

Starting and sustaining physical activity

Jiajian Chen and Wayne J. Millar

Abstract

Objectives

This article examines factors associated with starting or sustaining physical activity during leisure time.

Data source

The data are from the longitudinal household components of the National Population Health Survey. The sample consisted of 11,026 respondents who were aged 20 and older in 1994/95.

Analytical techniques

Multiple logistic regression was used to identify variables that independently predicted the adoption or maintenance of leisure-time physical activity.

Main results

Among people who had been inactive in 1994/95, the two-year incidence of starting at least moderate physical activity by 1996/97 or 1998/99 was 24 cases per 100 person-years. For people who had been at least moderately active in 1994/95, the two-year incidence of ceasing to maintain that level of activity was 32 cases per 100 person-years. Many predictors of starting or sustaining activity were the same: sex, age, educational attainment, smoking, and sense of mastery. However, some factors were significant for one sex only. For instance, overweight and the presence of children were deterrents for women, but not for men. Social involvement and smoking status were significant for men, but not for women.

Key words

exercise, physical fitness, body weight, health behaviour, socio-economic factors, health survey

Authors

Jiajian Chen (613-951-5059; chenjia@statcan.ca) and Wayne J. Millar (613-951-1631; millway@statcan.ca) are with the Health Statistics Division at Statistics Canada, Ottawa, Ontario, K1A 0T6.

Physical activity has long been recognized as beneficial to physical and mental health.¹⁻⁵ Yet despite strong health promotion efforts, the majority of Canadian adults are inactive in their leisure-time.⁶ For those who are active, sustaining that level of energy expenditure is also a challenge, as evidenced by the substantial dropout rate.^{7,8}

Relatively little is known about what prompts sedentary people to become active,^{9,10} and having done so, to remain active. Earlier studies, which have relied primarily on cross-sectional survey data, have shown a variety of factors to be related to physical activity.¹¹⁻¹⁴ However, findings are not consistent. For example, some studies suggest that education is associated with becoming active, while others do not find this relationship.^{7,8,15,16} In addition, the adoption and maintenance of physical activity may involve different factors.⁸ Understanding what influences each process is necessary if effective public health interventions are to be developed.

The 1994/95, 1996/97 and 1998/99 longitudinal components of the National Population Health Survey (NPHS) provide an opportunity to examine the adoption of physical activity by *inactive* people and the maintenance of activity among *active* people (see *Data source*, *Analytical techniques* and *Limitations*). The analysis looks at socio-demographic and psychological characteristics and health behaviour that have been shown to be related to physical activity (see *Definitions*).^{7-10,15-18}

Starting up/Slowing down

According to the NPHS, changes in the level of exertion involved in leisure-time activities are

relatively common. Among sedentary people aged 20 or older, the two-year incidence of starting at least moderate physical activity was 24 cases per 100 person-years over the period from 1994/95 to 1998/99 (Table 1). During the same time, among people who had been at least moderately active, the two-year incidence of ceasing activity requiring that amount of effort was 32 cases per 100 person-years (see *Physical activity*).

Not surprisingly, the predictors of starting and maintaining physical activity were often the same. For instance, people who were young, well-educated, healthy, former smokers, or had a high sense of mastery tended to begin or continue to be physically

Data source

This article is based on Statistics Canada's National Population Health Survey (NPHS). The NPHS, which began in 1994/95, collects information about the health of the Canadian population every two years. It covers household and institutional residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas. The NPHS has both a longitudinal and a cross-sectional component. Respondents who are part of the longitudinal component will be followed for up to 20 years. The analysis in this article is based on longitudinal data for the 10 provinces for the 1994/95, 1996/97 and 1998/99 survey cycles.

In 1994/95, one knowledgeable person in every participating household provided general socio-demographic and health information about each household member. In addition, one randomly selected member, not necessarily the same person, was chosen to provide in-depth information about his or her own health.

The socio-demographic data and limited health information obtained for each member of participating households are found in the General file. The in-depth health information collected for one randomly selected household member, as well as the information in the General file pertaining to that individual, is found in the Health file.

Among individuals in the longitudinal component in 1996/97 and 1998/99, the person providing in-depth health information about himself or herself for the Health file was the randomly selected person for the household in 1994/95, and was usually the person who provided information on all household members in 1996/97 and 1998/99.

