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- Stress and depression among workers
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Health Reports

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F	too unreliable to be published

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Health Reports contains *Research Articles* and *Health Matters*. *Research Articles* present in-depth analysis and undergo anonymous peer review. *Health Matters* are shorter, descriptive reports, largely based on survey and administrative data from Health Statistics Division. All articles are indexed in Index Medicus and MEDLINE.

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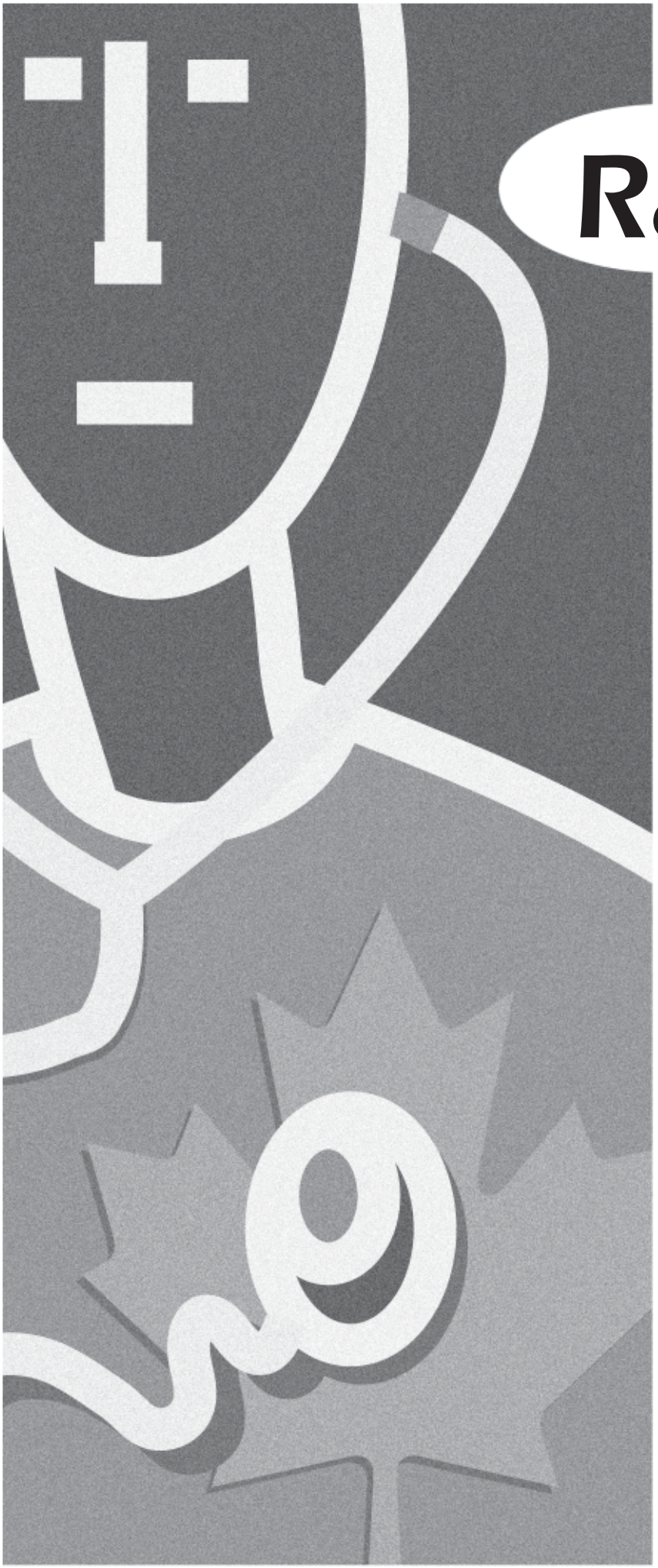

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Stress and depression in the employed population

Margot Shields

Abstract

Objectives

This article describes stress levels among the employed population aged 18 to 75 and examines associations between stress and depression.

Data sources

Data are from the 2002 Canadian Community Health Survey: Mental Health and Well-being and the longitudinal component of the 1994/95 through 2002/03 National Population Health Survey.

Analytical techniques

Stress levels were calculated by sex, age and employment characteristics. Multivariate analyses were used to examine associations between stress and depression in 2002, and between stress and incident depression over a two-year period, while controlling for age, employment characteristics, and factors originating outside the workplace.

Main results

In 2002, women reported higher levels of job strain and general day-to-day stress. When the various sources of stress were considered simultaneously, along with other possible confounders, for both sexes, high levels of general day-to-day stress and low levels of co-worker support were associated with higher odds of depression, as was high job strain for men. Over a two-year period, men with high strain jobs and women with high personal stress and low co-worker support had elevated odds of incident depression.

Keywords

health surveys, job strain, life stress, longitudinal studies, occupational health, work stress

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Depression is a debilitating condition that places an enormous burden on society. In 2000, the World Health Organization ranked depression as the leading cause of disability worldwide.[1] An important component of the economic impact of depression is lost productivity in the workplace.[2] Workers suffering from depression are more likely to take time off because of short- and long-term disability, and depressed people tend to be less productive on the job.[3-7]

Previous studies have found that stress both on and off the job is associated with a wide variety of mental health problems.[8-29] Although these relationships are not fully understood, it is thought that stress is instrumental in eroding positive self-concept, making those who experience stress more vulnerable to mental health problems such as depression.[30]

Understanding workers' vulnerability to different sources of stress is important, as is how these different stressors can interact to affect workers' mental health. Such information could help employers take steps to reduce or prevent stress, and thus perhaps lower the risk of depression.

The jobs considered to be the most stressful are often referred to as "high strain" jobs.[14] This means that demands are high, yet workers have few opportunities to use their skills and make decisions. The effects of high job strain on cardiovascular disease have been well documented,[31] but associations with mental health have not been studied as extensively, especially longitudinally.[10,18] Job strain is only one of the stressors workers may face in day-to-day life. Lack of support from supervisors and co-workers, for example, can cause stress. And, of course, workers may confront stress at home and in other areas of their lives.

This article, based on data from the 2002 Canadian Community Health Survey (CCHS) cycle 1.2: Mental Health and Well-being, describes stress levels of employed Canadians, considering variations by sex, age and employment characteristics. Job strain, low co-worker support, low supervisor support, and general or personal day-to-day stress are all considered (see *Defining stress and depression*). Cross-sectional relationships between stress and depression are examined. The association between stress and the incidence of depression over a two-year period is investigated using longitudinal data from the first five cycles of the National Population Health Survey (NPHS). These relationships are analyzed using multivariate techniques that control for employment characteristics, as well as factors originating outside the workplace (see *Data sources*, *Analytical techniques* and *Limitations*).

Job strain more common among women

Job strain comprises high psychological demands and low decision latitude.[14] The 2002 CCHS asked a series of questions to measure these two components, and scores ranging from 0 to 10 were calculated for each (see *Defining stress and depression*). On average, women had significantly higher scores

Data sources

Canadian Community Health Survey: The cross-sectional analysis on stress levels and their associations with depression is based on data from the 2002 Canadian Community Health Survey (CCHS) cycle 1.2: Mental Health and Well-being, which began in May 2002 and was conducted over eight months. The survey covered people aged 15 or older living in private dwellings in the 10 provinces. Residents of the three territories, Indian reserves, institutions, certain remote areas, members of the regular Armed Forces and civilian residents of military bases were excluded.

The sample was selected using the area frame designed for the Canadian Labour Force Survey. A multi-stage stratified cluster design was used to sample dwellings within this area frame. One person aged 15 or older was randomly selected from the sampled households. Individual respondents were selected to over-represent young people (15 to 24) and seniors (65 or older), thus ensuring adequate sample sizes for these age groups. More detailed descriptions of the design, sample and interview procedures can be found in other reports and on the Statistics Canada Web site.[32,33] All interviews were conducted using a computer-assisted application. Most (86%) were conducted in person; the remainder, by telephone. Selected respondents were required to provide their own information, and proxy responses were not accepted. The responding sample consisted of 36,984 people aged 15 or older; the response rate was 77%.

National Population Health Survey: The analysis of associations between stress and incident depression over a two-year period is based on data from National Population Health Survey (NPHS). The NPHS, which began in 1994/95, collects information about the health of Canadians 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.

In 1994/95, 20,095 respondents were selected for the longitudinal panel. The response rate for this panel in 1994/95 was 86.0%, representing 17,276 respondents; attempts were made to re-interview these 17,276 respondents every two years. The response rates for subsequent cycles, based on these 17,276 individuals, were: 92.8% for cycle 2 (1996/97); 88.2% for cycle 3 (1998/99); 84.8% for cycle 4 (2000/01); and 80.6% for cycle 5 (2002/03). More detailed descriptions of the NPHS design, sample and interview procedures can be found in published reports.[34,35]

This analysis uses the cycle 5 (2002/03) longitudinal "square" file, which contains records for all responding members of the original panel whether or not information about them was obtained in all subsequent cycles.

Analytical techniques

The prevalence of stress among workers was estimated using data from the 2002 Canadian Community Health Survey (CCHS) cycle 1.2: Mental Health and Well-being. Four sources of stress were considered: job strain, high general day-to-day stress, low co-worker support and low supervisor support. The data were weighted to represent the population of the provinces in 2002.

Cross-tabulations were used to study cross-sectional associations between the four sources of stress and having experienced a major depressive episode (MDE) in the previous 12 months. These relationships were also examined in a series of sex-specific multivariate logistic regression models. In the first set of models, the unadjusted odds of having had an MDE were estimated for each of the four sources of stress individually. In the second set, these same associations were examined controlling for possible confounders: occupation, working hours, shift work, self-employment, age, marital status, the presence of children in the household, education, personal income, heavy monthly drinking and low emotional support. In the final models, the four stressors were considered simultaneously in addition to the other control variables to determine if they were independently associated with depression. Correlations between the four stress measures were low to moderate.

Correlations between stress/support scores by sex, employed population aged 18 to 75, Canada excluding territories, 2002

	Job strain	General day-to-day stress	Co-worker support	Super-visor support
Men				
Job strain	1.00	0.18	-0.20	-0.11
General day-to-day stress	…	1.00	-0.17	-0.08
Co-worker support	…	…	1.00	0.27
Supervisor support	…	…	…	1.00
Women				
Job strain	1.00	0.16	-0.21	-0.14
General day-to-day stress	…	1.00	-0.14	-0.06
Co-worker support	…	…	1.00	0.33
Supervisor support	…	…	…	1.00

… not applicable

Notes: *A higher score indicates a higher level of job strain, general day-to-day stress, co-worker support or supervisor support.*

Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

All analyses were conducted separately for men and women and were based on those aged 18 to 75 who were employed at the time of the CCHS interview. The sample size was 10,660 for men and 10,087 for women; 396 of these men and 658 of these women were classified as having had an MDE in the previous year.

