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E	use with caution
F	too unreliable to be published

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Non-fatal injuries among Aboriginal Canadians

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In the table, under the "Provinces" column for "Injury-caused activity limitation," by Work status, 11.9% (Worked entire past year) should be marked with an asterisk; the asterisks should be removed from 18.9% (Worked part of past year) and 18.0% (Did not work past year).

Breastfeeding

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The third sentence in the first paragraph under the subheading "Why not?" should be: "A medical condition was cited by 20% of mothers, and 4% said that they smoked." In Chart 1, the value of the bar for "Mother smokes" should be 4%; the value for "Other" should be 12%.

Passengers of intoxicated drivers

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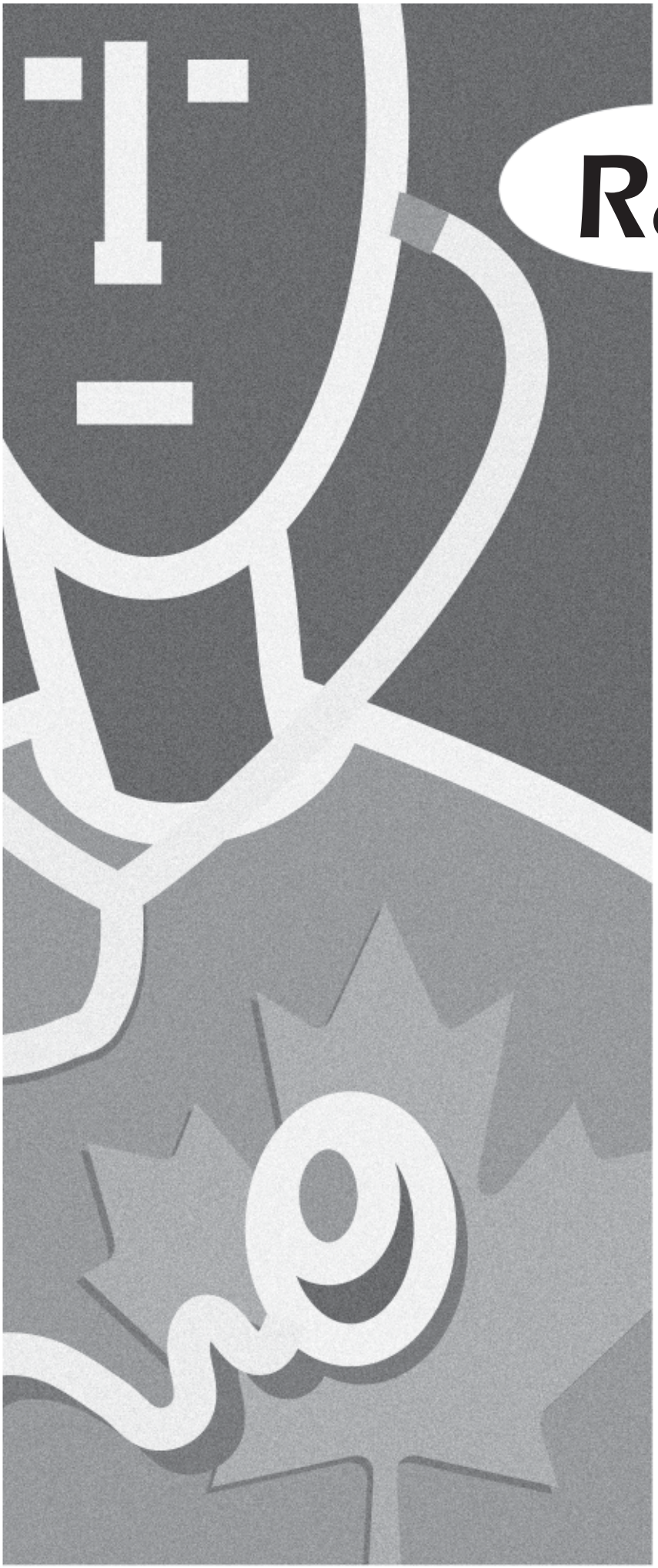
In the second chart, the asterisk should be removed from the Québec bar for the population aged 12+



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Early sexual intercourse

Didier Garriguet

Abstract

Objectives

This analysis estimates the percentage of adolescents who have had sexual intercourse by age 14 or 15 and examines characteristics at age 12 or 13 that are associated with early sexual activity.

Data source

The data are from the 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, conducted by Statistics Canada.

Analytical techniques

Descriptive statistics were used to determine the proportion of 14- or 15-year-olds who have had sexual intercourse. Logistic regression was used to model sexual activity at age 14 or 15 in relation to the adolescent's characteristics at age 12 or 13.

Main results

The percentages of boys and girls who had had intercourse by age 14 or 15 were almost the same—12% and 13%—but the characteristics associated with such behaviour differed. Among girls, region of residence, the onset of puberty, weak self-concept, having tried smoking or drinking, and not being overweight were significantly associated with early sexual activity. For boys, older age, a poor relationship with parents, low household income, and having tried smoking were significant.

Key words

sex behaviour, adolescent behaviour, risk behaviour, lifestyle

Author

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A substantial number of Canadian adolescents are sexually active at a relatively young age. The proportion reporting having had sexual intercourse by age 15 has been rising since the beginning of the 1980s .[1]

Early sexual intercourse can have serious consequences. The sooner that young people begin having sex, the longer they are exposed to the risk of an unwanted pregnancy or of contracting a sexually transmitted infection.[2] Teenage mothers have difficulty completing school; therefore, their economic and career opportunities are restricted,[3-7] and their likelihood of living in poverty is relatively high.[8] As well, babies born to teenagers are at greater risk of premature birth, low birth weight and of dying during their first year of life.[9,10]

Several recent American studies have profiled the characteristics of young people who have had sexual intercourse.[7,11-13] However, generalizations about Canadian adolescents based on American research may be misleading. Moreover, those reports typically focused on teenagers older

than 15. The sexual activity of younger adolescents has received relatively little attention, even though they are the group who would have the longest exposure to the associated risks. While a profile of these young people is informative in itself, it may be even more useful to identify characteristics that are precursors of early sexual activity.

This article uses data from cycles 2, 3 and 4 of the National Longitudinal Survey of Children and Youth (NLSCY) to examine characteristics at age 12 or 13 that are associated with having had sexual intercourse by age 14 or 15 (see *Methods* and *Definitions*). The independent variables selected for analysis are demographic, socio-economic and personal characteristics that either tend to increase the likelihood of having sex or are protective factors that reduce the likelihood.

Methods

Data source

This analysis is based on data from cycles 2, 3 and 4 of the National Longitudinal Survey of Children and Youth (NLSCY). Data collection for each cycle began in September of 1996, 1998 and 2000, respectively, and lasted 10 months. The dependent variable (having had sexual intercourse) was derived from cycles 3 and 4. The sample selected for the first cycle of the NLSCY (1994/95) was representative of the population in 1994. Therefore, this analysis considers two groups of children: those aged 8 or 9 in 1994/95 who were 14 or 15 in 2000/01 (cycle 4), and those aged 10 or 11 in 1994/95 who were 14 or 15 in 1998/99 (cycle 3). The characteristics of these children at ages 12 or 13 (in 1998/99 for the first group and in 1996/97 for the second) were examined to identify factors associated with having had sex by age 14 or 15.

The sampling frame used to select the initial sample for the NLSCY was the list of households responding to the Labour Force Survey. Households chosen for the sample had to include at least one member aged 0 to 11 in 1994.[14]

In each household, the person considered most knowledgeable about the child (usually the mother) answered a set of questions during a telephone interview. If the selected child was aged 10 or older, the interviewer went to the home and had the child complete a written questionnaire in private. To ensure confidentiality, the child placed the questionnaire in an envelope and sealed it before giving it back to the interviewer.

The self-reported component of the questionnaire has a relatively high non-response rate: 14% for cycle 3 and 24% for cycle 4. The data were reweighted, based on sex and province. This analysis pertains to 3,212 children who were aged 14 or 15 in 1998/99 or in 2000/01 (Appendix Table A).

Analytical techniques

Descriptive statistics were used to present estimates of the proportion of 14- or 15-year-olds who had had sexual intercourse in relation to selected characteristics of these adolescents at age 12 or 13. The percentages were calculated using the longitudinal weights from cycles 3 and 4 for children who participated in cycle 1. The weights are mutually exclusive and represent the population aged 8 to 11 in the 10 provinces in 1994.

Logistic regression was used to model having had sexual intercourse by age 14 or 15 in relation to the child's characteristics at 12 or 13. Based on a review of the literature and the availability of data in the NLSCY, the following variables were included in the full model: sex, cohort, age, region, onset of puberty, body mass index, self-concept, parent-child relationship, smoking, alcohol consumption, family income, religious attendance, household education, family type, time alone at home, emotional problems, number of friends, and relationships with friends (Appendix Table B). The final model used to compare the sexes retained the following variables: sex, cohort, age, region, onset of puberty, self-concept, parent-child relationship, smoking, alcohol consumption, family income, body mass index and religious attendance. To ensure an adequate sample size, "missing value" categories were included for some independent variables, but their odds ratios are not shown.

To account for survey design effects, coefficients of variation, standard errors and confidence intervals were calculated with the bootstrap technique.[15,16] The significance level was set at $p < 0.05$.

Limitations

The validity of the self-reported data in this analysis is unknown. Adolescents may give socially acceptable answers to questions about matters such as sexual activity, alcohol consumption and smoking that are not accurate reflections of their behaviour. On the other hand, young people may exaggerate their experience in these matters. Recall errors are also possible.[17]

The term "sexual intercourse" was not defined in the NLSCY question. While some respondents may consider certain behaviour to constitute sexual intercourse, others may not.

More than 1 in 10

By age 14 or 15, about 13% of Canadian adolescents have had sexual intercourse. The percentages were almost the same for boys and girls: 12% and 13%, respectively (Appendix Table A). However, the variables that were related to early sexual intercourse differed for boys and girls. These factors can include physical development such as the onset of puberty and weight; psychological traits such as self-concept; the parent-child relationship; socio-economic status; and willingness to engage in other risk-taking behaviours such as drinking and smoking (see *Definitions*). As well, these characteristics do not exist in isolation. For instance, an adolescent who is experimenting with behaviours such as drinking and smoking may have a poor relationship with his or her parents.

High in east, low in west

Young adolescents in the eastern provinces and Québec were more likely to report being sexually active than were those in Ontario and the west (Chart 1). At age 14 or 15, 15% of adolescents in the Atlantic provinces and 18% in Québec reported having had sex, compared with around 10% in Ontario and the western provinces.

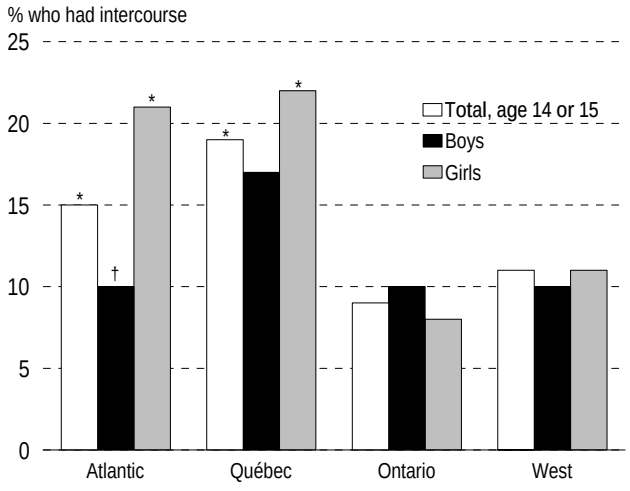
But when the results were examined separately for boys and girls, and the effects of the other physical, psychological, socio-economic and familial factors were taken into account, these regional differences persisted only for girls (Table 1). The odds of early sexual intercourse were high for girls in the Atlantic provinces and Québec, compared with Ontario. The odds that boys would have had sex by age 14 or 15 did not differ significantly from one region to another.

Age and physical development

As might be anticipated, the percentage of 15-year-olds who had had sexual intercourse was higher than the percentage of 14-year-olds. But when adjustments were made to control for the effects of the other variables, the difference was significant only for boys. Girls aged 14 were no less likely than those aged 15 to be sexually active.

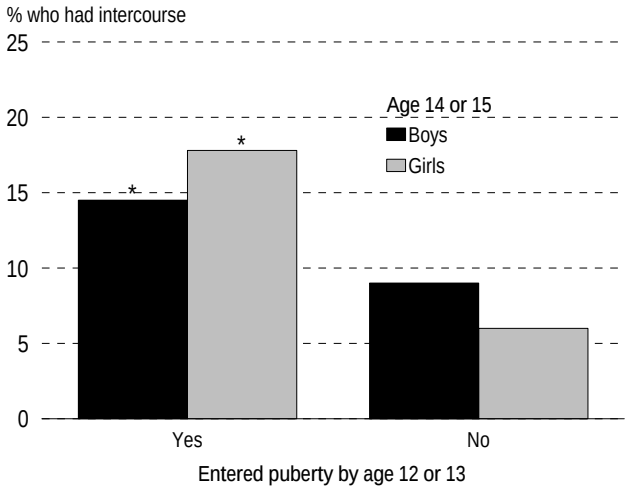
Physical development is closely tied to the age at which adolescents first have sexual intercourse. Among those who had entered puberty by age 12

Chart 1
Percentage of 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by region, household population, Canada excluding territories



Data source: 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
** Significantly higher than corresponding value for Ontario (p < 0.05)*
† Significantly lower than value for girls in same region (p < 0.05)

Chart 2
Percentage of 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by onset of puberty at age 12 or 13, household population, Canada excluding territories



Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
** Significantly higher than value for same sex who had not entered puberty (p < 0.05)*

or 13, nearly 15% of the boys and 18% of the girls reported having had sex by age 14 or 15. For those who had not entered puberty by age 12 or 13, the proportions reporting sexual activity were 8% and 6%, respectively (Chart 2).

When the effects of the other variables were taken into consideration, the onset of puberty was significantly related to early sexual intercourse only among girls (Table 1). This result may be because the indicator of puberty used for boys (change in voice range) is not as good a measure of development as the indicator used for girls (menstruation).

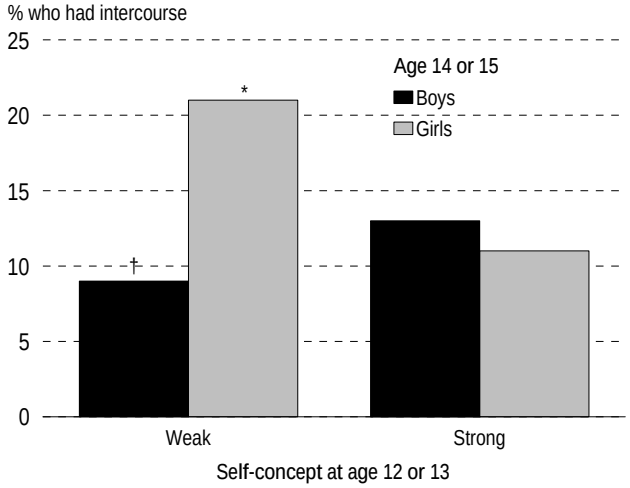
This association between puberty and early sexual intercourse among girls is not necessarily cause-and-

Table 1
Percentage of and adjusted odds ratios for 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by selected characteristics at age 12 or 13, household population, Canada excluding territories

	Boys			Girls		
	%	Adjusted odds ratio	95% confidence interval	%	Adjusted odds ratio	95% confidence interval
Cohort						
2000/01 (aged 8 or 9 in 1994/95)	1.35	1.72*	1.04, 2.81	12.5	0.86	0.52, 1.40
1998/99 (aged 10 or 11 in 1994/95)†	10.0	1.00	...	14.4	1.00	...
Age						
14†	8.4	1.00	...	11.4	1.00	...
15	15.1*	1.77*	1.04, 2.82	15.5	0.93	0.61, 1.46
Region						
Atlantic	10.7	0.86	0.44, 1.71	20.7*	2.80*	1.68, 5.47
Québec	17.1	1.45	0.72, 2.90	22.1*	2.30*	1.37, 4.45
Ontario†	10.2	1.00	...	8.2	1.00	...
West	9.9	0.83	0.49, 1.56	11.4	1.04	0.61, 2.01
Onset of puberty						
Yes	14.5*	1.23	0.74, 2.19	17.8*	3.46*	1.91, 5.72
No†	9.4	1.00	...	5.7	1.00	...
Body mass index						
Overweight†	10.0	1.00	...	10.2	1.00	...
Not overweight	12.1	1.11	0.53, 2.42	13.9	2.10*	1.01, 4.66
Self-concept						
Strong†	12.6	1.00	...	10.9	1.00	...
Weak	9.3	0.42*	0.21, 0.89	19.4*	1.84*	1.02, 3.07
Parent-child relationship‡						
Poor	21.6*	3.05*	1.69, 5.23	21.0*	1.70	0.98, 3.06
Good†	10.1	1.00	...	12.0	1.00	...
Tried smoking cigarettes						
Yes	26.7*	6.95*	4.06,11.69	27.8*	3.75*	2.23, 6.74
No†	6.4	1.00	...	7.1	1.00	...
Tried drinking alcohol						
Yes	17.2*	1.41	0.79, 2.53	21.9*	2.18*	1.27, 3.90
No†	7.4	1.00	...	8.4	1.00	...
Family income‡						
Below LICO	21.4*	2.23*	1.17, 3.84	18.6	0.99	0.49, 1.77
At or above LICO†	10.0	1.00	...	12.3	1.00	...
Religious attendance in past 12 months‡						
Yes†	11.6	1.00	...	12.7	1.00	...
No	12.2	0.90	0.50, 1.51	16.0	1.31	0.80, 2.31

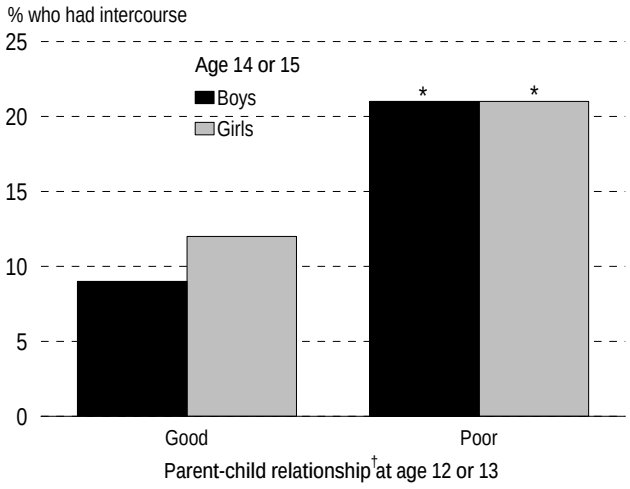
Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
Note: Models are based on records for 1,593 boys and 1,619 girls. Variables for "missing" onset of puberty, self-concept, parent-child relationship, smoking, drinking, body mass index and religious attendance were entered into the models; odds ratios are not shown.
† Reference category
‡ Reported by parent
** Significantly different from reference category ($p < 0.05$)*
··· Not applicable

Chart 3
Percentage of 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by self-concept at age 12 or 13, household population, Canada excluding territories



Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
** Significantly higher than value for girls with strong self-concept (p < 0.05)*
† Significantly lower than value for boys with strong self-concept (p < 0.05)

Chart 4
Percentage of 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by parent-child relationship at age 12 or 13, household population, Canada excluding territories



Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
† Reported by parent
** Significantly higher than value for same sex who had good relationship with parents (p < 0.05)*

effect. The proportion of girls having sex before age 15 has been rising for about two decades,[18] yet most recent studies indicate no real change in the age of first menstruation over that time.[19] Factors other than the onset of puberty are also associated with early sexual activity.

For girls, weight was related to having had intercourse by ages 14 or 15. The odds of having done so were twice as high for girls who were not overweight at ages 12 or 13, compared with those who were overweight. By contrast, among boys, weight was not associated with having had intercourse.

Self-concept

Self-concept is how adolescents view themselves: do they generally like the way they are? feel that they have much to be proud of? consider themselves competent? Girls whose self-concept was weak at age 12 or 13 were much more likely than those with a strong self-concept to have had sexual intercourse by 14 or 15 (Chart 3). The opposite was true for boys—those with a weak self-concept were less likely to have had sex. Even allowing for the influence of other variables, these opposing associations between self-concept and sexual intercourse persisted (Table 1).

At home

According to the analysis of NLSCY data, around 20% of boys and girls whose parent reported a poor relationship with them at age 12 or 13 had had sexual intercourse by the time they were 14 or 15 (Chart 4). This was about double the proportion for young people whose parent had said that the relationship was good. However, when the other factors related to the adolescent's development and behaviour were accounted for, the parent-child relationship was significantly associated with early sexual intercourse only among boys (Table 1).