The 1994/95 provincial, non-institutional sample consisted of 27,263 households, of which 88.7% agreed to participate. After application of a screening rule to maintain the representativeness of the sample, 20,725 households remained in scope. In 18,342 of these households, the selected person was aged 12 or older. Their response rate to the in-depth health questions was 96.1%, or 17,626 respondents.

Of the 17,626 randomly selected respondents in 1994/95, 14,786 were eligible members of the longitudinal panel, along with 468 persons for whom only general information was collected. An additional 2,022 of the 2,383 randomly selected respondents under age 12 were also eligible for the longitudinal panel. Thus, 17,276 respondents were eligible for re-interview in 1996/97, and 16,677 were still alive in 1998/99. A response rate of 93.6% was achieved for the longitudinal panel in 1996/97, and a response rate of 88.9%, based on the entire panel, was achieved in 1998/99. Of the 16,168 participants in 1996/97, full information (that is, general and in-depth health information for the first two survey cycles or an outcome of death or institutionalization) was available for 15,670. The corresponding number for 1998/99 was 14,619. More detailed descriptions of the NPHS design, sample, and interview procedures can be found in published reports.¹⁹⁻²¹

The population examined in this study consisted of 11,026 respondents who were aged 20 or older in 1994/95. The majority of them—6,869 or 62%—were classified as inactive and were selected for the analysis of the adoption of at least moderate physical activity. The remaining 4,157 (38%), classified as active, were examined in the analysis of the maintenance of physical activity (Appendix Table A).

Analytical techniques

Longitudinal data from the National Population Health Survey (NPHS) were used to identify two incident events: (1) initiating at least moderate physical activity by people who had been sedentary in 1994/95, and (2) quitting at least moderate physical activity by people who had been active in 1994/95. The analysis is restricted to adults aged 20 or older because the variables associated with physical activity among children and teenagers may be different.

The "person-time incidence rate" was used to measure the rate at which sedentary people started at least moderate physical activity or active people became sedentary. The rates were calculated by dividing the sum of new cases (of starting or stopping activity) by the total amount of "person-time."²²

The numerator for becoming at least moderately active is the number of sedentary people in 1994/95 who were physically active by 1996/97 or 1998/99. The denominator—expressed in person-years—is the time contributed by people who were "eligible" to become active (that is, people who were sedentary in 1994/95). An inactive respondent who became active by 1996/97 was no longer eligible and contributed no time to the denominator after that point; those who did not become active until 1998/99 and those who remained inactive continued to contribute time to the denominator. Respondents who were institutionalized or died during the period ceased to contribute person-time.

The person-time incidence rate for becoming sedentary is calculated similarly. The numerator is the number of people who were active in 1994/95 who had become inactive by 1996/97 or 1998/99. The denominator is the person-time contributed by people who were eligible to become inactive. An active person who had become physically inactive by 1996/97 could contribute person-time to the denominator only for the first half of the 1994/95 to 1998/99 period.

The NPHS operates on a two-year cycle. Since respondents in this analysis could potentially be followed from 1994/95 to 1998/99, each individual could contribute two units of person-time (one unit every two years) over approximately four years of follow-up. The exact timing of starting or stopping physical activity is not known beyond the fact that it occurred sometime between survey dates. A person who changed his or her activity status in, for instance, 1995 would be considered to have contributed one unit of person-time (a two-year interval) to the denominator.

While the person-time incidence rate measures the incidence of starting or *stopping* physical activity, multiple logistic regression was used to model relationships between selected factors and becoming or *remaining* active. Based on a review of the literature and availability on the NPHS, several variables were included in the regression model: sex, age, education, marital status, household type, health status, weight, smoking, mastery, social involvement, and chronic stress. For all independent variables, data from the 1994/95 interview were used.

The analysis was based on a weighted sample representing the total population aged 20 or older in the 10 provinces in 1994/95. The standard errors of the estimates were calculated using the bootstrap technique, which fully accounts for the design effects of the NPHS.²³⁻²⁵ Statistical significance was established at $p < 0.05$.

active. On the other hand, weight was a factor in maintaining activity, but not in starting to be active. And starting or maintaining activity did not differ significantly by marital status, household type, social involvement, or chronic stress.

