. Educational attainment was also important, as people with less than high school graduation had higher odds of being heavy smokers than did those with college or university graduation.

By contrast, while chronic stress was significantly related to heavy smoking, depression during the last year and low-self esteem were not.

Quitting

Daily smoking in early adolescence was also strongly associated with a lower probability of quitting. For example, just 18% of smokers who started at age 13 or younger had stopped within ten years, compared with 42% of those who started at age 20 or older (Table 2). These results are similar to findings of a local survey in the United States.[13]

Delaying the onset of daily smoking increased the cumulative probability of quitting for both sexes, although there were some differences. Among men who had started daily smoking when they were

Table 2
Cumulative probability of having quit smoking, by age of onset and duration of daily smoking, population aged 21 to 39 who ever smoked daily, provinces, 1994/95

Duration of daily smoking (years)†	Age of onset of daily smoking			
	13 or younger	14-17	18-19	20-39
	Probability of having quit			
1	.01	.02	.02	.06
2	.03	.04	.05	.10
3	.04	.07	.08	.13
4	.06	.10	.10	.16
5	.06	.13	.13	.21
6	.07	.15	.18	.24
7	.09	.17	.20	.28
8	.12	.19	.23	.31
9	.14	.21	.26	.35
10	.18	.22	.28	.42
11	.20	.26	.33	.45
12	.22	.28	.38	.49
13	.25	.30	.40	.51
14	.26	.33	.42	.52
15	.28	.35	.44	.54
16	.29	.37	.45	.55
17	.31	.38	.46	.58

Data source: *1994/95 National Population Health Survey*
† For those who quit smoking, duration refers to period from age of onset to age of quitting.

Psychological variables

The NPHS measures a *major depressive episode (MDE)* with a subset of questions from the Composite International Diagnostic Interview.[20,21] These questions cover a cluster of symptoms for a depressive episode, which are listed in the Diagnostic and Statistical Manual of Mental Disorder (DSM-III-R).[22] Respondents who reported that during the previous 12 months they had experienced a period of at least two weeks when they had felt sad, blue or depressed, or had lost interest in most things that usually give them pleasure, answered a series of questions about that period:

1. During that time, how long did these feelings usually last? (All day long; Most of the day; About half the day; Less than half the day)
2. How often did you feel this way during those two weeks? (Every day; Almost every day; Less often)
3. During those two weeks did you lose interest in most things? (Yes; No)
4. Did you feel tired out or low on energy most of the time? (Yes; No)
5. Did you gain weight, lose weight, or stay about the same? (Gained weight; Lost weight; Stayed about the same; Was on a diet)
6. About how much did you gain/lose?
7. Did you have more trouble falling asleep than you usually do? (Yes; No)
8. How often did that happen? (Every night; Nearly every night; Less often)
9. Did you have a lot more trouble concentrating than usual? (Yes; No)
10. At these times, people sometimes feel down on themselves, no good, or worthless. Did you feel this way? (Yes; No)
11. Did you think a lot about death—either your own, someone else's, or death in general? (Yes; No)

A value of 1 was assigned to any "yes" answer to the "yes/no" questions. For the question on weight, a score of 1 was assigned if the change was at least 10 pounds (4.5 kilograms). For the question on sleep, a score of 1 was assigned if respondents had trouble falling asleep every night or nearly every night. Responses were scored, and the results were transformed into a probability estimate of a diagnosis of MDE. For this article, if the estimate was 0.9 or more, that is, 90% likelihood of a positive diagnosis of MDE, the respondent was considered to have experienced depression. To obtain a probability of 0.9, respondents had to score 5 or more.

To measure *chronic stress*, NPHS respondents were asked whether 11 statements were true or false.[20] A score of 1 was assigned to each "true" response. High chronic stress was defined as a total score of 4 or more. The statements were:

1. You are trying to take on too many things at once.
2. There is too much pressure on you to be like other people.
3. Too much is expected of you by others.
4. You don't have enough money to buy the things you need.
5. Your work around the home is not appreciated.
6. Your friends are a bad influence.
7. You would like to move but you cannot.
8. Your neighbourhood or community is too noisy or too justify polluted.
9. You have a parent, a child, or a partner who is in very bad health and may die.
10. Someone in you family has an alcohol or drug problem.
11. People are too critical of you and what you do.

Self-esteem measures the "positiveness" with which individuals regard themselves.[23] On a five-point scale from "strongly disagree" (score 0) to "strongly agree" (score 4), NPHS respondents replied to six statements. A score of less than 18 was chosen to indicate low self-esteem.

1. You feel that you have a number of good qualities.
2. You feel that you are a person of worth at least equal to others.
3. You are able to do things as well as most other people.
4. You take a positive attitude toward yourself.
5. On the whole, you are satisfied with yourself.
6. All in all, you are inclined to feel you're a failure (scoring reversed).

younger than 20, the probability of quitting was relatively low and varied little by age of initiation (Chart 1). Among women, the probability of quitting was lowest for those who had started smoking at age 13 or younger. For women who had started ages 18 or 19, the probability of quitting was about the same as that for women who had started at age 20 or older.

Even among those who smoked fewer than 20 cigarettes a day, a younger age of onset was associated with a lower probability of quitting (data not shown).

The relationship between the age of starting to smoke and quitting persisted after controlling for some potential confounding factors such as education, income, and psychological state (Table 3). For women, the probability of quitting was significantly higher among those who had started at successively older ages, compared with the group who started daily smoking at age 13 or younger. But for men, the association was significant only for those who started at age 20 or older.

When the study population was divided into two age groups (21 to 29, 30 to 39), the effect of age of onset on smoking cessation still held (data not shown).

Limitations

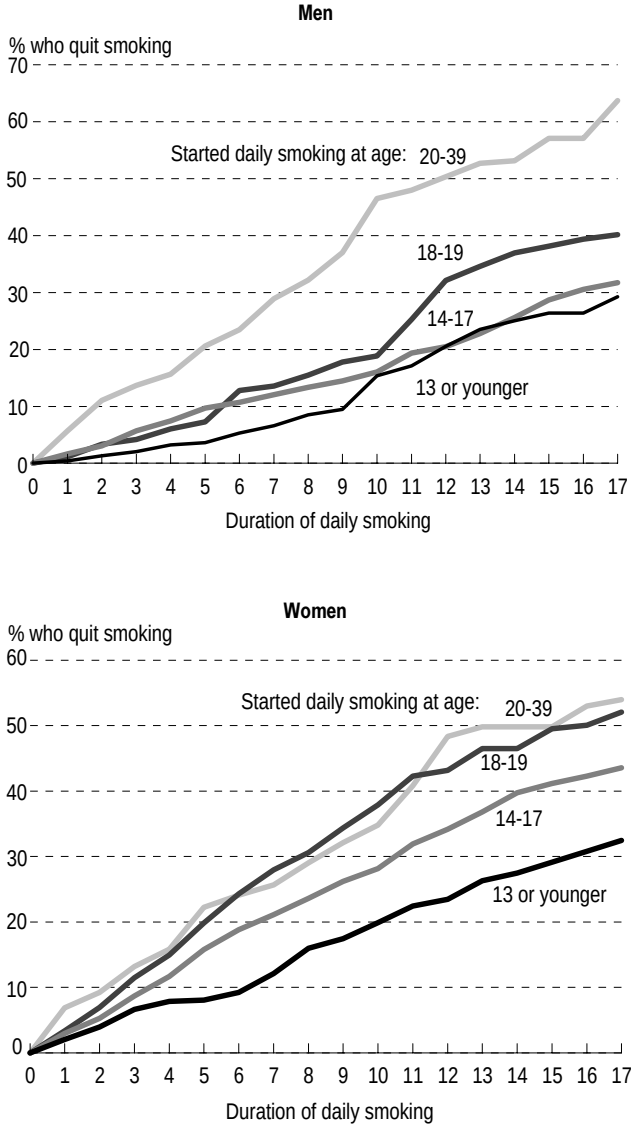
Except for age at smoking initiation, the variables used in the model refer to the characteristics of respondents when they were interviewed. These characteristics, especially psychological status, may have been different when respondents started and stopped smoking. Particularly for people who no longer smoke, these measures may not reflect psychological health at the time of cigarette use.

