

Reaching Smokers with Lower Educational Attainment

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Abstract

Between 1977 and 1994, smoking rates declined among men and women, but the decline was steeper for men. While smoking rates fell among people at all levels of education, the smallest drop was among those with high school graduation or less, particularly women. For those who had stopped smoking, health concerns had been the overriding factor.

Smokers with lower education reported encountering fewer smoking restrictions in their daily activities than did those with higher education. All smokers cited the mass media as their major source of information about smoking, but those with lower education reported the mass media less often than did smokers with higher levels of attainment, and were less likely to obtain information from books, pamphlets or magazines. In addition, smaller percentages of smokers with lower education recalled printed warnings about heart disease on cigarette packages.

Variations in the decline of smoking suggest that health promotion and smoking cessation programs should consider sex and educational differences when targeting the smoking population.

Differences in rates of smoking among people aged 20 and over were examined by educational attainment using selected health surveys conducted between 1977 and 1994. A Health Canada-sponsored supplement to Statistics Canada's National Population Health Survey was used for data on other aspects of smoking such as cutting back or attempting to quit, sources of health information, and awareness of smoking restrictions and cigarette package warnings.

Key words: cigarette smoking, smoking cessation, educational status, tobacco, health promotion, mass media

While the last few decades have seen an overall decline in smoking among Canadians, some smokers have been particularly resistant to this trend. Individuals with lower levels of formal schooling tend to have higher smoking rates. Moreover, smoking rates are not the only aspect of tobacco use associated with education. The percentages of smokers attempting to quit or cutting down, reasons for quitting, and sources of information about smoking also varied with their education.

Because cigarette smoking is one of the most important, but also preventable, causes of illness and death, the factors that influence smoking rates have implications for public health programs and health care expenditures.^{1,2} In this article, data from a Health Canada-sponsored supplement to Statistics Canada's 1994-95 National Population Health Survey (NPHS) are used to show that a wide range of smoking-related behaviours and attitudes are associated with educational attainment (see **Methods** and **Health Canada supplementary questions**).

Smoking rates down

From 1977 to 1994, smoking rates declined among both men and women aged 20 and over, though the decline was more pronounced among men (Table 1). The age-standardized percentage of men who smoked cigarettes daily or occasionally fell from 46% to 33%, an average annual percent change (AAPC) in rates of -2.22%. The age-standardized smoking rate among women fell more slowly from 35% to 29%, an AAPC in rates of -1.05%. Despite the sharper decline in men's smoking rates, they remained above those of women, although the difference narrowed from 11 to 4 percentage points.

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Methods

Data sources

Trends in smoking rates are based on data from a number of surveys conducted from 1977 to 1994: the Labour Force Survey smoking supplements (1977, 1979, 1981, 1983, 1986), the 1978-79 Canada Health Survey, the 1985 and 1990 Health Promotion Surveys, the 1989 National Alcohol and Drug Survey, the 1991 General Social Survey, and the longitudinal 1994-95 National Population Health Survey (NPHS) (see **Appendix**).³⁻¹²

Detailed data on smoking-related behaviour and attitudes are based on a Health Canada-sponsored supplement to the NPHS. The sample size of this supplement was 13,400 respondents (12,010 aged 20 and over). The response rate was 90.6% of eligible persons in the households.

All the estimates were weighted to represent the population at the date of the survey, so that the results can be generalized to the Canadian population. The sample sizes in each survey were large, so the variances associated with the estimates tend to be low.

Analytical techniques

Because this analysis examines the association between smoking and educational attainment, it focuses on the population aged 20 and over, an age at which most people who are going to do so have graduated from high school. The age distributions of the populations in the education categories vary substantially. Therefore, age-standardized smoking rates were calculated using the total 1994 population of Canada.

Changes in annual age-standardized smoking rates were examined by calculating the average annual percent change (AAPC) for the rates over 1977-1994. The AAPC is $(e^{\beta} - 1)100$, where β is the slope from a regression of log rates on year.

The time series data come from several different surveys. As much as possible, the educational

categories used in this analysis were grouped to be consistent with the classification in the Labour Force Survey. It was not possible to derive the population with elementary education for the Canada Health Survey (CHS). Therefore, the regression analysis for elementary education excludes the CHS.