Of course, many of the factors related to physical activity are interrelated. For example, younger people are generally more highly educated and healthier than older people and less likely to be overweight. As well, non-smokers tend to be in better health than smokers. It is also reasonable to suppose that people who succeed in giving up smoking have a strong sense of mastery. Therefore, to identify significant predictors of initiating and maintaining at least a moderate level of leisure-time physical activity, it is necessary to control for such confounding effects.

Physical activity

In the National Population Health Survey (NPHS), level of physical activity was based on total accumulated energy expenditure (EE) during leisure time. Information about energy expenditure at work was not collected. EE was calculated from the reported frequency and duration of all of a respondent's leisure-time physical activities in the three months before his or her NPHS interview and the metabolic energy demand (MET values) of each activity, which was independently established.^{13,26}

$EE = \sum(N_i * D_i * METS_i / 365 \text{ days})$, where

N_i = number of occasions of activity i in a year,

D_i = average duration in hours of activity i , and

$METS_i$ = a constant value for metabolic energy cost of activity i .

For each respondent, daily EE was the sum of energy expenditures of all leisure-time activities, expressed as total kilocalories expended per kilogram of body weight per day (KKD). An EE of 3 or more KKD was defined as high; 1.5 to 2.9 KKD, moderate; and less than 1.5 KKD, low.²⁶ Respondents with high or moderate EE were considered physically active; those with low EE, inactive.

Respondents who were inactive in 1994/95 were considered to have become active if they reported engaging in at least moderate leisure-time physical activity in either 1996/97 or 1998/99; otherwise, they were defined as remaining inactive. Those who were at least moderately active in 1994/95 were considered to have maintained their activity level if they reported continuing to be active in 1996/97 and 1998/99; if they were sedentary at follow-up, they were considered to have become inactive.

Definitions

Four *age groups*, as of 1994/95, were established for this analysis: 20 to 34, 35 to 44, 45 to 64, and 65 or older. The oldest was used as the reference category.

Education in 1994/95 was collapsed into three categories: less than secondary graduation (reference category); secondary graduation or some postsecondary; and postsecondary graduation.

Marital status in 1994/95 was classified into married/with partner and not currently married (reference category).

Household type in 1994/95 was dichotomized as parent(s) with child(ren) younger than 18 and others (reference category).

Self-perceived health was assessed by asking: "In general, would you say your health is: excellent? very good? good? fair? poor?" Responses were grouped into two categories: excellent/very good/good and fair/poor (reference category). Since it is closely related to physical activity, health status was defined as of two years before the follow-up used for the analysis. That is, to predict the adoption or maintenance of physical activity by 1996/97, health status was as of 1994/95. To predict the adoption or maintenance of activity by 1998/99, health status was as of 1996/97.

Weight in 1994/95 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 was grouped into two categories: overweight (BMI > 27) and not overweight (BMI ≤ 27, the reference group). Some caution is warranted in using BMI based on self-reported weight and height. The loss of height and bone mass that accompanies aging is one factor that may make BMI unreliable, especially among the elderly.

Smoking in 1994/95 was determined by asking: "At the present time do you smoke cigarettes daily, occasionally or not at all?" and "Have you ever smoked cigarettes at all?" Those who answered "daily" or "occasionally" to the first question were defined as current smokers (reference group). Those who responded "not at all" to the first question and "yes" to the second were classified as former smokers. Respondents who answered "no" to both questions were defined as people who had never smoked.

Mastery in 1994/95 was measured by asking seven questions on the extent to which respondents felt in control of their lives.²⁷ On a five-point scale from "strongly agree" (score 0) to "strongly disagree" (score 4), respondents replied to the following statements:

1. You have little control over the things that happen to you.
2. There is really no way you can solve the problems you have.
3. There is little you can do to change many of the important things in your life.
4. You often feel helpless in dealing with the problems of life.
5. Sometimes you feel that you are being pushed around in life.
6. What happens to you in the future mostly depends on you (scoring reversed).
7. You can do just about anything you really set your mind to (scoring reversed).

A total score of less than 20 was considered a low sense of mastery (reference group); 20 or more, moderate/high mastery. Scores

indicating moderate/high mastery were above the 46th percentile of the weighted distribution of the variable in the 1994/95 cross-sectional file.