Adolescents living in low-income households were more likely to have had intercourse than were those in households above the Statistics Canada low-income cut-offs. But again, when the effects of the other factors were controlled, the association

Definitions

The National Longitudinal Survey of Children and Youth (NLSCY) contains the question: "Have you ever had sexual intercourse?" This was asked as part of a written questionnaire that adolescents aged 14 and 15 completed themselves, then placed in an envelope, sealed, and gave to the interviewer.

The independent variables used in this analysis pertain to the adolescents' characteristics at age 12 or 13. Some of these variables came from the self-completed questionnaire.

Adolescents aged 12 and 13 were categorized according to whether they had entered *puberty*. For girls, this was signalled by having had a menstrual period; for boys, by a change in voice range.

Body mass index (BMI) was calculated based on the height and weight of the adolescent; specifically, weight in kilograms divided by the square of height in metres. Respondents were classified as overweight according to the age- and sex-specific BMI cut-offs defined by Cole et al.[20]

Overweight is body mass index greater than or equal to:

Age	Boys	Girls
12	21.56	22.14
13	22.27	22.98

To measure *self-concept*, adolescent respondents were asked to reply to four statements on a five-point scale: false (score 0); mostly false (1); sometimes false/sometimes true (2); mostly true (3); and true (4):

- In general, I like the way I am.
- Overall, I have a lot to be proud of.
- A lot of things about me are good.
- When I do something, I do it well.

Scores could range from 0 to 16, with higher scores indicating a strong self-concept. Scores of 10 or less (lowest decile of the weighted distribution) were defined as indicating a weak self-concept.

Those who had *tried smoking cigarettes* were compared with those who had not.

Adolescent respondents were asked if they had ever had a drink. In cycle 2, the response choices were "yes" or "no"; in cycle 3, "yes, at least one glass" and "yes, a few sips" were combined for the "yes" category. All individuals with such responses were considered to have *tried drinking alcohol*.

The other independent variables came from the questionnaire completed by the "person most knowledgeable" about the child, usually the mother.

Parent-child relationship was based on a problem resolution scale, with values ranging from 0 to 28, depending on the parent's responses to eight true/false statements about his/her relations with the adolescent:

- We disagree and fight.
- We bug each other or get on each other's nerves.
- We yell at each other.
- When we argue, we stay angry for a very long time.
- When we disagree, we refuse to speak to each other.
- When we disagree, one of us stomps out of the room, or house, or yard.
- We make up easily when we have a fight (reverse scored).
- When we disagree, we solve problems together (reverse scored).

High scores indicate greater conflict. Parent-child relationships were considered to be poor if the score was 12 or more (ninth decile of the weighted distribution).

Using the Consumer Price Index, Statistics Canada establishes low-income cut-offs (LICOs), which are income thresholds calculated for different geographic and family-size categories. For this analysis, the LICO calculated in 1996 was used to determine if an adolescent's *family income* placed him or her below or at/above the LICO.

Religious attendance (services or meetings) was collapsed into two groups: the adolescent had or had not attended a religious service (aside from special occasions such as weddings) in the previous 12 months.

between low income and having had sex was significant only for boys.

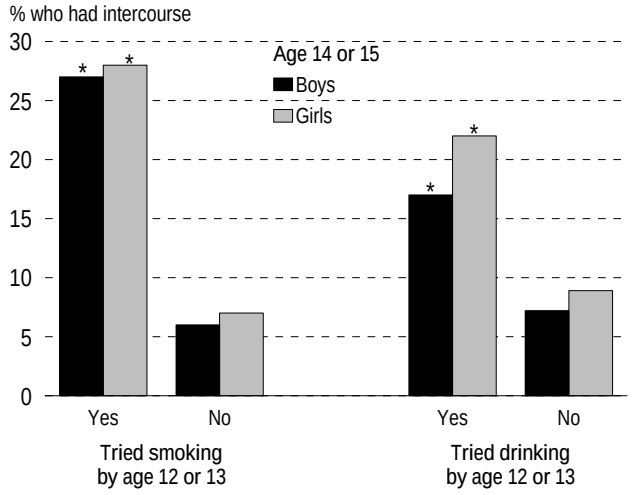
Risk-takers

In previous research, associations have emerged between drinking, smoking and sexual activity among adolescents.[21] While these three risk behaviours are closely linked and tend to be initiated around the same time, it cannot be inferred that one "causes" another. Rather, these are a cluster of behaviours characteristic of adolescents who are "risk-takers."

At age 12 or 13, 26% of boys and 31% of girls reported that they had tried smoking cigarettes (Appendix Table A). By age 14 or 15, over a quarter of this group reported that they had had intercourse. By contrast, just 6% who had not tried smoking by age 12 or 13 had had sex (Chart 5). Even when the effects of the other factors were taken into account, the association between smoking and early sexual intercourse was significant for both sexes (Table 1).

Close to half (45%) of the boys and over a third (37%) of the girls reported that they had tried drinking by age 12 or 13. Among those who had

Chart 5
Percentage of 14- or 15-year-old boys and girls reporting sexual intercourse in 1998/99 or 2000/01, by smoking and drinking at age 12 or 13, household population, Canada excluding territories



Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
** Significantly higher than value for same sex who had not tried smoking/drinking (p < 0.05)*

done so, 17% of the boys and 22% of the girls reported having had sex by age 14 or 15, compared with 7% and 9%, respectively, of those who had not consumed alcohol. But when the effects of the other factors were considered, the association between alcohol consumption and early sexual intercourse was significant only for girls.

Religious attendance

In the United States, one of the factors most extensively studied in relation to adolescent sexual activity is the influence of religion. American research has shown that adolescents who do not practice a religion have a higher probability of having sex, compared with those who do practice a religion.[13] By contrast, according to the analysis of NLSCY data, the situation is not the same in Canada: 12- or 13-year-olds who reported that they had not attended religious services in the previous year were no more or less likely than those who had done so to be sexually active by age 14 or 15 (Table 1).

Table 2
Percentage of 14- or 15-year-olds reporting sexual intercourse in 1998/99 or 2000/01, by religious attendance over time, household population, Canada excluding territories

Religious attendance (Age 12 or 13→Age 14 or 15)	% reporting sexual intercourse at age 14 or 15
Attend→Attend†	10
Attend→Do not attend	23*
Do not attend→Attend	14
Do not attend→Do not attend	14

Data sources: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
† Reference category
** Significantly different from reference category (p < 0.05)*

However, a change in religious attendance was related to the likelihood of having sexual intercourse. Between the ages of 12 or 13 and 14 or 15, the proportion of adolescents who did not regularly attend religious services rose from 23% to 32% (data not shown). Those who had ceased religious attendance were significantly more likely to have had sexual intercourse by age 14 or 15 than were those who continued to attend (Table 2). However, young people who started to attend religious services were no more or less likely to have had intercourse.

Concluding remarks

Results from the National Longitudinal Survey of Children and Youth show that by age 14 or 15, 13% of adolescents have had sexual intercourse. Several characteristics at age 12 or 13 were associated with having sex at an early age. However, these characteristics were not the same for boys and girls. For girls, the important factors tended to be more personal and individual than those that seemed to make a difference for boys, which had more to do with their social context. Among girls, weight, the onset of puberty, a weak self-concept and having tried smoking or drinking were significantly associated with early intercourse. For boys, older age, a poor parent-child relationship, low family income, and having tried smoking were significant. As well, a weak self-concept reduced the odds that boys would have had sexual intercourse by age 14 or 15.

This analysis demonstrates temporal relationships between several characteristics at ages 12 or 13 and having had sexual intercourse two years later, but they should not be interpreted as cause-and-effect associations. These characteristics are, however, precursors, and knowing some of the early signs makes it possible for parents, teachers and health professionals to better target messages about the consequences of early sexual activity to those young people who are most at risk of engaging in such behaviour.

References

1 Maticka-Tyndale E, Barrett M, Mackey A. Adolescent sexual and reproductive health in Canada: A review of national data sources and their limitations. *The Canadian Journal of Human Sexuality* 2000; 9(1): 41-65.

2 Canadian Institute for Health Information. Chapter 25. Gender differences in bacterial STIs in Canada. Women's Health Surveillance Report, 2003. Available at *http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_29_E&cw_topic=29&cw_rel=AR_342_E.*

3 Dryburgh H. Teenage pregnancy. *Health Reports* (Statistics Canada, Catalogue 82-003) 2000; 12(1): 9-19.

4 Coté J, Allahar A. *Generation on Hold.* Toronto: Stoddard Publishing, 1994.

5 Maynard R. *Kids Having Kids*. Washington: The Urban Institute Press, 1996.

6 Gruber J. *Risky Behaviour among Youths*. Chicago: The University of Chicago Press, 2001.

7 The Alan Guttmacher Institute. *Facts in Brief: Teen Sex and Pregnancy, 1999*. New York: The Alan Guttmacher Institute, 1999.

8 Moore KA, Myers D, Morrison DR, et al. Age at childbirth and later poverty. *Journal of Research on Adolescence* 1993; 3(4): 393-422.

9 Bissel M. Socio-economic outcomes of teen pregnancy and parenthood : a review of the literature. *The Canadian Journal of Human Sexuality* 2000; 9(3): 191-204.

10 Health Canada. Teen pregnancy. Health Canada, 1999. Available at *http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/measbaut/mu_ee_e.html.*

11 Robinson KL, Telljohann SK, Price JH. Predictors of sixth graders engaging in sexual intercourse. *The Journal of School Health* 1999; 69(9): 369-75.

12 Kaltiala-Heino R, Kosunen E, Rimpelä M. Pubertal timing, sexual behaviour, and self-reported depression in middle adolescence. *Journal of Adolescence* 2003; 26: 531-45.

13 Meier A. Adolescents' transition to first intercourse, religiosity and attitudes about sex. *Social Forces* 2003; 81(3); 1031-52.

14 Statistics Canada. National Longitudinal Survey of Children and Youth. Statistics Canada, 2003. Available at *http://www.statcan.ca/english/sdds/4450.htm.*

15 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.

16 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 283-310.

17 Communications. Virginity: a state of mind… but not necessarily of body. *The Journal of School Health* 2001; 71(3): 87-8.

18 Canadian Institute for Health Information. Chapter 23. Sexual health. Women's Health Surveillance Report, 2003. Available at *http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page = PG_29_E&w_topic= 29&cw_rel=AR_342_E.*

19 Chumlea WC, Schubert CM, Roche AF, et al. Age at menarche and racial comparisons in US girls. *Pediatrics* 2003; 111(1): 110-3.

20 Cole TJ, Bellizzi MC, Flegal KM, et al. Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal* 2000; 320(7244): 1240-3.

21 Galambos NL, Tilton-Weaver LC. Multiple-risk behaviour in adolescents and young adults. *Health Reports* (Statistics Canada, Catalogue 82-003) 1998; 10(2): 9-20.

Table A
Distribution of selected characteristics of 12- or 13-year-olds, household population, Canada excluding territories, 1996/97 and 1998/99

	Boys			Girls		
	Sample size	Estimated population		Sample size	Estimated population	
		'000	%		'000	%
Total	1,593	812	100	1,619	770	100
Sexual intercourse by age 14 or 15						
Yes	211	95	12	254	103	13
No	1,382	717	88	1,365	667	87
Age 14 or 15 in:						
2000/01	672	405	50	689	385	50
1998/99	921	407	50	930	386	50
Age when asked about sexual intercourse						
14	894	405	50	905	385	50
15	699	407	50	714	386	50
Region						
Atlantic	373	68	8	409	65	8
Québec	281	185	23	310	176	23
Ontario	411	302	37	395	286	37
West	528	257	32	505	244	32
Onset of puberty†						
No	838	435	54	572	277	36
Yes	533	267	33	817	374	49
Missing	222	110	13	230	119	15
Body mass index†						
Overweight	275	133	16	233	98	13
Not overweight	1,318	679	84	1,386	673	87
Self-concept†						
Strong	1,221	603	74	1,162	544	71
Weak	249	137	17	334	164	21
Missing	123	72	9	123	62	8
Parent-child relationship†						
Poor	220	116	14	258	124	16
Good	1,319	665	82	1,300	608	79
Missing	54	31	4	61	38	5
Tried smoking cigarettes†						
Yes	447	214	26	534	236	31
No	956	497	61	923	437	57
Missing	190	101	12	162	97	13
Tried drinking alcohol†						
Yes	690	363	45	622	285	37
No	748	365	45	861	401	52
Missing	155	84	10	136	84	11
Family income†						
Below LICO	250	124	15	248	134	17
At or above LICO	1,277	652	80	1,305	597	78
Missing	66	36	4	66	39	5
Highest education in household†						
Postsecondary graduation	1,259	655	81	1,260	602	78
Less than postsecondary graduation	291	132	16	320	140	18
Missing	43	25	3	39	28	4
Family type†						
Lone-parent	243	126	16	259	128	17
Two parents	1,309	663	82	1,321	614	80
Missing	41	24	3	39	28	4
Time alone at home†						
One hour or more a day	507	258	32	557	226	30
Less than one hour a day	871	439	54	879	440	57
Missing	215	115	14	183	104	14
Emotional problems†						
Yes	111	54	7	179	88	11
No	1,242	637	78	1,221	573	74
Missing	240	121	15	219	109	14
Relationships with friends†						
Poor	237	119	15	138	74	10
Good	1,237	630	78	1,365	628	82
Missing	119	64	8	116	68	9
Religious attendance in past 12 months†						
Yes	1,102	546	67	1,157	523	68
No	339	193	24	334	177	23
Missing	152	73	9	128	70	9

Data source: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth, longitudinal file
† At age 12 or 13

Table B
Adjusted odds ratios for 14- or 15-year-olds reporting sexual intercourse in 1998/99 or 2000/01, by selected characteristics at age 12 or 13, household population, Canada excluding territories

	Adjusted odds ratio	95% confidence interval
Sex		
Boys†	1.00	...
Girls	0.95	0.70, 1.36
Cohort		
2000/01 (aged 8 or 9 in 1994/95)	1.13	0.78, 1.61
1998/99 (aged 10 or 11 in 1994/95)†	1.00	...
Age		
14†	1.00	...
15	1.22	0.85, 1.69
Region		
Atlantic	1.79*	1.23, 2.91
Québec	1.99*	1.28, 3.32
Ontario†	1.00	...
West	1.05	0.72, 1.62
Onset of puberty		
No†	1.00	...
Yes	1.87*	1.30, 2.74
Body mass index		
Overweight†	1.00	...
Not overweight	1.53	0.89, 2.72
Self-concept		
Strong†	1.00	...
Weak	1.33	0.83, 2.11
Parent-child relationship		
Poor	2.16*	1.43, 3.18
Good†	1.00	...
Tried smoking cigarettes		
Yes	4.60*	3.18, 6.85
No†	1.00	...
Tried drinking alcohol		
Yes	1.81*	1.21, 2.75
No†	1.00	...
Family income		
Below LICO	1.31	0.76, 1.99
At or above LICO†	1.00	...
Highest education in household		
Less than postsecondary graduation	1.17	0.76, 1.64
Postsecondary graduation†	1.00	...
Family type		
Lone-parent	1.18	0.80, 1.79
Two parents†	1.00	...
Time alone at home		
One hour or more a day	1.17	0.82, 1.66
Less than one hour a day†	1.00	...
Emotional problems		
Yes†	1.00	...
No	1.33	0.71, 2.23
Number of friends		
More of opposite sex†	1.00	...
Equal or more of same sex	1.14	0.56, 2.42
Relationships with friends		
Good	1.91	0.87, 4.53
Poor†	1.00	...
Religious attendance in past 12 months		
No	1.01	0.70, 1.53
Yes†	1.00	...

Data sources: 1996/97, 1998/99 and 2000/01 National Longitudinal Survey of Children and Youth
† Reference category
** Significantly different from reference category (p < 0.05)*
··· Not applicable

The journey to quitting smoking

Margot Shields

Abstract

Objectives

This article outlines smoking trends over the past 10 years among the population aged 18 or older. Factors associated with smoking cessation and relapse are examined, as well as factors associated with having no intention of quitting in the next 6 months.

Data sources

Data are from the household cross-sectional and longitudinal components of Statistics Canada's National Population Health Survey (1994/95 to 2002/03) (NPHS) and from the 2000/01 and 2003 Canadian Community Health Survey (CCHS).

Analytical techniques

Trends in smoking rates were calculated using cross-sectional data from the NPHS and the CCHS. Factors associated with cessation and relapsing were examined using pooling of repeated observations over two-year periods and logistic regression based on NPHS longitudinal data from 1994/95 to 2002/03. Factors associated with having no plans to quit were examined with logistic regression, based on 2003 CCHS cross-sectional data.

Main results

In 2003, 19% of the Canadian population aged 18 or older smoked cigarettes daily, down 7 percentage points from a decade earlier. Smoking cessation, relapsing and having no plans to quit were all associated with addiction levels, notably, cigarettes smoked per day. Smoke-free homes and workplace smoking bans were associated with reduced cigarette consumption.

Key words

smoking prevalence, tobacco use, psychological stress, longitudinal studies, stages of change

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Despite substantial declines over the past decade, close to one in four Canadians aged 18 or older smoked in 2003. Given that smoking remains the major preventable cause of death in Canada,[1] this rate is unacceptably high. In 1998, the deaths of approximately 48,000 Canadians were attributable to smoking, up almost 25% since 1989.[1] Recent estimates suggest that 50% of smokers will die as a result of smoking-related illness.[2] As well, second-hand smoke is harmful to non-smokers; in 1998, an estimated 1,000 deaths in Canada resulted from exposure to environmental tobacco smoke.[1]

Smoking causes lung and other cancers, coronary heart disease, stroke, and chronic lung disease; quitting reduces the risks of developing these diseases.[3-5] In fact, quitting brings health benefits at any age.[2] The risk of mortality for former smokers who have been abstinent for 10 to 15 years approaches that of people who have never smoked.[4]

Although quitting is one of the most important steps that smokers can take to improve their health, it is certainly not easy. Smoking is highly addictive, so the effort required to stop is daunting. Quitting typically involves five distinct stages: precontemplation, contemplation, preparation,

action and maintenance (see *Stages of change*).[6] The factors associated with being at the various stages are not necessarily the same,[3,6-8] so understanding what is important at each stage is key to developing public health programs aimed at reducing the smoking rate.

With information from the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS) (see *Data sources*), this article updates Canadian smoking trends for the population aged 18 or older (see *Analytical techniques*, *Definitions* and *Limitations*). The association between smoke-free environments and cigarette consumption is explored with data from the 2003 CCHS. Based on longitudinal data from five cycles of the NPHS (1994/95 to 2002/03), smoking

Data sources

The smoking data for 1994/95 to 2003 are from the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS). The rates for the mid-1960s are from the Survey of Smoking Habits 1966 and are based on the household population aged 17 or older.

National Population Health Survey

Since 1994/95, Statistics Canada's biennial National Population Health Survey has collected information about the health of the Canadian population. The survey covers household and institutional residents in all provinces and territories, except people on Indian reserves, on Canadian Forces bases, and in some remote areas.

For each of the first three NPHS cycles (1994/95, 1996/97 and 1998/99), two cross-sectional files were produced: General and Health. The General file contains socio-demographic and some health information for each member of participating households (collected using the General questionnaire). The Health file contains additional, in-depth health information (collected using the Health questionnaire) about one randomly selected household member, as well as the information from the General file about that individual. Starting in 2000/01 (cycle 4), the NPHS became strictly longitudinal, and the General and Health questionnaires were combined.

For the first three cycles, two cross-sectional response rates were calculated: household and person. The household response rate is the percentage of households where at least the General questionnaire was completed for the randomly selected respondent. The person response rate is the percentage of responding households for which the Health questionnaire was completed for the randomly selected respondent. In 1994/95, the household response rate was 88.7%, and the person response rate was 96.1%. The corresponding rates were 82.6% and 95.6% in 1996/97, and 87.6% and 98.5% in 1998/99.

The time series smoking data for 1994/95, 1996/97 and 1998/99 were calculated using the NPHS cross-sectional Health files. The rates are based on the household population aged 18 or older living in the 10 provinces.