Smokers were defined as persons who smoked cigarettes either daily or occasionally at the time of each survey.

Limitations

Because the data are based on cross-sectional surveys, observed differences in smoking behaviour may reflect differences between cohorts, age groups, or a combination of the two.

The Labour Force Survey smoking supplements allowed proxy responses. Recent surveys, however, have attempted to reduce proxy reporting. In the National Alcohol and Drug Survey and in the 1990 Health Promotion Survey, proxy responses were not allowed. The 1991 General Social Survey allowed proxy responses only in cases where the selected respondent was either too ill to participate or did not speak either official language; there was little proxy reporting. The 1994-95 NPHS allowed some proxy reporting, but this did not apply to the modules pertaining to preventive health behaviour.

The effect of proxy response on smoking rates depends on the proportion of responses that are proxy and the degree to which proxy responses diverge from self-reported smoking behaviour. While it is not possible to determine the influence of proxy response on smoking rates in the early years of the time series, such reporting tends to be more of a problem for estimates of smoking among adolescents.¹³ Since this analysis is restricted to people aged 20 and over, the bias introduced by proxy reporting may have been minimized.

People with lower levels of formal schooling are generally more likely to be smokers. And while smoking rates fell among men and women regardless of education, the pace of decline varied. For men, there was a downturn in smoking rates at all education levels. By contrast, for women, the decline was primarily among the university-educated, whose AAPC (-3.18%) indicated a sharper drop than that for any other group.

Women in the two lowest educational attainment groups had the smallest declines in smoking rates. The AAPC among those with elementary education or less was -0.21%, and among those with some or completed high school, -0.31%. In fact, women with some or completed high school had the highest smoking rates: 38% in 1977; 36% in 1994. Similarly, the men with the highest smoking rates—those whose education had not extended beyond elementary school—also had the smallest decline in rates.

Table 1

Average annual percent change (AAPC) in smoking rates, by sex and educational attainment, Canada, 1977 to 1994

Educational attainment	Smoking rate		AAPC in rate 1977 to 1994
	1977	1994	
	%		%
Both sexes	40	31	-1.66
Elementary or less	44	37	-0.70
Some/completed high school	43	38	-0.88
Some postsecondary	37	31	-1.20
Certificate/diploma	36	30	-1.20
University degree	27	16	-2.81
Men	46	33	-2.22
Elementary or less	54	47	-0.93
Some/completed high school	50	40	-1.47
Some postsecondary	39	34	-1.43
Certificate/diploma	37	31	-1.58
University degree	28	18	-2.48
Women	35	29	-1.05
Elementary or less	33	30	-0.21
Some/completed high school	38	36	-0.31
Some postsecondary	34	29	-0.73
Certificate/diploma	35	29	-0.97
University degree	27	14	-3.18

Source: Labour Force Survey smoking supplements, Canada Health Survey, Health Promotion Surveys, General Social Survey, National Alcohol and Drug Survey, National Population Health Survey

Note: Based on weighted and age-standardized rates, population aged 20 and over; data from 1977, 1978-79, 1979, 1981, 1983, 1985, 1986, 1989, 1990, 1991, 1994-95.

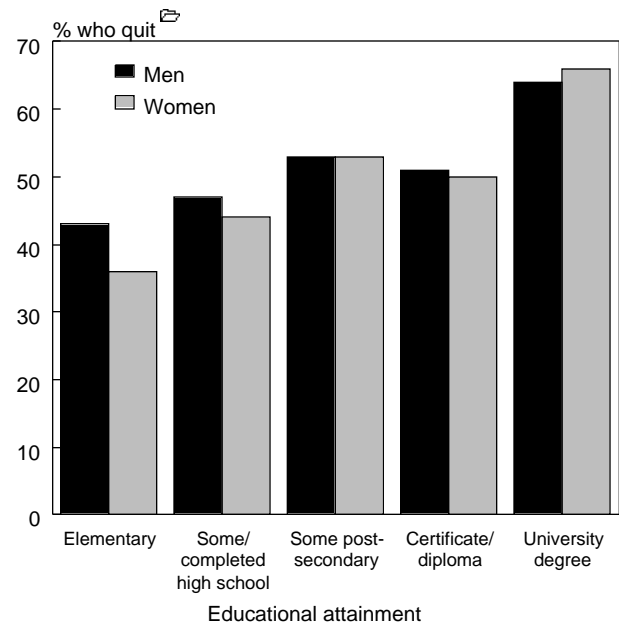
Variations in the decline of smoking since the mid-1970s widened the gap in smoking rates by educational attainment. For men, the difference between the highest and the lowest smoking rates rose from 26 to 29 percentage points; for women, the difference doubled from 11 to 22 percentage points. This pattern is not unique to Canada—in other countries, too, people with less education are more likely to smoke than are the highly educated.^{14,15}

