

# Weekly work hours and health-related behaviours in full-time students

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## Abstract

### Objectives

This article examines associations between the number of hours of paid work and smoking, alcohol use, episodic heavy drinking and leisure-time physical activity among full-time students aged 15 to 17.

### Data sources

Analyses are based on data from the 2003 Canadian Community Health Survey and the 1994/95 to 2002/03 National Population Health Survey.

### Analytical techniques

Selected characteristics and health-related behaviours of working and non-working students were compared. Logistic regression was used to examine relationships between average weekly hours at the main job and health-related behaviours, as well as maintenance of and changes in these behaviours, while controlling for possible confounders.

### Main results

Students who worked even a modest number of hours per week had higher odds of drinking alcohol regularly, and occasionally heavily, compared with those who had not worked. Students working any number of hours had higher odds of becoming regular drinkers within two years of their baseline interview. Longer working hours were associated with higher odds of smoking. Employed students had higher odds of being physically active in their leisure time. The influences of age, household income and urban/rural residence were taken into account.

## Key words

adolescent, alcohol drinking, employment, health surveys, longitudinal studies, physical activity, smoking

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Many high school students work during summer months, and some also choose to add a paying job to their schedules throughout the academic year. Increasingly, paid employment may be critical to financing postsecondary education.<sup>1,2</sup> While the pay received is likely attractive to teens for many reasons, working during adolescence can offer other benefits. Having work experience, for example, may ease a young person's transition into the labour market upon graduation. Working teens may take on increased responsibility, and may enjoy a greater sense of independence and higher self-esteem.<sup>3</sup> They are also more likely to be involved in positive activities in their communities.<sup>4</sup>

Despite such advantages, there is evidence suggesting that negative associations emerge when adolescents combine school and work. A recent study found a negative association between longer hours of work and health determinants such as leisure-time physical activity.<sup>5</sup> Research has also consistently established higher rates of substance use, including cigarettes and alcohol, among adolescent students who work, compared with those who do not.<sup>6-8</sup>

Although some studies have focused on the relationship between the number of hours worked and specific health-related behaviours, many unknowns remain about the nature of these associations. The likelihood of substance abuse (including alcohol use) in adolescents has been shown to be substantially higher beyond a threshold of 15 to 20 hours per week.<sup>9</sup> In other research, a more steadily increasing relationship between the likelihood of substance abuse and the number of work hours emerged.<sup>7</sup> Working more than 20 hours

per week has also been associated with lower levels of school attachment, greater autonomy from parents, and more alcohol use.<sup>9</sup> The mechanisms behind these associations, however, are not fully understood.

This article examines several health-related behaviours of full-time students aged 15 to 17—smoking, regular drinking, heavy episodic drinking, and leisure-time physical activity—in relation to hours worked weekly at a paying job (see *Working students* and *Definitions*). In addition to adjusting for

### Data sources

This article is based on data from the 2003 Canadian Community Health Survey (CCHS, cycle 2.1) and the 1994/95 to 2002/03 National Population Health Survey (NPHS, cycles 1 through 5). Both are general health surveys that cover a broad range of topics.

The CCHS covers the household population aged 12 or older in all provinces and territories, except residents of Indian reserves, Canadian Forces bases, and some remote areas. Cycle 2.1 began in January 2003 and ended in December that year. The response rate was 80.6%, yielding a sample of 135,573 respondents. More detail about the sample design of the CCHS is available in another report.<sup>10</sup>

The cross-sectional analysis began with an initial subset of 5,485 CCHS respondents aged 15 to 17 who were full-time students and had worked for pay in the 12 months before their survey interview. Those whose records did not provide enough information to determine the average number of hours worked weekly at their main job (154) were excluded, resulting in a sample of 5,331 (2,697 boys and 2,634 girls).

The National Population Health Survey (NPHS), conducted every two years, covers household and institutional residents in all provinces and territories, except residents of Indian reserves, Canadian Forces bases, and some remote areas. The NPHS has both longitudinal and cross-sectional components; beginning in 2000/01 (cycle 4), the NPHS became strictly longitudinal.

The 1994/95 NPHS (cycle 1) data were collected using two questionnaires: General and Health. With the General questionnaire, socio-demographic and some basic health information was collected from one knowledgeable household member for all members of sampled households. With the Health questionnaire, additional in-depth health information about one randomly selected household member was collected.

In 1994/95, the NPHS collected information from 20,725 households, meaning that at least the General questionnaire was completed for the randomly selected respondents. This yielded a response rate of 88.7%. The response rate to the Health questionnaire for the randomly selected respondents was 96.1%, or 17,276 respondents, who then formed the basis for the longitudinal panel. The response rates for the longitudinal panel in subsequent cycles were 92.8% in 1996/97, 88.2% in 1998/99, 84.8% in 2000/01, and 80.6% in 2002/03. More detailed descriptions of the NPHS design, sample and interview procedures are available in other reports.<sup>11,12</sup>

For this analysis, the 2002/03 NPHS (cycle 5) longitudinal square file was used to generate a file of respondents compiled across four cycles. This preliminary file included all respondents who had reached the ages of 15, 16 or 17 in cycle 1, 2, 3 or 4 and who had also completed two consecutive survey cycles. The same education and employment criteria that had been applied to the CCHS sample were applied to this NPHS file. The resultant analytical file initially included four mutually exclusive groups: 467 respondents aged 15 to 17 from cycle 1; 445 respondents who had reached the ages of 15 to 17 by cycle 2 and who had not been included in the first group; 404 respondents who had reached the ages of 15 to 17 by cycle 3; and 423 respondents aged 15 to 17 by cycle 4 who were not part of the first, second or third group. In total, this amounted to 1,739 full-time students who indicated whether they had worked for pay in the past 12 months. Of these, 141 were excluded because there was not enough information to determine the average number of hours worked weekly. The final analytical file comprised 1,598 full-time students aged 15 to 17.

socio-economic factors such as household income, the analysis controlled for urban/rural residence; recent research has suggested that tobacco and alcohol use of urban and rural youth differ.<sup>13</sup> The estimates are based on data from the 2003 Canadian Community Health Survey (CCHS) (see *Data sources, Analytical techniques and Limitations*). Longitudinal data from the National Population Health Survey (NPHS) were used to follow students over time to assess if the average number of weekly hours worked was related to subsequent changes in health-related behaviours.