From NPHS data, the exact age when an individual became a daily smoker cannot be precisely determined. The progression from experimental to regular smoking can take several years and can involve shifts between experimentation, quitting, occasional smoking, and daily smoking. For some people, smoking cessation may involve a series of relapses before they finally quit. Moreover, these data are based on the respondents' recall, and so are subject to error. However, the use of a relatively narrow age group for analysis—21 to 39—may have controlled for some of the bias.

Education, depression and stress associated with quitting

For both male and female smokers, education was also significantly associated with quitting. Compared with smokers who had not completed high school, those who had graduated from a postsecondary institution had a greater likelihood of having quit. Among women, the probability of quitting was also significantly elevated among high school graduates.

Chart 1
Cumulative probability of having quit smoking, by sex and age of onset and duration† of daily smoking, population aged 21 to 39 who ever smoked daily, provinces, 1994/95



Data source: *1994/95 National Population Health Survey*
† For those who quit smoking, duration refers to period from age of onset to age of quitting.

Earlier research has shown that people who have at some time experienced depression are more likely to smoke.[16,24-28] In turn, attempts to quit may lead to the development of depressive symptoms among some smokers.[25] Two psychological variables—depression and chronic stress—were also significantly associated with a lower likelihood of quitting, but only among female smokers. That is, women who reported having had a major depressive episode in the past year and those who scored high on chronic stress were less likely to have quit. And while the association between quitting and self-esteem was not statistically significant, this may be because of the strong relationship between depression and self-esteem.

Table 3
Hazard ratio for having quit smoking, men and women aged 21 to 39 who ever smoked daily, provinces, 1994/95

	Men		Women	
	Hazard ratio	95% confidence interval	Hazard ratio	95% confidence interval
Age at onset				
13 or younger†	1.00	...	1.00	...
14-17	1.04	.80, 1.36	1.28*	1.03, 1.59
18-19	1.25	.90, 1.73	1.48*	1.12, 1.95
20-39	2.49*	1.80, 3.44	1.55*	1.14, 2.09
Education				
Less than high school†	1.00	...	1.00	...
High school graduation/ some postsecondary	1.19	.91, 1.57	1.63*	1.27, 2.09
College/university graduation	1.56*	1.18, 2.07	2.14*	1.65, 2.77
Household income				
Quintiles 1,2 (inadequate)†	1.00	...	1.00	...
Quintile 3	1.16	.87, 1.56	1.07	.84, 1.35
Quintile 4	1.17	.88, 1.56	1.30*	1.04, 1.62
Quintile 5 (high)	1.34	.96, 1.87	1.73*	1.32, 2.25
Major depressive episode‡				
Yes	.52	.27, 1.00	.51*	.36, .72
No†	1.00	...	1.00	...
High chronic stress				
Yes	.80	.64, 1.00	.65*	.55, .78
No†	1.00	...	1.00	...
Low self-esteem				
Yes	.95	.68, 1.32	.90	.71, 1.16
No†	1.00	...	1.00	...
Smoked more than 20 cigarettes daily				
Yes	.62*	.51, .76	.85	.70, 1.02
No†	1.00	...	1.00	...

Data source: *1994/95 National Population Health Survey*
Note: *The analyses were based on 1,415 male respondents and 1,808 female respondents who provided information for all variables.*
† Identifies reference category, for which the hazard ratio is always 1.00.
‡ In 12 months before NPHS interview
... Figures not applicable
** p <0.05*

Some other factors were also associated with quitting smoking for one sex, but not for the other in the multivariate analysis. For example, the relationship between household income and quitting was significant only for women. Women residing in households in the two highest income quintiles were more likely to have quit than were those in the lowest quintile. On the other hand, the amount that an individual smoked significantly reduced the likelihood of quitting only among men; heavy smoking by women did not significantly reduce their chances of quitting. This may be because women tend to smoke lower tar/nicotine cigarettes.[29,30]

Implications

The 1994/95 National Population Health Survey found that the majority of smokers start in adolescence, and this affects the amount that they smoke and their chances of quitting in later life. Other research has shown similar results.[12,13,15] Thus, while preventing smoking initiation altogether is most desirable, delaying it by even a few years might have both individual and public-health benefits.

A central question is why such a delay makes a difference in the ability to quit. It might be that physical dependence on nicotine is greater if the person starts smoking at a younger age. An early age of smoking initiation could also mean that the psychological and/or social factors that contribute to dependency are stronger.

This issue has taken on added importance in light of a recent increase in teenage smoking. In 1990, 21% of 15- to 19-year-olds were smokers, but by 1994/95, the percentage had risen to 28%.[31] At the same time, smoking declined among most other age groups.

The age of smoking initiation may be an indicator for factors that were not accounted for in this analysis. Smoking at an early age may reflect family influences.[32] Studies have shown that the prevalence of smoking among children, their overall level of

cigarette consumption, and the tar/nicotine levels of cigarettes smoked by children are directly associated with the smoking practices of adults in the household.[33,34] Adult behaviour may communicate messages to children about the health risks and motivations associated with smoking.

As well, persistence in smoking over time may indicate greater social support for smoking, not only at home, but also at work. Smoking at an early age may be a marker for lower socioeconomic status. These smokers, in turn, may be selected into occupational groups with few constraints on workplace smoking.[35]

Prevention of smoking among adolescents and encouraging those who do smoke to quit are major objectives of programs to control tobacco use in Canada.[36] There is growing recognition that no single anti-smoking effort is likely to be successful, and multi-faceted approaches have been adopted.[37,38] For instance, the availability of cigarettes has been reduced by banning the sale of tobacco products from vending machines and restricting sales to persons over age 19. Restrictions on the advertising of cigarettes, taxation increases, and community smoking by-laws transmit a message that smoking is not desirable.[39] The NPHS data also suggest that the inclusion of information about the management of stress and depression may be important in smoking prevention programs.