Social involvement in 1994/95 was measured by asking respondents how often they had participated in associations or voluntary organizations, or attended religious services in the last year. Respondents were asked:

1. Are you a member of any voluntary organizations or associations such as school groups, church social groups, community centres, ethnic associations or social, civic or fraternal clubs?

If "no," respondents answered question 3. If "yes," they answered the following question:

2. How often did you participate in meetings or activities sponsored by these groups in the past 12 months? If you belong to many, just think of the ones in which you are most active.

All respondents were also asked:

3. Other than on special occasions (such as weddings, funerals or baptisms), how often did you attend religious services or religious meetings in the past 12 months?

Questions 2 and 3 were scored on a five-point scale: 0 ("not at all"), 1 ("at least once a year"), 2 ("at least three or four times a year"), 3 ("at least once a month") and 4 ("at least once a week"). A total score of 0 was classified as low social involvement (reference group); 1 or more, moderate/high social involvement. Scores in the moderate/high range were above the 41st percentile of the weighted distribution of the variable in the 1994/95 cross-sectional file.

Chronic stress in 1994/95 was measured by asking respondents if 11 statements on perceived exposures to stressors were true or false. A score of 1 was assigned to each "true" response. The statements were:

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

A total score of less than 4 was defined as low/moderate stress, and 4 or more as high stress (reference group). Scores in the low/moderate range were below the 79th percentile of the weighted distribution of the variable in the 1994/95 cross-sectional file.

Table 1
Two-year incidence of change in physical activity, by selected characteristics, household population aged 20 or older, Canada excluding territories, 1994/95 to 1998/99

	Inactive in 1994/95 who began at least moderate activity	Active in 1994/95 no longer at least moderately active
Cases per 100 person-years		
Total	24	32
Sex		
Men	27*	30
Women†	22	33
Age group		
20-34	28*	31*
35-44	25*	29*
45-64	23*	32*
65+†	19	40
Educational attainment		
Less than secondary graduation†	20	43
Secondary graduation/Some postsecondary	25*	30*
Postsecondary graduation	27*	28*
Marital status		
Married/With partner	25	32
Not currently married†	23	31
Household type		
Parent(s) with child(ren) < 18	25	31
Other†	24	32
Self-perceived health‡		
Excellent/Very good/Good	25*	30*
Poor/Fair†	19	48
Body mass index (BMI)		
Overweight (BMI > 27)	23	37*
Not overweight (BMI ≤ 27)†	25	30
Smoking status		
Current†	24	36
Former	27*	31*
Never	23	29*
Mastery		
Low†	22	37
Moderate/High	26*	28*
Social involvement		
Low†	24	31
Moderate/High	25	32
Chronic stress		
Low/Moderate	25	31
High†	23	33

Data source: 1994/95, 1996/97, 1998/99 National Population Health Survey, longitudinal sample, Health file

† Reference category

‡ Two years before follow-up

* Significantly different from reference category ($p < 0.05$).

As might be expected, even when other variables (sex, education, marital status, household type, self-perceived health, weight, smoking, mastery, social involvement and chronic stress) were taken into consideration, age was still significantly associated with beginning physical activity. Compared with their elderly counterparts, inactive people in all age groups from 20 to 64 had significantly high odds of starting at least moderate activity (Table 2). And among those who were already active, the odds of remaining so were significantly high for 35- to 44-year-olds and 45- to 64-year-olds, compared with seniors.

When the other variables were taken into account, postsecondary graduates still had significantly higher odds of starting and maintaining physical activity than did people who had not graduated from high school. As well, among people who were already active, the odds of maintaining activity were also significantly high for those with secondary graduation or some postsecondary education, compared with those who were not high school graduates.

The odds of beginning physical activity were no greater for people who reported themselves to be in at least good health than for those in poor or fair health. However, being in good health raised the odds that an already active person would continue to be at least moderately active.

Weight was not significantly associated with taking up physical activity, but active people who were overweight had lower odds of continuing that level of exertion, compared with those who were not overweight.

The odds that people who had never smoked would become physically active were no higher than the odds for smokers, but once engaged in active pursuits, never-smokers had higher odds of persevering.

Former smokers had significantly higher odds than current smokers of starting and sustaining physical activity. People who have met so difficult a challenge as smoking cessation may be motivated to take other initiatives to improve their health.