Associations between stress and the two-year incidence of depression were based on data from the National Population Health Survey (NPHS). Pooling of repeated observations was combined with logistic regression analysis. Two cohorts of pooled observations were used, with baseline years of 1994/95 (cycle 1) and 2000/01 (cycle 4). These are the two NPHS cycles for which questions on stress were asked and information on depression was available two years later.

For each baseline year, adults aged 18 to 75 who were employed at the time of the NPHS interview were selected. Those who had experienced an MDE in the year before the baseline interview were excluded. The incidence of depression among the remaining respondents two years later was estimated in relation to the four stress variables at baseline. Records were excluded if depression status at follow-up was unknown. Sample sizes were:

			Workers (baseline)		Depression (at follow-up)	
Cohort	**Baseline**	**Follow-up**	**Men**	**Women**	**Men**	**Women**
Cycle 1	1994/95	1996/97	3,199	2,994	72	134
Cycle 4	2000/01	2002/03	2,926	2,892	71	128
Total			**6,125**	**5,886**	**143**	**262**

Because the analysis is based on new "cases" of depression over a two-year period, it is possible that some workers may have contributed to more than one case in the calculation of the incidence rates. For example, a worker who was free from depression in 1994/95, subsequently reported depression in 1996/97, then was free from depression in 2000/01 and reported it again in 2002/03 contributed two "cases" of incident depression. The bootstrap method accounts for the increase in variance that may result from having repeated observations, because the same individual is always in the same bootstrap sample.[36]

A series of multiple logistic regression models was used on the pooled set of observations to estimate associations between stress in the baseline year and subsequent depression. The first three sets of models were similar to the ones used for the cross-sectional analysis, with all of the independent variables measured as of the baseline year. A fourth set of models was introduced that controlled for mastery in addition to the other variables in the earlier models.

For the longitudinal analysis, personal stress was considered (see *Defining stress and depression*).

For ease of interpretation, in all the regression models, categorical values were used to classify respondents' stress levels. This may have reduced the sensitivity of these measures.[37,38] However, when the regressions were rerun using continuous stress measures, all results were similar (data not shown).

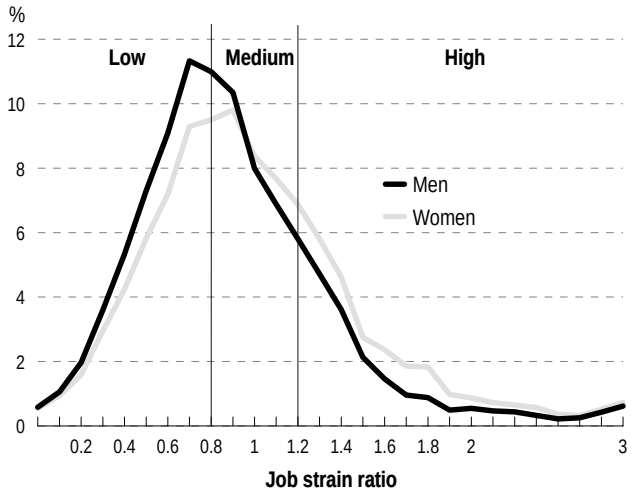
To account for the survey design effects of the CCHS and the NPHS, coefficients of variation and p-values were estimated and significance tests were performed using the bootstrap technique.[39-41] The significance level was set at $p < 0.05$.

for psychological demands and lower scores for decision latitude than did men (Table 1). Women's scores were lower for the two aspects of decision latitude: skill discretion and decision authority.

High strain jobs are psychologically demanding, yet provide little opportunity for workers to make decisions or apply their skills. In 2002, female workers were consistently more likely than male workers to have job strain scores over 1 (Chart 1), indicating that the demands of the job outweighed their freedom to make decisions or to apply their skills. Men, on the other hand, were more likely to have scores below 1, meaning that their decision latitude exceeded demands.

Job strain was classified as low, medium or high. Women were more likely (27%) than men (19%) to have high job strain, while men were more likely to have low job strain (47% versus 38% for women) (Table 1). When examined in a multivariate model controlling for other employment-related characteristics including occupation, work schedule, working hours and personal income, the finding that women were more likely to experience high strain on the job persisted (data not shown). Other research has also generally found that women are more likely to be in high strain jobs, and that men perceive higher job control than do women.[18,21,23,42,43]

Chart 1
Percentage distribution of employed population aged 18 to 75, by job strain ratio† and sex, Canada excluding territories, 2002



† *Psychological demands divided by decision latitude*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Table 1
Stress and support scores for employed population aged 18 to 75, Canada excluding territories, 2002

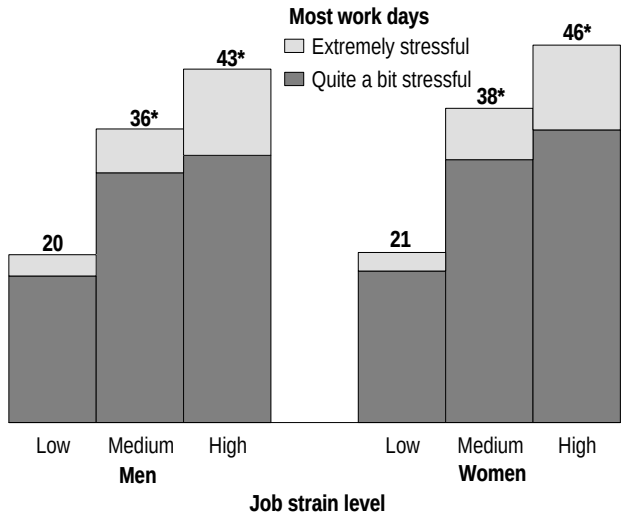
	Men	Women
Job strain, average score	**0.90**	**1.00***
High (ratio 1.2 or more) %	18.8	26.6*
Medium (ratio between 0.8 and 1.2) %	34.0	35.4
Low (ratio 0.8 or less) %	47.1	38.0*
Components of job strain		
Psychological demands, average score	5.61	5.85*
Job is very hectic - % agreeing	58.0	62.5*
Free from conflicting demands - % disagreeing	40.9	43.6*
Decision latitude, average score	6.66	6.27*
Skill discretion, average score	6.31	6.02*
Learning new things required - % agreeing	82.2	81.5
High skill level required - % agreeing	79.9	72.2*
Must do things over and over - % disagreeing	24.6	20.0*
Decision authority, average score	7.19	6.66*
Have freedom to make decisions - % agreeing	78.9	70.5*
Have a lot to say about what happens in job - % agreeing	70.2	61.1*
General day-to-day stress, average score	**4.69**	**5.04***
High general day-to-day stress		
Most days quite a bit/extremely stressful - % agreeing	25.3	29.3*
Co-worker support, average score	**6.75**	**6.72**
Low co-worker support (%)†	**32.2**	**32.4**
Exposed to hostility or conflict - % agreeing	28.6	27.9
People are helpful - % disagreeing	6.1	6.9
Supervisor support, average score	**6.40**	**6.54***
Low supervisor support		
Supervisor is helpful - % disagreeing	17.2	16.4

† *Percentage agreeing with the first item or disagreeing with the second item*
* *Significantly different from estimate for men ($p < 0.05$)*
Notes: *Higher scores indicate higher levels of job strain, psychological demands, skill discretion, decision authority and general day-to-day stress. For co-worker and supervisor support, higher scores indicate more support. With the exception of job strain, all scores have been prorated so the minimum value is 0 and the maximum value is 10.*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

On-the-job stress, dissatisfaction

Not surprisingly, workers in high strain jobs were more likely to report on-the-job stress. Men and women in high strain jobs were more than twice as likely to find most workdays "extremely" or "quite a bit" stressful, compared with those experiencing a low level of job strain (Chart 2). And, consistent with other studies, high strain jobs were associated with job dissatisfaction.[13,14] Women in jobs with a high level of strain were four times as likely to be dissatisfied than were those with a low level, and men, five times as likely (Chart 3).

Chart 2
Percentage perceiving high work stress, by level of job strain and sex, employed population aged 18 to 75, Canada excluding territories, 2002



* *Significantly higher than estimate for previous category (p < 0.05)*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Chart 3
Percentage reporting job dissatisfaction, by level of job strain and sex, employed population aged 18 to 75, Canada excluding territories, 2002

* *Significantly higher than estimate for previous category (p < 0.05)*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Support at work, general stress

Approximately one of every three employees reported low support from co-workers (32%) and one in six, low support from supervisors—two other sources of work stress (Table 1).

CCHS respondents were also asked about the amount of stress they perceived in general, in their day-to-day lives. Women were more likely (29%) than men (25%) to report that most days were "quite a bit" or "extremely" stressful.

Age, occupation

Stress levels varied between older and younger workers, and by selected employment characteristics. Compared with 40- to 54-year-olds, men and women aged 18 to 24 were more likely to report high job strain (Table 2). At the same time, however, the younger group perceived lower levels of general day-to-day stress. Workers aged 55 or older of both sexes also reported lower levels of general stress, and older male workers had lower levels of job strain.

Previous studies have found that white-collar workers, particularly men, perceive the highest levels of control at work, while blue-collar workers, especially women, perceive the lowest.[42-44] Consistent with these findings, men and women who worked as managers, professionals or technologists were the least likely to have high job strain. Those employed in processing, manufacturing or utilities and sales and service were the most likely to have this level of strain. In fact, close to half of the women in processing, manufacturing or utilities occupations reported high job strain. By contrast, male and female managers were the most likely to report high levels of general stress.

Work schedule

Men who worked part time (less than 30 hours per week) were more likely than those with regular hours (between 30 and 40) to have high job strain. Yet part-time workers of both sexes perceived the least general day-to-day stress, while workers with long hours reported the most (Table 2).

Defining stress and depression

To measure *job strain*, respondents were asked to "strongly agree," "agree," "neither agree nor disagree," "disagree" or "strongly disagree" with the following statements:

(a) Your job requires that you learn new things.
(b) Your job requires a high level of skill.
(c) Your job allows you freedom to decide how you do your job.
(d) Your job requires that you do things over and over. (Reverse scored.)
(e) Your job is very hectic.
(f) You are free from conflicting demands that others make. (Reverse scored.)
(g) You have a lot to say about what happens in your job.