One of the principles behind current efforts to reduce adolescent smoking is that prevention must be focused on strategic points in the smoking continuum. The NPHS data indicate that early adolescence is one of those points and that a delay of even a few years in the initiation of smoking could have a positive influence in later life.

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Appendix

Table A
Distribution of selected characteristics of population aged 21 to 39 who ever smoked daily, provinces, 1994/95

	Sample size	Weighted % distribution
Total	**3,449**	**100.0**
Age at onset		
13 or younger	575	16.4
14-17	1,889	54.7
18-19	511	15.2
20-39	460	13.5
Not stated or unknown	14	0.3
Sex		
Male	1,574	49.3
Female	1,875	50.7
Education		
Less than high school graduation	729	19.2
High school graduation/some postsecondary	1,718	49.9
College or university graduation	1,000	30.9
Not stated or unknown	2	0.1
Household income		
Quintiles 1, 2 (inadequate)	813	19.8
Quintile 3	1,043	29.3
Quintile 4	1,198	35.6
Quintile 5 (high)	302	12.1
Not stated or unknown	93	3.2
Major depressive episode		
Yes	320	7.5
No	3,008	88.0
Not stated or unknown	121	4.5
High chronic stress		
Yes	1,104	30.9
No	2,232	64.7
Not stated or unknown	113	4.3
Low self-esteem		
Yes	490	12.8
No	2,843	82.9
Not stated or unknown	116	4.4
Smoke more than 20 cigarettes daily		
Yes	942	27.1
No	2,502	72.6
Not stated or unknown	5	0.3

Data source: *1994/95 National Population Health Survey*
Note: *Because of rounding, percentages may not add to 100%.*

Reports

This section presents descriptive articles in the fields of health and vital statistics.

The health of Northern residents

Brent Diverty and Claudio Pérez

Abstract

Objectives

This article examines differences in health status and health determinants between residents of the North (Yukon and Northwest Territories) and of the provinces, and between Aboriginal and non-Aboriginal territorial residents. The use of health services and medications is also analyzed.

Data source

The data are from the 1994/95 National Population Health Survey (NPHS), both the territorial and provincial components. The population analyzed consists of household residents aged 12 and older.

Main results

Compared with non-Aboriginal Northerners, Aboriginal people in the territories more frequently rated their health poorly. However, they reported fewer injuries and diagnosed chronic conditions. The prevalence of alcohol consumption was lower among Aboriginal people, while the proportion of smokers was substantially higher. A lower proportion of Aboriginal territorial residents had consulted a general practitioner in the previous year, and a higher proportion had consulted a nurse. Aboriginal people also had a low rate of medication use.

Key words

Yukon, Northwest Territories, Indians – North American, Inuit, Métis, health status, health determinants, health services, delivery of health care

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Despite a remote location, and consequently, relatively less access to medical facilities, the health of people who live in the Yukon and the Northwest Territories differs little from that of provincial residents. The health characteristics of non-Aboriginal Northerners and provincial residents are generally similar. However, the health profile of Aboriginal people in the North is different, in some cases, more favourable, in others, less so, than that of non-Aboriginal Northerners.

Understanding these differences is essential in the provision of health care that is universal and equitable across Canada. The National Population Health Survey (NPHS), which covers both the provinces and the North, allows such comparisons.

This article examines the health status, health determinants, contact with health care professionals, and medication use of residents of the territories, compared with the provinces (see *Methods* and *Definitions*). It also explores differences between Aboriginal and non-Aboriginal territorial residents and between the Yukon and the Northwest Territories.

Methods

Data source

The data in this article are from the 1994/95 National Population Health Survey (NPHS), both the provincial and territorial components, the latter of which covered the Yukon and the Northwest Territories.[1,2] Data collection for the provincial component began in June 1994 and finished in June 1995; for the territorial component, the corresponding dates were November 1994 and March 1995. The population analyzed in this article consists of household residents aged 12 and older, not living on Canadian Forces bases or in institutions. The provincial component excluded people living on Indian reserves. However, residents of Indian reserves and settlements were included in the territorial component. Because of logistical problems, unorganized, very small, or remote areas were excluded from the territorial component.

The NPHS non-institutional sample for the provinces consisted of 27,263 households, of which 88.7% agreed to participate. After the application of a screening rule, 20,725 households remained in scope.

One randomly selected person in each of the 20,725 participating households was chosen to provide in-depth information about their own health. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to these in-depth health questions was 96.1%, or 17,626 respondents. In the remaining 2,383 participating households, the randomly selected respondent was younger than age 12.

The initial sample size for the territories was 4,131 households. At the household level, the survey response rate was 82.1%. After screening, 2,756 of the respondent households remained in the survey, of which 2,145 had a member aged 12 or older randomly selected to answer in-depth health questions. Of these, 94.2%, or 2,020 persons, responded.

Sample sizes and weighted counts for the variables examined in this analysis are provided in Appendix Tables A and B. Appendix Table C shows territorial data age-adjusted to the 1994/95 population of the provinces. Further information on the methodology, sample design, questionnaire and calculation of response rates for the territories can be found in the survey documentation.[2]

Analytical techniques

Proportions were estimated using the NPHS sample weights, which total to the target population at the time of collection. Differences in proportions were tested using the chi-square statistic after weights were standardized to average 1. This reduces the bias of the chi-square statistic, but does not take into account the design effect of the survey. Therefore, the p value was set at .01. This p-value, combined with some loss in statistical power because of small sample sizes, results in several apparently large differences in percentages that are not statistically significant.

Some of the differences between the Aboriginal and non-Aboriginal population of the territories were thought to reflect the young age profile of the former. Age-standardization, however, did not substantially change the patterns.

Limitations

Residents of unorganized, very small, or remote areas account for 13% of the Yukon population and 5% of the Northwest Territories population. If the characteristics of these people differ considerably from those of the population in the sample, their exclusion might result in biased estimates. Findings about contact with health professionals, in particular, would be affected.

The health characteristics of territorial residents reflect the high proportions of Aboriginal people (20% in the Yukon and 54% in the Northwest Territories). Aboriginal people make up much smaller shares of the provincial populations, and their effect on the provincial results was even further reduced by the exclusion of Indian reserves from the NPHS provincial target populations.

The definition of Aboriginal people used for the NPHS does not match that of the Census. To be consistent with the processing of the provincial component of the NPHS, weights for the territorial data were calibrated according to known age/sex population totals; ethnicity was not controlled for. Therefore, the percentages of Aboriginal people in the territories and provinces reported in this analysis differ from Census counts.

As with all self-reported data, NPHS results are subject to recall errors and misinterpretation of questions. In addition, cultural differences between Aboriginal and non-Aboriginal people with respect to the appropriateness of reporting various health conditions and service utilization would affect the results of the analysis.

Territorial Aboriginal people report poorer health

Self-perceived health status is a reliable indicator of health.[3] The NPHS asked respondents to assess their general health. Overall, the proportions of territorial and provincial residents who rated their health as "very good" or "excellent" were not significantly different. However, a much lower percentage of Aboriginal than non-Aboriginal people in the territories assessed their health at this high level: 47% versus 69% (Table 1).