A longitudinal file is also produced for each NPHS cycle. In 1994/95, a subset of the randomly selected respondents (17,626) was chosen to be in the longitudinal panel and was followed over time. In subsequent cycles, the response rates for this panel were: 92.8% for cycle 2 (1996/97), 88.2% for cycle 3 (1998/99), 84.8% for cycle 4 (2000/01), and 80.6% for cycle 5 (2002/03). The analyses of factors associated with smoking cessation and relapsing are based on the cycle 5 (2002/03) longitudinal "square" file, which contains records for all originally selected panel members about whom cycle 1 information was available, whether or not information about them was obtained in later cycles. More detailed descriptions of NPHS design, sample and interview procedures can be found in published reports.[9,10]

Canadian Community Health Survey

The time series smoking rates for 2001/02 and 2003 are based on data for the population aged 18 or older from cycles 1.1 and 2.1 of the Canadian Community Health Survey. Associations between smoke-free homes and workplaces and smoking intensity are based on 2003 data. The analysis of factors associated with being a persistent smoker (having no intention of quitting in the near future) used 2003 data for the provinces of Newfoundland, Québec and Saskatchewan.

The CCHS collects cross-sectional information about the health of Canadians every two years. The survey covers the household population aged 12 or older in the provinces and territories, except residents of Indian reserves, Canadian Forces bases, and some remote areas. The first cycle (1.1) began in September 2000 and continued over 14 months. The response rate was 84.7%, yielding a sample of 131,535 respondents. Cycle 2.1 began in January 2003 and ended in December that year. The response rate was 80.6%; the sample, 135,573. A description of the CCHS methodology is available in a published report.[11]

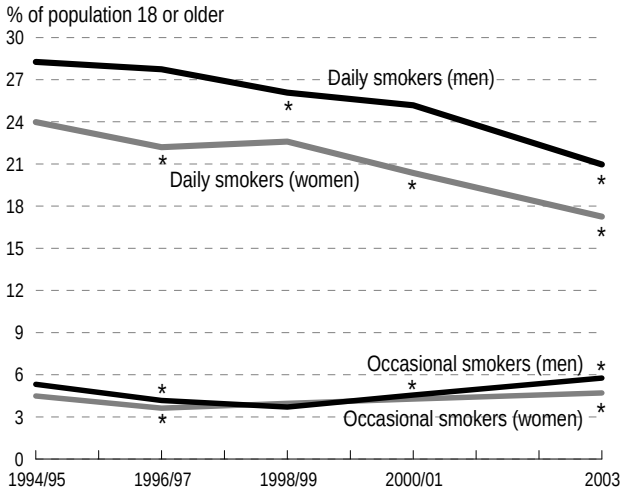
cessation and relapse rates are estimated, and factors associated with smoking cessation and relapse are examined. Cross-sectional data from the 2003 CCHS are used to identify the characteristics of smokers who have no plans to quit in the near future. Because some research suggests that factors associated with behaviour change among male and female smokers are different,[12-15] separate analyses are conducted for each sex.

Smoking less common

In the mid-1960s, close to half of Canadian adults smoked cigarettes; by 2003, the rate had fallen to 24% (data not shown). The decline in smoking over the last 40 years was much more pronounced among men than women. In the mid-1960s, men's rate had exceeded women's by 22 percentage points (59% versus 37%); by 2003, the gap had been reduced to 5 percentage points (27% versus 22%).

Most people who smoke do so daily. But trends in daily and occasional smoking differ. Since 1994/95, daily smoking rates have dropped, whereas occasional smoking rates remained relatively stable (Chart 1).

Chart 1
Percentage of current smokers, by sex and type of smoker, household population aged 18 or older, Canada excluding territories, 1994/95 to 2003



Data sources: 1994/95, 1996/97 and 1998/99 National Population Health Survey, cross-sectional sample, Health file; 2000/01 and 2003 Canadian Community Health Survey
Notes: The daily smoking rate for men is significantly higher than the rate for women in all periods. The occasional smoking rate for men is significantly higher than the rate for women in 2003.
** Significantly different from estimate for preceding period ($p < 0.05$)*

Quit rates rising

In this analysis, the quit rate is the percentage of people who had been smokers in one NPHS cycle, but when they were re-interviewed two years later, reported that they did not smoke.

During the last decade, the percentage of daily smokers who quit over a two-year period has risen (Table 1). Between 1994/95 and 1996/97, 9% of men who had been daily smokers quit; between 2000/01 and 2002/03, the figure was 18%. Among women, the percentage of daily smokers who quit over the same two-year intervals rose from 11% to 16%.

Stages of change

Research suggests that smokers go through five distinct stages in their attempts to quit.[3,6,16,17] It is not uncommon to cycle through these stages several times before successful abstinence.

- At the *precontemplation stage*, smokers have no plans to quit in the foreseeable future. In this article, smokers in the precontemplation stage are referred to as "persistent" smokers.
- At the *contemplation stage*, smokers recognize the problem and are seriously thinking about addressing it, typically in the next six months, although they will not necessarily quit within that period.
- The *preparation stage* involves a firm commitment to quit. Smokers at this stage have usually taken some initial steps to alter their behaviour, and they have immediate plans to quit.[6]
- At the *action stage*, a change has been made—the smoker has quit. In this analysis, the action stage was defined by a transition from daily smoking to not smoking between two consecutive National Population Health Survey (NPHS) cycles (see *Analytical techniques*).
- *Maintenance* is the stage at which an ex-smoker works to prolong abstinence and become a successful quitter. Although relapse is most likely to occur within a year of quitting, it sometimes happens after several years of continuous maintenance. In this analysis, pairs of consecutive cycles of the NPHS longitudinal file were used to identify former daily smokers who, at the follow-up interview two years later, reported that they smoked daily.

Table 1
Percentage of daily and occasional smokers who quit in a two-year period, by sex, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Total smokers			Daily smokers			Occasional smokers		
	Both sexes	Men	Women	Both sexes	Men	Women	Both sexes	Men	Women
		%			%			%	
Overall two-year quit rate	17.0	17.2	16.7	12.7	13.1	12.2	40.6	40.1	41.1
1994/95 to 1996/97	14.2	12.7	15.8	9.6	8.7	10.7	38.7	34.5	43.1
1996/97 to 1998/99	15.9	16.6*	15.0	11.8*	12.7*	10.8	41.1	40.6	41.7
1998/99 to 2000/01	17.5*	18.4*	16.6	13.9*	15.0*	12.8	39.9	42.1	38.1
2000/01 to 2002/03	21.5*	22.7*	20.3*	16.8*	17.9*	15.6*	43.1	45.1	41.1

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
** Significantly different from 1994/95 to 1996/97 ($p < 0.05$)*

At around 40%, two-year quit rates were far higher among occasional smokers. However, most occasional smokers have a lower level of addiction than do daily smokers, so the high quit rates are not surprising. Because occasional smokers are a unique and relatively small group, in this article, the analysis of factors associated with smoking cessation is limited to daily smokers.

Not all daily smokers are equally likely to quit. In fact, about a third of them have no plans to do so in the immediate future (see *Persistent smokers*). Some characteristics and situations seem to facilitate quitting, while others may be impediments. Moreover, factors that may be important, such as smoking behaviour, health, lifestyle, psycho-social variables and socio-demographic characteristics, do not exist in isolation. When eight years of longitudinal data from the NPHS were examined and potential interrelationships were taken into account, only some of these variables emerged as being significantly associated with quitting smoking.

Addiction levels

The addictiveness of nicotine has been cited as the main impediment to smoking cessation.[18] One of the most consistent research findings is that the number of cigarettes smoked per day is negatively associated with quitting.[8,12,14,15,19-23] And based on NPHS data, light smokers (less than 10 cigarettes a day) had substantially higher odds of quitting than did heavy smokers (25 or more) (Tables 2 and 3).

The timing of the first cigarette of the day is another measure of addiction.[24] Men and women who reported smoking their first cigarette within 30 minutes of waking were less likely to quit than were those who waited for more than an hour. As well, men and women who had started smoking when they were younger than 18 were less likely to quit than were those who had begun at older ages.

Smoke-free environments

A growing number of constraints have been placed on smoking in both public and private locations. In 2003, substantial percentages of men and women who were daily smokers lived in homes where smoking was completely restricted and worked in environments where smoking was banned (Table 4).

However, according to the analyses of NPHS data, workplace restrictions were not related to smoking cessation. And although smokers who lived in smoke-free homes were more likely to quit, this association was not significant when the effects of the other factors—notably, smoking intensity—were taken into account. Smokers who lived in such homes tended to be light smokers, who were the most likely to quit.

Nonetheless, restrictions on smoking in private households and public places are related to decreased tobacco consumption.[25-27] Male daily smokers living in smoke-free homes averaged 14 cigarettes a day, compared with 19 a day for those who lived in households where smoking was

Table 2
Odds ratios relating selected characteristics of male daily smokers to quitting in a two-year period, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
Men				
Cigarettes per day				
1 to 9 (light)	2.9*	2.0, 4.1	2.5*	1.7, 3.7
10 to 24 (moderate)	1.2	0.9, 1.6	1.1	0.9, 1.5
25 or more (heavy)†	1.0	...	1.0	...
First cigarette of day§				
Within 30 minutes of waking	0.5*	0.4, 0.7	0.6*	0.4, 0.8
31 to 60 minutes after waking	0.8	0.5, 1.1	0.8	0.5, 1.1
More than an hour after waking†	1.0	...	1.0	...
Age of smoking initiation				
Younger than 18†	1.0	...	1.0	...
18 or older	1.6*	1.3, 2.0	1.4*	1.1, 1.7
Smoke-free home				
Yes	1.4*	1.0, 1.9	1.1	0.8, 1.6
No†	1.0	...	1.0	...
Smoking banned at work§ (workers aged 18 to 54)				
Yes	1.1	0.8, 1.6	0.9	0.7, 1.4
No†	1.0	...	1.0	...
Chronic conditions				
Vascular				
At least one new condition	2.7*	1.9, 3.9	2.9*	2.0, 4.2
At least one existing condition	0.8	0.6, 1.2	0.8	0.6, 1.2
None†	1.0	...	1.0	...
Respiratory				
At least one new condition	0.8	0.5, 1.5	0.8	0.5, 1.5
At least one existing condition	0.7	0.5, 1.1	0.8	0.5, 1.2
None†	1.0	...	1.0	...
Body mass index (BMI)				
Not overweight (< 25)†	1.0	...	1.0	...
Overweight/Obese (≥ 25)	1.2	0.9, 1.5	1.1	0.9, 1.4
Heavy drinking				
Yes	0.7*	0.5, 0.9	0.8	0.6, 1.0
No†	1.0	...	1.0	...
Psychological distress				
Low†	1.0	...	1.0	...
Moderate	0.7*	0.6, 0.9	0.7*	0.6, 0.9
High	0.6*	0.4, 0.8	0.7*	0.5, 1.0
Low emotional support††				
Yes	0.6*	0.4, 0.8	0.6*	0.4, 0.9
No†	1.0	...	1.0	...
Chronic stress‡‡				
0 to 1 stressor (low)†	1.0	...	1.0	...
2 to 5 stressors (moderate)	1.1	0.7, 1.6	1.2	0.8, 1.9
6 or more stressors (high)	0.9	0.5, 1.5	1.0	0.6, 1.7
Age group				
18 to 29	0.9	0.7, 1.2	1.0	0.8, 1.4
30 to 64†	1.0	...	1.0	...
65 or older	1.3	0.9, 1.9	1.3	0.9, 1.9
Education				
Less than secondary graduation	1.1	0.8, 1.5	1.2	0.8, 1.6
Secondary graduation†	1.0	...	1.0	...
Some postsecondary	1.5*	1.0, 2.1	1.6*	1.1, 2.2
Postsecondary graduation	1.6*	1.1, 2.2	1.5*	1.1, 2.2
Household income				
Low/Lower-middle†	1.0	...	1.0	...
Middle/Upper-middle/High	1.9*	1.4, 2.5	1.7*	1.2, 2.3
Child(ren) aged 5 or younger in household				
Yes	1.5*	1.1, 1.9	1.4*	1.0, 1.8
No†	1.0	...	1.0	...

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
† Reference category
‡ Adjusted for cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, psychological distress, age, education, household income and children 5 or younger in household (see Analytical techniques*)*
§ Based on cohorts 2, 3 and 4 (see Analytical techniques*)*
†† Based on cohorts 1 and 2 (see Analytical techniques*)*
‡‡ Based on cohorts 1 and 4 (see Analytical techniques*)*
** p < 0.05*
··· Not applicable

permitted (Chart 2). The corresponding averages for women were 11 and 16. As well, men who smoked daily but were employed in environments where smoking was banned averaged 15 cigarettes a day, compared with 18 a day for those who could smoke at work; for women, the averages were 14 and 15 (Chart 3).

The combination of a smoke-free home and workplace smoking bans yields even larger differences in consumption (Chart 4). Male daily smokers facing such restrictions averaged 7 fewer cigarettes a day than did those who could smoke at work and at home. For women, the difference was 6 fewer cigarettes a day.

The relationship between smoking restrictions and cigarette consumption is relevant for two reasons. First, there is a dose-response between the number of cigarettes smoked per day and the risk

Table 3
Odds ratios relating selected characteristics of female daily smokers to quitting in a two-year period, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
Women				
Cigarettes per day				
1 to 9 (light)	2.0*	1.4, 2.9	1.7*	1.1, 2.5
10 to 24 (moderate)	1.1	0.8, 1.4	1.0	0.7, 1.4
25 or more (heavy)†	1.0	...	1.0	...
First cigarette of day§				
Within 30 minutes of waking	0.6*	0.5, 0.8	0.7*	0.5, 1.0
31 to 60 minutes after waking	0.9	0.7, 1.3	1.0	0.7, 1.4
More than an hour after waking†	1.0	...	1.0	...
Age of smoking initiation				
Younger than 18†	1.0	...	1.0	...
18 or older	1.3*	1.0, 1.6	1.3*	1.0, 1.6
Smoke-free home				
Yes	1.5*	1.1, 2.1	1.3	1.0, 1.9
No†	1.0	...	1.0	...
Smoking banned at work§ (workers aged 18 to 54)				
Yes	0.9	0.7, 1.3	0.8	0.6, 1.2
No†	1.0	...	1.0	...
Chronic conditions				
Vascular				
At least one new condition	2.1*	1.6, 2.8	2.4*	1.7, 3.3
At least one existing condition	1.0	0.7, 1.4	1.1	0.7, 1.5
None†	1.0	...	1.0	...
Respiratory				
At least one new condition	0.7	0.4, 1.1	0.7	0.4, 1.2
At least one existing condition	1.0	0.7, 1.3	1.0	0.7, 1.4
None†	1.0	...	1.0	...
Body mass index (BMI)				
Not overweight (< 25)†	1.0	...	1.0	...
Overweight/Obese (≥ 25)	1.0	0.8, 1.3	1.1	0.8, 1.3
Heavy drinking				
Yes	0.7*	0.5, 1.0	0.7*	0.5, 0.9
No†	1.0	...	1.0	...
Psychological distress				
Low†	1.0	...	1.0	...
Moderate	1.0	0.7, 1.2	0.9	0.7, 1.2
High	1.0	0.7, 1.3	0.9	0.7, 1.3
Low emotional support††				
Yes	0.8	0.5, 1.2	0.8	0.5, 1.3
No†	1.0	...	1.0	...
Chronic stress‡‡				
0 to 1 stressor (low)†	1.0	...	1.0	...
2 to 5 stressors (moderate)	0.7	0.5, 1.0	0.8	0.5, 1.2
6 or more stressors (high)	0.6*	0.4, 0.8	0.5*	0.3, 0.8
Age group				
18 to 29	1.4*	1.0, 1.7	1.5*	1.1, 2.0
30 to 64†	1.0	...	1.0	...
65 or older	1.4	1.0, 1.9	1.1	0.7, 1.5
Education				
Less than secondary graduation	1.2	0.9, 1.6	1.2	0.9, 1.7
Secondary graduation†	1.0	...	1.0	...
Some postsecondary	1.3	0.9, 1.7	1.2	0.9, 1.7
Postsecondary graduation	1.5*	1.1, 2.1	1.4*	1.1, 1.9
Household income				
Low/Lower-middle†	1.0	...	1.0	...
Middle/Upper-middle/High	1.4*	1.1, 1.8	1.4*	1.1, 1.8
Child(ren) aged 5 or younger in household				
Yes	0.9	0.7, 1.2	0.9	0.7, 1.2
No†	1.0	...	1.0	...

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
† Reference category
‡ Adjusted for cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, psychological distress, age, education, household income and children 5 or younger in household (see Analytical techniques*)*
§ Based on cohorts 2, 3 and 4 (see Analytical techniques*)*
†† Based on cohorts 1 and 2 (see Analytical techniques*)*
‡‡ Based on cohorts 1 and 4 (see Analytical techniques*)*
** p < 0.05*
... Not applicable

of disease and death—the more cigarettes smoked, the greater the chances of getting sick and dying.[5] Second, as the analysis of NPHS data shows, lower consumption is associated with an increased likelihood of quitting. Therefore, even if smoking bans at home and at work do not have an immediate impact on quitting, the reduced consumption associated with smoke-free environments may eventually make quitting easier.

Physical and emotional health

Even allowing for the strong influence of addiction indicators, a number of health factors played a role in the likelihood of smoking cessation (Tables 2 and 3).

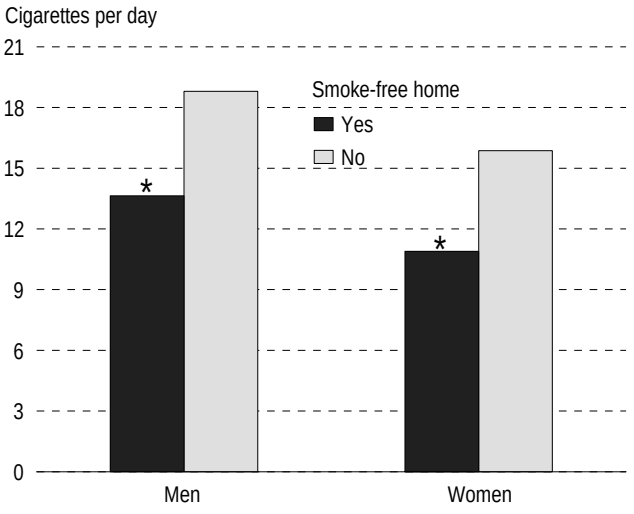
Daily smokers who had been newly diagnosed with a vascular condition (heart disease, high blood pressure, stroke or diabetes) had more than twice the odds of quitting, compared with those who had not developed such conditions. However, pre-existing vascular conditions were not associated with

Table 4
Percentage of population reporting smoking restrictions, by sex and smoking status, Canada excluding territories, 2003

	Men	Women
	%	
Smoke-free home (population aged 18 or older)		
Total	56	58*
Daily smoker	32	24*
Occasional smoker	54†	53†
Non-smoker	63†	65†*
Smoking banned at work (workers aged 18 to 54)		
Total	57	75*
Daily smoker	43	62*
Occasional smoker	52†	73†*
Non-smoker	62†	78†*

Data source: 2003 Canadian Community Health Survey
** Significantly different than estimate for men ($p < 0.05$)*
† Significantly higher than estimate for previous category ($p < 0.05$)

Chart 2
Average number of cigarettes smoked per day, by household smoking restrictions and sex, daily smokers aged 18 or older, Canada excluding territories, 2003



Data source: 2003 Canadian Community Health Survey
** Significantly lower than estimate for "no" ($p < 0.05$)*

Persistent smokers

Obviously, the first step that smokers must take in successful cessation is to decide to quit. In this article, those who had yet to take that step are called "persistent" smokers. They were identified by having replied "no" to the question, "Are you seriously considering quitting within the next 6 months?" In the "stages of change" model, these smokers would be "precontemplators" (see *Stages of change).*

Analysis of 1996/97 NPHS data revealed that half of daily smokers (51% of men and 53% of women) had no plans to quit in the immediate future. And indeed, two years later, just 19% of the men and 13% of the women in this group reported that they had tried to quit or had actually quit. This compared with 31% of daily smokers who had been seriously considering quitting in 1996/97.

In the 2003 CCHS, the question that identified persistent smokers was asked in only three provinces. In each of these provinces, the percentage of daily smokers not planning to quit had declined substantially since 1996/97: from 60% to 35% in Newfoundland; from 60% to 37% in Québec; and from 49% to 35% in Saskatchewan.

In 2003, for women, but not men, being a persistent smoker was strongly associated with cigarette consumption. Women who smoked 25 or more cigarettes a day had about twice the odds of being persistent smokers, compared with light smokers (Appendix Tables A and B). Surprisingly, men whose cigarette consumption was in the moderate range were actually less likely to be persistent smokers than those who were light smokers; for men who were heavy smokers, there was no significant difference.

For both sexes, living in a home where smoking was banned reduced the odds of being a persistent smoker, although the relationship was not significant for men when the effects of the other variables were taken into account.