A relatively strong sense of mastery, or feeling of control over one's life, was associated with both

Table 2

Adjusted odds ratios for beginning or sustaining physical activity, by selected characteristics, household population aged 20 or older, Canada excluding territories, 1994/95 to 1998/99

	Begin at least moderate activity versus remain inactive [†]		Sustain at least moderate activity versus quit [†]	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Sex				
Men	1.24*	1.10, 1.40	1.17*	1.01, 1.36
Women [§]	1.00	...	1.00	...
Age group				
20-34	1.67*	1.31, 2.14	1.26	0.98, 1.62
35-44	1.43*	1.11, 1.83	1.52*	1.14, 2.04
45-64	1.26*	1.03, 1.54	1.35*	1.07, 1.71
65+ [§]	1.00	...	1.00	...
Educational attainment				
Less than secondary graduation [§]	1.00	...	1.00	...
Secondary graduation/Some postsecondary	1.15	0.98, 1.35	1.48*	1.21, 1.80
Postsecondary graduation	1.21*	1.01, 1.44	1.59*	1.29, 1.95
Marital status				
Married/With partner	1.09	0.93, 1.27	0.92	0.79, 1.08
Not currently married [§]	1.00	...	1.00	...
Household type				
Parent(s) with child(ren) < 18	0.87	0.73, 1.04	0.88	0.72, 1.07
Other [†]	1.00	...	1.00	...
Self-perceived health^{††}				
Excellent/Very good/Good	1.22	0.99, 1.51	1.61*	1.26, 2.05
Poor/Fair [§]	1.00	...	1.00	...
Body mass index (BMI)				
Overweight (BMI > 27)	0.94	0.82, 1.08	0.76*	0.64, 0.90
Not overweight (BMI ≤ 27) [§]	1.00	...	1.00	...
Smoking status				
Current [§]	1.00	...	1.00	...
Former	1.23*	1.06, 1.44	1.31*	1.08, 1.59
Never	0.93	0.80, 1.09	1.30*	1.08, 1.57
Mastery				
Low [†]	1.00	...	1.00	...
Moderate/High	1.17*	1.03, 1.33	1.32*	1.13, 1.53
Social involvement				
Low [†]	1.00	...	1.00	...
Moderate/High	1.16*	1.03, 1.31	0.97	0.82, 1.14
Chronic stress				
Low/Moderate	1.05	0.89, 1.23	0.92	0.74, 1.13
High [†]	1.00	...	1.00	...

Data source: 1994/95, 1996/97, 1998/99 National Population Health Survey, longitudinal sample, Health file

[†] People who were inactive in 1994/95

[‡] People who were at least moderately active in 1994/95

[§] Reference category, for which odds ratio is always 1.00

^{††} Two years before follow-up

* $p < 0.05$

... Not applicable

starting and sustaining physical activity. Social involvement was predictive of beginning physical activity, but made little difference in maintaining it.

Several other factors that might be expected to be important—marital status, household type and chronic stress—were not significantly associated with either beginning or maintaining leisure-time physical activity.

Limitations

National Population Health Survey (NPHS) data are subject to the problems inherent in self-reporting. Recall errors may affect reported levels of physical activity.

The calculation of energy expenditure is not precise. Nor was there an independent source to confirm if people who reported engaging in various activities actually did so, or did so with the frequency and duration they claimed.^{4,28} Thus, caution should be used when comparing NPHS estimates of activity levels with those from other sources. The same is true of data on other variables susceptible to inaccurate reporting, such as smoking and weight.

Information was not collected about employment- or home-related physical activity. Consequently, people identified as remaining inactive might have actually been active at work or at home, and those who had ceased being at least moderately active during their leisure time might still have expended considerable energy on the job or while doing household chores.

Seasonal variations in leisure-time pursuits may affect reported levels of physical activity. Respondents interviewed during the winter (January, February, and March) had a lower activity rate (about 30% were at least moderately active) than those interviewed in other seasons (around 40%).

As well, about 24% of respondents were re-interviewed in a different season at follow-up. However, only 5% of them switched from winter to non-winter months, and about 4% switched from non-winter to winter months. Because people tended to be more active in non-winter months, these changes may have resulted in a slight overestimation of beginning and sustaining leisure-time physical activity.