A score was derived for each of the three components of job strain: *psychological demands*, based on items (e) and (f); *decision authority*, (c) and (g); and *skill discretion*, (a), (b) and (d). Scores were calculated by assigning a value between 4 (strongly agree) and 0 (strongly disagree) to each item of the component and then summing across the items. The scoring algorithm was created so that higher scores indicate higher demands, higher decision authority or higher skill discretion; scoring for items (d) and (f) was reversed. A *decision latitude* score was calculated by adding the scores for decision authority and skill discretion. All scores were adjusted (prorated) so that all respondents had a potential maximum of 10, consistent for all measures. The job strain ratio was then calculated by dividing the adjusted score for psychological demands by that of decision latitude. Since both the numerator and denominator were prorated to be out of 10, this ensured that the potential contributions for psychological demands and decision latitude were equal. A small constant (0.1) was added to the numerator and denominator to avoid division by 0. To deal with outliers, scores greater than 3 were set to 3; this affected approximately 1% of the records.

In many studies of associations between job strain and health, job strain has been defined as workers scoring above the median on demands and below the median on latitude. Using a quotient to measure job strain is a relatively new approach, but it allows more flexibility in choosing cut-points to classify high strain jobs.[31] Respondents were classified as being in high strain jobs if the ratio was 1.2 or higher. Values between 0.8 and 1.2 indicate medium strain; 0.8 or lower, low strain.

The following statements were used to measure *co-worker* and *supervisor support*:

- You are exposed to hostility or conflict from the people you work with. (Reverse scored.)
- The people you work with are helpful in getting the job done.
- Your supervisor is helpful in getting the job done.

Response categories ranged from "strongly agree" to "strongly disagree," and scores were calculated in a similar way to job strain, with higher values indicating greater support. Similarly adjusted (prorated) scores were calculated so that all respondents had a potential maximum of 10. Respondents were classified as having low co-worker support if they agreed or strongly agreed with the first item dealing with co-worker support or disagreed or strongly disagreed with the second item, and as having low supervisor support if they disagreed or strongly disagreed with the supervisor support item.

For the 2002 Canadian Community Health Survey (CCHS), *general day-to-day stress* was determined with the question, "Thinking about the amount of stress in your life, would you say that most days are: not at all stressful? not very stressful? a bit stressful? quit a bit stressful? extremely stressful?" Respondents were classified as having high day-to-day stress if they replied "extremely stressful" or "quite a bit stressful." A continuous score was also assigned, ranging from 4 (extremely stressful) down to 0 (not at all stressful) and then adjusted (prorated) so the maximum value was 10.

The question on general stress was not asked in cycles 1 and 4 of the National Population Health Survey (NPHS); five "true/false" statements were used to measure *personal stress*:

- You are trying to take on too many things at once.
- There is too much pressure on you to be like other people.
- Too much is expected of you by others.
- Your work around the home is not appreciated.
- People are too critical of you or what you do.

A personal stress score was obtained by summing the "true" responses. Respondents were classified as having high personal stress if they responded "true" to two or more items.

The CCHS used the World Mental Health version of the Composite International Diagnostic Interview (WMH-CIDI) to estimate the prevalence of various mental disorders including *depression*. The WMH-CIDI was designed to be administered by lay interviewers and is generally based on diagnostic criteria outlined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV®-TR).[45] Based on expert advice, the WMH-CIDI and the algorithms used to identify depression and other mental disorders were revised over a period of time. The questionnaire used for the CCHS is available at www.statcan.ca/english/concepts/health/cycle1.2/index.htm and the algorithm used to measure the 12-month prevalence of depression is available in the Annex of the 2004 *Health Reports* supplement.[46] The NPHS used a subset of questions from the *Composite International Diagnostic Interview*, according to the method of Kessler et al.[47] The questions cover a cluster of symptoms listed in the *Diagnostic and Statistical Manual of Mental Disorders*, third revised edition.[48] For this article, the presence of depression refers to the 12 months preceding the date of the survey interview.

Shift work has been shown to be detrimental to workers' health.[49-51] According to the CCHS data, shift workers were more likely to report high job strain than were people with more regular hours. At the same time, however, they had lower levels of general stress.

Other employment characteristics

Self-employed men were less likely than other male workers to perceive high job strain, but were more likely to report high general stress (Table 2). Likewise, for women, being self-employed was associated with lower levels of job strain. Self-employment, however, was unrelated to general stress levels among women.

Personal income was inversely associated with job strain and positively related to general stress for both sexes. Workers with low incomes tended to perceive higher job strain, but lower general stress.

CCHS respondents' answers to questions on the amount of day-to-day stress they perceived do not indicate which aspects of their lives they were considering. However, given that associations between job strain and general stress and other correlates were often in opposite directions, job

Table 2
Percentage reporting high work and personal stress, by sex, age and selected employment characteristics, employed population aged 18 to 75, Canada excluding territories, 2002

	High job strain		High general day-to-day stress		Low co-worker support		Low supervisor support	
	Men	Women	Men	Women	Men	Women	Men	Women
	%		%		%		%	
Total	**19**	**27**	**25**	**29**	**32**	**32**	**17**	**16**
Age group								
18 to 24	27*	31*	17*	23*	31	30	15	13
25 to 39	19	27	26	29	33	36*	17	19
40 to 54†	19	26	29	33	34	31	18	16
55 or older	12*	22	22*	25*	26*	28	18	16
Occupation‡								
Management	13*	18*	37*	43*	44*	39*	15	16
Professional/Technologist	13*	19*	28	31	30	34	17	16
Administrative/Financial/Clerical	18	27	32	30	27	29	17E	17
Sales/Service	27*	32*	23	25*	31	31	16	17
Trades/Transport/Equipment operating	20	34	20*	26	33	32	18	17
Farming/Forestry/Fishing/Mining	14	22E	22	13*E	24*	29E	14	12E
Processing/Manufacturing/Utilities	30*	48*	21	29	30	38	22	17
Weekly work hours								
Part-time (1 to 29)	24*	26	14*	23*	29	28	17	17
Regular (30 to 40)†	19	27	20	28	30	32	17	16
Long (more than 40)	18	26	33*	41*	35*	39*	17	17
Shift worker								
Yes	25*	32*	22*	26*	34	34	17	17
No†	16	24	26	30	32	32	17	16
Self-employed								
Yes	9*	12*	30*	29	29*	30	...	...
No†	21	29	24	29	33	33	...	...
Personal income								
Less than $20,000	28*	30*	23*	25*	29	29*	17	15
$20,000 to $39,999	22*	28*	22*	28*	30	33	18	18
$40,000 to $59,999	17*	23*	25*	36	36	37	17	18
$60,000 or more†	12	15	31	41	33	37	16	15

† *Reference category*
‡ *Reference category is the total.*
* *Significantly different from estimate for reference category ($p < 0.05$, adjusted for multiple comparisons)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
... *not applicable*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Employment and other characteristics

A *worker* was defined as a respondent aged 18 to 75 who was employed at the time of the Canadian Community Health Survey (CCHS) or National Population Health Survey (NPHS) interview. If a respondent had more than one job, the variables used for occupation, hours of work, shift work and self-employment were based on the main job; that is, the one with the highest number of weekly work hours.

For the CCHS, respondents were asked which of nine categories best described their *occupation*: (1) management; (2) professional; (3) technologist, technician, or technical occupation; (4) administrative, financial or clerical; (5) sales or service; (6) trades, transport or equipment operator; (7) occupation in farming, forestry, fishing or mining; (8) occupation in processing, manufacturing or utilities; (9) or any other occupation. For the NPHS, occupation was grouped into similar categories based on the 1991 Standard Occupational Classification.[52]

Three categories of *weekly work hours* were developed, based on the number of hours worked at the main job: part-time (1 to 29); regular (30 to 40); or long (more than 40).

Shift work was derived based on the question "Which of the following best describes the hours you usually work on the job?" Respondents who answered anything but a regular daytime schedule were classified as *shift workers*.

Respondents who "worked mainly in their own business, farm or professional practice" were defined as *self-employed*.

For the CCHS, four groups were established based on total *personal income* from all sources in the previous 12 months: less than $20,000; $20,000 to $39,999; $40,000 to $59,999; and $60,000 or more. Personal income was not asked in the first cycle of the NPHS; therefore, household income was used as a control variable in the NPHS regression models. *Household income* groups were based on the number of people in the household and total household income from all sources in the 12 months before the interview:

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

Four *age groups* were used for this analysis: 18 to 24, 25 to 39, 40 to 54, and 55 or older.

Respondents were asked their current *marital status*. Those who indicated "now married," "common-law" or "living with partner" were grouped as "married."

Presence of children in the household means that at least one child under the age of 12 lived in the household.

Two *education* categories represent the highest level attained: postsecondary graduation, or less than postsecondary graduation.

Heavy monthly drinking was measured by asking respondents the number of times in the past year they had had 5 or more alcoholic drinks on one occasion; at least once a month was classified as *heavy monthly drinking*. NPHS cycle 1 respondents were asked the number of times in the past year they had had 5 or more drinks on one occasion; 12 or more times was considered heavy monthly drinking.

To measure *perceived emotional support,* CCHS and NPHS cycle 4 respondents were asked: "How often is each of the following kinds of social support available to you if you need it? Someone:

- you can count on to listen when you need to talk?"
- to give you advice about a crisis?"
- to give you information in order to help you understand a situation?"
- to confide in or talk to about yourself or your problems?"
- whose advice you really want?"
- to share your most private worries and fears with?"
- to turn to for suggestions about how to deal with a personal problem?"
- who understands your problems?"

They were also asked to indicate how often the support was available. Respondents who answered "none of the time" or "a little of the time" for at least one item were classified as having *low emotional support*. In cycle 1 of the NPHS, four "yes/no" questions were used to measure this variable, and respondents who answered "no" at least once were considered to have *low emotional support*:

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

For the NPHS analysis, *daily smokers* were defined as those who smoked cigarettes every day. Smoking status was not used in the analysis based on 2002 CCHS data because questions on smoking were not included.

In the NPHS, to measure *mastery*, respondents were asked to react to seven statements, ranked on a five-point scale ranging from "strongly agree" (score 0) to "strongly disagree" (score 4):

- You have little control over the things that happen to you.
- There is really no way you can solve the problems you have.
- There is little you can do to change many of the important things in your life.
- You often feel helpless in dealing with problems of life.
- Sometimes you feel you are being pushed around in life.
- What happens in the future mostly depends on you. (Reverse scored.)
- You can do just about anything if you set your mind to it. (Reverse scored.)