Fewer chronic conditions, injuries

Although Aboriginal people in the territories rated their health less positively, in some respects it was as good or better than that of non-Aboriginal Northerners. For instance, a smaller share of Aboriginal people reported one or more diagnosed chronic conditions.

It would seem intuitive that the relatively low prevalence of chronic conditions among Aboriginal people might be attributable to their young age profile. But even when the results were adjusted to the non-Aboriginal age distribution, the gap persisted. (The rate for Aboriginal people changed only slightly from 45% to 46%.)

This result may be due to cultural differences in the propensity to disclose health-related information, or it may be that a substantial number of Aboriginal people have *undiagnosed* conditions. Alternatively, of course, the difference may be real. It should, however, be noted that this difference existed only in the Northwest Territories; the proportions of Aboriginal and non-Aboriginal people with chronic conditions were identical in the Yukon (Table 2).

Relatively few Aboriginal Northerners reported suffering a serious injury in the previous year. Just 18% of Aboriginal people in the territories reported having had a serious injury, almost the same as the figure for provincial residents. By contrast, 26% of non-Aboriginal Northerners had been seriously injured. As was the case for chronic conditions, this gap reflects the situation in the Northwest Territories. In the Yukon, there was no significant difference between Aboriginal and non-Aboriginal rates of injury.

Table 1
Health indicators, territorial and provincial† residents aged 12 and older, by Aboriginal status, 1994/95

	Territorial residents			
	Total	Aboriginal	Non-Aboriginal	Provincial residents
		%		
Health status				
Perceived health status				
Very good/excellent	59	47‡	69	63
Poor/fair	9	12‡	7	10
One or more chronic conditions	51	45‡	55	54
Injury in last 12 months	22	18‡	26	17
Long-term activity restriction	13	13	12	16
Major depressive episode in last 12 months	4	--	--	5
Health determinants				
Smoking (daily or occasional)	49§	67‡	34	29
Physically active leisure time	24	20‡	28	19
Drinking (regular or occasional)	70	59‡	78	75
Contact with health professionals in last 12 months				
General practitioner	50§	36‡	60	77
Dentist	51	46‡	54	56
Eye specialist	33	34	33	35
Nurse	27§	41‡	18	7
Other medical doctor††	16	14	18	26
Social worker	11	16‡	6	5
Medication use in last month				
Any medication	64	58‡	70	77
Pain reliever	55	49‡	59	61
Cough/cold	23	21	24	16
Allergy	7	4‡	9	10

Source: *1994/95 National Population Health Survey*
Note: *Categories for a given variable were tested simultaneously.*
† Provincial data exclude Indian reserves.
‡ Difference between Aboriginal and non-Aboriginal territorial residents is significant at 99% confidence level.
§ Difference between territorial and provincial residents is significant at 99% confidence level.
†† For example, surgeon, allergist, gynecologist, psychiatrist
-- Number of respondents in cell is too small to provide a reliable estimate.

Differences between the proportions of territorial and provincial residents, or between Northern Aboriginal and non-Aboriginal people, who had long-term activity restrictions were not significant. In addition, the proportions who had experienced a major depressive episode were similar for the provinces and territories.

Definitions

Respondents who indicated that their ethnic origin was "Native/ Aboriginal peoples of North America (North American Indian, Métis, Inuit/Eskimo)" were considered to be Aboriginal. Those whose ethnicity was in any other category, including multiple categories (such as Aboriginal/non-Aboriginal combinations), were considered "non-Aboriginal." The number of respondents who reported an Aboriginal/non-Aboriginal combination was very small.

To measure *self-perceived health status*, respondents were asked: "In general, would you say your health is: excellent, very good, good, fair or poor?"

To measure the prevalence of *chronic conditions*, the NPHS asked: "Do you have any of the following long-term conditions that have been diagnosed by a health professional: food allergies, other allergies, asthma, arthritis or rheumatism, back problems excluding arthritis, high blood pressure, migraine headaches, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of stroke, urinary incontinence, acne requiring prescription medication (respondents younger than 30), Alzheimer disease or other dementia, cataracts, glaucoma (the last three were not asked if respondents were younger than 18), any other long term condition?" The chronic conditions variable in this analysis is a general indicator; specific chronic conditions (such as diabetes) were not examined because of small sample sizes.

To measure *long-term activity restriction,* respondents were asked: "Because of a long-term physical or mental condition or a health problem, are you limited in the kind or amount of activity you can do: at home, at school, at work, in caring for children?"

To determine whether respondents had suffered an *injury*, they were asked: "In the past 12 months, did you have any injuries that were serious enough to limit your normal activities?"

Respondents who were daily or occasional smokers were classified as *smokers*.

If respondents were regular (one drink at least once a month) or occasional drinkers (less than one drink a month), they were classified as *drinkers*. Although it would have been preferable to examine heavy drinking or binge drinking, this was not possible because of high non-response rates or small sample sizes.

The NPHS, utilizing the methodology of Kessler et al.,[4] measures a *major depressive episode* (MDE) with a subset of questions from the Composite International Diagnostic Interview. These questions cover a cluster of symptoms for depressive disorder, which are listed in the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R). Responses to these questions are scored on a scale and transformed into a probability estimate of a diagnosis of MDE. If this estimate was 0.9 or greater, that is, 90% certainty of a positive diagnosis, then the respondent was considered to have experienced an MDE in the previous 12 months.

To derive respondents' level of *physical activity*, their energy expenditure (EE) was estimated for each activity they engaged in during leisure time. EE was calculated by multiplying the number of times respondents engaged in an activity over a 12-month period (a three-month recall period multiplied by 4), by the average duration in minutes, and by the energy cost of the activity (expressed in kilocalories expended per kilogram of body weight per hour of activity). To calculate an average daily EE for the activity, the estimate was divided by 365. This calculation was repeated for all leisure time activities reported, and the resulting estimates were summed to provide an aggregate average daily EE. Respondents with an estimated EE below 1.5 were considered physically inactive. This index does not take account of workplace physical activity, which is an important health determinant. In addition, the activities about which respondents were queried may not accurately reflect a rural lifestyle.

Respondents' *contact with health care professionals* was measured by asking: "(Not counting when you were an overnight patient, if applicable) In the past 12 months, have you seen or talked on the telephone with a health professional about your physical, emotional or mental health?" The list of health professionals consisted of: general practitioner or family physician; eye specialist (such as ophthalmologist or optometrist); other medical doctor (such as surgeon, allergist, gynecologist, psychiatrist); nurse; dentist or orthodontist; physiotherapist; social worker or counsellor; psychologist; and speech, hearing or occupational therapist.

To measure *medication use*, respondents were asked: "In the past month, did you take any of the following medications?" The medications listed were: pain relievers such as aspirin or tylenol (includes arthritis medicine and anti- inflammatories); tranquilizers such as valium; diet pills; anti-depressants; codeine, Demerol or morphine; allergy medicine; asthma medications; cough or cold remedies; penicillin or other antibiotic; medicine for the heart; medicine for blood pressure; diuretics or water pills; steroids; insulin; pills to control diabetes; sleeping pills; stomach remedies; laxatives; hormones for menopause or aging symptoms (women aged 30 and older); birth control pills (females younger than than 50); and any other medication.