Elderly people had around twice the odds of being persistent smokers, compared with people aged 30 to 64. At older ages, smokers may be particularly resistant to quitting, so special intervention programs may be required to convince them to consider doing so.[28]

While some associations were found between socio-economic status and being a persistent smoker, the only one that remained significant when the effects of the other factors were taken into account was not having graduated from secondary school for men. As well, men living in households with young children were less likely to be persistent smokers than those in households without young children.

Analytical techniques

Daily and occasional smoking prevalence rates from 1994/95 to 2003 were estimated using cross-sectional data from the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS).

The analyses of factors associated with smoking cessation and relapse were based on longitudinal data from cycles 1 to 5 (1994/95 to 2002/03) of the NPHS. For both sets of analyses, "pooling of repeated observations" combined with logistic regression analysis was used.[12,29] This method is particularly useful in predicting the short-term risk of an event where the risk factors associated with the event may change over time.[12] While trying to quit, smokers may relapse several times before succeeding, and risk factors such as emotional support and stress levels may vary.[4]

The analysis of factors associated with smoking cessation was based on daily smokers aged 18 or older. Quitting was defined as a transition from being a daily smoker to a non-smoker between two consecutive NPHS cycles.

The analysis used four cohorts of pooled observations. The baseline years for these four cohorts were 1994/95, 1996/97, 1998/99 and 2000/01. For each baseline year, all daily smokers aged 18 or older were selected. They were considered to be quitters if, in the follow-up interview two years later, they reported not smoking at all.

Sample sizes for daily smokers and quitters

			Daily smokers (baseline)		Quitters (follow-up)	
Cohort	Baseline	Follow-up	Men	Women	Men	Women
1	1994/95	1996/97	1,650	1,701	146	180
2	1996/97	1998/99	1,538	1,532	189	157
3	1998/99	2000/01	1,325	1,413	180	195
4	2000/01	2002/03	1,095	1,145	178	181
Total			5,608	5,791	693	713

Logistic regression analysis was then used on this pooled set of observations to examine smokers' characteristics at the baseline year in relation to having quit two years later. Unadjusted odds were calculated to examine the individual relationship of each factor to quitting, and multiple logistic regression analysis was used to estimate the effect of each factor conditional on the effects of a combination of factors. Variables entered into the multivariate model, which were selected based on the literature and availability in the NPHS, included smoking behaviours, chronic conditions, health behaviours, psycho-social factors, and socio-economic characteristics (see *Definitions*). Certain variables that the literature suggests may be related to smoking cessation and relapse were not included in every NPHS cycle. In such cases, the logistic regression models were run only on the cohorts for whom information was collected for in the baseline year. These variables were: timing of the first cigarette of the day (cohorts 2, 3, 4), workplace smoking bans (cohorts 2, 3, 4), emotional support (cohorts 1, 2) and chronic stress (cohorts 1, 4).

The analysis of factors associated with relapsing was similar. For each of the four baseline years, former daily smokers aged 18 or older were selected (did not currently smoke but in the past had smoked daily). A "relapser" was defined as a former daily smoker who reported smoking daily at their follow-up interview two years later.

Sample sizes for former daily smokers and "relapsers"

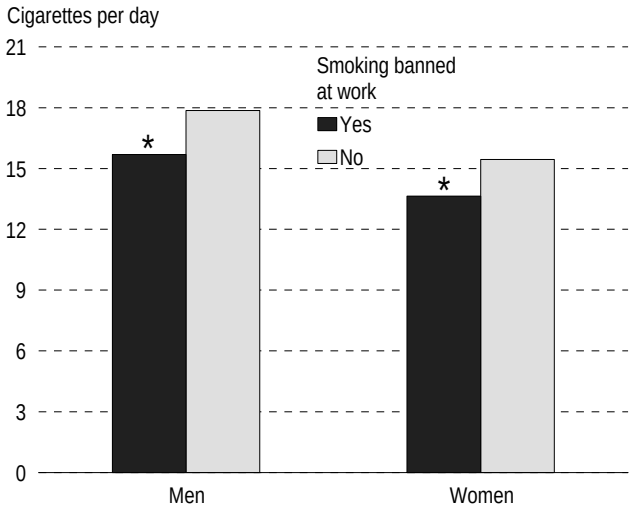
			Former daily smokers (baseline)		"Relapsers" (follow-up)	
Cohort	Baseline	Follow-up	Men	Women	Men	Women
1	1994/95	1996/97	1,602	1,429	68	69
2	1996/97	1998/99	1,595	1,449	72	84
3	1998/99	2000/01	1,522	1,382	67	48
4	2000/01	2002/03	1,575	1,551	54	64
Total			6,294	5,811	261	265

The number of years since quitting was a strong predictor of relapse. Therefore, in the first set of regressions, relapsing was examined in relation to each risk factor, controlling for years since quitting. In the second set, the additional variables were similar to those used in the quitting models, and again, associations with variables only asked at certain NPHS cycles were studied based on the applicable cohorts.

The analysis of factors associated with having no plans to quit in the next six months (persistent smokers) was based on 2003 CCHS cross-sectional data for Newfoundland, Québec and Saskatchewan. In these provinces, the sample sizes for daily smokers were 3,606 for men and 3,833 for women. Of these daily smokers, 1,311 men and 1,538 women had no plans to quit. Again, logistic regression was used, and the unadjusted and adjusted odds associated with being a persistent smoker were estimated with models similar to those using for quitting.

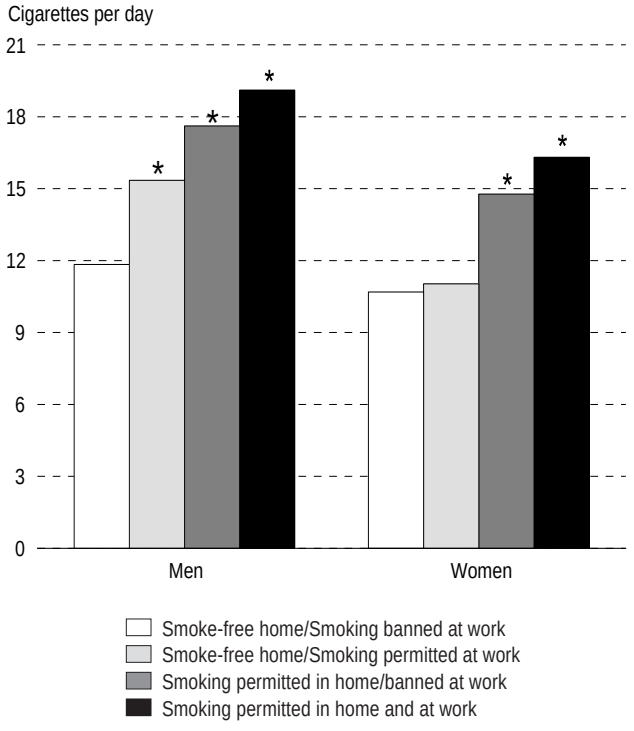
Variances on smoking prevalence rates, quitting rates, relapse rates, differences between rates and on odds ratios were calculated using the bootstrap technique, which accounts for survey design effects.[30-32]

Chart 3
Average number of cigarettes smoked per day, by workplace smoking restrictions and sex, employed daily smokers aged 18 to 54, Canada excluding territories, 2003



Data source: 2003 Canadian Community Health Survey
** Significantly lower than estimate for "no" (p < 0.05)*

Chart 4
Average number of cigarettes smoked per day, by workplace and household smoking restrictions and sex, employed daily smokers aged 18 to 54, Canada excluding territories, 2003



Data source: 2003 Canadian Community Health Survey
** Significantly higher than estimate for previous category(ies) (p < 0.05)*

quitting. This accords with other research showing that a long-standing illness is not related to smoking cessation,[14,19] but that recently detected health problems may provide the needed incentive.[8,12] Somewhat surprisingly, neither a pre-existing nor a newly diagnosed respiratory condition (chronic bronchitis, emphysema or asthma) was associated with quitting.

The relationship between weight and smoking is complex. Although overweight and obese smokers may wish to quit because of the added health risks, concern about subsequently gaining even more weight may be a deterrent. Based on NPHS data, daily smokers who were overweight or obese were no more or less likely to quit than were those whose weight was in the normal range.

Consistent with the literature,[14,21,23,33] heavy drinking reduced the likelihood of smoking cessation for both sexes. However, when the other factors were taken into account, the relationship did not remain significant for men.

Moderate or high psychological distress and low emotional support reduced the odds that male smokers would quit. Neither distress nor emotional support affected female smokers' odds of quitting. For women, chronic stress was more important; those who reported six or more stressors had half the odds of quitting, compared with women who reported no stressors or just one.

Socio-demographic factors

Socio-economic status has repeatedly been related to smoking cessation.[3,8,12-14,17,19,21-23,28] And based on analyses of NPHS data, higher levels of education and household income were associated with quitting for both sexes, even when the effects of the other variables were taken into account (Tables 2 and 3).

Men's odds of quitting did not vary by age. By contrast, women aged 18 to 29 had high odds of quitting, compared with those aged 30 to 64. Younger women's advantage may, in part, be attributable to plans to become pregnant or to being pregnant. Women are more likely to stop smoking during pregnancy than at any other time in their lives.[5] Another possibility is that medical

Definitions

To classify smokers, the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS) asked:

1. At the present time do you smoke cigarettes daily, occasionally or not at all?
2. Have you ever smoked cigarettes daily?

Daily smokers were those who answered "daily" to question 1; *occasional smokers* were those who answered "occasionally." *Former daily smokers* were those who answered "not at all" to question 1 and "yes" to question 2.

Smoking cessation and *relapsing* were defined by comparing successive pairs of cycles of the NPHS, which is conducted every two years. For each pair of cycles, smoking status was derived for the baseline and follow-up interviews. *Quitters* were those who reported smoking cigarettes daily at the baseline interview and not at all at the follow-up interview. *Relapsers* were former daily smokers at the baseline interview who reported that they smoked daily two years later at the follow-up interview.

Daily smokers who responded "no" to the following question were defined as *persistent smokers*: "Are you seriously considering quitting within the next 6 months?" In the 1996/97 NPHS, all daily smokers were asked this question, but in the 2003 CCHS, the question was asked in just three provinces: Newfoundland, Québec and Saskatchewan.

Smoking intensity was assessed by asking daily smokers and former daily smokers the number of cigarettes smoked each day. *Light smokers* were those who answered 1 to 9; *moderate smokers*, 10 to 24; and *heavy smokers*, 25 or more.

The timing of the *first cigarette of the day* was established with the question: "How soon after you wake up do you smoke your first cigarette?" The possible response categories were: within 5 minutes; 6 to 30 minutes; 31 to 60 minutes; and more than 60 minutes.

Age of smoking initiation was established with the question: "At what age did you begin smoking cigarettes daily?" Responses were grouped into two categories: younger than 18, and 18 or older.

For the analyses based on NPHS data, a *smoke-free home* was defined as a response of "no" to the question: "Does anyone in this household smoke regularly inside the house?" For the analyses based on CCHS data, two questions were used to identify *smoke-free homes*: "Are there any restrictions against smoking cigarettes in your home?" Those who responded "yes" were asked: "How is smoking restricted in your home?" The possible responses were: smokers are asked to refrain from smoking in the house; smoking is allowed in certain rooms only; smoking is restricted in the presence of young children; or other restriction. Respondents were defined as living in smoke-free homes if they said that smokers were asked to refrain from smoking in the house.

Workplace smoking restrictions were measured by asking employed respondents if smoking at their place of work was: restricted completely; allowed only in designated areas; restricted only in certain places; or not restricted at all. The "restricted completely" group was compared with the other three categories combined.

Respondents were asked if they had "any long-term health conditions that have lasted or are expected to last six months or more that have been diagnosed by a health professional." The interviewer then read a checklist. Two groups of *chronic conditions* were considered in this analysis: *vascular* (high blood pressure, heart disease, the effects of a stroke, and diabetes) and *respiratory* (asthma and chronic bronchitis or emphysema). In the analysis of quitting smoking, three categories were considered for each group of conditions: those who had one or more newly diagnosed condition(s) between the baseline and follow-up interviews; those who did not have a new condition but had reported at least one condition at the baseline year, and those with no conditions.

Weight was defined in terms of body mass index (BMI), which was calculated by dividing weight in kilograms by the square of height in metres. BMI is not calculated for pregnant women. Based on the World Health Organization's standards,[34] BMI was grouped into two categories: overweight or obese (BMI 25.0 or more) and not overweight (less than 25.0).

Heavy drinking was measured by asking respondents the number of times in the past year they had had five or more alcoholic drinks on one occasion. Those who reported that this had occurred at least once a month were classified as heavy drinkers. (In cycle 1, NPHS respondents were asked the exact number of times in the past year they had had five or more drinks on one occasion. Heavy drinkers were defined as those who reported 12 or more times.)

Psychological distress was based on responses to the following:

During the past month, about how often did you feel:

... so sad that nothing could cheer you up?
... nervous?
... restless or fidgety?
... hopeless?
... worthless?
... that everything was an effort?

Each question was answered on a five-point scale: all of the time (score 4), most of the time (3), some of the time (2), a little of the time (1), or none of the time (0). The possible range of scores was 0 to 24. High distress was defined as a score of 7 or more (an

Definitions - continued

average score per item of over 1), moderate distress as 1 to 6, and low distress as 0.

Four "yes/no" questions were used to measure perceived *emotional support*.

- Do you have someone you can talk to about your private feelings or concerns?
- Do you have someone you can really count on in a crisis situation?
- Do you have someone you can really count on to give you advice when you are making important personal decisions?
- Do you have someone who makes you feel loved and cared for?

Respondents were classified as having low emotional support if they answered "no" to at least one question.

Chronic stress was measured by asking respondents to reply "true" or "false" to 17 statements:

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 partner doesn't understand you.
6) Your partner doesn't show enough affection.
7) Your partner is not committed enough to your relationship.
8) You find it is very difficult to find someone compatible with you.
9) One of your children seems very unhappy.
10) A child's behaviour is a source of serious concern to you.
11) Your work around the home is not appreciated.
12) Your friends are a bad influence.
13) You would like to move but you cannot.
14) Your neighbourhood or community is too noisy or too polluted.
15) You have a parent, child or partner who is in very bad health and may die.
16) Someone in your family has an alcohol or drug problem.
17) People are too critical of you or what you do.

Respondents were classified as having high stress if they replied "true" to 6 or more items, moderate stress (2 to 5), and low stress (1 or 0).

In the 2003 CCHS, *self-perceived stress* was measured by asking, "Thinking about the amount of stress in your life, would you say most days are: not at all stressful? not very stressful? a bit stressful? quite a bit stressful? extremely stressful?" Respondents who indicated the last two categories were classified as having high self-perceived stress.

Three *age groups* were established for this analysis: 18 to 29, 30 to 64, and 65 or older.

Respondents were grouped into four education categories based on the highest level attained: less than secondary graduation, secondary graduation, some postsecondary, and postsecondary graduation.

Household income was based on the number of people in the household and total household income from all sources in the 12 months before the interview.

Household income group	People in household	Total household income
Lowest	1 to 4	Less than $10,000
	5 or more	Less than $15,000
Lower-middle	1 or 2	$10,000 to $14,999
	3 or 4	$10,000 to $19,999
	5 or more	$15,000 to $29,999
Middle	1 or 2	$15,000 to $29,999
	3 or 4	$20,000 to $39,999
	5 or more	$30,000 to $59,999
Upper-middle	1 or 2	$30,000 to $59,999
	3 or 4	$40,000 to $79,999
	5 or more	$60,000 to $79,999
Highest	1 or 2	$60,000 or more
	3 or more	$80,000 or more

professionals urge women of reproductive age to stop smoking if they are taking oral contraceptives.

Male smokers in homes with young children were more likely to quit than were those in households without young children. For female smokers, the presence of young children in the household was not associated with smoking cessation, possibly because those most likely to quit had already done so during pregnancy.

Relapse rates

Not every smoker who quits quits for good. A number of attempts over several years may be needed before achieving abstinence.[6,16] In the

NPHS, it was possible to identify non-smokers who reported that in the past they had smoked cigarettes daily. When they were re-interviewed two years later, some of these former smokers had resumed daily smoking. They were defined as "relapsers." Over the eight years from 1994/95 to 2002/03, the two-year relapse rate was relatively stable at approximately 4% for both sexes (Table 5).

Relapsing was strongly associated with the length of time since quitting. Approximately 20% of those who had quit for two years or less started smoking again within the next two years. By contrast, 5% who had quit for three to five years resumed smoking, and among those who had quit for more than five years, the figure was 1% (Chart 5).

The factors related to relapsing were not necessarily the same as those related to quitting. In other words, circumstances and characteristics that are significant at one "stage of change" may not be important at another.

Although high cigarette consumption was strongly associated with a reduced likelihood of quitting, the relationship with relapsing was not as clear (Tables 6 and 7).[8,12,16,20,35] For instance, women who had been moderate or heavy smokers were more likely to relapse than were those who had been light smokers, but the pattern was not the same for men. While men who had been moderate smokers were more likely to relapse than those who had been light smokers, those who had been heavy smokers were no more or less likely to relapse.

The presence of smokers in the household or in the immediate social environment of a former smoker has been identified as a predictor of relapse.[16,35] And according to the results of the analysis of NPHS data, men living in smoke-free homes had lower odds of relapsing than did men in homes where other members smoked. However, living in a smoke-free home was not related to relapsing among women.

In 1998/99, for the first time, the NPHS asked both smokers and non-smokers about workplace smoking bans. Although sample sizes were too small for this variable to be considered in the multivariate models, it was possible to calculate two-year relapse rates. Women who worked in locations where smoking was banned were less likely to relapse than were those who could smoke at work. By contrast, relapse rates for men were similar, regardless of workplace smoking restrictions (data not shown).

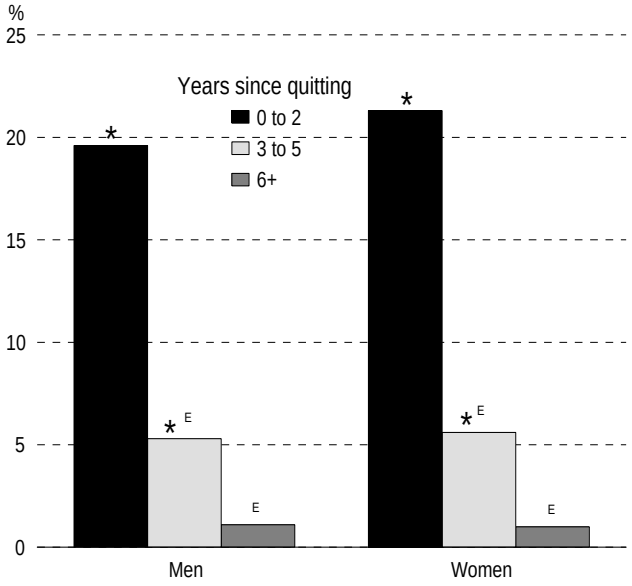
Women, but not men, with a respiratory condition had low odds of relapsing. For men, being overweight or obese reduced the odds of relapse, but for women, weight was not significant.

Table 5
Two-year relapse rates among former daily smokers, by sex, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Both sexes	Men	Women
	%	%	%
Overall two-year relapse rate	4.2	3.8	4.7
1994/95 to 1996/97	4.2	3.6[E]	4.9
1996/97 to 1998/99	4.7	4.1	5.5
1998/99 to 2000/01	4.0	4.3	3.6[E]
2000/01 to 2002/03	4.0	3.3	4.7[E]

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
E Coefficient of variation 16.6% to 33.3%

Chart 5
Two-year relapse rates, by years since quitting and sex, former daily smokers aged 18 or older, Canada excluding territories, 1994/95 to 2002/03



Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
** Significantly higher than estimate(s) for subsequent group(s) (p < 0.05)*
E Coefficient of variation 16.6% to 33.3%

Some studies have found that alcohol use was related to taking up smoking again,[16,21,33] but based on NPHS data, heavy drinking was not a significant factor for either sex.

Emotional support was not associated with relapsing among former daily smokers. However, women with at least moderate chronic stress or high psychological distress were more likely to start smoking again than were those with low levels of stress and psychological distress.

Women aged 18 to 29 were more likely than middle-aged women to quit, yet they were also more likely to relapse. Male and female former smokers aged 65 or older were less likely than middle-aged people to relapse, but this association disappeared when the other factors were taken into account.

Although men in households with young children were more likely to quit smoking, they were also more likely to relapse. However, when all the other factors were considered, this association only approached significance (p=0.052).