Responses were summed (ranging from 0 to 28), with higher scores indicating greater mastery (Cronbach's alpha = 0.76). Respondents in the lower quartile of the distribution were classified as having low mastery. Questions on mastery were not asked in the CCHS.

strain and day-to-day stress are obviously measuring different aspects of workers' lives.

Associations between employment characteristics were less evident for the other sources of work stress considered in this analysis: low support from co-workers and supervisors. Men and women in management, as well as those who worked long hours, were more likely to perceive low co-worker support, while men who were self-employed and women with low personal incomes were less likely to do so. None of the variables considered was significantly related to low support from supervisors.

Stress and depression

According to the 2002 CCHS, 3% of male workers and 6% of female workers had experienced a major depressive episode in the year before their survey interview. For workers of both sexes, high stress, on and off the job, was associated with depression, a result consistent with other studies.[8-29] Men in high strain jobs were 2.5 times more likely and women 1.6 times more likely than their counterparts in low strain jobs to have experienced depression (Chart 4). Male and female workers who considered most days to be quite a bit or extremely stressful were over 3 times more likely to have suffered a major depressive episode, compared with those who reported low levels of general stress. Low co-worker support was associated with a higher prevalence of depression for both sexes. Low supervisor support was significantly associated with a higher rate of depression for women, but only approached significance for men (p=0.054).

Associations between stress and depression were examined in multivariate models controlling for age and the employment characteristics shown to be related to stress. Mental health problems are also associated with personal characteristics such as marital status, presence of children in the household, education, heavy drinking and perceived emotional support.[53] Previous studies have been criticized for failing to control for possible confounders such as age, socio-economic status and social support.[31] But even when all of these factors were taken into account, each of the four sources of stress was associated with elevated odds of depression for both sexes (Table 3). In fact, the adjusted odds ratios relating stress to depression, which controlled for all of these potentially confounding variables, were very similar to the unadjusted odds.

The four sources of stress considered in this analysis do not necessarily occur in isolation (see *Analytical techniques*), and workers may also be particularly vulnerable to a specific type of stress. When the four sources of stress were taken into account simultaneously in addition to the other variables, the association between job strain and depression persisted for men, but not for women. As well, the association with low supervisor support disappeared for both sexes. By contrast, general day-to-day stress and low co-worker support remained independently associated with depression for male and female workers.

Chart 4
Prevalence of depression, by sex and source of stress, employed population aged 18 to 75, Canada excluding territories, 2002

† *Reference category*
* *Significantly higher than estimate for reference category (p < 0.05)*
§ *Significantly higher than estimate for medium (p < 0.05)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Limitations

For this analysis, high strain jobs are those for which workers have reported high psychological demands coupled with low decision latitude. These measures were based on the individual worker's perceptions and are thus subject to response bias (i.e., it is possible that two workers with similar work situations could have different perceptions and therefore different job strain scores). Validation studies with more objective assessments have found high correlations with self-reported ratings for decision latitude, but concluded that psychological demands are more subjective.[14,31] Furthermore, assessments of depression were based on self-reports and therefore may have resulted in bias when measuring associations between stress and depression. Negative affectivity, or a general tendency to be pessimistic, may have resulted in an overestimation of the odds ratios between depression and stress. In the longitudinal analysis, controlling for mastery may have partly addressed this limitation, depending on the extent to which negative affectivity is correlated with mastery.

It was not possible to control for some employment-related variables such as union membership, job permanency and employment income because they were not available in the Canadian Community Health Survey (CCHS) cycle 1.2 or the National Population Health Survey (NPHS). Including these variables might have altered associations between stress and depression.

In the longitudinal analyses, incident depression over a two-year period was examined in relation to stress at the beginning of the period. Only workers who were free from depression at the start were considered. However, these workers may have had a past history of depression, and the failure to control for this could have biased the findings. As well, the various sources of stress were measured only at the baseline year, and the length of time workers might have been exposed to stress is unknown. Depression was measured two years later at the follow-up interview. Some workers may have left the labour force or changed jobs at various points over this two-year period.

Using 2002 CCHS data, Cronbach's alpha was used to assess the internal consistency of the work stress indices. It was not possible to produce such an estimate for supervisor support because only one item was used to measure this construct. The internal consistency estimates were 0.32 for psychological demands of work, 0.62 for decision latitude, and 0.21 for support from co-workers. Previous studies based on all items from Karasek's Job Content Questionnaire,[43] which contains more items for each of these scales, have reported internal consistency estimates of 0.7 or above for all three scales.[11,43,54] The relatively low estimates of internal consistency found here are partly due to the limited number of items available from the CCHS (and the NPHS) to measure work stress. These low consistency scores may have affected associations between work stress and depression in both the cross-sectional and longitudinal analyses. This is particularly true for supervisor support, since only one item was used to measure this construct.

The potential for selection bias due to respondent attrition is problematic in longitudinal research. For the longitudinal analysis based on NPHS data, stress levels among workers aged 18 or older in cycles 1 and 4 (baseline cycles) were examined in relation to incident depression two years later in cycles 2 and 5 (follow-up cycles), respectively (see *Analytical techniques*). From one survey cycle to the next, respondents were lost from the analysis for reasons such as refusal to participate, death, item non-response, institutionalization or relocation out of the country. From the pooled total of 6,866 male workers assessed in the baseline cycles, 10.8% (741) did not respond in the follow-up cycle. For female workers, 8.6% were lost to follow-up (556 of the 6,442 workers assessed at baseline).

Non-respondents (unweighted sample), by sex, employed population aged 18 or older, NPHS

Men				Women			
Respondents at baseline		Non-respondents at follow-up		Respondents at baseline		Non-respondents at follow-up	
(1994/95)	3,490	(1996/97) 291	8.3%	(1994/95)	3,232	(1996/97) 238	7.4%
(2000/01)	3,376	(2002/03) 450	13.3%	(2000/01)	3,210	(2002/03) 318	9.9%
Total	**6,866**	**741**	**10.8%**		**6,442**	**556**	**8.6%**

To assess the potential for non-response bias on the results, the weighted proportions of non-respondents were compared among stress levels. No significant differences emerged between stress categories for any of the four sources of stress.

Non-response rates (weighted) at follow-up, by sex and stress levels at baseline, employed population aged 18 or older, NPHS, 1994/95 to 2002/03

	Men	Women
Total	**11.1**	**9.1**
Job strain		
High	10.7	10.3
Medium	11.0	8.1
Low	11.3	8.6
High personal stress		
Yes	11.3	9.5
No	10.9	8.9
Low co-worker support		
Yes	10.7	9.4
No	11.2	8.3
Low-supervisor support		
Yes	11.2	8.7
No	11.0	9.2

The survey weights were based on the response status in cycle 1 and were not inflated to account for subsequent non-response. This could have biased estimates if the characteristics of continuers in the longitudinal panel differed from non-respondents.

Table 3
Unadjusted and adjusted odds ratios relating selected sources of stress to depression, by sex, employed population aged 18 to 75, Canada excluding territories, 2002

Source of stress	Unadjusted odds ratio	95% confidence interval	Controlling for employment and personal characteristics‡		Controlling for employment and personal characteristics‡ and other three sources of stress	
			Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Job strain						
Men						
High	2.6*	1.8, 3.7	2.4*	1.7, 3.5	1.7*	1.2, 2.5
Medium	1.7*	1.2, 2.5	1.8*	1.3, 2.6	1.6*	1.1, 2.3
Low†	1.0	...	1.0	...	1.0	...
Women						
High	1.7*	1.2, 2.2	1.5*	1.1, 2.0	1.1	0.8, 1.5
Medium	1.2	0.9, 1.7	1.2	0.9, 1.7	1.1	0.7, 1.5
Low†	1.0	...	1.0	...	1.0	...
High general day-to-day stress						
Men						
Yes	4.0*	3.0, 5.5	4.4*	3.2, 6.0	3.8*	2.7, 5.2
No†	1.0	...	1.0	...	1.0	...
Women						
Yes	3.5*	2.7, 4.4	3.6*	2.8, 4.7	3.5*	2.7, 4.6
No†	1.0	...	1.0	...	1.0	...
Low co-worker support						
Men						
Yes	2.5*	1.9, 3.4	2.4*	1.7, 3.3	1.9*	1.4, 2.6
No†	1.0	...	1.0	...	1.0	...
Women						
Yes	1.9*	1.5, 2.4	1.8*	1.4, 2.4	1.5*	1.1, 2.1
No†	1.0	...	1.0	...	1.0	...
Low supervisor support						
Men						
Yes	1.7*	1.1, 2.6	1.7*	1.0, 2.7	1.3	0.8, 2.0
No†	1.0	...	1.0	...	1.0	...
Women						
Yes	1.7*	1.2, 2.3	1.6*	1.2, 2.2	1.3	0.9, 1.9
No†	1.0	...	1.0	...	1.0	...

† *Reference category*
‡ *Occupation, working hours, shift work, self-employment, age, marital status, presence of children in the household, personal income, education, heavy monthly drinking and low emotional support*
* *Significantly different from estimate for reference category ($p < 0.05$)*
... *not applicable*
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Incident depression

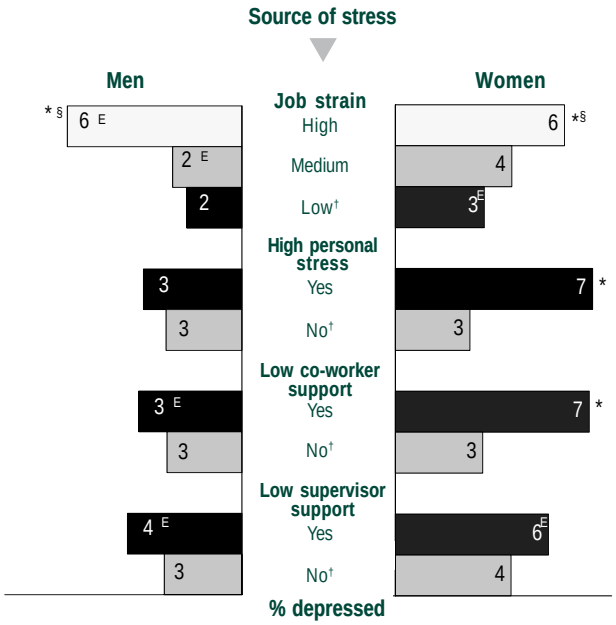
Longitudinal data from the NPHS were used to explore whether stress precedes depression (see *Defining stress and depression* and *Analytical techniques*). Two-year incident depression was defined as a report of depression among workers who had not reported depression two years previously. Questions to measure stress were asked in cycles 1 (1994/95) and 4 (2000/01) of the NPHS; therefore, incident depression in relation to stress could only be measured for the 1994/95-to-1996/97 and 2000/01-to-2002/03 periods.