### Most students worked

In 2003, an estimated 63% of full-time high-school students aged 15 to 17 had worked for pay in part- or full-time jobs in the past 12 months (Table 1). The older teens in this group were more likely to

work, as were those from households with higher incomes or in rural areas.

A third of these students (30%) averaged 5 or fewer hours at their main job in a typical week. But some (5%, an estimated 52,000) said that they had worked more than 20 hours on average; this was more likely among boys than girls.

Working regularly scheduled hours was common, especially for boys (Table 2). This means they worked regular daytime, evening or night shifts. Irregular hours, including on-call schedules, were more common for girls. Not surprisingly, about three-quarters of these full-time students with jobs worked weekends. Some may have usually worked both weekends and weekdays, or weekdays only, but it was not possible to differentiate between these schedules, as the information is from a question designed specifically to determine weekend work.

Table 1  
Percentage distribution of average weekly hours at main job in previous 12 months, by selected characteristics, full-time students aged 15 to 17, household population, Canada, 2003

|                                  | Average weekly hours |     |                |                |                |                |
|----------------------------------|----------------------|-----|----------------|----------------|----------------|----------------|
|                                  | 0 (not employed)     | ≤5  | >5 to ≤10      | >10 to ≤15     | >15 to ≤20     | >20            |
|                                  | %                    |     |                |                |                |                |
| Total                            | 37                   | 30  | 14             | 8              | 6              | 5              |
| Sex                              |                      |     |                |                |                |                |
| Girls <sup>†</sup>               | 37                   | 30  | 14             | 8              | 6              | 4 <sup>E</sup> |
| Boys                             | 37                   | 30  | 13             | 8              | 6              | 6*             |
| Age                              |                      |     |                |                |                |                |
| 15 <sup>†</sup>                  | 53                   | 32  | 7              | 4              | 2 <sup>E</sup> | 1 <sup>E</sup> |
| 16                               | 33*                  | 30  | 18*            | 8*             | 6*             | 5*             |
| 17                               | 20*                  | 27* | 18*            | 13*            | 11*            | 10*            |
| Household income                 |                      |     |                |                |                |                |
| Lowest/Lower-middle <sup>†</sup> | 47                   | 29  | 9 <sup>E</sup> | x              | F              | F              |
| Middle                           | 35*                  | 30  | 17*            | 6 <sup>E</sup> | 6 <sup>E</sup> | 6 <sup>E</sup> |
| Upper-middle/Highest             | 34*                  | 31  | 15*            | 9*             | 6              | 5              |
| Missing                          | 40                   | 30  | 13             | 8*             | 5              | 5 <sup>E</sup> |
| Residence                        |                      |     |                |                |                |                |
| Rural <sup>†</sup>               | 28                   | 33  | 17             | 8              | 8              | 6              |
| Urban                            | 39*                  | 30  | 13*            | 8              | 5*             | 5              |

**Data source:** 2003 Canadian Community Health Survey

**Note:** Because of rounding, detail may not add to 100%.

<sup>†</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

<sup>E</sup> Coefficient of variation 16.6% to 33.3% (interpret with caution)

<sup>F</sup> Coefficient of variation greater than 33.3% (suppressed because of extreme sampling variability)

<sup>x</sup> Suppressed to meet confidentiality requirements of Statistics Act

Table 2  
Percentage distribution of selected characteristics, by typical schedule of main job, and percentage working weekends, employed full-time students aged 15 to 17, household population, Canada, 2003

|                                  | Typical schedule     |                        |          |
|----------------------------------|----------------------|------------------------|----------|
|                                  | Regular <sup>†</sup> | Irregular <sup>‡</sup> | Weekends |
|                                  | %                    |                        |          |
| Total                            | 69                   | 31                     | 76       |
| Sex                              |                      |                        |          |
| Girls <sup>§</sup>               | 66                   | 34                     | 78       |
| Boys                             | 71*                  | 29*                    | 73*      |
| Age                              |                      |                        |          |
| 15 <sup>§</sup>                  | 68                   | 32                     | 69       |
| 16                               | 69                   | 31                     | 76*      |
| 17                               | 70                   | 30                     | 81*      |
| Household income                 |                      |                        |          |
| Lowest/Lower-middle <sup>§</sup> | 72                   | 28                     | 77       |
| Middle                           | 71                   | 29                     | 77       |
| Upper-middle/Highest             | 68                   | 32                     | 75       |
| Missing                          | 68                   | 32                     | 76       |
| Residence                        |                      |                        |          |
| Rural <sup>§</sup>               | 68                   | 32                     | 79       |
| Urban                            | 69                   | 31                     | 75*      |

**Data source:** 2003 Canadian Community Health Survey

<sup>†</sup> Regular daytime/evening/night shift

<sup>‡</sup> On-call/Irregular shift

<sup>§</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

## Working students

In this analysis, *full-time student* refers to a 15-, 16- or 17-year-old who was enrolled full-time in an educational institution and had not graduated from secondary school at the time of the survey interview. In both the Canadian Community Health Survey (CCHS) and the National Population Health Survey (NPHS), full-time student status was initially derived using two questions: "Are you currently attending a school, college or university?" and "Are you enrolled as a full-time student or a part-time student?" Information from two other questions was also used to determine inclusion in this sample: "What is the highest grade of elementary or high school ever completed?" and "Did you graduate from high school (secondary education)?"