Table 6
Odds ratios relating selected characteristics of male former daily smokers to relapsing in a two-year period, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Adjusted odds ratio‡	95% confidence interval	Adjusted odds ratio§	95% confidence interval
Men				
Years since quitting				
0 to 2	23.0*	15.5,34.1	18.9*	12.0,29.7
3 to 5	5.2*	3.1, 8.9	4.3*	2.4, 7.6
6+†	1.0	...	1.0	...
Cigarettes per day (before quitting)				
1 to 9 (light)†	1.0	...	1.0	...
10 to 24 (moderate)	2.2*	1.2, 3.9	2.1*	1.2, 3.7
25 or more (heavy)	1.6	0.8, 3.0	1.6	0.8, 3.2
Age of smoking initiation				
Younger than 18	1.1	0.7, 1.8	1.1	0.7, 1.7
18 or older†	1.0	...	1.0	...
Smoke-free home				
Yes	0.6*	0.4, 0.9	0.6*	0.4, 0.9
No†	1.0	...	1.0	...
Chronic condtions				
Vascular				
One or more	0.8	0.5, 1.2	1.0	0.6, 1.6
None†	1.0	...	1.0	...
Respiratory				
One or more	1.2	0.7, 2.2	1.3	0.7, 2.5
None†	1.0	...	1.0	...
Body mass index (BMI)				
Not overweight (< 25)†	1.0	...	1.0	...
Overweight/Obese (≥ 25)	0.7*	0.5, 1.0	0.6*	0.5, 0.9
Heavy drinking				
Yes	1.2	0.8, 1.7	1.1	0.7, 1.5
No†	1.0	...	1.0	...
Psychological distress				
Low†	1.0	...	1.0	...
Moderate	1.1	0.8, 1.6	1.0	0.7, 1.5
High	1.0	0.5, 1.8	0.9	0.5, 1.7
Low emotional support††				
Yes	0.8	0.5, 1.5	0.9	0.5, 1.6
No†	1.0	...	1.0	...
Chronic stress‡‡				
0 to 1 stressor (low)†	1.0	...	1.0	...
2 to 5 stressors (moderate)	1.1	0.6, 1.9	1.0	0.5, 1.8
6 or more stressors (high))	1.3	0.6, 2.7	1.0	0.4, 2.3
Age group				
18 to 29	1.2	0.7, 1.9	1.0	0.7, 1.7
30 to 64†	1.0	...	1.0	...
65 or older	0.5*	0.3, 0.9	0.5	0.3, 1.1
Education				
Less than secondary graduation	1.0	0.6, 1.6	1.1	0.6, 1.8
Secondary graduation	1.2	0.6, 2.1	1.1	0.6, 1.9
Some postsecondary	1.2	0.7, 2.0	1.1	0.6, 1.8
Postsecondary graduation†	1.0	...	1.0	...
Household income				
Low/Lower-middle	1.4	0.9, 2.2	1.4	0.9, 2.4
Middle/Upper-middle/High†	1.0	...	1.0	...
Child(ren) aged 5 or younger in household				
Yes	1.6*	1.0, 2.5	1.5	1.0, 2.4
No†	1.0	...	1.0	...

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
† Reference category
‡ Adjusted for years since quitting
§ Adjusted for years since quitting, cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, psychological distress, age, education, household income and children 5 or younger in household (see Analytical techniques*)*
†† Based on cohorts 1 and 2 (see Analytical techniques*)*
‡‡ Based on cohorts 1 and 4 (see Analytical techniques*)*
** p < 0.05*
··· Not applicable

Table 7
Odds ratios relating selected characteristics of female former daily smokers to relapsing in a two-year period, household population aged 18 or older, Canada excluding territories, 1994/95 to 2002/03

	Adjusted odds ratio‡	95% confidence interval	Adjusted odds ratio§	95% confidence interval
			Women	
Years since quitting				
0 ro 2	25.9*	17.0,39.5	18.3*	11.1,30.1
3 to 5	5.7*	3.2,10.3	4.4*	2.4, 8.2
6+†	1.0	...	1.0	...
Cigarettes per day (before quitting)				
1 to 9 (light)†	1.0	...	1.0	...
10 to 24 (moderate)	2.2*	1.3, 3.6	2.5*	1.5, 4.3
25 or more (heavy)	2.4*	1.4, 4.1	2.9*	1.6, 5.4
Age of smoking initiation				
Younger than 18	1.6*	1.1, 2.4	1.2	0.8, 1.8
18 or older†	1.0	...	1.0	...
Smoke-free home				
Yes	0.9	0.5, 1.4	1.0	0.6, 1.6
No†	1.0	...	1.0	...
Chronic conditions				
Vascular				
One or more	0.5*	0.3, 0.9	0.7	0.4, 1.1
None†	1.0	...	1.0	...
Respiratory				
One or more	0.6	0.3, 1.0	0.5*	0.3, 1.0
None†	1.0	...	1.0	...
Body mass index (BMI)				
Not overweight (< 25)†	1.0	...	1.0	...
Overweight/Obese (≥ 25)	1.0	0.7, 1.4	1.1	0.8, 1.5
Heavy drinking				
Yes	1.6	0.9, 2.8	1.4	0.7, 2.5
No†	1.0	...	1.0	...
Psychological distress				
Low†	1.0	...	1.0	...
Moderate	1.0	0.7, 1.5	0.9	0.6, 1.4
High	2.0*	1.1, 3.4	1.7*	1.0, 2.8
Low emotional support††				
Yes	1.4	0.7, 2.7	1.6	0.8, 3.0
No†	1.0	...	1.0	...
Chronic stress‡‡				
0 to 1 stressor (low)†	1.0	...	1.0	...
2 to 5 stressors (moderate)	2.1*	1.2, 3.6	1.9*	1.1, 3.4
6 or more stressors (high))	2.5*	1.3, 4.6	2.8*	1.4, 5.6
Age group				
18 to 29	1.8*	1.2, 2.8	2.1*	1.3, 3.4
30 to 64†	1.0	...	1.0	...
65 or older	0.6*	0.3, 1.0	0.7	0.4, 1.3
Education				
Less than secondary graduation	1.2	0.7, 2.0	1.3	0.8, 2.2
Secondary graduation	1.1	0.7, 1.9	1.1	0.6, 1.8
Some postsecondary	1.4	0.9, 2.0	1.3	0.8, 1.9
Postsecondary graduation†	1.0	...	1.0	...
Household income				
Low/Lower-middle	1.2	0.8, 1.7	1.2	0.8, 1.7
Middle/Upper-middle/High†	1.0	...	1.0	...
Child(ren) aged 5 or younger in household				
Yes	1.1	0.8, 1.7	0.9	0.6, 1.3
No†	1.0	...	1.0	...

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file (square)
† Reference category
‡ Adjusted for years since quitting
§ Adjusted for years since quitting, cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, psychological distress, age, education, household income and children 5 or younger in household (see Analytical techniques*)*
†† Based on cohorts 1 and 2 (see Analytical techniques*)*
‡‡ Based on cohorts 1 and 4 (see Analytical techniques*)*
** p < 0.05*
··· Not applicable

Concluding remarks

In 2003, 19% of the Canadian population aged 18 or older were daily smokers. Although this was down 7 percentage points from the early 1990s, it is still high in light of the serious health effects of smoking.[3]

A recent study found that the gap in life expectancy between smokers and non-smokers has widened over the past few decades.[2] Recent cohorts of smokers took up the habit at earlier ages and smoked substantially more cigarettes over their lifetime resulting in increased mortality rates. This disturbing trend underscores the importance of smoking cessation programs for all ages and the value of gaining an understanding of the stages a smoker goes through on the journey to quitting.

Analysis of data from the National Population Health Survey and the Canadian Community Health Survey shows that the factors associated with smoking cessation, relapsing and having no plans to quit were not necessarily the same. However, the number of cigarettes smoked each day emerged as one of the most important.

Limitations

For this article, smoking prevalence rates over the past 10 years were estimated based on data from the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS). The questions about smoking in both surveys were asked in the context of a general health survey. Smoking prevalence can also be estimated from Statistics Canada's Canadian Tobacco Use Monitoring Survey (CTUMS), which was designed to produce semi-annual smoking rates. Trends based on CTUMS data are similar to those in the NPHS and CCHS, in that prevalence is declining, but the CTUMS rates have been consistently lower.[36] A study carried out to determine why the rates differ suggested that people are more inclined to talk about smoking when the topic is included in a broader survey.[37]

The NPHS collects information about the smoking status of the selected respondent only; the smoking status of other household members is not known. Therefore, it was not possible to determine if the presence of other smokers in the household was related to quitting, relapsing or being a persistent smoker. Furthermore, if the effects of this variable could have been controlled, associations with smoke-free home status might have been altered.

Although self-perceived emotional support was examined in relation to various stages of smoking cessation, it is not known if the support was aimed at helping the smoker quit. Other studies have found that smoking-specific support is positively associated with quitting and negatively associated with relapsing.[38,39]

The definition of quitting used in this analysis required only that people who were smokers at the baseline interview did not smoke at the follow-up interview two years later. However, this group of "quitters" consists of people who quit the day before the follow-up interview, as well as those who had not smoked for close to two years. Similarly, former smokers who began smoking again may have relapsed the day before the follow-up interview or almost two years earlier. The extent to which such diversity among quitters and relapsers affected associations with baseline characteristics is unknown.

To maximize sample size and increase precision, the sample considered for the smoking cessation and relapse analyses comprised all respondents to cycle 1 of the NPHS, regardless of their response status in subsequent cycles. For the smoking cessation analysis, two-year quitting records were created for cases where a respondent was a daily smoker in the baseline year and smoking status was known in the follow-up interview (see *Analytical techniques*). Likewise for the relapse analysis, two-year relapse records were created for respondents who were former daily smokers at the baseline year and smoking status was known in the follow-up interview. If there was a non-response in either the baseline or follow-up interview, records were not created for inclusion in the analyses. The survey weights were based on the response status in cycle 1 and were not inflated to account for subsequent non-response. This could have biased the estimates if the characteristics of continuers in the longitudinal panel differed from non-respondents.

To assess the potential for non-response bias in the smoking cessation analysis, the characteristics of continuers and dropouts at the baseline interview were compared. (Continuers were those whose smoking status was known in the follow-up interview versus those who were excluded from the analysis owing to non-response in the follow-up interview.) In total, 12,750 respondents were identified as daily smokers across the four baseline interviews; 11,399 were included in the analysis, and 1,351 were excluded because of non-response in the follow-up interview (dropouts). For the relapse analysis, 13,083 former daily smokers were identified across the four baseline interviews; 12,105 were included in the analysis, and 978 were dropouts. In both cases, dropouts were slightly more likely to be men, to be young (18 to 29), and to have low incomes. For the quitting analysis, dropping out was also associated with having less than secondary graduation. Smoking intensity was not associated with dropping out in either analysis.

In some cases, small sample sizes precluded examining certain variables. For example, although being diagnosed with cancer may be related to quitting, sample sizes were too small to consider this variable. As well, small sample sizes necessitated broad age groups (18 to 29, 30 to 64, and 65 or older), which may have masked associations that would have been evident if finer age breakdowns had been possible.

Findings related to home and workplace smoking bans are particularly intriguing. Both types of ban were associated with reduced consumption. And given the strong link between cigarettes smoked per day and quitting, smoking bans may be an indirect means of reducing consumption and ultimately facilitating cessation.

The chances of relapse among former smokers diminished with time. This suggests that support in the early phases of quitting may be especially beneficial in strengthening the resolve of those who have made the difficult decision to stop smoking.

References

1 Makomaski Illing EM, Kaiserman MJ. Mortality attributable to tobacco use in Canada and its regions, 1998. *Canadian Journal of Public Health* 2004; 95(1): 38-44.

2 Doll R, Peto R, Boreham J, et al. Mortality in relation to smoking: 50 years' observations on male British doctors. *British Medical Journal* 2004; 328(7455): 1519.

3 US Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General*. DHHC Publication No. (CDC) 89-8411. Atlanta, Georgia: US Department of Health and Human Services, 1989.

4 US Department of Health and Human Services. *The Health Benefits of Smoking Cessation*. DHHC Publication No. (CDC) 90-8416. Atlanta, Georgia: US Department of Health and Human Services, 1990.

5 US Department of Health and Human Services. *Women and Smoking. A Report of the Surgeon General - 2001*. Atlanta, Georgia: US Department of Health and Human Services, 2001.

6 Prochaska JO, DiClemente CC, Norcross JC. In search of how people change. Applications to addictive behaviors. *American Psychologist* 1992; 47(9): 1102-14.

7 Pizacani BA, Martin DP, Stark MJ, et al. A prospective study of household smoking bans and subsequent cessation related behaviour: the role of stage of change. *Tobacco Control* 2004; 13(1): 23-8.

8 McWhorter WP, Boyd GM, Mattson ME. Predictors of quitting smoking: the NHANES I follow-up experience. *Journal of Clinical Epidemiology* 1990; 43(12): 1399-405.

9 Swain L, Catlin G, Beaudet MP. The National Population Health Survey—its longitudinal nature. *Health Reports* (Statistics Canada, Catalogue 82-003) 1999; 10(4): 69-82.

10 Tambay J-L, Catlin G. Sample design of the National Population Health Survey. *Health Reports* (Statistics Canada, Catalogue 82-003) 1995; 7(1): 29-38.

11 Béland Y, Bélanger Y, Dufour J, et al. *Comparaison méthodologique entre l'Enquête sur la santé dans les collectivités canadiennes (ESCC) et l'Enquête de surveillance de l'usage du tabac au Canada (ESUTC): Rapport interne du groupe de travail*. Ottawa: Statistics Canada, 2002.

12 Freund KM, D'Agostino RB, Belanger AJ, et al. Predictors of smoking cessation: the Framingham Study. *American Journal of Epidemiology* 1992; 135(9): 957-64.

13 Godtfredsen NS, Prescott E, Osler M, et al. Predictors of smoking reduction and cessation in a cohort of Danish moderate and heavy smokers. *Preventive Medicine* 2001; 33(1): 46-52.

14 Osler M, Prescott E, Godtfredsen N, et al. Gender and determinants of smoking cessation: a longitudinal study. *Preventive Medicine* 1999; 29(1): 57-62.

15 Tillgren P, Haglund BJ, Lundberg M, et al. The sociodemographic pattern of tobacco cessation in the 1980s: results from a panel study of living condition surveys in Sweden. *Journal of Epidemiology and Community Health* 1996; 50(6): 625-30.

16 Curry SJ, McBride CM. Relapse prevention for smoking cessation: review and evaluation of concepts and interventions. *Annual Review of Public Health* 1994; 15: 345-66.

17 Lindstrom M, Isacsson SO. Smoking cessation among daily smokers, aged 45-69 years: a longitudinal study in Malmo, Sweden. *Addiction* 2002; 97(2): 205-15.

18 US Department of Health and Human Services. *The Health Consequences of Smoking: Nicotine Addiction*. DHHC Publication No. (CDC) 88-8406. Atlanta, Georgia: US Department of Health and Human Services, 1988.

19 Lundberg O, Rosen B, Rosen M. Who stopped smoking? Results from a panel survey of living conditions in Sweden. *Social Science and Medicine* 1991; 32(5): 619-22.

20 Hellman R, Cummings KM, Haughey BP, et al. Predictors of attempting and succeeding at smoking cessation. *Health Education Research* 1991; 6(1): 77-86.

21 Hymowitz N, Sexton M, Ockene J, et al. Baseline factors associated with smoking cessation and relapse. MRFIT Research Group. *Preventive Medicine* 1991; 20(5): 590-601.

22 Monden CW, de Graaf ND, Kraaykamp G. How important are parents and partners for smoking cessation in adulthood? An event history analysis. *Preventive Medicine* 2003; 36(2): 197-203.

23 Osler M, Prescott E. Psychosocial, behavioural, and health determinants of successful smoking cessation: a longitudinal study of Danish adults. *Tobacco Control* 1998; 7(3): 262-7.

24 Farkas AJ, Pierce JP, Zhu SH, et al. Addiction versus stages of change models in predicting smoking cessation. *Addiction* 1996; 91(9): 1271-80.

25 Farkas AJ, Gilpin EA, Distefan JM, et al. The effects of household and workplace smoking restrictions on quitting behaviours. *Tobacco Control* 1999; 8(3): 261-5.

26 Chapman S, Borland R, Scollo M, et al. The impact of smoke-free workplaces on declining cigarette consumption in Australia and the United States. *American Journal of Public Health* 1999; 89(7): 1018-23.

27 Kinne S, Kristal AR, White E, et al. Work-site smoking policies: their population impact in Washington State. *American Journal of Public Health* 1993; 83(7): 1031-3.

28 Derby CA, Lasater TM, Vass K, et al. Characteristics of smokers who attempt to quit and of those who recently succeeded. *American Journal of Preventive Medicine* 1994; 10(6): 327-34.

29 Cupples LA, D'Agostino RB, Anderson K, et al. Comparison of baseline and repeated measure covariate techniques in the Framingham Heart Study. *Statistics in Medicine* 1988; 7(1-2): 205-22.

30 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.

31 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.

32 Yeo D, Mantel H, Liu TP. Bootstrap variance estimation for the National Population Health Survey. *Proceedings of the Annual Meeting of the American Statistical Association, Survey Research Methods Section, August 1999*. Baltimore: American Statistical Association, 1999.

33 Zimmerman RS, Warheit GJ, Ulbrich PM, et al. The relationship between alcohol use and attempts and success at smoking cessation. *Addictive Behaviors* 1990; 15(3): 197-207.

34 World Health Organization. *Physical Status: The Use and Interpretation of Anthropometry, Report of the WHO Expert Committee* (WHO Technical Report Series, No. 854). Geneva: World Health Organization, 1995.

35 Matheny KB, Weatherman KE. Predictors of smoking cessation and maintenance. *Journal of Clinical Psychology* 1998; 54(2): 223-35.

36 Gilmore J. *Report on Smoking in Canada, 1985 to 2001* (Statistics Canada, Catalogue 82F0077XIE) 2002.

37 Béland Y. Canadian Community Health Survey—Methodological overview. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 13(3): 9-14.

38 Mermelstein R, Cohen S, Lichtenstein E, et al. Social support and smoking cessation and maintenance. *Journal of Consulting and Clinical Psychology* 1986; 54(4): 447-53.

39 Gulliver SB, Hughes JR, Solomon LJ, et al. An investigation of self-efficacy, partner support and daily stresses as predictors of relapse to smoking in self-quitters. *Addiction* 1995; 90(6): 767-72.