For men, only one of the four sources of stress—job strain—was associated with new cases of depression (Chart 5). Men in high strain jobs were more than three times as likely as those in low strain positions to have developed depression. For women, incident depression was associated with three sources of stress: high job strain, high personal stress, and low co-worker support.

These associations were examined in multivariate models controlling for employment and personal characteristics (Table 4). When all four stressors were controlled for simultaneously in addition to the other variables, the association between job strain and incident depression held for men, but not for women. For women, though, the associations between depression and high personal stress and low co-worker support did persist. These results are consistent with other research suggesting that men's health is more vulnerable to job strain and women's is placed at higher risk by stress arising from multiple roles and family situations.[15,17,19]

A crucial issue in the study of associations between work stress and depression is whether depression is related to negative work situations or to the worker's perception. Virtually all workers will find high strain jobs stressful. When stress levels and depression are determined using self-reported data, it is possible that negative personality traits may confound the relationship between stress and depression (see *Limitations*). It could be that people who have a negative outlook are more likely to think they have little control, find situations stressful and go on to experience depression. If this is the case, it is not the stressful situations that cause the depression, but the negative personality traits. Although negative affectivity was not measured in the NPHS, mastery, which is the degree to which people see themselves as being in control of their lives,[30] was measured. If depression is more closely associated with the characteristics of the worker than with stress, it would be expected that including mastery in the multivariate models would weaken or eliminate the observed associations between stress and depression. This was not the case. When mastery was included as a control variable, the odds ratios remained virtually unchanged (Table 4, final model).

Chart 5
Two-year incidence of depression, by sex and source of stress, employed population aged 18 to 75, Canada excluding territories, 1994/95 to 1996/97 and 2000/01 to 2002/03



† *Reference category*
* *Significantly higher than estimate for reference category (p < 0.05)*
§ *Significantly higher than estimate for medium (p < 0.05)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
Note: *An incident case of depression was defined as not having the condition in one NPHS cycle, but reporting it in the next. NPHS cycles 1 and 2 (1994/95 to 1996/97) and 4 and 5 (2000/01 to 2002/03) were examined.*
Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*

Table 4
Unadjusted and adjusted odds ratios relating selected sources of stress to two-year incidence of depression, by sex, employed population aged 18 to 75, Canada excluding territories, 1994/95 to 1996/97 and 2000/01 to 20002/03

			Controlling for employment and personal characteristics‡		Controlling for employment and personal characteristics‡ and other three sources of stress		Controlling for employment and personal characteristics,‡ other three sources of stress, and mastery	
Source of stress	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Job strain								
Men								
High	3.3*	1.9, 5.8	3.0 *	1.6, 5.5	2.9*	1.6, 5.4	2.9*	1.5, 5.4
Medium	1.3	0.8, 2.0	1.2	0.7, 2.0	1.2	0.7, 2.0	1.2	0.7, 2.0
Low†	1.0	...	1.0	...	1.0	...	1.0	...
Women								
High	2.0*	1.3, 3.0	1.6*	1.0, 2.5	1.3	0.8, 2.0	1.2	0.8, 1.9
Medium	1.3	0.8, 2.1	1.2	0.8, 1.9	1.1	0.7, 1.7	1.1	0.7, 1.7
Low†	1.0	...	1.0	...	1.0	...	1.0	...
High personal stress								
Men								
Yes	1.3	0.9, 2.0	1.1	0.7, 1.7	0.9	0.6, 1.5	0.9	0.6, 1.4
No†	1.0	...	1.0	...	1.0	...	1.0	...
Women								
Yes	2.8*	2.1, 3.7	2.6*	1.9, 3.4	2.3*	1.7, 3.1	2.0*	1.5, 2.7
No†	1.0	...	1.0	...	1.0	...	1.0	...
Low co-worker support								
Men								
Yes	1.4	0.8, 2.3	1.2	0.7, 2.0	1.1	0.6, 1.8	1.1	0.6, 1.8
No†	1.0	...	1.0	...	1.0	...	1.0	...
Women								
Yes	2.3*	1.6, 3.3	2.1*	1.5, 3.1	1.9*	1.3, 2.7	1.8*	1.2, 2.6
No†	1.0	...	1.0	...	1.0	...	1.0	...
Low supervisor support								
Men								
Yes	1.5	0.8, 2.7	1.4	0.8, 2.5	1.2	0.6, 2.3	1.2	0.6, 2.3
No†	1.0	...	1.0	...	1.0	...	1.0	...
Women								
Yes	1.3	0.9, 2.0	1.3	0.9, 1.9	0.9	0.6, 1.4	1.0	0.6, 1.4
No†	1.0	...	1.0	...	1.0	...	1.0	...

† *Reference category*
‡ *Occupation, working hours, shift work, self-employment, age, marital status, presence of children in the household, household income, education, heavy monthly drinking, low emotional support and smoking status*
* *Significantly different from estimate for reference category ($p < 0.05$)*
... *not applicable*
Notes: *An incident case of depression was defined as not having the condition in one NPHS cycle but reporting it in the subsequent cycle. NPHS cycles 1 and 2 (1994/95 to 1996/97) and 4 and 5 (2000/01 to 2002/03) were examined. Because of rounding, an odds ratio for which the lower confidence interval was 1.0 was statistically significant.*
Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*

Demands and latitude—interactive?

Most studies of job strain have clearly demonstrated that high levels are detrimental to health. However, exactly how the effects of psychological demands and decision latitude are associated with negative health outcomes is not as clear. If the effects interact, high psychological demands would be detrimental to health only if decision latitude were low; and if decision latitude were high, the health of workers facing high job demands would not be at risk.

To clarify this situation, psychological demands and decision latitude were entered into logistic regression models along with an interaction term. A negative interaction between psychological demands and decision latitude would indicate that increased psychological demands are more detrimental to workers with lower decision latitude.

In 2002, depression was positively associated with psychological demands and negatively with decision latitude for both sexes (Appendix Table A). The interaction term was *not* significant, indicating that decision latitude and job demands are associated with depression independently and in combination. This was also the case for women in the longer term (Appendix Table B); for men, however, the interaction was significant.

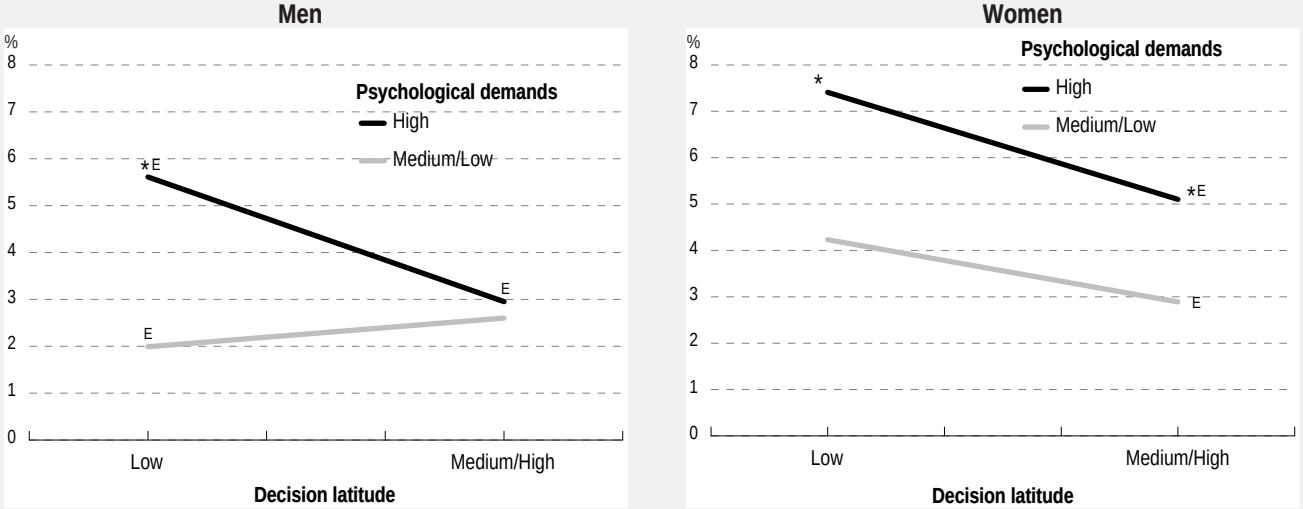
When looked at graphically, it is clear that, for both sexes, incident depression is most likely when their jobs present low decision latitude and high psychological demands (see charts). However, for men, psychological demands are not related to depression when decision latitude is medium or high. For women, though, psychological demands still make a difference for higher levels of decision latitude.

Support from co-workers or supervisors may also modify associations between job strain and negative health outcomes; that is, support from co-workers or supervisors can buffer the deleterious effects of job strain.[31] To test this hypothesis, all regression models were rerun to test for interactions between job strain and co-worker support, and between job strain and supervisor support. Interactions between job strain and co-worker and supervisor support were not significant (data not shown), mirroring the results of other studies.[10,11,13,17-20,22,25] There was, however, evidence of a main effect for co-worker and supervisor support for both sexes in 2002. In other words, co-worker and supervisor support are beneficial regardless of job strain level. Using the longitudinal data, a main effect for co-worker support was found for women, but not men.

Another possibility is that stress at home may interact positively with job strain to create particularly deleterious conditions for mental health. The cross-sectional regression models were rerun to test for interactions between job strain and general stress, and the longitudinal models to test for interactions between job strain and personal stress. Again, none of the interaction terms was statistically significant (data not shown).

In all cases, continuous measures of stress were used when testing for interactions.

Two-year incidence of depression, by psychological demands and decision latitude, employed population aged 18 to 75, Canada excluding territories, 1994/95 to 1996/97 and 2000/01 to 2002/03



* *Significantly higher than estimate for medium/low psychological demands ($p < 0.05$)*

E *Use with caution (coefficient of variation 16.6% to 33.3%)*

Notes: *An incident case of depression was defined as not having the condition in one NPHS cycle, but reporting it in the next. NPHS cycles 1 and 2 (1994/95 to 1996/97) and 4 and 5 (2000/01 to 2002/03) were examined.*

Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*

Persistent job strain

The 1994/95 NPHS and the 2002 CCHS asked identical questions to measure job strain, so with the cross-sectional files from each of these surveys, changes over time can be examined. For both sexes, average job strain levels were significantly lower in 2002 than in 1994/95 (Table 5). In 2002, 19% of men were classified as being in high strain jobs, down from 23%. The decline for women was even larger: from 35% to 27%. When the three components of job strain were considered, the decrease for men arose from a small decrease in psychological demands and an increase in skill discretion; for women, increases in both skill discretion and decision authority were behind the decline. Levels of perceived support from co-workers and supervisors remained stable (data not shown).