*Employment status* was derived from responses to questions about labour force participation: "Last week, did you work at a job or business? Please include part-time jobs, seasonal work, contract work, self-employment, babysitting and any other paid work, regardless of the number of hours worked." Respondents were also asked if they had worked at a job or business "at any time in the past 12 months." Those who had worked were asked, "During the past 52 weeks, how many weeks did you do any work at a job or business (include paid vacation leave, paid maternity leave, and paid sick leave)?" and "About how many hours a week do you usually (did you usually) work at your job/business? If you usually work (worked) extra hours, paid or unpaid, please include these hours." *Average weekly hours* worked in the past 12 months was derived by multiplying the respondent's reported number of hours usually worked weekly at their main job by the reported number of weeks worked at their main job, then dividing by 52 (see *Limitations*).

Average weekly hours worked was derived the same way for the NPHS respondents who were included in the study because they met the age criterion by cycle 4 (see *Analytical techniques*). However, for the NPHS respondents who met the age criterion in cycles 1, 2 or 3, the average number of hours was derived slightly differently because respondents were not directly asked about the number of weeks worked. Work duration in months was calculated using the start and end dates from the respondent's employment history. This "number of months worked" was multiplied by 4.33 to

derive the total number of weeks worked in the past 12 months. The product of the derived total number of weeks worked and the reported typical number of hours worked per week was divided by 52 to produce the average number of hours worked weekly. Information about work hours was based on the respondents' main job if they had more than one job.

The derived average number of hours worked weekly was used to place working students into one of the following categories:

- 5 hours or less ( $\leq 5$ )
- more than 5 but not greater than 10 hours ( $> 5$  to  $\leq 10$ )
- more than 10 but not greater than 15 hours ( $> 10$  to  $\leq 15$ )
- more than 15 but not greater than 20 hours ( $> 15$  to  $\leq 20$ )
- more than 20 hours ( $> 20$ ).

For the analysis of NPHS data, those working more than 10 hours were grouped because of the subset's small sample size (Appendix Table A). Students who reported that they had not worked for pay in the past year were categorized as having worked 0 hours (not employed).

*Typical schedule* was based on information for CCHS respondents who had a job: "Which of the following best describes the hours you usually work (worked) at your job or business?" Response categories were: regular daytime schedule or shift; regular evening shift; regular night shift; rotating shift; split shift; on call; irregular schedule; or "other." Regular daytime, evening and night shifts were grouped as *regularly scheduled* hours. Those with on-call, split, or rotating or irregular shifts were classified as working *irregularly scheduled* hours. Reports of "other" were excluded because it was not known if these schedules represented a typical schedule.

Students who said "yes" to "Do you (did you) usually work on weekends at this job/business?" were classified as having *typically worked weekends*. Those who answered "no," were assumed to have typically worked weekdays. These two categories are not mutually exclusive; that is, some who responded "yes," may have "usually" worked both weekend and weekday hours. These data are not specific enough to determine more precise breakdowns of schedules for the students' main job.

### Work linked to smoking . . .

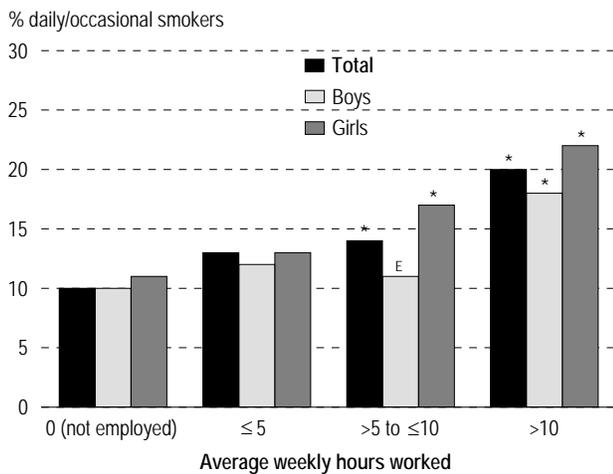
Compared with high-school students who were not employed, those who averaged more than 5 hours of work per week were more likely to report that they smoked cigarettes either daily or occasionally (Chart 1). Approximately one-fifth of the students

who worked more than 10 hours a week were smokers.

Of course, the relationship between having a job and smoking can be partly explained by age, as both become more common as young people move through their teen years. But even when age, urban/

rural residence and household income were taken into account using multiple logistic regression analysis, students who worked more than 10 and up to 15 hours, or more than 20 hours weekly, had nearly twice the odds of being smokers, compared with students who were not employed (Table 3). (The odds ratio for those who worked 15 to 20 hours per week was elevated, but did not reach statistical significance ( $p=0.052$ ) because of the small sample size.) These findings contrast with those of a previous study, which indicated that age moderates the relationship between longer work hours and smoking.<sup>14</sup> Possibly, exposure to smoking at work played a role; an estimated 40% of the employed students reported either that smoking was allowed in their workplace with some restrictions, or that their workplace had no smoking restrictions at all (data not shown).