Quitting

A downturn in smoking rates over time can come about in two ways: if people do not start smoking or if smokers quit. Much of the overall decline in rates since 1977 was attributable to smokers kicking the habit. By 1994, around half the population aged 20 and over who had ever smoked had quit: 50% of women and 52% of men. The percentages of former smokers among people who had ever smoked mirrored the pattern of decline in rates by level of education. Smokers who had not gone beyond high school, particularly women, were the most resistant to quitting

Chart 1

Ever smokers who quit, by sex and educational attainment, Canada, 1994-95



Source: National Population Health Survey, 1994-95

Note: Based on population aged 20 and over. Percentages are age-standardized.

[†] Percentage of people who have ever smoked who have quit.

(Chart 1). Among people who had ever smoked, just 36% of women and 43% of men with elementary school or less had quit by 1994; the comparable figures for those with some or completed high school were 44% and 47%. By contrast, 66% of female and 64% of male university graduates who had ever smoked had quit.

Table 2

Former smokers' reasons for quitting, by sex and educational attainment, Canada, 1994-95

Reasons for quitting [†]	Educational attainment					
	Total	Elementary or less	Some/ completed high school	Some post-secondary	Certificate/ diploma	Degree
Both sexes						
Former smokers [‡]	6,651	544	2,272	1,704	1,164	948
			'000			
			%			
Future health	48	47	46	46	48	53
Cost	12	12	13	12	15	10
Present health	11	9	11	12	12	12
Social/family pressure	10	6	8	10	9	14
Physician advice	6	5	6	5	4	3
Restrictions	2	—	1	2	2	2
Men						
Former smokers [‡]	3,647	343	1,254	877	612	548
			'000			
			%			
Future health	51	50	51	48	51	56
Cost	13	13	11	14	17	11
Present health	12	8	13	13	10	11
Social/family pressure	10	2	8	11	9	14
Physician advice	6	6	7	5	6	3
Restrictions	2	—	1	2	2	2
Women						
Former smokers [‡]	3,003	201	1,017	828	552	400
			'000			
			%			
Future health	44	43	41	43	45	47
Cost	12	10	15	10	14	8
Present health	11	10	8	10	13	13
Pregnancy	11	3	13	13	11	8
Social/family pressure	11	13	9	10	10	14
Physician advice	5	2	5	5	2	3
Restrictions	1	—	2	1	2	1

Source: National Population Health Survey, 1994-95
Notes: Based on population aged 20 and over. Because the estimated male and female populations were independently rounded to the nearest 1,000, the sum may not equal the estimate for both sexes. Percentages are age-standardized.

[†] Respondents could specify more than one reason.
[‡] Row counts do not sum to total because educational attainment was not stated by some respondents.

The leading reason why they had stopped smoking, cited by 51% of men and 44% of women, was concern for their future health (Table 2). Cost ranked a distant second (13% of men and 12% of women). There was no clear-cut pattern in reasons for quitting by educational attainment. However, at higher levels of education, former smokers were generally more likely to cite social and family pressure as a factor in their decision.

Encountering restrictions

To the extent that smoking is discouraged or prohibited in various settings, its prevalence can be expected to decline. For example, although few former smokers reported that smoking restrictions had affected their decision to quit, previous research has demonstrated that when restrictions are introduced in a workplace, the number of cigarettes smoked per day

Health Canada supplementary questions

The 1994-95 National Population Health Survey contained a set of supplementary questions, which were sponsored by Health Canada. Included among them were a number of open-ended questions on smoking and tobacco use.