Smoking more prevalent

Unlike most other measures of health examined by the NPHS, the prevalence of smoking in the North differs significantly from that in the provinces. Close to half of Northern residents (49%) were daily or occasional smokers, compared with just 29% of provincial residents.

These figures reflect high smoking rates among Aboriginal people. Two-thirds of Aboriginal residents of the territories were smokers, compared with a third of non-Aboriginal people. In addition, the Aboriginal majority in the Northwest Territories resulted in a higher prevalence of smoking there than in the Yukon (53% versus 38%).

The NPHS indicates that Aboriginal people became daily smokers at a younger age than did non-Aboriginal people (an average of 15.7 versus 16.9 years of age). However, the average daily cigarette consumption of Aboriginal smokers was somewhat less than that of their non-Aboriginal counterparts: 13 compared with 19 cigarettes.

Leisure time

Aboriginal Northerners were just as active in their leisure time as provincial residents. The 20% of Aboriginal residents of the territories who spent leisure time in active pursuits matched the 19% of provincial residents who did so. Non-Aboriginal

Table 2
Health indicators, Northwest Territories and Yukon residents aged 12 and older, by Aboriginal status, 1994/95

	Northwest Territories			Yukon		
	Total	Aboriginal	Non-Aboriginal	Total	Aboriginal	Non-Aboriginal
	%					
Health status						
Perceived health status						
Very good/excellent	60	47†	75	58	43†	62
Poor/fair	9	11†	6	10	15†	8
One or more chronic conditions	48‡	43	53	56	56	56
Injury in last 12 months	21	17†	27	24	23	24
Long-term activity restriction	12	12	9	15	18	15
Major depressive episode in last 12 months	4	--	--	4	--	--
Health determinants						
Smoking (daily or occasional)	53‡	70†	34	38	55†	35
Physically active leisure time	23	19†	28	27	27	27
Drinking (regular or occasional)	67‡	59†	77	76	61†	80
Contact with health professionals in last 12 months						
General practitioner	43‡	33†	54	64	59	66
Dentist	53‡	46†	61	46	45	47
Eye specialist	34	34	35	32	29	32
Nurse	32‡	43†	20	17	27†	15
Other medical doctor§	17‡	15	22	13	--	--
Social worker	12‡	--	--	7	--	--
Medication use in last month						
Any medication	58‡	54	61	77	76	78
Pain reliever	51‡	47	55	63	62	65
Cough/cold	21‡	19	22	27	33	26
Allergy	6	--	--	9	--	--

Source: *1994/95 National Population Health Survey*
Note: *Categories for a given variable were tested simultaneously.*
† Difference compared with non-Aboriginal is significant at 99% confidence level.
‡ Difference compared with Yukon is significant at 99% confidence level.
§ For example, surgeon, allergist, gynecologist, psychiatrist
-- Number of respondents in cell is too small to provide a reliable estimate.

Northerners, however, were more active than either of these groups, with 28% reporting active leisure time.

Alcohol consumption

A smaller proportion of Aboriginal than non-Aboriginal Northerners reported alcohol consumption. Just 59% of Aboriginal people were regular or occasional drinkers, whereas non-Aboriginal residents of the territories were as likely as provincial residents to be drinkers (78% and 75%, respectively). Other research, however, indicates that when they do consume alcohol, Aboriginal people are more likely than non-Aboriginal people to have five or more drinks.[5]

The relatively small percentage of Aboriginal Northerners who were regular or occasional drinkers is due, in part, to liquor restrictions in the Northwest Territories.[5] While the proportion of Yukon residents who drink was similar to the rate for the provinces, the Northwest Territories had among the lowest percentages of drinkers in Canada.

Few report barriers to health care

The principles of universal access and equity in the distribution of health care services are especially difficult to achieve in the North. Even so, just 6% of Yukon residents and 7% of residents of the Northwest Territories reported that there had been a time during the previous year when they had needed health care or advice and had not received it. Although these figures surpass the 4% of provincial residents who reported difficulty receiving needed health care or advice, the difference was not statistically significant. There was no difference in the percentage of Aboriginal and non-Aboriginal Northerners reporting that they did not receive the attention they required (data not shown).

Less contact with doctors, more with nurses

Although most Northerners received health care services when they needed them, the sources of this care differed from those commonly used in the provinces. Except for the urban areas, health care in Northern communities is typically delivered in nursing stations or health centres rather than in doctors' offices and hospitals. As well, some health care services are not accessed in the same way in the territories as in the provinces. For example, dentists make annual visits to many Northern communities, rather than occupying a clinic year round. Also, severely ill people may be transferred out of the territories to medical facilities elsewhere in Canada.

Just 50% of people in the territories had consulted general practitioners in the previous year, well below the figure for provincial residents (77%). This is not surprising, as in 1993, there was one physician for every 695 people in the Yukon and one for every 1,068 in the Northwest Territories, compared with one for every 476 in Canada overall.[6] On the other hand, the 27% of Northern residents who had consulted a nurse was substantially higher than the 7% who had done so in the provinces. As well, many nurses in the North have received additional training to perform extended duties such as determining presenting diagnoses and administering treatment (under the standing order of a doctor).

To a large extent, the health care utilization patterns of the Northern population reflect those of Aboriginal people. According to the NPHS, Aboriginal residents of the territories were much less likely than non-Aboriginal Northerners to have seen a general practitioner in the previous year (36% versus 60%) and much more likely to have seen a nurse (41% versus 18%). Similarly, in the North, Aboriginal people were less likely than non-Aboriginal people to have seen dentists. These trends were most pronounced in the Northwest Territories.

Medication use

Aboriginal Northerners were less likely than the non-Aboriginal population to report having used prescription drugs and over-the-counter medications in the month before they were interviewed (58% versus 70%). Not unexpectedly, given the large

proportion of Aboriginal people in the Northwest Territories, medication use was lower there than in the Yukon (58% versus 77%). In fact, the Northwest Territories had the lowest proportion of people reporting medication use of any province or territory.

As in the provinces, pain relievers were the drugs most commonly taken in the North, followed by cough or cold remedies and allergy medications.

Concluding remarks

The overall health profile of residents of the Yukon and Northwest Territories did not differ significantly from that of provincial residents in 1994/95. By contrast, differences between Aboriginal and non-Aboriginal Northerners were substantial. These differences were not consistently in one direction, as exemplified by the proportions of drinkers and smokers.

Certain health differences between Aboriginal and non-Aboriginal people, even though statistically significant, could result from cultural influences on the propensity to report or from varying rates of diagnosis. For instance, the relatively small proportion of Aboriginal people with diagnosed chronic conditions might have been a result of their low rates of contact with physicians.

While this article provides only a very general overview of health and the utilization of services in the North, it establishes baseline figures that can be compared with future NPHS cycles to identify trends.