Because the NPHS is a general health survey, information about physical activity is limited. For instance, a study of factors related to changes in activity levels would ideally include barriers to adopting or maintaining activity. However, the NPHS collected information on barriers only for respondents who answered “yes” to the question: “Do you think there is anything you should do to improve your physical health?” Consequently, data are not available about barriers confronting inactive people who had not considered the need to improve their health.

With all variables considered, men had higher odds of becoming and staying active than did women. Moreover, the characteristics that facilitated or deterred physical activity were not necessarily the same for men and women.

Getting going

For men, three factors were significantly associated with becoming active: being aged 20 to 34, compared with being 65 or older; having quit smoking, compared with currently smoking; and having moderate/high social involvement, compared with low social involvement (Table 3).

For women, too, starting physical activity was related to age. The odds of becoming active were higher for women in all age groups younger than 65 than for senior women. As well, having attained at least high school graduation was predictive of beginning physical activity for women. But contrary to the situation among men, smoking status and social involvement did not affect women's odds of becoming more active.

Women who were overweight or who were parents with children younger than 18 had significantly low odds of undertaking at least moderate leisure-time physical activity. For men, neither weight nor household composition made any difference to becoming physically active.

Marital status and chronic stress might be expected to affect an individual's ability and inclination to undertake physical activity, and also to differ for men and women. Yet, neither factor was significant.

Staying the course

Among men and women who were at least moderately active in 1994/95, educational attainment was predictive of sustaining that level of activity (Table 4). Even with other variables taken into account, the odds of remaining active were greater for people with at least high school education, compared with those with less formal education.

As well, for both sexes, a moderate/high sense of mastery (control) was significantly associated with continuing to be active.

Table 3
Adjusted odds ratios for beginning physical activity,[†] by sex and selected characteristics, household population aged 20 or older, Canada excluding territories, 1994/95 to 1998/99

	Men		Women	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Age group				
20-34	1.62*	1.17, 2.25	1.80*	1.23, 2.63
35-44	1.29	0.93, 1.79	1.63*	1.10, 2.41
45-64	1.14	0.86, 1.52	1.37*	1.02, 1.85
65+ [‡]	1.00	...	1.00	...
Educational attainment				
Less than secondary graduation [‡]	1.00	...	1.00	...
Secondary graduation/Some postsecondary	1.01	0.79, 1.28	1.27*	1.00, 1.60
Postsecondary graduation	1.06	0.83, 1.35	1.33*	1.03, 1.72
Marital status				
Married/With partner	1.22	0.96, 1.55	0.96	0.79, 1.17
Not currently married [‡]	1.00	...	1.00	...
Household type				
Parent(s) with child(ren) < 18	0.95	0.74, 1.21	0.77*	0.60, 0.98
Other [‡]	1.00	...	1.00	...
Self-perceived health[§]				
Excellent/Very good/Good	1.09	0.80, 1.47	1.32	0.96, 1.82
Poor/Fair [‡]	1.00	...	1.00	...
Body mass index (BMI)				
Overweight (BMI > 27)	1.18	0.95, 1.45	0.74*	0.61, 0.90
Not overweight (BMI ≤ 27) [‡]	1.00	...	1.00	...
Smoking status				
Current [‡]	1.00	...	1.00	...
Former	1.38*	1.09, 1.75	1.08	0.86, 1.34
Never	1.11	0.87, 1.42	0.82	0.66, 1.02
Mastery				
Low [‡]	1.00	...	1.00	...
Moderate/High	1.14	0.95, 1.37	1.19	1.00, 1.43
Social involvement				
Low [‡]	1.00	...	1.00	...
Moderate/High	1.22*	1.03, 1.44	1.15	0.96, 1.36
Chronic stress				
Low/Moderate	1.02	0.78, 1.33	1.08	0.88, 1.33
High [‡]	1.00	...	1.00	...

Data source: 1994/95, 1996/97, 1998/99 National Population Health Survey, longitudinal sample, Health file

Note: Because of rounding, some odds ratios with 1.00 as the lower limit of the confidence interval were significant.