Using the NPHS longitudinal file, it was possible to determine the extent to which workers move in and out of high job strain. Longitudinal respondents were asked about job strain in 1994/95 and again in 2000/01, and the persistence of job strain was based on those who were employed in both interview periods. Of those who had been employed in 1994/95, 87% of men and 80% of women were employed at follow-up in 2000/01. Men who reported job strain in 1994/95 were less likely to be employed at follow-up in 2000/01, but for women, employment status at follow-up was unrelated to job strain level in 1994/95 (data not shown).

Over one-quarter of the men (28%) who had reported high job strain in 1994/95 continued to experience it six years later. Persistent job strain was even more common for women (42%). Of the men classified as having low or medium strain in 1994/95, 13% reported high strain by 2000/01. A transition to high job strain was even more common among women (20%).

Few studies have assessed job strain at more than one point in time,[11,31,37,55] but the longitudinal NPHS offers a unique opportunity to study the effects of persistent exposure to high job strain. Based on exposure to high job strain in 1994/95 and/or 2000/01, four categories of workers were identified to reflect transitions into and out of high strain situations (Table 6). Depression in 2000/01 and 2002/03 was compared across these categories. Only workers who were free from depression in 1994/95 were considered, and men and women were combined for analysis because of small sample sizes.

Workers persistently exposed to high job strain were about three times as likely as those who had no such exposure to have experienced a major depressive episode in the year before the 2000/01 survey; the same was true for those who moved into high strain situations. By 2002/03, both of these groups continued to be at a higher risk of

Table 5
Job strain scores by sex, employed population aged 18 to 75, Canada excluding territories, 1994/95 and 2002

	Men		Women	
	1994/95	2002	1994/95	2002
Average job strain score	**0.94**	**0.90***	**1.08**	**1.00***
High job strain (ratio 1.2 or higher) %	22.9	18.8*	34.7	26.6*
Medium job strain (ratio between 0.8 and 1.2) %	33.2	34.0	30.1	35.4*
Low job strain (ratio 0.8 or lower) %	43.9	47.1*	35.3	38.0*
Job strain components				
Psychological demands - average score	5.74	5.61*	5.96	5.85
Skill discretion - average score	6.09	6.31*	5.71	6.02*
Decision authority - average score	7.15	7.19	6.45	6.66*

* *Significantly different from estimate for 1994/95 (p < 0.05)*
Sources: *1994/95 National Population Health Survey, cross-sectional health file; 2002 Canadian Community Health Survey: Mental Health and Well-being*

Table 6
Percentage depressed in 2000/01 and 2002/03, by transitions in job strain, employed population aged 18 to 75 who were free from depression in 1994/95, Canada excluding territories

		Depression	
		2000/01	2002/03
		%	%
High job strain in:			
1994/95	**2000/01**		
Yes	Yes	7.4*[E]	9.3*[E]
Yes	No	3.5[E]	4.0*[E]
No	Yes	7.0*[E]	7.2*[E]
No	No[†]	2.3	2.0

[†] *Reference category*
* *Significantly different from estimate for reference category (p < 0.05)*
[E] *Use with caution (coefficient of variation 16.6% to 33.3%)*
Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*

Table 7
Unadjusted and adjusted odds ratios relating transitions in job strain level to depression in 2000/01 and 2002/03, by sex, employed population aged 18 to 75 who were free from depression in 1994/95, Canada excluding territories

				Controlling for employment and personal characteristics‡		Controlling for employment and personal characteristics‡ and four sources of stress§		Controlling for employment and personal characteristics,‡ four sources of stress§ and mastery	
		Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
		Depression in 2000/01							
High job strain in:									
1994/95	2000/01								
Yes	Yes	3.3*	2.1, 5.4	2.8*	1.7, 4.6	2.6*	1.5, 4.4	2.4*	1.4, 4.2
Yes	No	1.5	0.8, 2.7	1.4	0.7, 2.5	1.3	0.7, 2.4	1.3	0.7, 2.4
No	Yes	3.2*	1.9, 5.1	2.8*	1.7, 4.6	2.8*	1.7, 4.5	2.7*	1.6, 4.4
No	No†	1.0	...	1.0	...	1.0	...	1.0	...
		Depression in 2002/03							
High job strain in:									
1994/95	2000/01								
Yes	Yes	5.1*	2.9, 8.9	3.6*	2.0, 6.5	3.6*	1.9, 6.6	3.4*	1.8, 6.4
Yes	No	2.1*	1.2, 3.8	1.6	0.9, 3.1	1.6	0.9, 3.0	1.6	0.9, 3.0
No	Yes	3.9*	2.0, 7.5	3.3*	1.8, 6.0	3.3*	1.8, 6.0	3.3*	1.8, 6.1
No	No†	1.0	...	1.0	...	1.0	...	1.0	...

† *Reference category (No in 1994/95 and No in 2000/01)*
‡ *Occupation, working hours, shift work, self-employment, sex, age, marital status, presence of children in the household, household income, education, heavy monthly drinking, low emotional support and smoking status*
§ *Job strain, high personal stress, low co-worker support and low supervisor support*
* *Significantly different from estimate for reference category ($p < 0.05$)*
... *not applicable*
Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*

depression. In addition, those who no longer reported high strain in 2000/01 were twice as likely as the unexposed group to have depression in 2002/03.

When examined in multivariate models that controlled for employment and personal characteristics as well as other sources of stress and mastery, the finding that the persistently exposed group and the newly exposed group had an increased likelihood of depression remained (Table 7).

Concluding remarks

Depression stands out as a major occupational health issue. According to the 2002 Canadian Community Health Survey: Mental Health and Well-being, just over 1 million adults aged 18 or older had experienced a major depressive episode in the year before their survey interview. More than 70% of these individuals were employed during that year.

Stress on and off the job was associated with depression among workers. Men and women with jobs high in psychological demands, but with limited ability to use skills and authority to address these demands, had significantly higher rates of depression. The same was true for workers who felt a lack of support from their co-workers and supervisors, as well as for workers who generally perceived high levels of day-to-day stress. However, some evidence suggests that these stressors do not occur in isolation. When the various sources of stress were considered simultaneously along with other possible confounders, the association between low supervisor support and depression did not persist for either sex, nor did the association between job strain and depression for women.

Analysis based on longitudinal data revealed that stress is, at least in some cases, a precursor to depression. Incident depression was more likely for those in high strain jobs. For women, low co-worker support and high personal stress were also associated with incident depression. When the various sources of stress were considered simultaneously, the only association that did not persist was high job strain for women.

These findings are consistent with other research, suggesting that the mental health of male workers is more vulnerable to stress arising from the work environment, while female workers are vulnerable to stress arising from multiple roles both on and off the job.[15,17,19]

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Appendix

Table A

Odds ratios relating psychological demands and decision latitude to depression, by sex, employed population aged 18 to 75, Canada excluding territories, 2002

	Without interaction		With interaction	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Men				
Psychological demands	1.16*	1.09, 1.24	1.16*	1.09, 1.24
Decision latitude	0.81*	0.74, 0.89	0.81*	0.74, 0.90
Interaction	...	...	1.00	0.96, 1.03
Women				
Psychological demands	1.08*	1.03, 1.14	1.08*	1.02, 1.14
Decision latitude	0.90*	0.84, 0.97	0.91*	0.84, 0.97
Interaction	...	...	0.99	0.97, 1.02

* *Significantly different from 1.00 ($p < 0.05$)*
··· not applicable
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Table B

Odds ratios relating psychological demands and decision latitude to two-year incidence of depression, by sex, employed population aged 18 to 75, Canada excluding territories, 1994/95 to 1996/97 and 2000/01 to 2002/03

	Without interaction		With interaction	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Men				
Psychological demands	1.19*	1.06, 1.34	1.19*	1.06, 1.34
Decision latitude	0.85*	0.74, 0.98	0.89	0.76, 1.04
Interaction	...	...	0.94*	0.88, 0.99
Women				
Psychological demands	1.14*	1.05, 1.23	1.15*	1.07, 1.23
Decision latitude	0.86*	0.76, 0.97	0.86*	0.75, 0.97
Interaction	...	...	1.01	0.97, 1.06

* *Significantly different from 1.00 ($p < 0.05$)*
··· not applicable
Note: *An incident case of depression was defined as not having the condition in one cycle, but reporting it in the subsequent cycle. NPHS cycles 1 and 2 (1994/95 to 1996/97) and 4 and 5 (2000/01 to 2002/03) were examined.*
Source: *1994/95 through 2002/03 National Population Health Survey, longitudinal Health file (square)*


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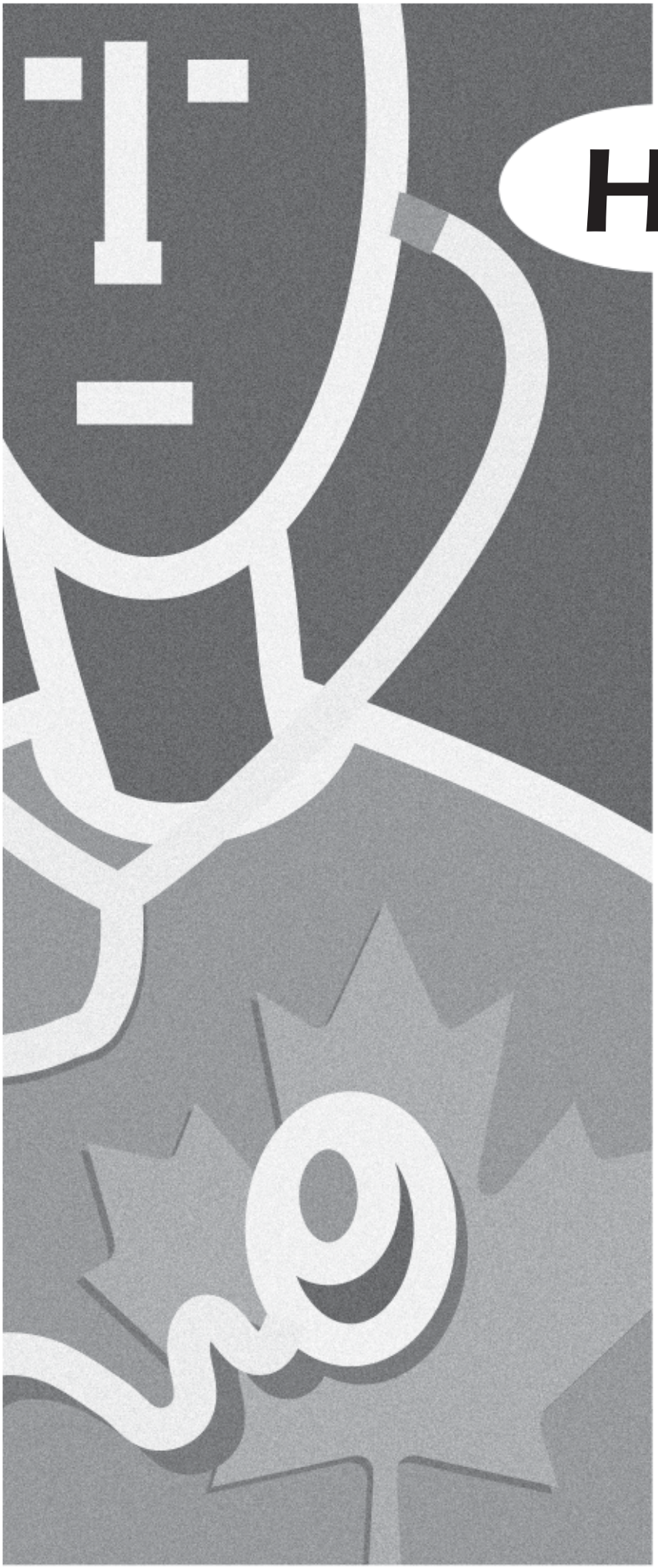