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Appendix

Table A
Sample size and weighted counts for health indicators, territorial and provincial† residents aged 12 and older, by Aboriginal status, 1994/95

	Territorial residents						Provincial residents	
	Total		Aboriginal		Non-Aboriginal			
	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count
		'000		'000		'000		'000
Total	**2,020**	**65.2**	**637**	**28.1**	**1,282**	**33.0**	**17,626**	**23,948.6**
Health status								
Perceived health status								
Very good/excellent	1,195	38.7	284	13.1	838	22.7	10,737	15,106.7
Poor/fair	195	5.9	88	3.3	101	2.3	2,226	2,480.9
One or more chronic conditions	1,096	33.1	312	12.7	723	18.0	10,112	12,950.9
Injury in last 12 months	459	14.2	125	4.9	315	8.5	3,000	4,164.7
Long-term activity restriction	289	8.3	95	3.7	184	4.0	3,383	3,929.1
Major depressive episode in last 12 months	91	2.5	--	--	--	--	1,043	1,255.6
Health determinants								
Smoking (daily or occasional)	909	31.8	415	19.0	454	11.2	5,462	7,022.6
Physically active leisure time	513	15.9	131	5.7	354	9.2	3,211	4,448.6
Drinking (regular or occasional)	1,494	45.6	381	16.6	1,039	25.8	13,245	18,070.9
Contact with health professionals in last 12 months								
General practitioner	1,158	32.7	263	10.2	834	19.8	13,821	18,442.1
Dentist	966	33.2	287	13.0	628	17.9	9,231	13,443.4
Eye specialist	659	21.5	212	9.4	424	11.0	6,118	8,383.7
Nurse	473	17.8	243	11.4	217	5.8	1,399	1,683.2
Other medical doctor‡	299	10.3	80	3.9	205	5.9	4,509	6,263.5
Social worker	194	6.8	99	4.6	91	2.1	978	1,152.8
Medication use in last month								
Any medication	1,429	41.8	402	16.2	963	22.9	13,816	18,340.3
Pain reliever	1,193	35.8	342	13.9	797	19.6	11,057	14,610.9
Cough/cold	483	15.0	145	6.0	312	7.9	2,662	3,823.8
Allergy	159	4.6	35	1.2	117	3.1	1,760	2,370.1

Data source: *1994/95 National Population Health Survey*
Note: *Because of non-response to some questions, detail does not add to totals.*
† Provincial data exclude Indian reserves.
‡ For example, surgeon, allergist, gynecologist, psychiatrist
-- Number of respondents is too small to provide a reliable estimate.

Table B
Sample size and weighted counts for health indicators, Northwest Territories and Yukon residents aged 12 and older, by Aboriginal status, 1994/95

	Northwest Territories						Yukon					
	Total		Aboriginal		Non-Aboriginal		Total		Aboriginal		Non-Aboriginal	
	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count	Sample size	Weighted count
		'000		'000		'000		'000		'000		'000
Total	**740**	**44.5**	**410**	**24.0**	**265**	**16.9**	**1,280**	**20.8**	**227**	**4.1**	**1,017**	**16.1**
Health status												
Perceived health status												
Very good/excellent	437	26.7	188	11.4	201	12.7	758	12.1	96	1.7	637	9.9
Poor/fair	69	3.9	53	2.7	13	1.0	126	2.0	35	0.6	88	1.4
One or more chronic conditions	373	21.4	183	10.4	150	8.9	723	11.7	129	2.3	573	9.0
Injury in last 12 months	148	9.3	67	4.0	69	4.6	311	4.9	58	0.9	246	3.9
Long-term activity restriction	91	5.1	57	3.0	26	1.6	198	3.2	38	0.7	158	2.4
Major depressive episode in last 12 months	31	1.7	--	--	--	--	60	0.8	--	--	--	--
Health determinants												
Smoking (daily or occasional)	407	23.8	287	16.7	94	5.7	502	8.0	128	2.2	360	5.6
Physically active leisure time	158	10.2	71	4.6	72	4.8	355	5.7	60	1.1	282	4.4
Drinking (regular or occasional)	508	29.9	244	14.1	212	13.0	986	15.7	137	2.5	827	12.8
Contact with health professionals in last 12 months												
General practitioner	327	19.3	132	7.8	152	9.1	831	13.3	131	2.4	682	10.7
Dentist	381	23.7	184	11.2	158	10.3	585	9.6	103	1.8	470	7.5
Eye specialist	250	14.9	142	8.2	92	5.8	409	6.5	70	1.2	332	5.2
Nurse	257	14.3	182	10.3	63	3.5	216	3.5	61	1.1	154	2.4
Other medical doctor†	128	7.7	59	3.6	60	3.7	171	2.6	--	--	--	--
Social worker	96	5.4	--	--	--	--	98	1.4	--	--	--	--
Medication use in last month												
Any medication	441	25.8	232	13.1	165	10.3	988	16.0	170	3.1	798	12.6
Pain reliever	383	22.6	199	11.3	144	9.2	810	13.2	143	2.5	653	10.4
Cough/cold	153	9.4	77	4.7	58	3.7	330	5.6	68	1.3	254	4.2
Allergy	45	2.8	--	--	--	--	114	1.8	--	--	--	--

Data source: *1994/95 National Population Health Survey*
Note: *Because of non-response to some questions, detail does not add to totals.*
† For example, surgeon, allergist, gynecologist, psychiatrist
-- Number of respondents is too small to provide a reliable estimate.

Table C
Age-adjusted health indicators, territorial and provincial† residents aged 12 and older, 1994/95

	Territorial residents	Provincial residents
	%	
Health status		
Perceived health status		
Very good/excellent	54	63
Poor/fair	13	10
One or more chronic conditions	56	54
Injury in last 12 months	20	17
Long-term activity restriction	17	16
Major depressive episode in last 12 months	3	5
Health determinants		
Smoking (daily or occasional)	47	29
Physically active leisure time	22	19
Drinking (regular or occasional)	66	75
Contact with health professionals in last 12 months		
General practitioner	51	77
Dentist	47	56
Eye specialist	35	35
Nurse	29	7
Other medical doctor‡	17	26
Social worker	9	5
Medication use in last month		
Any medication	65	77
Pain reliever	55	61
Cough/cold	22	16
Allergy	6	10

Data source: *1994/95 National Population Health Survey*
Note: *Territorial data are age-standardized to the 1994/95 population of the provinces (both sexes).*
† Provincial data exclude Indian reserves.
‡ For example, surgeon, allergist, gynecologist, psychiatrist

Data Releases

This section presents synopses of recent health information produced by Statistics Canada.

Marriages and divorces, 1996

Fewer couples married in 1996, but at the same time far fewer officially ended their marriages. A total of 156,692 couples married in Canada in 1996, down 2.2% from 1995. Meanwhile, 71,528 couples were divorced, down 7.9%.

The number of divorces was the lowest since 1985. Amendments to the Divorce Act came into effect in 1986, allowing divorce after one year of separation instead of three. Those amendments resulted in a record 96,200 divorces in 1987. The number of divorces fell abruptly the next year, then levelled off, fluctuating between 77,000 and 79,000 during the 1990s.

Ontario and Quebec were largely responsible for the overall drop in divorces in 1996. In Ontario, 25,035 couples officially ended their marriages, a 14.7% decline from 1995, and the lowest level since 1985. In Quebec, 18,078 couples obtained divorces, down 10.2%. The decline in Quebec followed an increase of just over 10% in 1995.