Appendix

Table A
Odds ratios relating selected characteristics to persistent daily smoking among men, household population aged 18 or older, Newfoundland, Québec and Saskatchewan, 2003

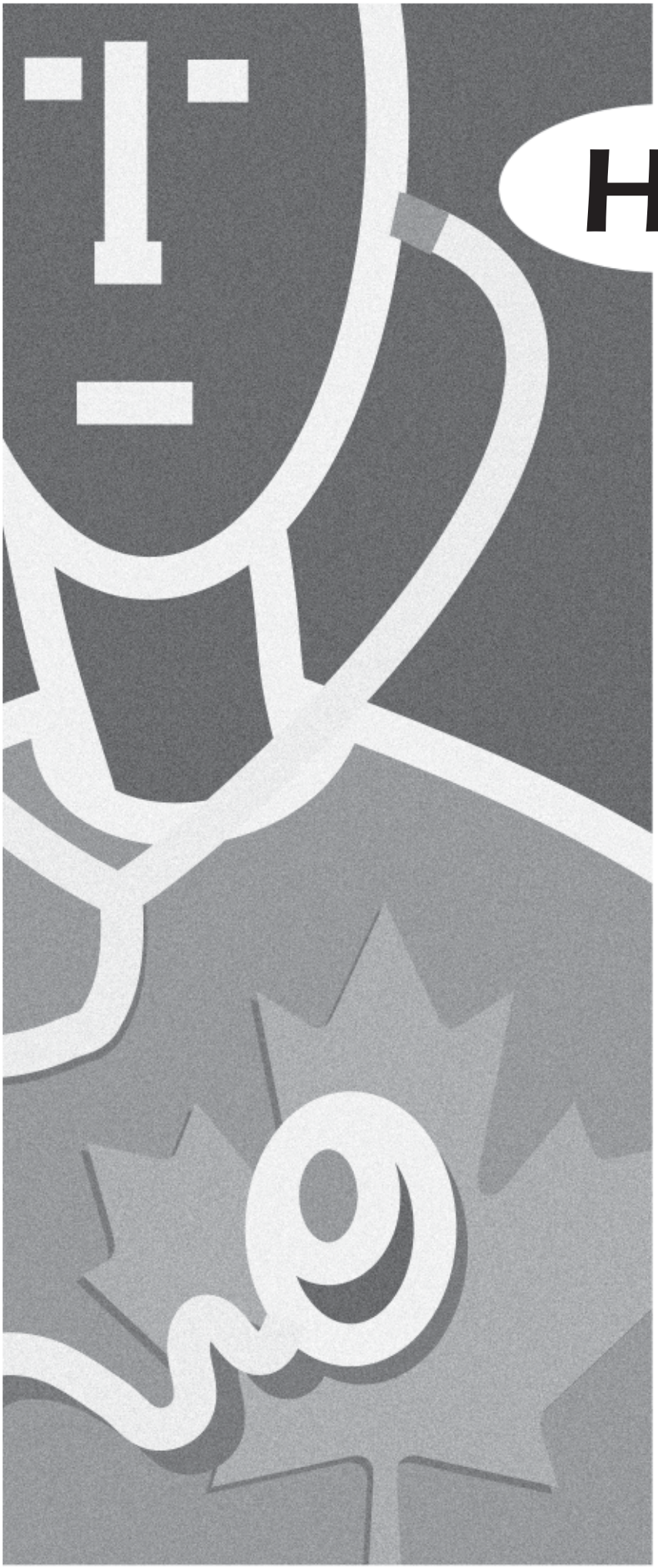
	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
Men				
Cigarettes per day				
1 to 9 (light)†	1.0	...	1.0	...
10 to 24 (moderate)	0.7*	0.5, 0.9	0.7*	0.5, 1.0
25 or more (heavy)†	1.2	0.8, 1.7	1.1	0.8, 1.7
First cigarette of day§				
Within 5 minutes of waking	1.0	0.7, 1.5	0.8	0.5, 1.3
6 to 30 minutes after waking	0.9	0.6, 1.3	0.8	0.6, 1.3
31 to 60 minutes after waking	0.7	0.5, 1.1	0.7	0.4, 1.2
More than an hour after waking†	1.0	...	1.0	...
Age of smoking initiation				
Younger than 18	1.2	0.9, 1.5	1.1	0.9, 1.4
18 or older†	1.0	...	1.0	...
Smoke-free home				
Yes	0.7*	0.5, 0.9	0.8	0.5, 1.2
No†	1.0	...	1.0	...
Smoking banned at work (workers aged 18 to 54)				
Yes	0.9	0.7, 1.3	1.0	0.7, 1.4
No†	1.0	...	1.0	...
Chronic conditions				
Vascular				
At least one	1.4*	1.0, 1.8	1.1	0.8, 1.5
None†	1.0	...	1.0	...
Respiratory				
At least one	1.0	0.7, 1.5	0.8	0.6, 1.1
None†	1.0	...	1.0	...
Body mass index (BMI)				
Not overweight (< 25)†	1.0	...	1.0	...
Overweight/Obese (≥ 25)	1.1	0.8, 1.4	1.1	0.8, 1.4
Heavy drinking				
Yes	0.9	0.7, 1.2	1.0	0.8, 1.4
No†	1.0	...	1.0	...
Self-perceived stress				
Low/Moderate†	1.0	...	1.0	...
High	0.9	0.7, 1.2	0.9	0.7, 1.2
Age group				
18 to 29	1.1	0.8, 1.5	1.2	0.9, 1.7
30 to 64†	1.0	...	1.0	...
65 or older	2.1*	1.5, 3.0	1.9*	1.2, 2.7
Education				
Less than secondary graduation	1.6*	1.2, 2.1	1.5*	1.1, 2.0
Secondary graduation	1.3	0.8, 1.9	1.3	0.8, 1.9
Some postsecondary	1.2	0.7, 2.0	1.3	0.7, 2.2
Postsecondary graduation†	1.0	...	1.0	...
Household income				
Low/Lower-middle	1.5*	1.0, 2.2	1.4	1.0, 2.0
Middle/Upper-middle/High†	1.0	...	1.0	...
Child(ren) aged 5 or younger in household				
Yes	0.6*	0.4, 0.9	0.6*	0.4, 0.9
No†	1.0	...	1.0	...

Data source: 2003 Canadian Community Health Survey
† Reference category
‡ Adjusted for number of cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, age, education, household income and children 5 or younger in household
§ Based on Québec and Saskatchewan (not asked in Newfoundland)
** $p < 0.05$*
··· Not applicable

Table B
Odds ratios relating selected characteristics to persistent daily smoking among women, household population aged 18 or older, Newfoundland, Québec and Saskatchewan, 2003

	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
Women				
Cigarettes per day				
1 to 9 (light)†	1.0	…	1.0	…
10 to 24 (moderate)	1.0	0.8, 1.3	0.9	0.7, 1.2
25 or more (heavy)	1.9*	1.4, 2.6	1.8*	1.3, 2.5
First cigarette of day§				
Within 5 minutes of waking	1.7*	1.2, 2.3	1.3	0.9, 1.8
6 to 30 minutes after waking	1.4*	1.0, 1.9	1.2	0.9, 1.7
31 to 60 minutes after waking	1.1	0.8, 1.6	1.0	0.7, 1.4
More than an hour after waking†	1.0	…	1.0	…
Age of smoking initiation				
Younger than 18	1.0	0.8, 1.3	1.0	0.8, 1.2
18 or older†	1.0	…	1.0	…
Smoke-free home				
Yes	0.6*	0.4, 0.9	0.7*	0.5, 1.0
No†	1.0	…	1.0	…
Smoking banned at work (workers aged 18 to 54)				
Yes	0.9	0.7, 1.2	1.1	0.8, 1.4
No†	1.0	…	1.0	…
Chronic conditions				
Vascular				
At least one	1.1	0.8, 1.4	1.0	0.7, 1.3
None†	1.0	…	1.0	…
Respiratory				
At least one	0.9	0.7, 1.3	0.8	0.6, 1.1
None†	1.0	…	1.0	…
Body mass index (BMI)				
Not overweight (< 25)†	1.0	…	1.0	…
Overweight/Obese (≥ 25)	1.1	0.9, 1.4	1.0	0.8, 1.3
Heavy drinking				
Yes	1.1	0.8, 1.5	1.1	0.8, 1.5
No†	1.0	…	1.0	…
Self-perceived stress				
Low/Moderate†	1.0	…	1.0	…
High	1.0	0.8, 1.3	1.1	0.9, 1.4
Age group				
18 to 29	1.0	0.8, 1.3	1.3	0.9, 1.7
30 to 64†	1.0	…	1.0	…
65 or older	1.7*	1.2, 2.3	1.7*	1.1, 2.5
Education				
Less than secondary graduation	1.4*	1.1, 1.8	1.3	0.9, 1.7
Secondary graduation	1.2	0.9, 1.7	1.2	0.9, 1.7
Some postsecondary	0.8	0.5, 1.3	0.8	0.5, 1.2
Postsecondary graduation†	1.0	…	1.0	…
Household income				
Low/Lower-middle	1.1	0.9, 1.5	1.1	0.8, 1.4
Middle/Upper-middle/High†	1.0	…	1.0	…
Child(ren) aged 5 or younger in household				
Yes	0.9	0.6, 1.2	1.0	0.7, 1.4
No†	1.0	…	1.0	…

Data source: 2003 Canadian Community Health Survey
† Reference category
‡ Adjusted for number of cigarettes per day, age of smoking initiation, smoke-free home status, chronic conditions (vascular and respiratory), BMI, heavy drinking, age, education, household income and children 5 or younger in household
§ Based on Québec and Saskatchewan (not asked in Newfoundland)
** $p < 0.05$*
··· Not applicable



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SEX, CONDOMS AND STDS AMONG YOUNG PEOPLE

by Michelle Rotermann

In 2003, about 6 in 10 young people aged 15 to 24 reported having had sexual intercourse at least once in their lives (Table A). The same proportions of males and females in that age group had had sex (62%), and most of them remained sexually active after their first experience. The average age at first-time sexual intercourse was also consistent for both sexes: 16.5 years (data not shown).

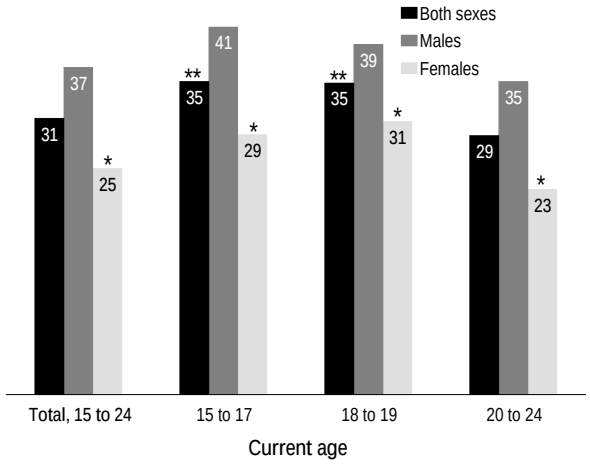
The proportion of 15- to 24-year-olds who had had sex was significantly higher than the national figure in Québec (74%), as well as in Newfoundland and Labrador and New Brunswick (both 68%). In British Columbia, Saskatchewan, Alberta, and Ontario, the figures ranged from 55% to 58%, all significantly below the national average (Table A).

Approaching adulthood

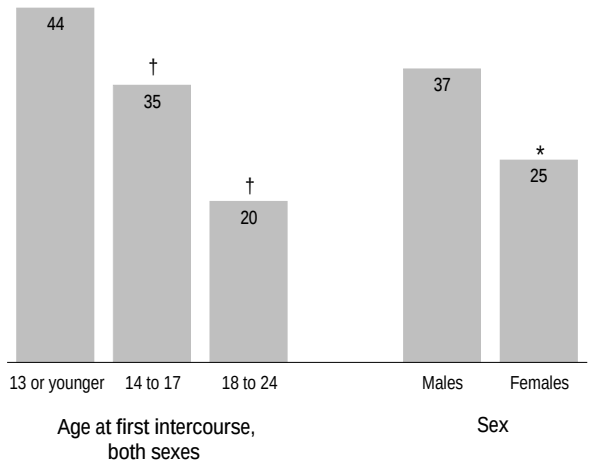
As expected, the likelihood of having sex rose as teens approached adulthood. At ages 15 to 17, 28% reported having had sex. By comparison, 65% in the 18-to-19 age group and 80% in the 20-to-24 group had had intercourse.

Percentage of sexually active 15- to 24-year-olds who reported having multiple partners in past year...

by current age and sex



by age at first intercourse and by sex



Data source: 2003 Canadian Community Health Survey
** Significantly different from estimate for males (p < 0.05)*
*** Significantly different from estimate for 20-24 age group (p < 0.05)*
† Significantly different from estimate for 13 or younger (p < 0.05)

Multiple partners

Among the 15- to 24-year-olds who had had intercourse in the past year, about one-third had done so with more than one partner. Males were more likely than females to have had multiple partners: 37% versus 25%.

Age at first sexual experience was related to the likelihood of having more than one partner. Those who had had intercourse by age 13 were generally significantly more likely to have had two or more sexual partners during the past year than those who had had their first experience when they were older.

Higher proportions of youth aged 15 to 17 and 18 to 19 had had intercourse with multiple partners in the past year, compared with 20-to 24-year-olds. This difference may reflect a tendency toward longer-term, monogamous relationships at older ages.

Condoms

Just under 4 in 10 sexually active 15-to-24 year-olds who had been with multiple partners in the past year and/or who were single had not used a condom the last time they had intercourse. The figures were significantly lower in Newfoundland, Nova Scotia and Ontario, and significantly higher in Québec (Table B).

Of course, other factors influence condom use. When the effects of age, age at first intercourse, Aboriginal and marital status were also considered, higher odds of having sex without a condom emerged for young women in Québec and New Brunswick, compared with their Ontario counterparts (data not shown).

The Questions

The percentages of 15- to 24-year-olds who had had sexual intercourse at least once in their life or who were sexually active were based on "Yes"/"No" responses to the following questions in the 2003 Canadian Community Health Survey (CCHS):

- Have you ever had sexual intercourse?
- In the past 12 months, have you had sexual intercourse?

Respondents were asked how old they were "the first time," which was used to establish average age at first intercourse.

The percentage who had had sexual intercourse with more than one partner in the past year was based on the number of partners respondents said they had had in the 12 months before their survey interview.

Estimates of condom use among sexually active young people who had been with multiple partners in the past year and/or who were single were based on responses to:

- Did you use a condom the last time you had intercourse?

Because condom use was based on the most recent sexual encounter, it may not necessarily reflect an individual's typical behaviour. It is also possible that the question itself generated confusion among respondents, as it does not specifically ask about male versus female condom use.

The prevalence of sexually transmitted diseases (STDs), also referred to as "sexually transmitted infections" or "STIs", among sexually active young people was based on responses to:

- Have you ever been diagnosed with a sexually transmitted disease?

Sex without condom

Females were more likely than males to have intercourse without a condom (Table B), a finding consistent with other studies.[1-4] The difference found in this analysis may have been partly caused by the wording of the question about condom use: "Did you use a condom . . . ?" Females may have thought they were being asked about using a female condom, and not if their partner had worn one.

For females, reporting sex without a condom was related to age at first intercourse. Close to 60% of those who started having sex by age 13 reported not using a condom the last time they had had intercourse. This compares with 46% of females who began having sex at ages 14 to 17, and 37% of those who began at ages 20 to 24. Even allowing for other related influences, the odds of not using a condom were higher for females who started having intercourse at the beginning of their teens (data not shown).

Use by number of partners, age

Young people who had had only one sex partner in the past year were less likely to report having used a condom the last time they had intercourse than those who had had more than one partner. This association persisted even when adjusting for other factors (data not shown).

Sex without a condom was most common at ages 20 to 24, with nearly 44% reporting that they had not used a condom the last time they had had intercourse (Table B). This compares with 33% in the 18-to-19 group, and 22% of those aged 15 to 17. Even when other factors were taken into account, this relationship between age and condom use persisted. Again, it may be that long-term relationships with one partner are more common in the older age group and thus condom use is perceived to be less of a concern.

Unprotected sex was about as common among Aboriginal as non-Aboriginal youth. However, when separate analyses were conducted for males and females and other influences were considered, the odds of not using a condom were nearly twice as high for young Aboriginal males as for their non-Aboriginal counterparts (data not shown).

Sexually transmitted diseases

When used properly and consistently, condoms are effective barriers in preventing many sexually transmitted diseases (STDs), including gonorrhea and chlamydia. Such conditions are now often referred to as "sexually transmitted infections," however, CCHS respondents were asked if they had ever been diagnosed with a "sexually transmitted disease." Recent reports have found persistently high—even increasing—rates of these diseases among younger people,[5,6] yet condom use among 15- to 24-year-olds has been described as erratic.[1,7-9]

According to the 2003 CCHS, 4% of 15- to 24-year-olds (about 106,000) who had had sex at least once in their lives reported having been diagnosed with an STD (Table C). Because of the lack of symptoms and/or a lack of awareness, these figures likely represent only a fraction of the actual number of infections in this age group.

In 2003, over twice as many females as males aged 15 to 24 reported ever having been diagnosed with an STD. This may partly reflect the greater opportunity for diagnosis among females who visit physicians for reproductive health care.[13,14] In addition, some STD screening programs target women.[13,14]

Age and STD risk

Probably as a reflection of more years of sexual activity, young adults aged 20 to 24 were significantly more likely to have been diagnosed with an STD at some point, compared with 15- to 17-year-olds (Table C). As well, across the country, youth in the Territories and Manitoba were more likely to report having been diagnosed with an STD (data not shown).

Early age at first intercourse, being Aboriginal, and having had sex with multiple partners in the past year increased the risk of an STD. Youth who began having sexual intercourse by age 13 were over twice as likely to report an STD than were individuals who began having sex when they were older. The proportion of Aboriginal youth reporting STDs was 2.5 times as high as the corresponding figure for non-Aboriginals.

As expected, not using a condom was associated with a higher risk of STDs. The proportion of youth reporting STDs was twice as high for those who did not use a condom the last time they had sexual intercourse as for those who did (6% versus 3%).

Data source

Reports of sexual intercourse, condom use and sexually transmitted diseases among young people aged 15 to 24 were estimated with data from the 2003 Canadian Community Health Survey (CCHS), conducted between January and December of that year. The CCHS covers the population aged 12 or older who were living in private households at the time. It does not include residents of Indian reserves, Canadian Forces bases, or some remote areas.[10]

The overall response rate was 80.6%; the total sample size was 135,573. This analysis is based on a sample of 18,084, weighted to be representative of the household population aged 15 to 24 in 2003. All differences were tested to ensure statistical significance, which was established at the 0.05 level. To account for survey design effects, standard errors and coefficients of variation were estimated using the bootstrap technique.[11,12]

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References

1 Martin K, Wu Zheng. Contraceptive use in Canada: 1984-1995. *Family Planning Perspectives* 2000; 32(2): 65-73.

2 Matika-Tyndale E, McKay A, Barrett M. Teenage Sexual and Reproductive Behavior in Developed Countries—Country Report For Canada 2001. Available at *http://www.guttmacher.org/pubs/canada_teen.pdf*. Accessed August 9, 2004.

3 Matika-Tyndale E, Barrett M, McKay A. Adolescent sexual and reproductive health in Canada: A review of national data sources and their limitations. *The Canadian Journal of Human Sexuality* 2000; 9(1): 41-65.

4 Ford K, Sohn W, Lepkowski J. Characteristics of adolescents' sexual partners and their association with use of condoms and other contraceptive methods. *Family Planning Perspectives* 2001; 33(3): 101-5, 132.

5 Health Canada, Population and Public Health Branch. 1998/1999 Canadian Sexually Transmitted Diseases (STD) Surveillance Report. Available at *http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/ccdr-rmtc/00pdf/cdr26s6e.pdf*. Accessed August 9, 2004.

6 Public Health Agency of Canada. 2002 Canadian Sexually Transmitted Infections (STI) Surveillance Report. Available at *http: //www.phas-aspc.gc.ca/std-mts/stddata_pre_06_04/index.html*. Accessed November 19, 2004.

7 Glei DA. Measuring contraceptive use patterns among teenage and adult women. *Family Planning Perspectives* 1999; 31(2): 73-80.

8 Galambos NL, Tilton-Weaver LC. Multiple-risk behaviour in adolescents and young adults. *Health Reports* (Statistics Canada, Catalogue 82-003) 1998 10(2): 9-19.

9 Thomas BH, CiCenso A, Griffith L. Adolescent sexual behaviour: results from an Ontario sample. *Canadian Journal of Public Health* 1998; 89(2): 94-7.

10 Béland Y. Canadian Community Health Survey—Methodological overview. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 13(3): 9-14.

11 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992: 18(2): 209-17.

12 Rust K, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310

13 Panchaud C, Singh S, Feivelson D, et al. Sexually transmitted diseases among adolescents in developed countries. *Family Planning Perspectives* 2000; 32(1): 24-32, 45.

14 Wong T, Singh S, Mann J, et al. Gender differences in bacterial STIs in Canada. BMC Women's Health 2004; 4(Suppl 1): S26. Available at *http://www.biomedcentral.com/content/pdf/1472-6874-4-SI-S26.pdf*. Accessed November 19, 2004.