Chart 1  
Percentage of full-time students aged 15 to 17 who reported daily/occasional smoking, by average weekly hours worked in past 12 months, household population, Canada, 2003

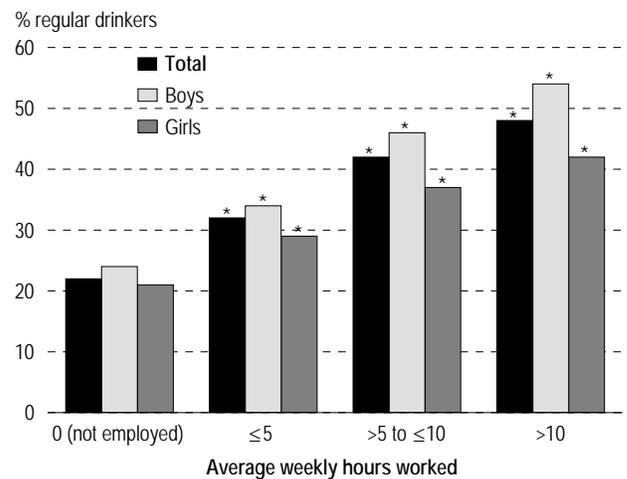


Data source: 2003 Canadian Community Health Survey  
 Note: Based on a sample of 5,331 full-time students aged 15 to 17 (2,697 boys and 2,634 girls).  
 \* Significantly different from estimate for same group in "not employed" ( $p < 0.05$ )  
 E Coefficient of variation 16.6% to 33.3% (interpret with caution)

### ... and drinking

Full-time students aged 15 to 17 with paid employment were more likely than their non-working counterparts to have consumed alcohol regularly, regardless of the average number of hours worked weekly (Chart 2). About half of those who worked more than 10 hours a week reported regular alcohol consumption, compared with about one-fifth of those who did not have jobs. The relationship between working and alcohol consumption persisted even when controlling for potentially confounding factors such as age (Table 3).

Chart 2  
Percentage of full-time students aged 15 to 17 who reported regular alcohol consumption, by average weekly hours worked in past 12 months, household population, Canada, 2003



Data source: 2003 Canadian Community Health Survey  
 Note: Based on a sample of 5,331 full-time students aged 15 to 17 (2,697 boys and 2,634 girls).  
 \* Significantly different from estimate for same group in "not employed" ( $p < 0.05$ )

### ... and heavy episodic drinking

Having a job was also linked to heavy episodic drinking, which is defined as consuming five or more drinks on one occasion, 12 or more times in the past year. Compared with non-working students, even those who worked few hours were more likely to engage in this behaviour (Chart 3). About 1 in 10 students who worked 5 or fewer hours reported heavy episodic drinking, and almost a quarter of

Table 3

Adjusted odds ratios for health-related behaviours among full-time students aged 15 to 17, by average weekly hours at main job in previous 12 months and selected characteristics, household population, Canada, 2003

|                                  | Daily/Occasional smoking |                         | Regular alcohol consumption |                         | Heavy episodic drinking |                         | Physically active in leisure time |                         |
|----------------------------------|--------------------------|-------------------------|-----------------------------|-------------------------|-------------------------|-------------------------|-----------------------------------|-------------------------|
|                                  | Adjusted odds ratio      | 95% confidence interval | Adjusted odds ratio         | 95% confidence interval | Adjusted odds ratio     | 95% confidence interval | Adjusted odds ratio               | 95% confidence interval |
| <b>Average weekly hours</b>      |                          |                         |                             |                         |                         |                         |                                   |                         |
| 0 (not employed) <sup>†</sup>    | 1.0                      | ...                     | 1.0                         | ...                     | 1.0                     | ...                     | 1.0                               | ...                     |
| ≤5                               | 1.2                      | 0.9, 1.5                | 1.5*                        | 1.2, 1.8                | 1.3                     | 0.9, 1.8                | 1.4*                              | 1.1, 1.7                |
| >5 to ≤10                        | 1.2                      | 0.9, 1.6                | 2.0*                        | 1.5, 2.6                | 1.9*                    | 1.3, 2.8                | 1.8*                              | 1.4, 2.3                |
| >10 to ≤15                       | 1.8*                     | 1.2, 2.7                | 2.4*                        | 1.7, 3.3                | 2.9*                    | 1.8, 4.5                | 1.9*                              | 1.4, 2.6                |
| >15 to ≤20                       | 1.6                      | 1.0, 2.4                | 2.3*                        | 1.6, 3.3                | 2.2*                    | 1.4, 3.5                | 2.6*                              | 1.8, 3.7                |
| >20                              | 1.8*                     | 1.2, 2.9                | 2.6*                        | 1.7, 3.9                | 2.6*                    | 1.5, 4.3                | 1.7*                              | 1.1, 2.4                |
| <b>Age</b>                       |                          |                         |                             |                         |                         |                         |                                   |                         |
| 15 <sup>†</sup>                  | 1.0                      | ...                     | 1.0                         | ...                     | 1.0                     | ...                     | 1.0                               | ...                     |
| 16                               | 1.2                      | 0.9, 1.6                | 1.7*                        | 1.3, 2.1                | 2.2*                    | 1.6, 3.0                | 0.9                               | 0.7, 1.1                |
| 17                               | 1.8*                     | 1.3, 2.4                | 2.2*                        | 1.8, 2.8                | 2.4*                    | 1.7, 3.3                | 0.6*                              | 0.5, 0.8                |
| <b>Sex</b>                       |                          |                         |                             |                         |                         |                         |                                   |                         |
| Girls <sup>†</sup>               | 1.0                      | ...                     | 1.0                         | ...                     | 1.0                     | ...                     | 1.0                               | ...                     |
| Boys                             | 0.8                      | 0.7, 1.0                | 1.3*                        | 1.1, 1.6                | 1.8*                    | 1.4, 2.2                | 2.1*                              | 1.8, 2.5                |
| <b>Residence</b>                 |                          |                         |                             |                         |                         |                         |                                   |                         |
| Rural <sup>†</sup>               | 1.0                      | ...                     | 1.0                         | ...                     | 1.0                     | ...                     | 1.0                               | ...                     |
| Urban                            | 0.7*                     | 0.6, 0.9                | 0.8*                        | 0.7, 0.9                | 0.7*                    | 0.6, 0.9                | 1.2                               | 1.0, 1.4                |
| <b>Household income</b>          |                          |                         |                             |                         |                         |                         |                                   |                         |
| Lowest/Lower-middle <sup>†</sup> | 1.0                      | ...                     | 1.0                         | ...                     | 1.0                     | ...                     | 1.0                               | ...                     |
| Middle                           | 0.9                      | 0.5, 1.4                | 1.2                         | 0.7, 2.0                | 0.9                     | 0.5, 1.6                | 0.9                               | 0.6, 1.4                |
| Upper-middle/Highest             | 0.6*                     | 0.4, 1.0                | 1.5                         | 0.9, 2.4                | 1.0                     | 0.6, 1.7                | 1.0                               | 0.7, 1.4                |
| Missing                          | 0.8                      | 0.5, 1.1                | 1.3                         | 0.8, 2.2                | 0.8                     | 0.5, 1.3                | 1.0                               | 0.7, 1.4                |