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Unhappy on the job

by Margot Shields

Keywords: employment, job satisfaction, occupational health, work, work schedule tolerance

The vast majority of Canadian workers were satisfied with their jobs in 2002, but approximately 1 in 12—that's 1.3 million—were not. According to data from the 2002 Canadian Community Health Survey (CCHS): Mental Health and Well-being, just over 6% of workers were "not too satisfied" and 2% were "not at all satisfied." Understanding what is behind these negative views would be helpful to both employees and their employers, given that many people spend a large share of their waking hours on the job.

Occupation

Men and women were equally likely to be dissatisfied with their jobs, although the connections between dissatisfaction and job characteristics sometimes differed by sex (Table 1). Relatively high proportions of men and women who worked in sales or service, or processing, manufacturing or utilities were unhappy on the job. The same was true for men in administrative, financial or clerical jobs. By contrast, comparatively low percentages of men and women in professional positions were dissatisfied. And among men in management, as well as those in farming, forestry, fishing or mining occupations, job dissatisfaction was particularly uncommon.

Shift workers dissatisfied

Men and women who worked evening or night shifts were more likely to report dissatisfaction than those who worked regular daytime schedules. The same was true for men who worked rotating shifts. By contrast, women who worked irregular shifts were more likely to be satisfied.

Table 1

Percentage reporting job dissatisfaction, by sex and selected characteristics, employed population aged 18 to 75, Canada excluding territories, 2002

	Total	Men	Women
	%	%	%
Total	**8.6**	**8.4**	**8.8**
Occupation†			
Management	5.7*	4.2*	8.3
Professional	5.3*	5.8*	4.9*
Technologist	7.4	7.2	7.9E
Administrative/Financial/Clerical	10.7*	14.5*E	9.8
Sales/Service	11.4*	10.9*	11.8*
Trades/Transport/Equipment operating	8.0	8.1	F
Farming/Forestry/Fishing/Mining	4.4*E	4.2*E	F
Processing/Manufacturing/Utilities	16.7*	17.9*	14.7*E
Work schedule			
Regular daytime‡	7.7	7.0	8.5
Evening shift	14.9*	15.5*E	14.3*
Night shift	18.4*	19.1*E	17.3*E
Rotating shifts	10.0*	10.5*	9.4
Irregular shifts	7.8	9.0	6.3*
Weekly work hours			
Part-time (1 to 29)	9.5	13.4*	7.9*
Regular (30 to 40)‡	9.5	9.3	9.7
Long (more than 40)	6.8*	6.6*	7.3*
Self-employed			
Yes	4.2*	4.6*E	3.6*E
No‡	9.4	9.3	9.6
Personal income			
Less than $20,000	12.0*	15.0*	10.4
$20,000 to $39,999‡	9.2	9.5	8.9
$40,000 to $59,999	7.4*	6.9*	8.2
$60,000 or more	4.5*	4.6*	4.3*E
Education			
Less than secondary graduation	8.4	9.1	7.3
Secondary graduation‡	8.8	8.6	9.0
Some postsecondary	10.8	10.6	11.0
Postsecondary graduation	8.2	7.7	8.7
Age group			
18 to 24	13.6*	13.7*	13.5*
25 to 39‡	9.5	9.2	9.8
40 to 54	7.2*	6.9*	7.5*
55 or older	5.2*	5.7*E	4.4*E

† *Reference category is Total*
‡ *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
F *Too unreliable to be published (coefficient of variation greater than 33.3%)*

Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*

Men and women who had long workweeks (more than 40 hours) were less likely to be dissatisfied with their jobs than their counterparts with regular hours (30 to 40 hours weekly). Men who had part-time jobs were more likely to be dissatisfied than those working regular hours, but women working part time were more likely to be content with their job situation. In fact, this connection between part-time work and job satisfaction for women was the only relationship with working hours that persisted when other employment-related variables, age and personal income were taken into account in multivariate analysis (data not shown). This suggests that, rather than working hours, other aspects of the job—occupation and income, for example—account for the relationships observed in bivariate analysis.

Not surprisingly, few self-employed men and women were dissatisfied with their jobs.

Data sources

Estimates are based on data from the 2002 Canadian Community Health Survey (CCHS) (cycle 1.2): Mental Health and Well-being. The CCHS 1.2 covers people aged 15 or older living in private dwellings in the 10 provinces. Residents of the three territories, Indian reserves, institutions, and certain remote areas, as well as full-time members of the Canadian Armed Forces, were excluded. Data collection began in May 2002 and took place over eight months. Most interviews (86%) were conducted in person; the remainder, by telephone. Selected respondents were required to provide their own information, as proxy responses were not accepted. The responding sample consisted of 36,984 people aged 15 or older; the response rate was 77%. More detailed descriptions of the design, sample and interview procedures can be found in other reports and on the Statistics Canada Web site.[1,2] The analysis for this article was based on the population aged 18 to 75 who were employed at the time of the survey; 20,747 respondents met these conditions.

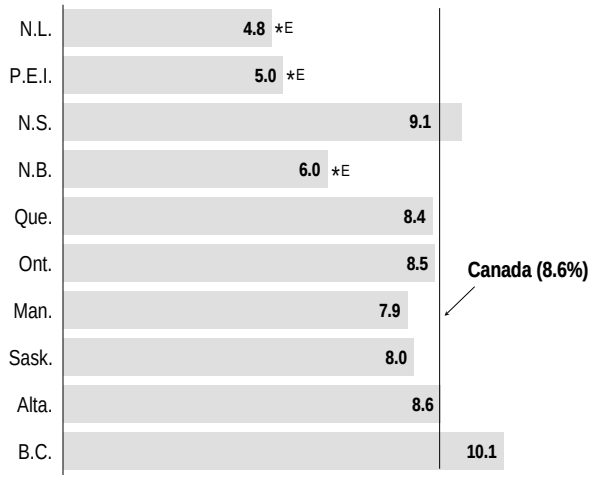
To account for survey design effects, standard errors and coefficients of variation were estimated using the bootstrap technique.[3-5]

Money makes a difference

Personal income was related to job satisfaction, but the association was stronger for men. Compared with men earning $20,000 to $39,000 per year, those whose incomes were less than $20,000 were over 50% more likely to be dissatisfied with their jobs, while men making $40,000 or more were less likely to be dissatisfied. For women, a significant advantage emerged only for those with an annual income of at least $60,000. Education, another indication of socio-economic status, was not related to job satisfaction for either sex.

Age was related to job satisfaction. Compared with workers aged 25 to 39, younger workers were more likely, and older workers less likely, to be dissatisfied with their jobs. When other employment variables were taken into account, the only association that held was that women aged 55 or older were more satisfied with their jobs.

Chart 1
Percentage reporting job dissatisfaction, by province, employed population aged 18 to 75, Canada excluding territories, 2002



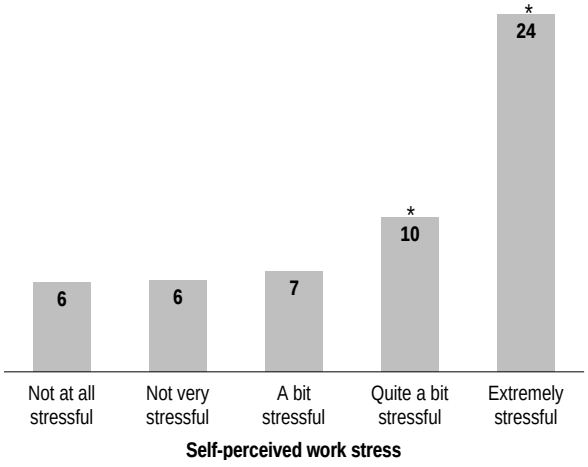
* *Significantly different from estimate for Canada ($p < 0.05$)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
Source: *2002 Canadian Community Health Survey; Mental Health and Well-being*

Generally, job satisfaction levels did not vary by province. Comparatively small proportions of workers in Newfoundland, Prince Edward Island, and New Brunswick did, however, express dissatisfaction with their jobs (Chart 1).

Links to stress

Clear associations emerged between the amount of job stress workers perceived and their job satisfaction levels. Approximately 1 out of 15 workers who found most days not at all stressful, not very stressful, or a bit stressful were dissatisfied. Among workers who found most days to be quite a bit stressful, the number dissatisfied increased to 1 in 10. And for workers who found most days extremely stressful, 1 in 4 were dissatisfied with their jobs (Chart 2).