All respondents, both smokers and non-smokers, were asked, "What are your most important sources of information about health risks from smoking and tobacco use?" The interviewers recorded all sources of information that the respondents mentioned.

All respondents were asked, "Have you ever seen health warning messages on cigarette packages?" Those who replied affirmatively were asked, "What are the health warning messages you have seen?" The interviewers recorded all messages that the respondents recalled.

Former smokers were asked, "Why did you quit smoking?" The interviewers recorded all reasons mentioned.

Current smokers were asked, "Have you tried to quit smoking in the last twelve months?" and "Are you smoking less now than you were twelve months ago?" They were also asked where they encountered smoking restrictions: "Nowadays, there are many restrictions on where people are allowed to smoke. In your day-to-day activities, where do you find you have restrictions on your smoking?" The interviewers recorded as many locations as the respondents mentioned.

influence diminished among smokers with more education.

One source of information that smokers can hardly avoid is the health warnings on cigarette packages. Not surprisingly, awareness of these messages was almost universal (Table 5). However, smokers' recollection of specific messages varied with their education. For instance, comparatively few women

Table 4
Smokers' sources of information about smoking and tobacco use, by sex and educational attainment, Canada, 1994-95

Sources of information [†]	Educational attainment					
	Total	Elementary or less	Some/ completed high school	Some post-secondary	Certificate/ diploma	University degree
Both sexes						
Current smokers [‡]	6,316	406	2,519	1,674	1,180	528
			'000			
			%			
TV/radio/newspapers	57	55	55	59	59	68
Health professionals	32	43	33	33	28	26
Pamphlets/magazines/ books	32	30	30	32	36	45
Family	16	15	16	16	14	15
Friends	10	6	11	10	9	10
Men						
Current smokers [‡]	3,306	237	1,274	858	622	308
			'000			
			%			
TV/radio/newspapers	58	58	57	60	57	68
Health professionals	27	48	27	28	18	23
Pamphlets/magazines/ books	28	30	26	29	26	45
Family	17	16	17	15	14	16
Friends	10	6	12	10	7	8
Women						
Current smokers [‡]	3,010	168	1,245	816	558	220
			'000			
			%			
TV/radio/newspapers	57	51	53	58	62	67
Health professionals	38	35	39	38	37	28
Pamphlets/magazines/ books	37	30	34	35	45	44
Family	15	13	14	17	13	14
Friends	10	6	10	9	11	12

Source: National Population Health Survey, 1994-95
Notes: Based on population aged 20 and over. Because the estimated male and female populations were independently rounded to the nearest 1,000, the sum may not equal the estimate for both sexes. Percentages are age-standardized.

[†] Respondents could indicate more than one source.
[‡] Row counts do not sum to total because educational attainment was not stated by some respondents.

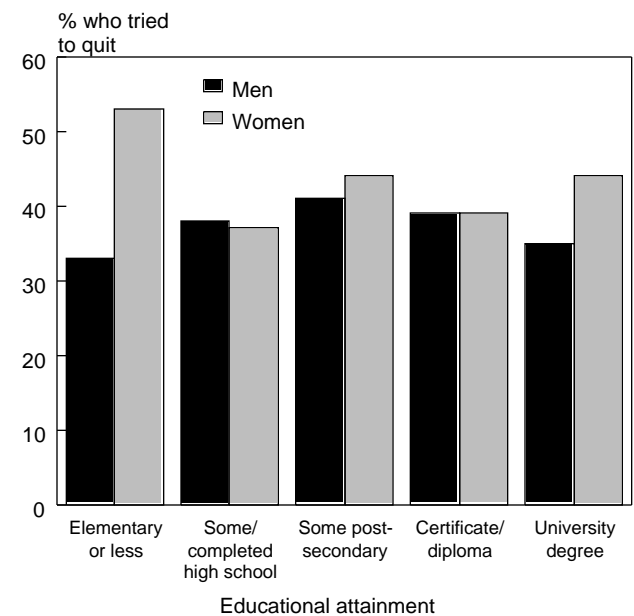
with lower educational attainment were aware of messages about the relationship between smoking and life expectancy, heart disease or pregnancy.