**Data source:** 2003 Canadian Community Health Survey

**Notes:** Separate models were run for each health-related behaviour, based on samples of 5,315, 5,312, 5,300 and 5,205 respondents, respectively. Because of rounding, some odds ratios with 1.0 as upper confidence limit are statistically significant.

<sup>†</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

... Not applicable

students who worked more than 10 hours did so. Again, the relationships held when age and the other student characteristics were taken into account (Table 3).

### Still time for physical activity?

Not all of the behaviours that were more prevalent in working students are negatively related to health. Boys who worked more than 5 hours a week were more likely to report being physically active during leisure time than those who did not have jobs (Chart 4). For girls, a positive relationship between the number of work hours and physical activity emerged only in those who averaged over 10 hours of work per week.

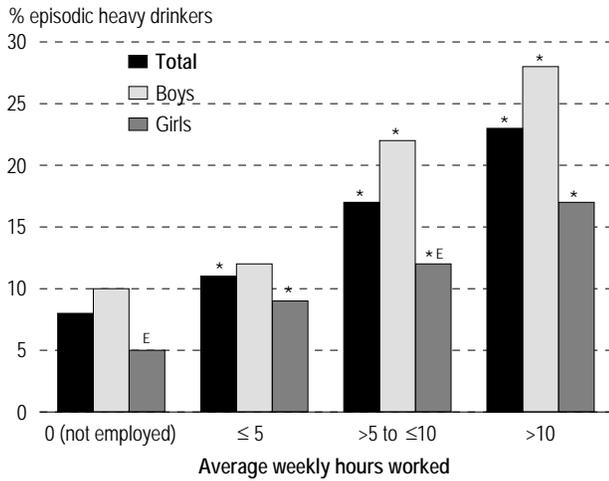
For the two sexes combined, students who worked up to 20 hours a week were more likely to be physically active in their leisure time than those who

were not working, but beyond 20 hours, the difference was not statistically significant (data not shown).

Associations between working and physical activity in leisure time persisted at each level of hours worked when the influences of age, sex, household income and urban/rural residence were taken into account (Table 3). The odds of being physically active were almost twice as high for students working more than 5 and up to 15 hours per week, and more than double for those averaging between 15 and up to 20 hours, compared with students who did not work. Beyond 20 hours, the odds of such activity decreased, but remained above those for the non-workers.

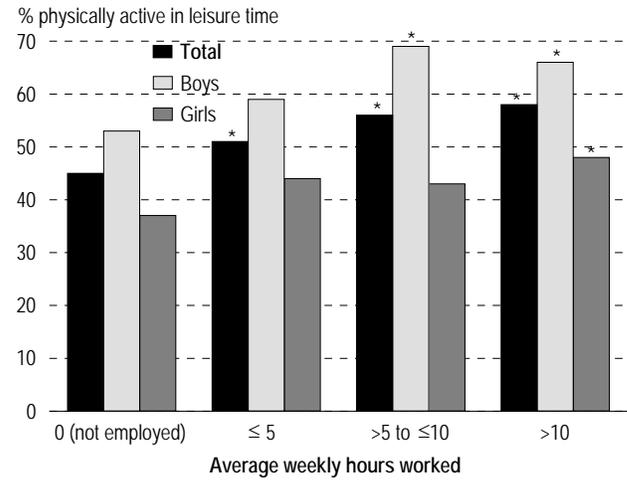
A previous report noted a higher rate of sports participation and a greater likelihood of vigorous exercise in adolescents who worked 1 to 5 hours a

**Chart 3**  
 Percentage of full-time students aged 15 to 17 who reported episodic heavy drinking, by average weekly hours worked in past 12 months, household population, Canada, 2003



*Data source: 2003 Canadian Community Health Survey*  
*Notes: Based on a sample of 5,331 full-time students aged 15 to 17 (2,697 boys and 2,634 girls).*  
 \* Significantly different from estimate for same group in "not employed" ( $p < 0.05$ )  
 E Coefficient of variation 16.6% to 33.3% (interpret with caution)

**Chart 4**  
 Percentage of full-time students aged 15 to 17 who reported being physically active in leisure time, by average weekly hours worked in past 12 months, household population, Canada, 2003



*Data source: 2003 Canadian Community Health Survey*  
*Notes: Based on a sample of 5,331 full-time students aged 15 to 17 (2,697 boys and 2,634 girls).*  
 \* Significantly different from estimate for same group in "not employed" ( $p < 0.05$ )

### Limitations

The data used for this article were based on self- or proxy-reported responses. Responses were not verified by direct measures or independent sources, so their degree of accuracy is unknown. For example, recall errors may affect reported levels of physical activity, and there were no independent sources to confirm if people who reported engaging in specific activities actually did so, or with the frequency and duration reported. It is also possible that respondents may have provided socially desirable responses to questions about smoking, alcohol consumption, physical activity, or hours worked. The extent to which the data are biased, or prevalence has been over- or underestimated, because of these potential sources of error is unknown.