[†] People who were inactive in 1994/95

[‡] Reference category, for which odds ratio is always 1.00

[§] Two years before follow-up

* $p < 0.05$

... Not applicable

Table 4
Adjusted odds ratios for sustaining physical activity,[†] by sex and selected characteristics, household population aged 20 or older, Canada excluding territories, 1994/95 to 1998/99

	Men		Women	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Age group				
20-34	1.16	0.79, 1.70	1.37	0.98, 1.91
35-44	1.41	0.92, 2.16	1.68*	1.13, 2.51
45-64	1.14	0.82, 1.59	1.67*	1.24, 2.25
65+ [‡]	1.00	...	1.00	...
Educational attainment				
Less than secondary graduation [‡]	1.00	...	1.00	...
Secondary graduation/Some postsecondary	1.43*	1.07, 1.92	1.52*	1.14, 2.04
Postsecondary graduation	1.57*	1.16, 2.13	1.57*	1.18, 2.09
Marital status				
Married/With partner	1.00	0.78, 1.29	0.83	0.66, 1.04
Not currently married [‡]	1.00	...	1.00	...
Household type				
Parent(s) with child(ren) < 18	0.83	0.62, 1.12	0.93	0.71, 1.21
Other [‡]	1.00	...	1.00	...
Self-perceived health[§]				
Excellent/Very good/Good	1.29	0.87, 1.90	1.96*	1.36, 2.82
Poor/Fair [‡]	1.00	...	1.00	...
Body mass index (BMI)				
Overweight (BMI > 27)	0.93	0.74, 1.16	0.58*	0.46, 0.74
Not overweight (BMI ≤ 27) [‡]	1.00	...	1.00	...
Smoking status				
Current [‡]	1.00	...	1.00	...
Former	1.63*	1.23, 2.16	0.98	0.75, 1.30
Never	1.68*	1.26, 2.23	1.04	0.80, 1.35
Mastery				
Low [‡]	1.00	...	1.00	...
Moderate/High	1.33*	1.06, 1.66	1.31*	1.05, 1.62
Social involvement				
Low [‡]	1.00	...	1.00	...
Moderate/High	0.98	0.78, 1.23	0.99	0.80, 1.24
Chronic stress				
Low/Moderate	1.05	0.76, 1.45	0.81	0.62, 1.07
High [‡]	1.00	...	1.00	...

Data source: 1994/95, 1996/97, 1998/99 National Population Health Survey, longitudinal sample, Health file

[†] People who were at least moderately active in 1994/95

[‡] Reference category, for which odds ratio is always 1.00

[§] Two years before follow-up

* $p < 0.05$

... Not applicable

However, several factors were associated with sustaining activity for one sex, but not for the other. Women aged 35 to 44 or 45 to 64 had significantly high odds of remaining active compared with senior women, but for men, age made no difference. Women in good health also had higher odds of continuing to be active than did those in fair or poor health. By contrast, health status was not predictive of men's remaining active.

Active women who were overweight had low odds of continuing at least moderate physical activity. The odds that overweight men would remain active were no different from the odds for those who were not overweight.

For men, smoking status was associated with continued activity. Compared with current smokers, men who had never smoked or were former smokers had significantly high odds of maintaining activity levels. On the other hand, among women, the odds of maintaining activity were no different for current, former or never-smokers.

As was the case for becoming active, marital status and chronic stress were not significantly related to remaining active for either men or women.

Women face more obstacles

Many of the characteristics associated with starting physical activity were the same as those associated with maintaining it: age, education, smoking, and sense of mastery. However, the factors that were significant sometimes differed for men and women. For example, educational attainment, a socio-economic measure, was associated with both the adoption and maintenance of physical activity for women, but only with maintenance for men.

As well, for women, family responsibilities play a role in leisure-time physical activity. The presence of children younger than 18 lowered the odds that women would become active. However, the presence of children was not associated with activity levels among men.

Women also differed from men in terms of the effect of weight on leisure-time physical activity. Overweight women were less likely than those who were not overweight to start and continue physical activity. For women, the association between weight

and activity is complicated, as overweight can be both a consequence of inactivity and an impediment to being active.

Social involvement was not significantly associated with activity among women, whereas it was predictive of the adoption of physical activity among men. Social involvement may be an avenue to organized activities, such as team sports. However, while it was important in getting men started, being socially involved was not significantly related to the maintenance of activity levels.

For men, but not women, smoking status, particularly being a former smoker, was related to starting physical activity and remaining active. Smoking cessation and physical activity may be part of the same initiative-taking effort. For example, the reason for quitting smoking might have been a chronic illness associated with both smoking and lack of activity.