Divorces declined slightly in all other provinces except British Columbia, where they went up 5%, and Newfoundland, where they rose 8%. The Yukon and the Northwest Territories recorded slight increases.

The number of marriages declined in every province except Prince Edward Island, Nova Scotia and New Brunswick, where marginal increases were recorded.

A number of factors may explain the 7.9% decline in 1996. Given that the incidence of divorce peaks after five or six years of marriage, one factor could be the decline in marriages nationally between 1990 and 1991. However, it is unlikely this event acted in isolation.

Many couples settle a marriage breakdown through separation agreements that need not be followed by a legal divorce. The 1996 decline in divorces could have been partly offset by an increase in legal separations.

Although statistics on legal separations are not available, there was a reduction in the number of divorces funded by legal aid in Ontario. (Ontario accounted for 35% of divorces nationally in 1996.)

According to The Law Society of Upper Canada 1997 Annual Report on The Ontario Legal Aid Plan, the number of completed divorce cases funded by this program dropped to 5,800 in the April 1996-March 1997 fiscal year, down from 11,600 the year before. Given that the cost of divorce may induce some couples to remain legally separated, reduced legal aid funding may have contributed to the falling divorce rate in Ontario, particularly among lower-income couples.

Marriage stability can be estimated using divorce rates according to years of marriage. Based on 1996 divorce rates, the percentage of marriages expected to end in divorce declined to 37% nationally, compared with 40% based on 1995 rates. In Quebec, 46% of marriages could be expected to end in divorce based on 1996 rates, compared with 50% based on 1995 rates. In Ontario, the proportion fell from 39% to 33%.

Continuing a trend observed since the early 1970s, the average age at first marriage rose slightly in 1996: to 29.3 years for men (from 29.0 in 1995) and to 27.3 years for women (from 27.1). Previously divorced persons accounted for 21.8% of newlyweds in 1996, up from 21.0% a year earlier.

The marriage rate (marriages per 1,000 Canadians) fell to 5.2 in 1996, from 5.4 in 1995 (and a high of 7.0 in 1988). The rate in Quebec and the Northwest Territories remained about half that in the rest of Canada.

For further information on this release, contact François Nault (613-951-1764), Health Statistics Division. Available on CANSIM: matrix 7.

Record linkage for biotechnology companies 1991, 1993 and 1995

Data are now available from a record linkage project involving aggregated information on biotechnology companies in Canada for 1991, 1993 and 1995. This project was conducted on behalf of the Bio-industries Branch of Industry Canada.

The aggregated information included but was not limited to financial export, labour, and manufacturing data. The information was also disaggregated by type of biotechnology, province, and size of business.

For further information on this release, contact Bob Patterson (613-941-2366), Bio-industries Branch, Industry Canada, or Tony Labillois (613-951-1478), Health Statistics Division, Statistics Canada.

Postcensal Population Estimates

Each issue of *Health Reports* includes current quarterly population estimates. July 1, 1997 (preliminary) estimates are shown on the following page.

Preliminary postcensal population estimates, by sex and age group, Canada, provinces and territories, July 1, 1997