Some students reported more than one job in the past 12 months: 163 in the National Population Health Survey (10% of the weighted sample), and 126 in the Canadian Community Health Survey (2% of the weighted sample). Only information about respondents' main job was used to derive average hours typically worked per week. For those who reported more than one job, it was not possible to determine if any of the total weeks worked at other jobs were concurrent with the weeks worked at the main job. Consequently, their average number of weekly hours worked may have been underestimated.

NPHS data were used to measure behaviours at only two points in time; changes that may have happened before, within or after the two-year interval could not be considered. As well, only information collected at the initial survey about socio-demographic characteristics, such as student employment status and number of hours worked per week, was used.

For the NPHS, it is possible that youth who had left home between survey cycles were more likely to have been non-responders and therefore excluded. As well, some youth were excluded from these analyses because no information was provided about the number of weeks or typical number of hours worked per week. For the CCHS, 154 records from working students were excluded for this reason; for the NPHS, 141 records. Potential bias from these kinds of attrition and exclusions and the impact on associations between employment and changes in health behaviours are not known.

Although the longitudinal NPHS data establish a temporal relationship between employment and health-related behaviours approximately two years later, causality cannot be inferred. Nor can causality be determined using the cross-sectional CCHS data. The associations could be related to other factors not included in the analyses. The mechanisms that underlie associations between work or the number of hours of work and health-related behaviours cannot be determined with these data.

## Definitions

In both the Canadian Community Health Survey (CCHS) and the National Population Health Survey (NPHS), *household income* was based on the number of people in the household and total annual household income from all sources in the 12 months before the survey interview. The NPHS analysis used household income reported in the baseline year: 1994/95, 1996/97, 1998/99 or 2000/01, depending on when the student reached the age of 15, 16 or 17.

| Income group | Number of household members | 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     |

Household income was regrouped as lowest/lower-middle, middle and upper-middle/highest. When information was not known (refusals, unknowns), the records were grouped as "missing." Information on the students' personal income from work was not available.

*Physically active in leisure time* was based on total accumulated energy expenditure (EE) calculated from the reported frequency and duration of all of a respondent's leisure-time physical activities in the three months before the CCHS or NPHS interview, and the metabolic energy demand (MET value) of each activity, which was independently established. EE was calculated by multiplying the number of times a respondent engaged in an activity over a 12-month period (a 3-month recall period multiplied by 4) by the average duration in minutes and the energy cost of the activity (kilocalories expended per kilogram of body weight per hour of activity). To calculate the daily energy expenditure for the activity, the yearly estimate was divided by 365. This calculation was repeated for all

reported leisure-time activities, and the resulting estimates were summed to provide the aggregate average daily energy expenditure. Respondents whose leisure-time EE was 3.0 kcal/kg/day or more were considered *physically active*. A value between 1.5 and 2.9 kcal/kg/day indicated *moderately active*, and those below 1.5 kcal/kg/day were considered *inactive*. Physical activity during school or in the workplace was not included.

The NPHS category *increased leisure-time physical activity or maintained active status* included respondents who were "active" or "moderately active" according to information reported at the first interview and "active" based on the second interview two years later, as well as those who were "inactive" at the first interview and either "moderately active" or "active" two years later.

Smoking status was derived from questions about current and former behaviour. *Daily/Occasional smokers* were those who reported smoking cigarettes either daily or occasionally at the time of their interview. NPHS respondents who had a smoking status of "never smoked" or "former smoker" at the study baseline, but two years later reported smoking daily or occasionally, were considered to have *initiated daily/occasional smoking*.

Both surveys asked, "During the past 12 months, how often did you drink alcoholic beverages?" For CCHS respondents, *regular drinkers* were those who said that they consumed alcohol once a month or more. For the NPHS analysis, *initiated regular alcohol consumption* represents former drinkers who did not currently drink, or those who had always been abstainers at the first interview, but when surveyed approximately two years later, consumed alcohol once a month or more.

*Heavy episodic drinking* was measured by asking CCHS respondents the number of times in the past year they had had five or more drinks on one occasion. Those who had done so 12 or more times were classified as having engaged in heavy episodic drinking.

CCHS respondents were classified as *urban or rural residents*. Urban areas are continuously built-up areas with a population concentration of 1,000 or more and a population density of 400 or more per square kilometre, based on the 1996 Census of Population.

week, compared with those not working at all.<sup>15</sup> It also reported a negative association with exercise among adolescents who worked more than 5 hours a week.<sup>15</sup> The differences between those results and the findings of this analysis may reflect the measures

of physical activity. In the CCHS, respondents were asked specifically about a range of physical activities and the amount of time spent doing each of them for a specific reference period (see *Definitions*).

## Analytical techniques

Canadian Community Health Survey (CCHS) data were weighted to represent the household population of the provinces and territories in 2003. National Population Health Survey (NPHS) data were weighted to represent the household population of the provinces in 1994/95.