Attempting to quit and cutting down

There is some evidence from the NPHS that anti-smoking messages are being heeded. A substantial share of smokers had tried to quit in the year before they were interviewed: 39% of men and 42% of women. An almost equal number reported that they were smoking less than they had 12 months earlier: 39% of men and 41% of women. But again, relatively few of those whose smoking rates were highest—women with some or completed high school—had tried to quit (37%) or had cut down (38%) (Charts 2 and 3).

By contrast, another group of women with a high smoking rate—the small number with elementary education or less—was also the group most likely to have tried to quit (53%) or to have cut down (50%).

Chart 2
Smokers who tried to quit in last 12 months, by sex and educational attainment, Canada, 1994-95



Source: National Population Health Survey, 1994-95
Note: Based on population aged 20 and over. Percentages are age-standardized.

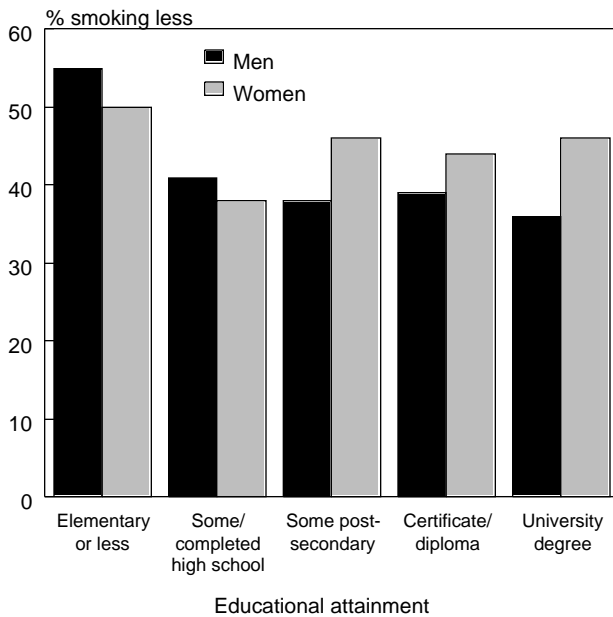
The men least likely to have tried to quit smoking (33%) were those with elementary education or less, and these men also had the highest smoking rate. Yet of all male smokers, they were the most likely to report having cut down (55%).

Implications

The decline in smoking rates since 1977 has not affected all groups equally. Smokers with lower levels of education, notably women, have been particularly resistant to this trend. Even so, the results of the NPHS indicate some desire among these smokers to stop, as substantial numbers reported trying to quit or cutting down during the previous year. These smokers may find quitting a particular challenge, as they are more likely to be in environments where smoking is not restricted.

Chart 3

Smokers who smoke less than they did 12 months ago, by sex and educational attainment, Canada, 1994-95



Source: National Population Health Survey, 1994-95
 Note: Based on population aged 20 and over. Percentages are age-standardized.

Table 5

Smokers' awareness of health messages on cigarette packages, by sex and educational attainment, Canada, 1994-95

Health messages on cigarette packages [†]	Educational attainment					
	Total	Elementary or less	Some/completed high school	Some post-secondary	Certificate/diploma	Degree
Both sexes						
Current smokers [‡]	6,316	406	2,519	1,674	1,180	528
Have seen messages	98	94	98	99	98	99
Smoking during pregnancy can harm baby	72	62	70	76	74	77
Smoking is the major cause of lung cancer	69	71	70	68	67	72
Smoking is a major cause of heart disease	49	47	50	50	54	51
Smoking reduces life expectancy	46	44	44	50	43	54
Men						
Current smokers [‡]	3,306	237	1,274	858	622	308
Have seen messages	98	93	97	99	98	98
Smoking during pregnancy can harm baby	67	59	66	70	70	74
Smoking is the major cause of lung cancer	70	77	71	67	66	73
Smoking is a major cause of heart disease	49	56	50	45	46	47
Smoking reduces life expectancy	45	48	43	46	42	56
Women						
Current smokers [‡]	3,010	168	1,245	816	558	220
Have seen messages	98	95	98	99	99	99
Smoking during pregnancy can harm baby	76	66	73	82	76	84
Smoking is the major cause of lung cancer	69	64	70	70	67	73
Smoking is a major cause of heart disease	50	35	51	55	44	54
Smoking reduces life expectancy	48	38	45	53	45	54