	Canada	Nfld	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta	B.C.	Yukon	N.W.T.
							'000						
Both sexes	**30,286.6**	**563.6**	**137.2**	**947.9**	**762.0**	**7419.9**	**11407.7**	**1145.2**	**1023.5**	**2847.0**	**3933.3**	**31.6**	**67.5**
<1	363.2	5.6	1.7	10.3	8.1	82.9	139.2	15.5	13.0	38.1	46.9	0.5	1.5
1-4	1552.6	24.3	7.1	44.1	35.4	362.2	594.4	65.2	56.3	159.3	196.5	1.9	5.9
5-9	2049.4	35.4	9.9	63.0	48.8	474.0	777.5	83.5	79.3	214.6	253.1	2.4	8.0
10-14	2027.1	41.2	10.1	64.1	51.5	456.8	758.5	81.5	81.8	215.7	257.2	2.4	6.4
15-19	2024.1	43.2	10.0	63.4	52.3	502.0	731.8	78.7	77.3	203.3	254.5	2.3	5.3
20-24	2034.5	43.7	9.7	65.1	55.3	485.5	750.8	79.7	70.5	202.6	264.0	2.2	5.4
25-29	2203.0	44.3	9.7	68.3	57.0	503.9	851.3	81.0	64.0	218.5	296.2	2.4	6.3
30-34	2564.4	45.7	10.7	77.9	62.5	619.3	1003.7	90.0	73.8	243.8	327.4	3.1	6.5
35-39	2706.0	47.5	11.0	82.9	64.6	674.3	1024.0	95.2	82.7	267.1	347.3	3.3	5.9
40-44	2465.9	47.0	10.2	76.3	62.2	626.5	905.8	86.9	78.0	242.2	323.2	2.9	4.8
45-49	2183.8	43.1	9.6	69.4	57.2	560.0	809.3	76.3	63.8	195.1	293.3	2.8	3.8
50-54	1794.1	34.8	8.0	57.7	45.6	478.7	666.0	62.7	51.0	151.4	233.7	2.0	2.5
55-59	1382.6	25.2	6.1	44.3	34.6	365.6	520.5	48.9	42.3	113.9	178.6	1.0	1.8
60-64	1210.0	21.0	5.6	38.6	29.5	310.9	463.2	43.8	40.0	98.6	156.5	0.8	1.4
65-69	1141.3	18.7	5.0	35.0	28.5	294.0	438.0	42.5	39.5	89.1	149.3	0.8	1.0
70-74	986.1	15.9	4.4	30.4	25.0	246.2	381.9	39.5	36.6	73.4	131.9	0.5	0.6
75-79	743.0	13.0	3.7	26.0	20.3	177.8	278.6	32.6	31.2	55.9	103.4	0.2	0.2
80-84	476.6	8.1	2.6	17.3	13.1	111.1	174.3	22.8	22.8	35.9	68.4	0.1	0.2
85-89	251.6	4.1	1.4	9.2	7.1	58.7	92.1	12.2	12.9	18.5	35.3	0.0	0.1
90+	127.1	1.8	0.8	4.7	3.5	29.6	46.8	6.6	6.7	10.0	16.7	0.0	0.1
Males	**14999.7**	**281.3**	**67.8**	**466.7**	**376.9**	**3657.2**	**5636.3**	**567.8**	**508.3**	**1432.5**	**1953.6**	**16.3**	**35.0**
<1	186.0	2.8	0.9	5.2	4.2	42.5	71.4	7.9	6.5	19.5	24.2	0.2	0.7
1-4	795.8	12.5	3.7	22.8	18.1	185.2	304.5	33.4	28.6	81.8	101.3	0.9	3.0
5-9	1049.5	18.2	5.1	32.4	24.9	242.7	398.3	42.9	40.4	109.9	129.2	1.3	4.2
10-14	1035.4	21.0	5.2	32.6	26.2	232.8	388.2	42.0	41.4	110.4	131.0	1.2	3.3
15-19	1037.3	21.7	4.9	31.9	26.9	257.2	375.9	39.9	40.1	104.1	130.8	1.2	2.7
20-24	1032.1	22.3	5.0	33.1	28.1	247.2	380.2	40.8	36.0	103.4	132.2	1.1	2.7
25-29	1110.4	22.7	5.0	34.9	29.0	256.6	425.8	41.2	32.0	110.8	148.0	1.2	3.3
30-34	1298.2	22.7	5.2	39.5	31.6	316.0	507.0	45.7	36.7	124.4	164.5	1.6	3.4
35-39	1364.7	23.7	5.4	40.9	32.3	341.0	516.6	48.6	41.8	136.1	173.6	1.6	3.0
40-44	1231.0	23.3	5.1	37.5	30.8	313.7	449.1	43.6	40.1	123.4	160.5	1.4	2.5
45-49	1096.0	21.7	4.9	34.6	28.9	280.4	402.7	38.5	32.8	99.5	148.4	1.4	2.1
50-54	899.1	17.7	4.1	29.2	23.2	237.5	332.0	31.6	25.7	77.1	118.4	1.1	1.4
55-59	687.3	12.9	3.1	22.1	17.4	180.0	257.5	24.1	20.8	58.2	89.6	0.7	1.0
60-64	593.7	10.6	2.7	19.0	14.5	149.3	226.5	21.7	19.9	49.3	79.1	0.4	0.7
65-69	544.9	9.2	2.5	16.4	13.3	135.8	209.6	20.1	19.2	43.7	74.2	0.5	0.5
70-74	439.0	7.5	2.0	13.4	11.0	106.2	169.5	17.6	16.9	33.9	60.5	0.3	0.3
75-79	305.6	5.7	1.5	10.6	8.5	69.7	114.9	13.4	13.3	23.8	44.1	0.1	0.1
80-84	177.9	3.2	0.9	6.5	5.0	38.7	65.2	8.7	9.1	13.8	26.8	0.0	0.1
85-89	81.9	1.4	0.5	3.0	2.3	17.5	29.6	4.2	4.7	6.4	12.3	0.0	0.1
90+	33.7	0.5	0.2	1.1	0.9	7.2	11.8	1.8	2.1	3.1	5.0	0.0	0.0
Females	**15286.9**	**282.3**	**69.4**	**481.2**	**385.1**	**3762.7**	**5771.4**	**577.4**	**515.2**	**1414.5**	**1979.7**	**15.3**	**32.5**
<1	177.2	2.8	0.8	5.1	3.9	40.5	67.8	7.6	6.5	18.6	22.6	0.2	0.7
1-4	756.8	11.8	3.4	21.3	17.3	177.0	289.9	31.9	27.7	77.5	95.2	1.0	2.8
5-9	999.9	17.2	4.8	30.5	23.9	231.2	379.2	40.6	38.8	104.7	123.9	1.1	3.9
10-14	991.8	20.3	4.9	31.5	25.3	223.9	370.3	39.5	40.4	105.3	126.1	1.2	3.1
15-19	986.8	21.5	5.0	31.5	25.4	244.9	355.9	38.8	37.2	99.3	123.8	1.1	2.6
20-24	1002.4	21.4	4.7	32.1	27.2	238.2	370.6	38.9	34.5	99.2	131.8	1.1	2.7
25-29	1092.6	21.6	4.8	33.5	28.0	247.3	425.5	39.8	32.0	107.7	148.2	1.2	3.1
30-34	1266.2	23.0	5.5	38.5	30.9	303.2	496.7	44.3	37.1	119.4	162.9	1.5	3.1
35-39	1341.3	23.8	5.6	42.0	32.3	333.4	507.4	46.6	40.9	131.0	173.7	1.7	2.9
40-44	1234.9	23.6	5.0	38.8	31.4	312.7	456.6	43.4	38.0	118.8	162.7	1.5	2.3
45-49	1087.8	21.5	4.7	34.7	28.3	279.7	406.6	37.8	31.0	95.6	144.9	1.4	1.6
50-54	895.0	17.1	3.9	28.6	22.4	241.2	333.9	31.1	25.2	74.3	115.3	0.9	1.1
55-59	695.3	12.3	3.0	22.2	17.2	185.6	263.0	24.8	21.5	55.7	89.0	0.4	0.8
60-64	616.2	10.4	2.9	19.6	15.0	161.6	236.7	22.1	20.1	49.3	77.4	0.4	0.7
65-69	596.4	9.5	2.5	18.5	15.2	158.2	228.4	22.3	20.3	45.5	75.2	0.3	0.5
70-74	547.1	8.4	2.3	17.0	14.0	140.0	212.3	21.9	19.7	39.5	71.4	0.2	0.3
75-79	437.4	7.3	2.2	15.3	11.8	108.1	163.7	19.2	17.9	32.1	59.4	0.1	0.2
80-84	298.7	4.9	1.7	10.9	8.1	72.4	109.2	14.1	13.8	22.0	41.5	0.1	0.1
85-89	169.7	2.6	1.0	6.2	4.8	41.2	62.5	8.0	8.2	12.1	23.0	0.0	0.0
90+	93.4	1.3	0.6	3.6	2.6	22.3	35.0	4.8	4.6	6.9	11.7	0.0	0.0

Source: *Demography Division, Population Estimates Section*
Note: *The population estimates are adjusted for net census undercoverage and include non-permanent residents.*

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To order the products listed below, contact:

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Telephone: (613) 951-7277
1-800-267-6677, toll-free in Canada
Fax: (613) 951-1584,
or visit our site on the internet, www@statcan.ca

Title	Catalogue number	Format	Price† Canada	US ($ US)	Other countries ($ US)
Health Reports · subscription	82-003-XPB	Paper	$116	$116	$116
· single issue			$ 35	$ 35	$ 35
	82-003-XIE	Internet	$ 26	$ 26	$ 26
Health Indicators	82-221-XDE	Diskette	$250	$250	$250
Births					
Births and Deaths‡	84-210-XPB	Paper	$35	$35	$35
	84-210-XMB	Microfiche	$25	$25	$25
	84-210-XIB	Internet	$26	$26	$26
Reproductive Health: Pregnancies and Rates, Canada, 1974-1993	82-568-XPB	Paper	$32	$39	$45
Selected Birth and Fertility Statistics, Canada, 1921-1990	82-553-XPB	Paper	$40	$48	$56
General Summary of Vital Statistics	84F0001-XPB	Paper	$30	$30	$30
Cancer					
Cancer in Canada‡	82-218-XPB	Paper	$25	$30	$35
Cancer Incidence in Canada, 1969-1993	82-566-XPB	Paper	$42	$42	$42
Canadian Cancer Statistics	82F0008-XIE	Internet	Free of charge		
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Births and Deaths‡	84-210-XPB	Paper	$35	$42	$49
	84-210-XMB	Microfiche	$25	$30	$35
	84-210-XIB	Internet	$26	$26	$26
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Selected Infant Mortality and Related Statistics, Canada, 1921-1990	82-549-XPB	Paper	$40	$48	$56
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