Descriptive statistics based on CCHS data for full-time students aged 15 to 17 were used to report the proportion of students in each category of average number of hours worked weekly, by the students' socio-demographic characteristics. Students who had not worked for pay were classified as having worked 0 hours per week (not employed). CCHS data were also used to report employment characteristics by household socio-demographic characteristics. Descriptive statistics based on these data were generated by cross-tabulating the prevalence of health-related behaviours by average number of hours worked weekly in the previous 12 months, and by the student's sex.

Using logistic regression analysis, odds ratios were estimated to examine associations between hours worked and changes in health-related behaviours reported to the NPHS. Socio-demographic factors believed to be associated with health-related behaviours were included as control variables in the regression models. All variables used in the models were dichotomized. The reference case for the regression models was a female, aged 15, with a total annual household income in the lowest to lower-middle category, who was not employed (0 work hours), and, for the CCHS only, who lived in a rural area.

Preliminary analyses of the CCHS data included interaction terms between age and sex in the logistic regression models. However, the odds ratios were not significant (data not shown), so these interaction terms were excluded from the final models.

The NPHS longitudinal file was used to study the relationship between employment status and changes in health-related

behaviours between the baseline year (1994/95, 1996/97, 1998/99 or 2000/2001, depending on the year the student reached the age of 15, 16 or 17) and approximately two years later. Employment status and other respondent characteristics used in the NPHS logistic regressions were those reported at the beginning of the two-year period and were assumed to have remained constant over the two years. The possibility that there were differences between the two study conditions (those who had not worked and those who had worked some number of hours) in the average length of time between the baseline interview and the second interview in the subsequent survey cycle was considered. The time between interviews ranged from 455 days to 1,005 days among the students who worked some number of hours (estimated mean 728 days; standard error 2.38), and ranged from 463 days to 1,008 days among the students who had not worked (estimated mean 729 days; standard error 2.63); the respective estimated means were not significantly different ( $p < 0.05$ ).

One goal of this analysis was to see if there was a threshold of average number of weekly work hours above which health-related behaviours were more likely to occur. Models portraying changes to the probability of health-related behaviours as the average number of weekly hours worked increased were run using specified characteristics. Appendix Chart A illustrates the results of four such models for youths with the following characteristics: female, aged 15, lowest/lower-middle household income, rural residence.

To account for survey design effects, the bootstrap technique was used to estimate sampling variances for all reported prevalence estimates and the differences between them, confidence intervals for odds ratios, and covariances of estimated coefficients used in tests for differences.<sup>16-18</sup> A significance level of  $p < 0.05$  was established.

### Becoming regular drinkers

As no information on the timing of employment in relation to the health-related behaviours can be obtained from the CCHS cross-sectional data, temporal relationships cannot be established. However, data from the NPHS can be used to assess changes in or maintenance of the health-related behaviours among students in relation to their employment status approximately two years earlier (see *Data sources* and *Analytical techniques*).

Even when age and household income were taken into account, students who worked had higher odds of becoming regular drinkers within the next two years than did students who were not employed. This relationship emerged at each level of hours worked (Table 4), but was notably high for students averaging more than 10 hours a week. Their odds of having become regular drinkers were more than three times those of students who had not been working two years earlier. The odds of initiating

Table 4

Adjusted odds ratios for changes in or maintenance of health-related behaviours among full-time students aged 15 to 17, by average weekly hours at main job and selected characteristics, household population, Canada, 1994/95 to 2002/03

|                                  | Started daily/<br>occasional smoking |                               | Started regular<br>alcohol<br>consumption |                               | Increased leisure-time<br>physical activity/<br>Maintained active status |                               |
|----------------------------------|--------------------------------------|-------------------------------|---|-------------------------------|--|-------------------------------|
|                                  | Adjusted<br>odds<br>ratio            | 95%<br>confidence<br>interval | Adjusted<br>odds<br>ratio                 | 95%<br>confidence<br>interval | Adjusted<br>odds<br>ratio  | 95%<br>confidence<br>interval |
| <b>Average weekly hours</b>      |                                      |                               |   |                               |  |                               |
| 0 (not employed) <sup>†</sup>    | 1.0                                  | ...                           | 1.0                                       | ...                           | 1.0  | ...                           |
| ≤5                               | 0.9                                  | 0.6, 1.5                      | 1.9*                                      | 1.3, 2.7                      | 1.3  | 0.9, 1.8                      |
| >5 to ≤10                        | 1.0                                  | 0.5, 1.8                      | 2.0*                                      | 1.1, 3.4                      | 1.1  | 0.7, 1.7                      |
| >10                              | 1.1                                  | 0.6, 2.1                      | 3.1*                                      | 1.6, 5.7                      | 1.0  | 0.7, 1.6                      |
| <b>Age</b>                       |                                      |                               |   |                               |  |                               |
| 15 <sup>†</sup>                  | 1.0                                  | ...                           | 1.0                                       | ...                           | 1.0  | ...                           |
| 16                               | 1.3                                  | 0.9, 2.0                      | 1.6*                                      | 1.1, 2.2                      | 0.9  | 0.7, 1.3                      |
| 17                               | 1.3                                  | 0.8, 2.2                      | 1.7*                                      | 1.2, 2.6                      | 0.7*   | 0.5, 0.9                      |
| <b>Sex</b>                       |                                      |                               |   |                               |  |                               |
| Girls <sup>†</sup>               | 1.0                                  | ...                           | 1.0                                       | ...                           | 1.0  | ...                           |
| Boys                             | 1.1                                  | 0.7, 1.6                      | 1.5*                                      | 1.1, 2.1                      | 1.7*   | 1.3, 2.3                      |
| <b>Household income</b>          |                                      |                               |   |                               |  |                               |
| Lowest/Lower-middle <sup>†</sup> | 1.0                                  | ...                           | 1.0                                       | ...                           | 1.0  | ...                           |
| Middle                           | 1.1                                  | 0.6, 2.1                      | 0.8                                       | 0.4, 1.4                      | 0.8  | 0.5, 1.3                      |
| Upper-middle/Highest             | 1.1                                  | 0.6, 2.1                      | 1.2                                       | 0.7, 2.1                      | 1.2  | 0.8, 1.8                      |
| Missing                          | 1.2                                  | 0.6, 2.5                      | 0.9                                       | 0.5, 1.7                      | 0.9  | 0.6, 1.4                      |

Data source: 1994/95 to 2002/03 National Population Health Survey, longitudinal square file

Note: Separate models were run for each health-related behaviour, based on samples of 1,231, 1,086 and 1,439 respondents, respectively.