Source: National Population Health Survey, 1994-95
 Notes: Based on population aged 20 and over. Because the estimated male and female populations were independently rounded to the nearest 1,000, the sum may not equal the estimate for both sexes. Percentages are age-standardized.

[†] Based on smokers who had seen the health messages.
[‡] Row counts do not sum to total because educational attainment was not stated by some respondents.

Variations in the decline of smoking suggest that health promotion and smoking cessation programs should take account of sex and educational differences when targeting the smoking population. There may be a need for alternative approaches to reach smokers with lower levels of education. This could entail designing messages that emphasize the smoking-related issues that most concern these smokers and using channels of communication that are most likely to influence them.

Health concerns are the overriding factor in smokers' decision to quit. However, the most resistant smokers were less likely than others to recall warnings on cigarette packages about the relationship of smoking to heart disease, life expectancy, and potential harm to a baby if the mother smokes when she is pregnant.

While television, radio and newspapers were the major source of information about smoking, a smaller percentage of smokers with less education reported obtaining such information from the mass media. These smokers were also less likely to get information from pamphlets, magazines, or books.

On the other hand, a substantial share of people with lower levels of education reported health professionals as sources of information about smoking and tobacco use. As well, a small proportion of former smokers mentioned physician advice as a reason for quitting. The fact that most people visit physicians regularly provides an opportunity for intervention by the medical profession.¹⁸ In 1994-95, 87% of female and 84% of male smokers had consulted a physician in the previous year, and smokers with less than high school were more likely than those with university degrees to have contacted a physician six or more times.

Prohibitions on smoking in various settings seem to have an effect on its prevalence. The high smoking rates of people with the lowest levels of education may be associated with their milieu—at home, at work, with friends—in which smoking is not discouraged or prohibited. By contrast, low smoking rates among more highly educated individuals may have some relation to the restrictions they encounter. Successful attempts

to quit smoking also vary with education and lend some support to the idea that non-smoking environments may play a role.

Of course, the picture of smoking presented here is incomplete, as by age 20 most people who are going to smoke have already started, and much of the anti-smoking initiative is directed at discouraging young people from becoming smokers. Studies of the smoking behaviour of people younger than age 20, particularly longitudinal studies that the NPHS will make possible, may clarify the process of smoking initiation and cessation.¹⁹

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Appendix

Survey sample sizes for ages 20 and over, by educational attainment, Canada

Survey date	Survey [†]	Educational attainment					
		Total	Elementary	Some/ completed high school	Some post-secondary	Certificate/ diploma	University degree
1977	LFS	34,170	9,983	15,022	2,793	3,761	2,611
1978-79 [‡]	CHS	20,157	..	14,967	1,581	1,997	1,611
1979	LFS	33,709	9,403	15,859	2,197	3,542	2,708
1981	LFS	34,209	8,779	16,357	2,461	3,683	2,929
1983	LFS	33,924	8,358	15,882	2,735	3,959	2,990
1985	HPS	10,188	1,060	5,411	1,168	1,146	1,403
1986	LFS	27,709	5,966	13,126	2,343	3,576	2,698
1989	NADS	10,659	1,216	5,341	1,240	1,286	1,576
1990	HPS	12,236	1,362	5,973	1,416	1,621	1,864
1991	GSS	11,008	1,346	4,372	1,653	2,168	1,469
1994-95	NPHS	12,010	1,033	4,266	2,975	2,112	1,624

[†] LFS - Labour Force Survey, CHS - Canada Health Survey, HPS - Health Promotion Survey, GSS - General Social Survey, NADS - National Alcohol and Drug Survey, NPHS - National Population Health Survey (Health Canada supplement).

[‡] It was not possible to derive counts for those with elementary education.