Table A

Percentage of 15- to 24-year-olds who had had sexual intercourse at least once, by sex and selected characteristics, Canada, 2003

	Total		Males		Females†	
	'000	%	'000	%	'000	%
Total	2,604.2	61.9	1,321.1	61.5	1,283.1	62.3
Age group						
15 to 17†	349.7	28.1	173.4	27.4	176.3	28.8
18 to 19	515.9	64.7*	265.3	65.6*	250.6	63.8*
20 to 24	1,738.6	80.2*	882.4	79.4*	856.1	81.1*
Marital status						
Single (never married/separated/ divorced/widowed)	2,224.2	58.5*	1,189.7	59.2*	1,034.6	57.6*
Married/Common-law†	378.2	94.1	130.8	94.7	247.4	93.8
Aboriginal						
Yes	135.3	75.7*	54.9	70.5*	80.4	79.7*
No†	2,384.3	62.8	1,221.2	62.5	1,163.2	63.0
Province/Territories						
Newfoundland and Labrador	51.1	67.9§	25.4	63.9	25.7	72.3§
Prince Edward Island	11.9	62.7	5.7	60.1	6.1	65.3
Nova Scotia	80.8	64.2	38.6	61.0	42.2	67.5
New Brunswick	66.3	68.0§	33.8	65.1	32.6	71.3§
Québec	704.0	73.8§	361.7	73.3§	342.3	74.3§
Ontario	961.7	58.1§	489.7	58.0§	472.0	58.3§
Manitoba	89.5	61.8	44.5	63.5	45.0	60.2
Saskatchewan	78.3	56.4§	37.0	53.8§	41.3	58.9
Alberta	258.4	57.3§	132.5	56.1§	125.9	58.6
British Columbia	292.1	54.8§	147.9	56.0§	144.2	53.6§
Territories	10.0	67.2	4.3	60.4	5.7	73.3§

Data source: 2003 Canadian Community Health Survey
† Reference group
** Significantly different from estimate for reference group ($p < 0.05$)*
§ Significantly different from estimate for Canada total or male/female total ($p < 0.05$)

Table B

Non-condom use among sexually active 15- to 24-year-olds who were single and/or had sex with more than one partner in past year, by sex and selected characteristics, Canada, 2003

	Did not use condom the last time					
	Total		Males		Females†	
	'000	%	'000	%	'000	%
Total	771.8	37.8	350.0	32.7§	421.8	43.5
Age group						
15 to 17	65.4	21.5‡	22.3	14.8§	43.1	28.0
18 to 19	146.2	32.5‡	58.1	25.2§	88.0	40.0
20 to 24	560.3	43.6‡	269.5	39.1§	290.7	48.8
Number of partners						
One†	533.2	41.0	243.1	38.4§	290.1	43.6
More than one	238.6	32.3*	106.8	24.6§	131.7	43.4
Two	133.4	34.0*	49.3	24.2§	84.1	44.4
Three	50.4	30.5*	26.3	25.7§	24.1	38.5
Four or more	54.8	30.3*	31.2	24.2§	23.5	45.5
Age at first sexual intercourse						
13 or younger†	49.4	42.8	22.1	32.1§	27.3	58.8
14 to 17	522.2	38.9	235.6	33.0§	286.5	45.7*
18 or older	200.2	34.4*	92.3	32.1	108.0	36.5*
Aboriginal						
Yes	41.4	42.4	16.2E	41.7	25.1	42.8
No†	703.2	37.5	320.9	32.3§	382.3	43.5
Marital status						
Single (never married/separated/ divorced/widowed)	754.8	37.5*	344.1	32.5§	410.7	43.0
Married/Common-law†	16.0E	63.3E	F	49.2E	10.3E	75.3
Province/Territories						
Newfoundland and Labrador	11.7E	29.6*	4.9E	23.1E	6.9E	37.0
Prince Edward Island	2.5E	27.5E	F	F	2.0E	43.3
Nova Scotia	18.2	28.6*	6.8E	22.9E	11.4E	33.5
New Brunswick	20.1	38.9	7.6E	28.2§E	12.5	50.6
Québec	241.4	44.3*	106.6	37.0§	134.8	52.4
Ontario	270.5	34.9*	130.5	32.0§	140.0	38.1
Manitoba	26.5	36.5	12.5E	33.3E	14.0	39.8
Saskatchewan	19.4	33.9	7.1E	24.7§E	12.3	43.3
Alberta	76.0	40.4	36.4	36.3	39.6	45.1
British Columbia	83.4	36.3	36.2	29.8§	47.2	43.5
Territories	2.0	29.9	0.9E	28.4E	1.2E	31.0E

Data source: 2003 Canadian Community Health Survey
† Reference group
‡ Significantly different from all other categories (p < 0.05)
§ Significantly different from estimate for females (p < 0.05)
** Significantly different from estimate for reference group or from estimate for Canada total or male/female total (p < 0.05)*
E Coefficient of variation 16.6% to 33.3%
F Coefficient of variation greater than 33.3%

Table C

Self-reported STDs, ever sexually active 15- to 24-year-olds, by sex and selected characteristics, Canada, 2003

	Total		Males		Females†	
	'000	%	'000	%	'000	%
Total	105.7	4.1	30.5	2.3§	75.2	6.0
Age group						
15 to 17†	6.3E	1.8E	F	F	4.3E	2.5E
18 to 19	12.2	2.4	2.7E	1.0‡E	9.5E	3.8E
20 to 24	87.3	5.1*	25.8	3.0‡	61.4	7.3
Number of partners						
One†	57.4	3.5	12.1E	1.6‡E	45.3	5.1
More than one	45.7	6.2*	17.9E	4.1‡E	27.7	9.1
Two	19.0E	4.8	3.8E	1.9‡E	15.2E	8.1E
Three	7.8E	4.7E	F	F	4.5E	7.2E
Four or more	18.8E	10.4E	10.8E	8.4E	8.0E	15.5E
Age at first sexual intercourse						
13 or younger†	16.3	10.7	3.6E	4.2‡E	12.7E	19.1
14 to 17	69.0	4.2*	21.0	2.5‡	48.0	6.0
18 or older	20.4E	2.7*E	F	F	14.5E	3.7E
Used condom last time						
Yes	37.3	2.9*	13.5E	1.9‡*E	23.8	4.4*
No†	48.8	6.3	13.7E	3.9‡E	35.1	8.3
Aboriginal						
Yes†	12.8E	9.7*	3.9E	7.5E	8.9E	11.1E
No	91.1	3.9	26.5	2.2‡	64.6	5.6

Data source: 2003 Canadian Community Health Survey
† Reference group
‡ Significantly different from estimate for females ($p < 0.05$)
** Significantly different from estimate for reference group ($p < 0.05$)*
E Coefficient of variation 16.6% to 33.3%
F Coefficient of variation greater than 33.3%


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FOOD INSECURITY

by Ingrid Ledrou and Jean Gervais

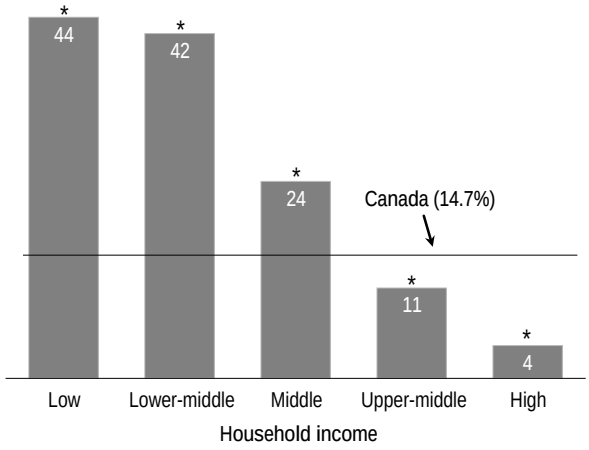
The presence of food banks and school "breakfast clubs" in Canada indicates that not everyone has ready access to a healthy diet. Insufficient food—either quality or quantity—can lead to vitamin and mineral deficiencies, and even to serious health problems.[1,2]

In 2000/01, the Canadian Community Health Survey (CCHS) asked respondents aged 12 or older if, because of a lack of money, in the previous year they or someone in their household had not eaten the quality or variety of food that they had wanted; had worried about not having enough to eat; or had actually not had enough to eat. Respondents were considered to be living in a "food-insecure" household if they had been in at least one of these situations because of a lack of money. According to this definition, an estimated 3.7 million Canadians, or 14.7% of the population aged 12 or older, had experienced food insecurity.

Reflects income

Since food insecurity is defined in financial terms, rates reflect household income.[3,4] More than 40% of people in low- or lower-middle-income households reported food insecurity. Even in middle-income households, almost 25% reported at least one aspect of the problem. While food insecurity was much less common in higher-income households, it was not unknown: 11% of people in upper-middle- and 4% in high-income households reported at least one dimension.

Prevalence of food insecurity, by household income



Data source: 2000/01 Canadian Community Health Survey
** Significantly different from estimate for Canada ($p < 0.05$)*

Food insecurity may exist at higher income levels because annual income is a static measure that is not sensitive to sudden economic changes that could contribute to temporary episodes of food insecurity.[5] For example, the impact of a job loss or the death of an income-earner around the time of the CCHS interview would not be reflected in reported household income, which covered the previous 12 months.[6]

At risk

The younger the person, the more likely he or she was to report food insecurity. About 18% of people aged 12 to 44 had experienced food insecurity (Table A). This may partly be attributable to lower incomes of young people who are still in school or who have recently entered the labour market. It could also capture the financial responsibilities of many young families—paying for a home and raising children, for example.

While just 7% of seniors reported food insecurity, factors other than monetary resources may put their nutrition at risk. Illness or physical restrictions, for instance, may limit seniors' ability to shop and prepare meals.

A higher percentage of women than men reported food insecurity: 16% versus 13%. This difference, however, is largely the result of factors such as household income and family structure. In fact, when these effects were taken into account, women were no more likely than men to report food insecurity (data not shown).

Nonetheless, one group of women was at especially high risk: a third (33%) of female lone parents reported food insecurity.[7] This was almost double the figure for male lone parents (18%). Just 9% of people who were partners in a couple without children reported food insecurity.

The rate was also notably high among off-reserve Aboriginal people: 31% replied affirmatively to at least one of the food insecurity questions, more than double the rate for non-Aboriginals (14%).

Provincial/Territorial differences

Food insecurity is closely tied to geography, and residents of the territories were particularly vulnerable. In Nunavut, over half the population (56%) reported food insecurity. Rates in the Northwest Territories (28%) and Yukon (21%) were also well above the national level.

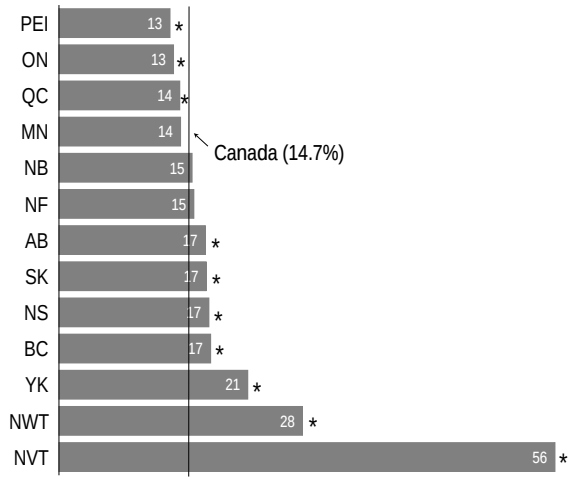
Food insecurity was less common in the provinces yet, at 17%, was significantly above the national level in Alberta, Saskatchewan, Nova Scotia and British Columbia. In Prince Edward Island, Ontario and Québec, rates were significantly low.

Level of severity

The three dimensions of food insecurity are not equally serious. Not eating the desired quality or variety of foods and "worrying" about not having enough to eat are less problematic than actually not having sufficient food. As well, the dimensions of food insecurity follow a typical progression, with those who report the most serious level also reporting the less severe levels.

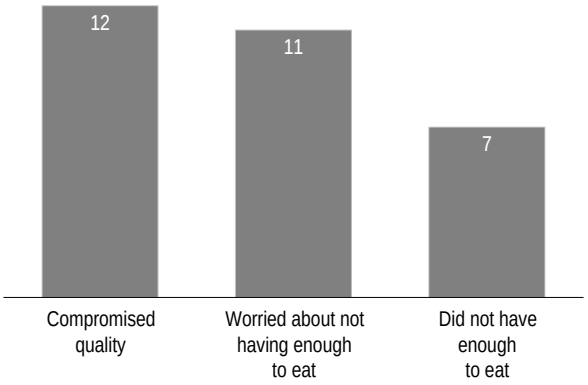
In 2000/01, 7% of Canadians reported that, in the past year, they or someone in their household did not have enough to eat because of a lack of money. Higher percentages had compromised the quality or variety of their diet (12%), or had worried about not having enough to eat (11%). Not surprisingly, each dimension of food insecurity was most common in lower-income households.

Prevalence of food insecurity, by province or territory



Data source: 2000/01 Canadian Community Health Survey
* Signficantly different from estimate for Canada ($p < 0.05$)

Percentage of population reporting each dimension of food insecurity



Data source: 2000/01 Canadian Community Health Survey

Not enough to eat

Overall, 28% of people in low- and lower-middle-income households had not had enough to eat at some point in the past year, compared with 5% of those in middle- to high-income households.

In almost every province, at least a quarter of residents of low- and lower-middle income households reported an instance of not having had enough to eat in the past year. The proportion ranged from 24% in Prince Edward Island and Saskatchewan to almost 30% in Alberta and British Columbia.

The problem tended to be even more common in low- and lower-middle-income households in the territories. In Nunavut, two-thirds (68%) of people in such households had had at least one occasion in the previous year when they had not had

enough food because of a lack of money. The comparable figure in the Northwest Territories was 49%. By contrast, the percentage in Yukon (30%) did not differ from the national level.

As well, in both Nunavut and the Northwest Territories, significantly large proportions of residents of higher-income households reported not having enough food at least once in the past year: 40% and 12%, respectively.

Prevalence of food insecurity and not having enough to eat, by household income

	Total food insecurity			Not enough to eat		
	Total	Low/ Lower-middle income	Middle to high income	Total	Low/ Lower-middle income	Middle to high income
		%			%	
Canada	15	42	12	7	28	5
Newfoundland and Labrador	15	45	9*	8	28	3*
Prince Edward Island	13*	34*	10*	6	24	4
Nova Scotia	17*	46	12	8	26	5
New Brunswick	15	46	10	7	28	4*
Québec	14*	42	10*	7	28	4*
Ontario	13*	41	11*	7*	27	5
Manitoba	14	39	11	7	26	5
Saskatchewan	17*	42	13*	7	24*	5
Alberta	17*	43	15*	9*	29	7*
British Columbia	17*	46*	14*	8*	30	6*
Yukon	21*	58*	18*	10	30[E]	7[E]
Northwest Territories	28*	61*	22*	18*	49*	12*
Nunavut	56*	74*	47*	49*	68*	40*

Data source: 2000/01 Canadian Community Health Survey
** Significantly different from estimate for Canada*
E Coefficient of variation between 16.6% and 33.3%

Food insecurity, however, is a subjective concept that is not understood in the same way by everyone. Moreover, these results are based on the assumption that all members of a household would reply in the same way as the person selected to respond to the CCHS, but this may not be true. For example, children living in a household identified as food insecure are not necessarily "food insecure" themselves, because adults may compromise their own diets so that the children are not affected.[6,9]

More detailed information about the prevalence and correlates of food insecurity in Canada will be available from cycle 2.2 of the CCHS, which was conducted in 2004 and focused on nutrition. That survey contains in-depth questions about the nature of food insecurity and the adults and children who are affected.

The Questions

Food insecurity means that the availability of nutritionally adequate and safe foods or the ability to acquire food in socially acceptable ways is limited and uncertain.[8] In cycle 1.1 of the Canadian Community Health Survey (2000/01), food insecurity was determined with three questions. "In the past 12 months, how often did you or anyone else in your household:

- not eat the quality or variety of foods that you wanted to eat because of a lack of money?"
- worry that there would not be enough to eat because of a lack of money?"
- not have enough food to eat because of a lack of money?"

For each question, the choices were: often, sometimes, or never. Respondents who replied "often" or "sometimes" to at least one question were considered to have experienced food insecurity. Those who replied "never" to all three questions did not experience food insecurity.

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Data source

Estimates of food insecurity were obtained from the first cycle (1.1) of the Canadian Community Health Survey (CCHS), which was conducted between September 2000 and October 2001. The CCHS is a general health survey that covers the population aged 12 or older living in private households. It does not include residents of Indian reserves, Canadian Forces bases, and some remote areas. The overall response rate for cycle 1 was 85%; the total sample size was 131,535.

All differences were tested to ensure statistical significance. To account for survey design effects, standard errors and coefficients of variation were estimated using the bootstrap method.[10,11] A significance level of $p < 0.05$ was applied in all cases.

The prevalence of food insecurity may be underestimated because the CCHS does not cover the homeless, or Aboriginal people living on Indian reserves, two groups among whom the prevalence of food insecurity might be relatively high.

Because the analysis is based on cross-sectional data, no conclusions about cause-and-effect relationships can be made.

References

1 Cook JT. Clinical implications of household food insecurity: Definitions, monitoring and policy. *Nutrition and Clinical Care* 2002; 5(4): 152-67.

2 Tarasuk VS, Vozoris NT. Household food insufficiency is associated with poorer health. *Journal of Nutrition* 2003; 133: 120-6.

3 Sarlie-Lahteenkorva S, Lahlelma E. Food insecurity is associated with past and present economic disadvantage. *Journal of Nutrition* 2001; 131(11): 2880-4.

4 Tingay RS, Tan CJ, Tan NC, et al. Food insecurity and low income in an English inner city. *Journal of Public Health and Medicine* 2003; 25(2): 156-9.

5 Rose D. Economic determinants and dietary consequences of food insecurity in the United States. *Journal of Nutrition* 1999; 129(suppl): S517-20.

6 Che J, Chen J. Food insecurity in Canadian households. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 12(4): 11-22.

7 McIntyre L, Glanville NT, Officer S, et al. Food insecurity of low-income lone mothers and their children in Atlantic Canada. *Canadian Journal of Public Health* 2002; 93(6): 411-5.

8 Anderson SA. Core indicators of nutritional state for difficult-to-sample populations. *Journal of Nutrition* 1990; 120(suppl): 1557-660.

9 McIntyre L, Glanville NT, Raine KD, et al. Do low-income lone mothers compromise their nutrition to feed their children? *Canadian Medical Association Journal* 2003; 168(6): 686-91.

10 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.

11 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.

Table A

Prevalence of food insecurity, by selected characteristics, household population aged 12 or older, Canada, 2000/01

	Estimated food-insecure population	
	'000	%
Total	3,739	14.7
Sex		
Male	1,679	13
Female	2,060	16
Age group		
12-17	428	18*
18-24	537	19*
25-44	1,659	18*
45-64	859	12
65+	256	7*
Household income		
Low	388	44*
Lower-middle	741	42*
Middle	1,256	24*
Upper-middle	882	11*
High	248	4*
Missing	223	9*
Family type		
Couple with child(ren) <25	1,584	13*
Couple without child(ren) <25	544	9*
Lone mother with child(ren) <25	625	33*
Lone father with child(ren) <25	80	18*
Unattached individual	812	19*
Other	44	15
Aboriginal status		
Yes	252	31*
No	3,448	14
Province/Territory		
Newfoundland and Labrador	70	15
Prince Edward Island	15	13*
Nova Scotia	133	17*
New Brunswick	96	15
Québec	844	14*
Ontario	1,316	13*
Manitoba	124	14
Saskatchewan	133	17*
Alberta	406	17*
British Columbia	578	17*
Yukon	5	21*
Northwest Territories	9	28*
Nunavut	11	56*

Data source: 2000/01 Canadian Community Health Survey
** Significantly different from estimate for Canada ($p < 0.05$)*


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YOUTH SMOKING

by Margot Shields

According to the Canadian Community Health Survey (CCHS), in 2003, about one in ten 12- to 17-year-olds smoked cigarettes. More than half of them (58%) did so daily.

Boys and girls aged 12 to 17 were almost equally likely to report smoking: 10% of boys and 11% of girls. However, the smoking rate for 15- to 17-year-olds was five times that of 12- to 14-year-olds (17% versus 3%).

Income, education

Smoking was related to socio-economic status. Youths in low or lower-middle income households were more likely to be smokers (13%) than were those in households with higher incomes (9%). There was also a strong association between youth smoking and household education. While 9% of young people in households where the highest level of education was postsecondary graduation were smokers, 23% of those in households where no member had graduated from high school said they smoked.

Provincial differences

Young people living in rural areas were no more or less likely to smoke than were those in urban areas. However, provincial/territorial differences were pronounced. Youth smoking rates were significantly above the national level in Nunavut, the Northwest Territories and Québec, and significantly below it in British Columbia and Ontario.