<sup>†</sup> Reference group

\* Significantly different from estimate for reference group ( $p < 0.05$ )

... Not applicable

regular alcohol consumption were higher for boys than girls and, not surprisingly, increased with each additional year of age.

No associations between working any number of hours and smoking initiation or increase in or maintenance of physical activity level were found in longitudinal analysis.

### Concluding remarks

This analysis, based on nationally representative data, adds to the evidence that full-time students of high-school age who work for pay have elevated odds of smoking, drinking alcohol regularly—and heavily on occasion, than their non-working peers. The persistence of these relationships, even when controlling for age, is consistent with findings from other research.<sup>6-8</sup> Individual factors, such as having more spending money, may play a role. Workplace

factors, including access to alcohol and tobacco and exposure to co-workers or customers who engage in these behaviours, may also increase the risk for working students.

Although smoking and drinking were associated with employment in cross-sectional analysis, these associations are not necessarily lasting. When students were followed over a two-year period, working was associated with subsequent regular drinking, but not with smoking initiation.

Not all the health behaviours linked with employment or increased hours of work were detrimental. Despite the demands of school and work, students who were employed—even those who averaged over 20 hours a week—had higher odds of being physically active in their leisure time, compared with non-working students. ●

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## Appendix

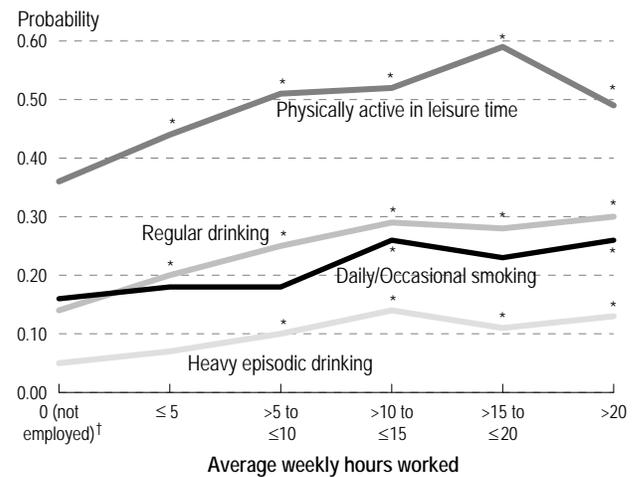
Table A  
Distribution of full-time students aged 15 to 17, by selected characteristics at baseline, household population, Canada, 1994/95 to 2002/03

|   | Sample size  | Estimated population |            |
|---|--------------|----------------------|------------|
|   |              | '000                 | %          |
| <b>Total</b>  | <b>1,598</b> | <b>3,385</b>         | <b>100</b> |
| <b>Sex</b>  |              |                      |            |
| Girls   | 808          | 1,714                | 51         |
| Boys  | 790          | 1,671                | 49         |
| <b>Age</b>  |              |                      |            |
| 15  | 575          | 1,190                | 35         |
| 16  | 579          | 1,309                | 39         |
| 17  | 444          | 886                  | 26         |
| <b>Household income</b>   |              |                      |            |
| Lowest/Lower-middle   | 180          | 352                  | 10         |
| Middle  | 369          | 806                  | 24         |
| Upper-middle/Highest  | 734          | 1,565                | 46         |
| Missing   | 315          | 662                  | 20         |
| <b>Average hours worked weekly in 12 months before baseline</b>   |              |                      |            |
| 0 (not employed)  | 722          | 1,518                | 45         |
| ≤5  | 459          | 1,003                | 30         |
| >5 to ≤10   | 230          | 496                  | 15         |
| >10   | 187          | 368                  | 11         |
| <b>Smoking/Alcohol use at baseline</b>                            |              |                      |            |
| Former smoker/Never smoked  | 1,237        | 2,632                | 78         |
| Not drinking regularly/Never consumed alcohol                     | 1,096        | 2,324                | 69         |
| <b>Changes to health-related behaviours at follow-up</b>          |              |                      |            |
| Started daily/occasional smoking                                  | 219          | 433                  | 17         |
| Started regular alcohol consumption                               | 507          | 1,106                | 48         |
| Increased leisure-time physical activity/Maintained active status | 675          | 1,455                | 46         |

*Data source:* 1994/95 to 2002/03 National Population Health Survey, longitudinal square file

*Note:* This sample of 1,598 consists of 15- to 17-year-olds who were full-time students who had not completed a secondary diploma at the beginning of the initial reference period, and who reported their work status for the previous 12 months.

Chart A  
Probabilities of selected health-related behaviours for full-time female students aged 15, living in lower-income households in rural areas, as a function of number of hours worked weekly at main job, household population, Canada, 2003



*Data source:* 2003 Canadian Community Health Survey

*Note:* The models are based on a sample of 5,331 full-time students aged 15 to 17. The probability of each health-related behaviour is modelled for each increase in range of hours worked weekly.

† Reference category

\* Significantly different from those not employed (0 hours) ( $p < 0.05$ )