Mastery, that is, feeling in control of one's life chances in contrast to being fatalistic,¹⁸ was predictive of remaining active for both sexes. Once embarked on a regimen of physical activity, people with a strong sense of mastery had high odds of persisting. This association of mastery with adherence to physical activity, even when other variables were taken into account, suggests that psychological factors may mediate the effects of socio-economic status.²⁹

Concluding remarks

Beginning and sustaining physical activity is a complex process. After years of exposure to programs designed to promote the health benefits of an active lifestyle,^{1-3,13,14} most Canadians are still inactive in their leisure time. Moreover, a considerable share of formerly active people quit active leisure-time pursuits. This suggests that knowledge of the health benefits is not, in itself, enough to prompt people to become and remain active.

Results based on longitudinal data from the National Population Health Survey show that not all adults are equally likely to become active, and having done so, to persist. Environmental, social and psychological factors may either facilitate or

impede physical activity. Environmental factors include community or family characteristics that generate and support a specific health behaviour.³⁰ For example, some people may have little control over their time as a result of family responsibilities. Psychological factors are differences in the way people perceive their environment and their response to the stresses of everyday life.³¹ Personal resources such as coping skills and sense of mastery may determine whether an individual is able to overcome barriers to engaging in physical activity.

Publicizing the health benefits of physical activity is useful if more people are to begin and maintain such activity.³² However, effective intervention implies understanding environmental, social and psychological impediments to the adoption and maintenance of an active lifestyle.³⁰ And since NPHS data suggest that the factors related to becoming and remaining active differ, for men and women, strategies may also need to be gender-specific.¹⁵ ●

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Appendix

Table A
Characteristics of household population aged 20 or older, by activity level, Canada excluding territories, 1994/95

	Sample size	Popu- lation	Activity level		
			Total	In- active	Active
		'000		%	
Total	11,026	19,270	100.0	62.1	37.9
Sex					
Men	4,805	9,175	100.0	58.3	41.7
Women	6,221	10,095	100.0	65.7	34.4
Age group					
20-34	3,247	5,955	100.0	58.8	41.2
35-44	2,286	4,722	100.0	63.0	37.0
45-64	3,176	5,628	100.0	63.3	36.7
65+	2,317	2,964	100.0	65.3	34.7
Educational attainment					
Less than secondary graduation	3,182	4,677	100.0	69.2	30.8
Secondary graduation/Some postsecondary	4,374	8,014	100.0	61.8	38.3
Postsecondary graduation	3,454	6,537	100.0	57.6	42.4
Missing	16	42	--	--	--
Marital status					
Married/With partner	6,584	13,203	100.0	63.0	37.0
Not currently married	4,442	6,067	100.0	60.3	39.7
Household type					
Parent(s) with child(ren) < 18	3,546	11,606	100.0	65.2	34.8
Other	7,480	7,665	100.0	60.1	39.9
Self-perceived health					
Excellent/Very good/Good	9,546	17,140	100.0	60.7	39.3
Poor/Fair	1,480	2,131	100.0	74.0	26.0
Body mass index (BMI)					
Overweight (BMI > 27)	3,462	5,768	100.0	65.2	34.8
Not overweight (BMI ≤ 27)	7,316	13,050	100.0	60.3	39.7
Missing	248	452	--	--	--
Smoking status					
Current	3,242	5,488	100.0	65.3	34.8
Former	3,777	6,474	100.0	59.3	40.7
Never	4,003	7,288	100.0	62.2	37.8
Missing	4	19	--	--	--
Mastery					
Low	5,828	10,474	100.0	66.7	33.3
Moderate/High	5,090	8,554	100.0	58.2	41.9
Missing	108	241	--	--	--
Social involvement					
Low	4,191	7,752	100.0	64.0	36.0
Moderate/High	6,775	11,379	100.0	60.8	39.2
Missing	60	138	--	--	--
Chronic stress					
Low/Moderate	8,816	15,085	100.0	61.3	38.7
High	2,167	4,078	100.0	64.7	35.3
Missing	43	108	--	--	--

Data source: 1994/95, 1996/97, 1998/99 National Population Health Survey, longitudinal sample, Health file

Note: Because of rounding, detail may not add to totals.

-- Sample size too small to provide reliable estimate