Smoking rates of 12- to 17-year-olds, by selected characteristics

	Total smokers		Daily smokers	
	'000	%	'000	%
Total	255.2	10.2	148.5	5.9
Sex				
Boys†	123.9	9.6	69.7	5.4
Girls	131.3	10.8	78.8	6.5
Age group				
12 to 14†	43.5	3.4	20.3	1.6
15 to 17	211.7	17.1*	128.2	10.3*
Household income				
Low/Lower-middle	22.5	12.7*	15.1	8.5*
Middle/Upper-middle/High†	147.1	9.3	83.2	5.3
Highest level of education in household				
Less than secondary graduation	30.3	22.9‡	19.6	14.9‡
Secondary graduation	33.2	10.3	21.7	6.7
Some postsecondary	19.8E	11.8	13.1E	7.8E
Postsecondary graduation	157.6	8.9‡	85.4	4.8‡
Residence				
Urban†	195.3	9.9	115.1	5.8
Rural	59.9	11.1	33.4	6.2
Province/Territory				
Newfoundland and Labrador	6.2	13.0	4.5E	9.4‡E
Prince Edward Island	1.2E	9.3E	1.0E	7.7E
Nova Scotia	6.8E	8.7E	4.4E	5.6E
New Brunswick	5.0E	8.5E	3.5E	5.9E
Québec	80.5	14.5‡	48.2	8.7‡
Ontario	88.3	9.1‡	47.2	4.9‡
Manitoba	9.3E	10.0E	6.2E	6.6E
Saskatchewan	9.7	10.9	5.0E	5.6E
Alberta	23.9	8.8	14.1	5.2
British Columbia	21.7	6.7‡	12.6E	3.9‡E
Yukon	F	F	F	F
Northwest Territories	0.9E	21.8‡E	0.7E	15.7‡E
Nunavut	F	51.5‡E	F	F

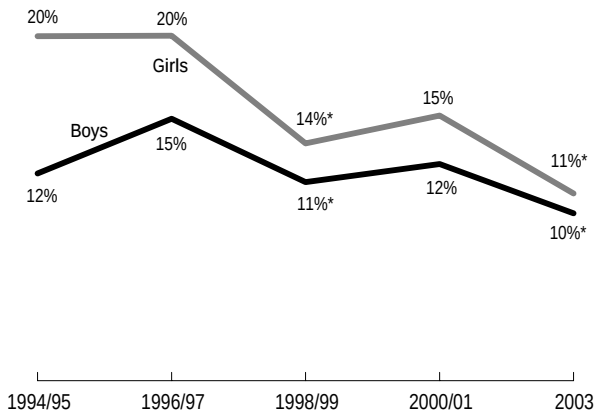
Data source: 2003 Canadian Community Health Survey
Note: Because "missing" categories for some variables were excluded, detail may not add to totals.
† Reference category
‡ Significantly different from estimate for total ($p < 0.05$)
** Significantly higher than estimate for reference category ($p < 0.05$)*
E Coefficient of variation 16.6% to 33.3%
F Coefficient of variation greater than 33.3%

Declining rates

In Canada, the proportion of young people who smoked declined during the 1970s and early 1980s, stabilized in the late 1980s, and then increased in the early 1990s.[1] This pattern mirrored trends in the United States.[2] By the mid-1990s, youth smoking rates in Canada were again decreasing. The gap between the percentage of boys and girls who smoked had also narrowed. From 1996/97 to 2003, the proportion of boys who smoked fell from 15% to 10%; for girls, the figure dropped from 20% to 11%.

Three distinct processes may account for the downturn in youth smoking rates: fewer youths may be starting (initiation); more may be quitting; and/or fewer may be returning to smoking after they have quit (relapse). With longitudinal data from the National Population Health Survey (NPHS), the contribution of each process to the decline in youth smoking rates can be examined.

Percentage of 12- to 17-year-olds who smoke, by sex, 1994/95 to 2003



Data sources: 1994/95, 1996/97 and 1998/99 National Population Health Survey, cross-sectional sample, Health file; 2000/01 and 2003 Canadian Community Health Survey
Note: The smoking rate for girls was significantly higher than the rate for boys in 1994/95, 1996/97 and 2000/01.
** Significantly lower than estimate for preceding period (p < 0.05)*

Starting

Initiation rates were calculated based on youths who, in one NPHS cycle, indicated they did not smoke and never had, but reported that they were smokers when they were interviewed two years later. During the eight years from 1994/95 to 2002/03, initiation rates between successive two-year periods declined from 14% (between 1994/95 and 1996/97) to 5% (between 2000/01 to 2002/03). This contrasts with stable, but much lower (approximately 2%), initiation rates among adults in each two-year period (see *The journey to quitting smoking* in this issue).

Stopping

The quit rate is the percentage of youths who had been daily or occasional smokers in one NPHS cycle, but two years later, reported that they did not smoke. Over the eight years, the two-year quit rate for smokers aged 12 to 17 was relatively stable at around 17%, and no differences between any successive two-year periods were significant. By contrast, among adults, the proportion of smokers who quit rose from 14% between 1994/95 and 1996/97, to 22% between 2000/01 and 2002/03.[3]

Relapsing

Relapse rates were calculated for youths who reported they were former smokers; that is, they did not currently smoke, but had smoked in the past. If they had resumed smoking two years later, they were defined as "relapsers." The average two-year relapse rate for youths over the eight years was 35%, substantially above the rate for adult smokers (7%) (data not shown). This difference likely results from the strong association between relapsing and the number of years of abstinence. Adults who manage

Two-year smoking initiation, quit and relapse rates among 12- to 17-year-olds, by selected characteristics

	Initiation rate (never-smokers)	Quit rate (smokers)	Relapse rate (former smokers)
	%	%	%
Average two-year rates (1994/95 to 2002/03)	8.9	17.4	35.0
Two-year period			
1994/95 to 1996/97	13.7	16.9[E]	40.6
1996/97 to 1998/99	6.3†	20.0[E]	32.5
1998/99 to 2000/01	10.2	15.1[E]	36.4
2000/01 to 2002/03	4.8†	16.3[E]	29.9
Sex			
Boys	8.1	12.1[E]	35.5
Girls‡	9.8	21.4*	34.5
Age group			
12 to 14‡	8.7	16.0[E]	35.3
15 to 17	9.2	17.8	34.8
Type of smoker			
Daily‡	...	10.2[E]	...
Occasional	...	31.7*	...
Former daily‡	...	...	57.4
Former occasional	...	...	30.7*
Smoke-free home			
Yes	6.8*	20.7[E]	30.3*
No‡	13.9	15.3	40.9

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal sample, Health file
† Significantly lower than estimate for previous two-year period (p < 0.05)
‡ Reference category
** Significantly different from estimate for reference category (p < 0.05)*
E Coefficient of variation 16.6% to 33.3%
... Not applicable

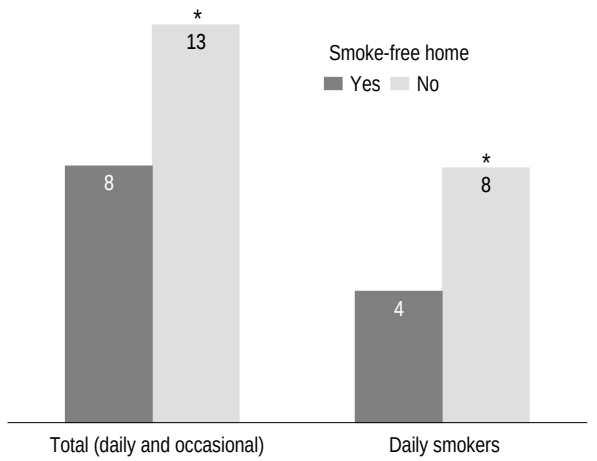
to go more than five years without smoking are far less likely to start again than are those who have been abstinent for two years or less.[3] Young smokers have not had the opportunity to experience a long period of abstinence. However, two-year relapse rates among both youths and adults were relatively stable over the eight years.

These trends in initiation, quit and relapse rates over successive two-year periods show that the drop in youth smoking can be attributed to declining initiation rates. For adults, however, the drop in smoking prevalence stemmed from rising quit rates.

Smoke-free homes

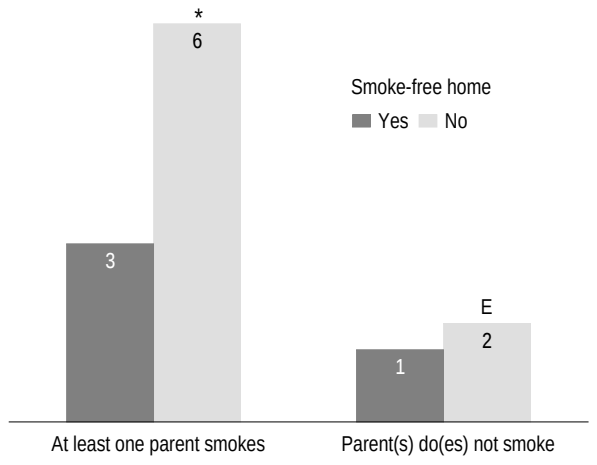
According to 2003 CCHS data, 56% of 12- to 17-year-olds lived in homes where people were asked to refrain from smoking in the house. These youths were less likely to be smokers (8%) than were those who lived in homes where smoking was permitted (13%). The percentage of young people living in smoke-free homes who were *daily* smokers was 4% or half that for those in homes where smoking was permitted (8%).

Percentage of 12- to 17-year-olds who smoke, by smoke-free home status



Data source: 2003 Canadian Community Health Survey
** Significantly higher than estimate for smoke-free home (p < 0.05)*

Percentage of students in Grades 5 to 9 who smoke, by parents' smoking status and smoke-free home status



Data source: 2002 Youth Smoking Survey
** Significantly higher than estimate for smoke-free home (p < 0.05)*
E Coefficient of variation 16.6% to 33.3%

In the NPHS and the 2000/01 CCHS, the criterion for a smoke-free home was less restrictive than in the 2003 CCHS. Respondents were asked if any household member regularly smoked inside the house. Based on this definition, the percentage of 12- to 17-year-olds living in smoke-free homes rose from 61% in 1994/95 to 68% in 2000/01 (data not shown).

NPHS longitudinal data indicate that youths in smoke-free homes were much less likely to start smoking in a two-year period: 7%, compared with 14% of those regularly exposed to smoke in their homes. The relapse rate was also lower for youths who reported that they were living in smoke-free homes (30% versus 41%).

Parental influence

The lower smoking rates among youths in smoke-free homes may be partly attributable to the smoking behaviour of the parents. According to the 2002 Youth Smoking Survey, 2.7% of students in Grades 5 to 9 (ages 9 to 15) smoked. Those who reported that at least one parent smoked were four times more likely to be smokers than those whose parents did not smoke: 5.0% versus 1.2%. Among children living with two parents, the smoking rate was 7.2% if both parents smoked, 3.7% if one parent smoked, and 1.1% if neither parent smoked (data not shown).

However, even if parents smoked, living in a smoke-free home made a difference. Among children with at least one parent who smoked, the

smoking rate was 2.9% for those in smoke-free homes, but 6.4% when smoking was permitted. It has been suggested that parents (even those who smoke) who ban smoking at home send a clear message that it is not condoned,[10] which may help reduce youth smoking rates.

Data sources

Data from the 2003 Canadian Community Health Survey (CCHS)[4] were used to produce smoking rates for 12- to 17-year-olds by selected socio-demographic factors. The CCHS is a general health survey that covers the population aged 12 or older living in private households. It does not include residents of Indian reserves, Canadian Forces bases, and some remote areas. The overall response rate for the 2003 CCHS was 80.6%. The sample size of youths aged 12 to 17 used for this article was 14,136.

Historical estimates of youth smoking rates were based on the 2000/01 and 2003 CCHS and the 1994/95, 1996/97 and 1998/99 National Population Health Survey (NPHS).

Two-year smoking initiation, quit and relapse rates were calculated using NPHS longitudinal data collected from a panel of respondents who were re-interviewed every two years. The rates are based on four cohorts of pooled observations. The baseline years were 1994/95, 1996/97, 1998/99 and 2000/01. Initiation rates were based on 12- to 17-year-olds who, in baseline years, reported that they had never smoked, but two years later reported daily or occasional smoking. Quit rates were based on youths who were smokers in baseline years, but who reported not smoking two years later. Relapse rates were based on youths who were former smokers in the baseline years and who had resumed smoking two years later. Detailed descriptions of the NPHS design, sample and interviewer procedures can be found in published reports.[5,6]

Associations between youth smoking and smoke-free home status were explored using data from the 2003 CCHS, NPHS longitudinal files, and the 2002 Youth Smoking Survey (YSS). Between October and December 2002, the YSS was administered to 19,018 children in Grades 5 to 9 in a sample of classes selected from a list of all public and private schools in the 10 provinces.

All estimates are based on weighted data. Standard errors and coefficients of variation were estimated using the bootstrap technique, which accounts for the survey design effects.[7-9]

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References

1 Stephens M, Siroonian J. Smoking prevalence, quit attempts and successes. *Health Reports* (Statistics Canada, Catalogue 82-003) 1998; 9(4): 31-7.

2 US Department of Health and Human Services. *Preventing Tobacco Use Among Young People: A Report of the Surgeon General.* Atlanta, Georgia: US Department of Health and Human Services, Office on Smoking and Health, 1994.

3 Shields M. The journey to quitting smoking. *Health Reports* (Statistics Canada, Catalogue 82-003) 2005; 16(3): 19-36.

4 Béland Y. Canadian Community Health Survey—Methodological overview. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 13(3): 9-14.

5 Swain L, Catlin G, Beaudet MP. The National Population Health Survey—its longitudinal nature. *Health Reports* (Statistics Canada, Catalogue 82-003) 1999; 10(4): 69-82.

6 Tambay J-L, Catlin G. Sample design of the National Population Health Survey. *Health Reports* (Statistics Canada, Catalogue 82-003) 1995; 7(1): 29-38.

7 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.

8 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.

9 Yeo D, Mantel H, Liu TP. Bootstrap variance estimation for the National Population Health Survey. *Proceedings of the Annual Meeting of the American Statistical Association, Survey Research Methods Section, August 1999*. Baltimore: American Statistical Association, 1999.

10 Farkas AJ, Gilpin EA, White MM, et al. Association between household and workplace smoking restrictions and adolescent smoking. *Journal of the American Medical Association* 2000; 284(6): 717-22.

The Questions

Both the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS) asked, "At the present time do you smoke cigarettes daily, occasionally, or not at all?" *Daily smokers* were those who answered "daily"; *occasional smokers,* those who responded "occasionally." *Total smokers* included daily and occasional smokers.

In the NPHS, respondents who did not smoke were asked, "Have you ever smoked cigarettes at all?" and "Have you ever smoked cigarettes daily?" *Former occasional smokers* were those who responded "yes" to the first question and "no" to the second; *former daily smokers* were those who responded "yes" to both questions.

In the 2002 Youth Smoking Survey (YSS), two questions were used to classify *current smokers*: "Have you smoked 100 or more cigarettes in your life?" and "On how many of the last 30 days did you smoke one or more cigarettes?" Smokers were defined as those who replied "yes" to the first question and indicated at least one day in the second. The smoking rate for 12- to 14-year-olds based on the YSS was 3.2%, which was very close to the rate based on 2003 CCHS data for the same age group (3.4%).

Parental smoking status for the YSS was measured by asking, "Does your father smoke?" and "Does your mother smoke?" Youths who did not live with a father (or mother), but most of the time lived with someone who was like a father (or mother), were instructed to answer the question about this person.

The 2003 CCHS contained two questions that were used to identify *smoke-free homes*: "Are there any restrictions against smoking cigarettes in your home?" Those who responded "yes" were asked, "How is smoking restricted in your home? … smokers are asked to refrain from smoking in the house; smoking is allowed in certain rooms only; smoking is restricted in the presence of young children; or other restriction." Youths were defined as living in smoke-free homes if they said that smokers were asked to refrain from smoking in the house.

For the analyses based on NPHS longitudinal data, a smoke-free home was identified by a response of "no" to the question, "Does anyone in this household smoke regularly inside the house?"

For the YSS, the questions and definition used to identify smoke-free homes were the same as those for the 2003 CCHS. These questions were asked in a follow-up survey conducted with a parent of each youth in the YSS sample.


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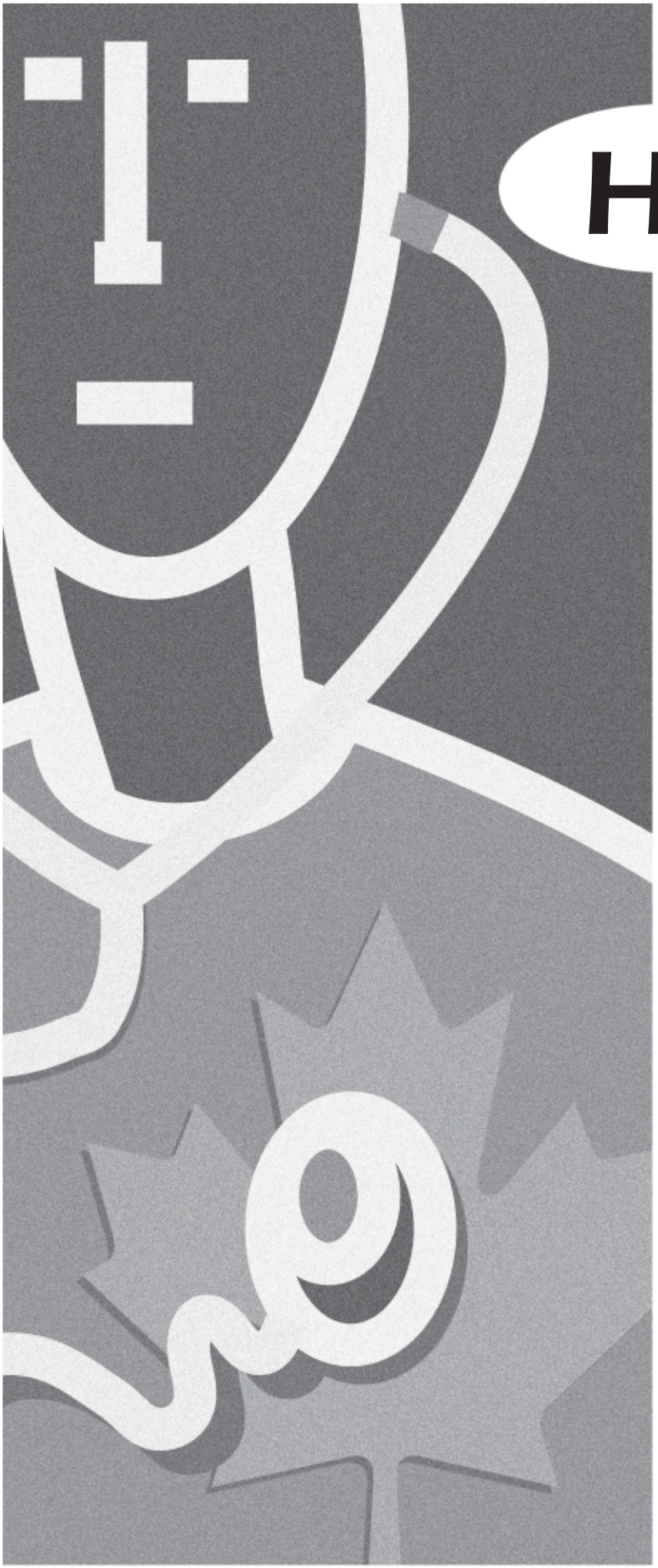

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Custom tables	Household Institutions	82C0013 82C0015	Price varies with information requirements. Price varies with information requirements.	

† All prices exclude sales tax.
‡ See inside cover for shipping charges.

POPULATION HEALTH SURVEYS

Canadian Community Health Survey (CCHS)

Cycle 1.1: The CCHS provides cross-sectional estimates of health determinants, health status and health system utilization for 133 health regions across Canada, plus the territories.

Cycle 1.2: The CCHS - Mental Health and Well-being provides provincial cross-sectional estimates of mental health determinants, mental health status and mental health system utilization.

Cycle 2.1: The second cycle of CCHS provides cross-sectional estimates of health determinants, health status and health system utilization for 134 health regions across Canada.

National Population Health Survey (NPHS)

Household - The household component covers household residents in all provinces, excluding Indian Reserves, Canadian Forces Bases and some remote areas in Québec and Ontario.

Institutions - The institutional component covers long-term residents (expected to stay longer than six months) in health care facilities with four or more beds in all provinces, excluding the Yukon and the Northwest Territories.

North - The northern component covers household residents in the Yukon and the Northwest Territories, excluding Indian Reserves, Canadian Forces Bases and some of the most northerly remote areas.

Health Services Access Survey (HSAS)

The Health Services Access Survey provides detailed information about access to health care services such as 24/7 first contact services and specialized services. Data are available at the national level.

Joint Canada/United States Survey of Health (JCUSH)

The Joint Canada/United States Survey of Health collected information about health, use of health care and functional limitations from Canadian and U.S. residents.

For more information about these surveys, visit our web site at
http://www.statcan.ca/english/concepts/hs/index.htm

Canadian Statistics

Obtain free tabular data on various aspects of Canada's economy, land, people and government.

For more information about these tables, visit our web site at
http://www.statcan.ca/english/Pgdb/health.htm

The Research Data Centres Program

The Research Data Centres (RDC) program is part of an initiative by Statistics Canada, the Social Sciences and Humanities Research Council (SSHRC) and university consortia to help strengthen Canada's social research capacity and to support the policy research community.

RDCs provide researchers with access, in a secure university setting, to microdata from population and household surveys. The centres are staffed by Statistics Canada employees. They are operated under the provisions of the *Statistics Act* in accordance with all the confidentiality rules and are accessible only to researchers with approved projects who have been sworn in under the *Statistics Act* as 'deemed employees.'

RDCs are located throughout the country, so researchers do not need to travel to Ottawa to access Statistics Canada microdata. For more information, contact Gustave Goldman at (613) 951-1472, Program Manager, Research Data Centres.

For more information about this program, visit our web site at
http://www.statcan.ca/english/rdc/index.htm