Chart 2
Percentage reporting job dissatisfaction, by self-perceived work stress level, employed population aged 18 to 75, Canada excluding territories, 2002



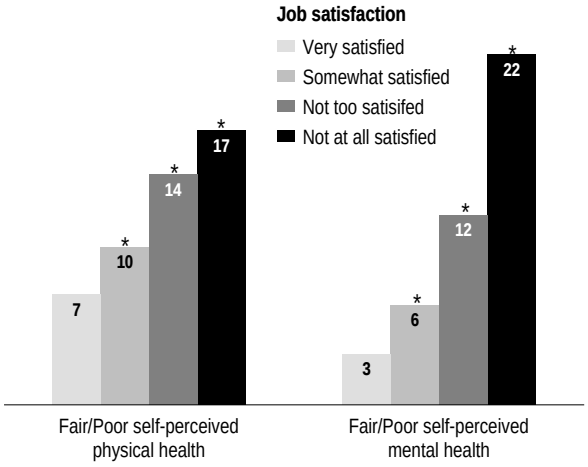
* *Significantly higher than estimate for "a bit stressful" ($p < 0.05$)*
Source: *2002 Canadian Community Health Survey; Mental Health and Well-being*

Physical and mental health

A recent review of the literature concluded that job dissatisfaction was strongly associated with mental health problems such as burnout, low self-esteem, depression and anxiety, and moderately associated with subjective physical illness.[6]

Consistent with these studies, based on CCHS data, workers who were dissatisfied with their jobs had diminished perceptions of both their physical and mental health (Chart 3). Only 7% of workers who were very satisfied with their jobs reported

Chart 3
Percentage reporting fair or poor physical/mental health, by job satisfaction, employed population aged 18 to 75, Canada excluding territories, 2002



* *Significantly higher than estimate for "very satisfied" ($p < 0.05$)*
Source: *2002 Canadian Community Health Survey; Mental Health and Well-being*

Limitations

This study is based on cross-sectional data; therefore, a causal relationship between job satisfaction and health cannot be established. While it is possible that job dissatisfaction may lead to poor health, it could be that people in poor health are more likely to be unhappy on the job.

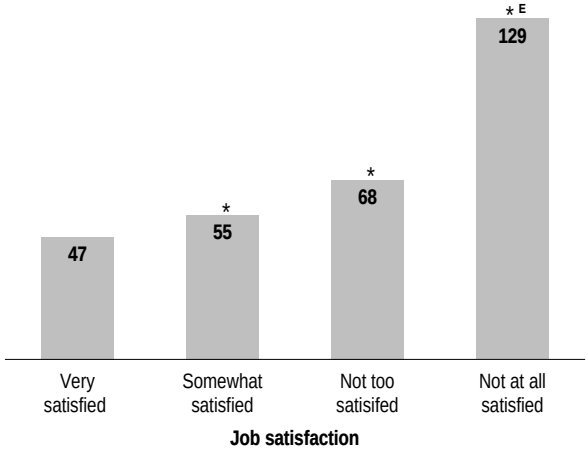
The questions

The estimates for *job satisfaction* were based on responses to the question, "How satisfied are you with your job: very satisfied, somewhat satisfied, not too satisfied, or not at all satisfied?" Respondents who indicated the last two categories were classified as being dissatisfied with their jobs. Those who were working at more than one job were asked to consider their main job (the one with the greatest number of weekly hours).

Self-perceived physical health was measured by asking, "In general, would you say your physical health is: excellent? very good? good? fair? poor?" A similar question was used to measure *self-perceived mental health.*

Number of disability days was measured in terms of bed-days and "cut-down" days over the past two weeks. Respondents were asked about days they stayed in bed because of illness or injury (including nights in hospital) and about days they had cut down normal activities because of illness or injury.

Chart 4
Average number of disability days in past two weeks per 100 workers, by job satisfaction, employed population aged 18 to 75, Canada excluding territories, 2002



* *Significantly higher than estimate for "very satisified" ($p < 0.05$)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
Source: *2002 Canadian Community Health Survey; Mental Health and Well-being*

that their physical health was fair or poor. This increased to 10% for workers who were somewhat satisfied to 14% for those who were not too satisfied, and to 17% for those who were not at all satisfied. Differences in perceptions of mental health in relation to level of job satisfaction were even more pronounced. Only 3% of workers who were very satisfied with their jobs reported fair or poor mental health, compared with 22% for those who were not at all satisfied.

Disability days

Job dissatisfaction was related to the number of disability days workers had in the previous two weeks. Respondents were defined as having had a disability day if they had stayed in bed or cut down on things they normally did because of illness or injury. For every 100 workers who were very satisfied with their jobs, 47 disability days were reported, but for every 100 workers who reported that they were not at all satisfied with their jobs, the figure was 129 disability days (Chart 4).

In other studies, shift work,[7] working hours[8] and work stress[9] have been linked to poor health. Therefore it is particularly relevant that in this study the associations between job dissatisfaction and diminished perceptions of physical and mental health and increased disability days persisted when examined in multivariate models that controlled for shift work, working hours and work stress, as well as other possible confounders (Table A). It has been suggested that job dissatisfaction is more strongly associated with an employee's mental health and well-being than any other work characteristic.[6] This points to the importance of understanding what aspects of the job underlie dissatisfaction among workers.

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Table A

Adjusted odds ratios and regression coefficients relating job satisfaction to selected outcomes, employed population aged 18 to 75, Canada excluding territories, 2002

	Fair/Poor self-perceived physical health		Fair/Poor self-perceived mental health		Number of disability days in past two weeks	
	Adjusted odds ratio‡	95% confidence interval	Adjusted odds ratio‡	95% confidence interval	Regression coefficients‡	95% confidence interval
Job satisfaction						
Very satisfied†	1.0	...	1.0	...	...	...
Somewhat satisfied	1.3*	1.1, 1.6	1.8*	1.5, 2.2	0.05	-0.02, 0.12
Not too satisfied	1.8*	1.4, 2.4	3.1*	2.2, 4.3	0.15	-0.02, 0.33
Not at all satisfied	2.0*	1.3, 2.9	5.5*	3.8, 8.0	0.72*	0.17, 1.27

† *Reference category*
‡ *Controlled for sex, age, occupation, working hours, shift work, self-employment status, self-perceived work stress, personal income, education, heavy monthly drinking and low emotional support*
* *Significantly different from estimate for reference category ($p < 0.05$)*
... not applicable
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being*


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Government-subsidized home care

by Kathryn Wilkins

Keywords: activities of daily living, homemaker services, public welfare, social service

In 1994/95, over half a million people, or 2.5% of the population aged 18 or older, received some form of government-subsidized home care (see *Data sources* and *The questions*). By 2003, although the estimated number of recipients had increased by about 125,000, the proportion of the population receiving such care—2.7%—did not differ significantly from the 1994/95 figure.

In some ways, the characteristics of home care recipients were similar in both periods (Table 1). For example, the sex distribution remained the same, at about two-thirds women and one-third men. There was also no significant change in the proportion who depended on social assistance as their main source of income.

Recipients younger

In other ways, the characteristics of recipients of government-subsidized home care changed over the eight years. Curiously, their average age fell from just under 65 in 1994/95 to 62 in 2003. By contrast, the average age of the general population aged 18 or older rose from 44.1 to 45.5 over the same period.

The days spent in hospital by those home care recipients who had been hospitalized in the previous year also declined. Between 1994/95 and 2003, the average number of days spent in hospital fell sharply from 13.4 to 8.6. This decrease likely reflects the reduction in the length of hospital stays overall.[1] Although information on health status at the time of discharge is not available, shorter stays may result in a greater need for care when patients return home.

Table 1
Selected characteristics, recipients of government-subsidized home care

	1994/95	2003
Number (% of population 18 or older)	522,900 (2.5)	647,800 (2.7)
Average age (years)	64.9	62.0*
Male (%)	32.7	34.6
Social assistance is main source of income (%)	38.9	33.8
Average number of days hospitalized in past year	13.4	8.6*

* *Significantly different from estimate for 1994/95 ($p < 0.05$)*
Sources: *1994/95 National Population Health Survey; 2003 Canadian Community Health Survey*

More need nursing, personal care

In view of shorter hospital stays, it was not surprising that, in 2003, people who had been hospitalized during the previous 12 months were significantly more likely to receive government-subsidized home care (16%) than were their counterparts in 1994/95 (12%) (Table 2).

Of people who received home care, the proportion receiving nursing or personal care was up substantially in 2003. That year, 52% of home care clients received nursing care, compared with 39% in 1994/95 (Chart 1). By contrast, the percentage receiving assistance with housework dropped from 51% to 33%. Clearly, a shift to more specialized services occurred. The increase in the number of nursing care recipients is particularly important in the context of concerns about shortages of qualified nurses.

Table 2

Percentage receiving government-subsidized home care in 1994/95 and 2003, by selected characteristics, household population aged 18 or older

	1994/95	2003
Socio-demographic		
Aged 80 or older	22.3	19.0
Lives alone	7.5	5.9*
Social assistance is main source of income	9.1	9.4
Activities of daily living (ADL) dependency		
Needs help with personal care	46.3	35.2*
Needs help to move around in house	38.6	24.2*
Illness/Injury-related factors		
Poor health	20.5	17.9
Effects of stroke	25.6	20.0
Urinary incontinence	16.9[E]	14.6
Diabetes	11.3	9.0
Cancer	13.5[E]	16.7
Heart disease	14.7	11.8
High blood pressure	7.2	6.0
Activity-limiting injury in past year	3.3	3.4
Hospitalized in past year	12.1	16.4*
Obese class II/III (body mass index ≥ 35)	2.3[E]	5.2*

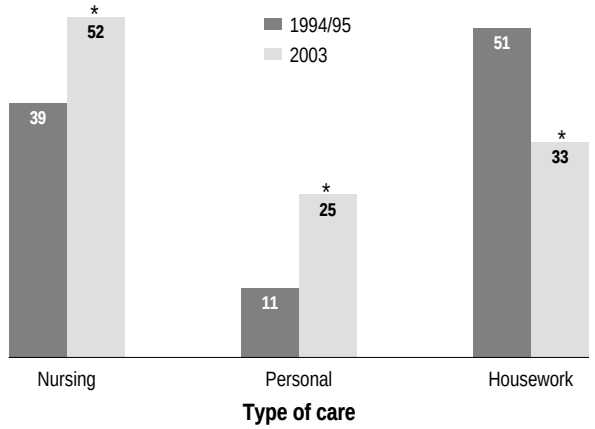
* *Significantly different from estimate for 1994/95 ($p < 0.05$)*
[E] *Use with caution (coefficient of variation 16.6% to 33.3%)*
Sources: *1994/95 National Population Health Survey; 2003 Canadian Community Health Survey*

Smaller share now receiving help

Again, perhaps because of the trend toward shorter hospital stays, along with the aging of the population, the number of household residents who needed help with personal activities of daily living or with moving about in their homes increased substantially between 1994/95 and 2003. But despite government-subsidized home care services reaching greater numbers of people in 2003, a smaller share of individuals with these basic needs received care (Table 2).

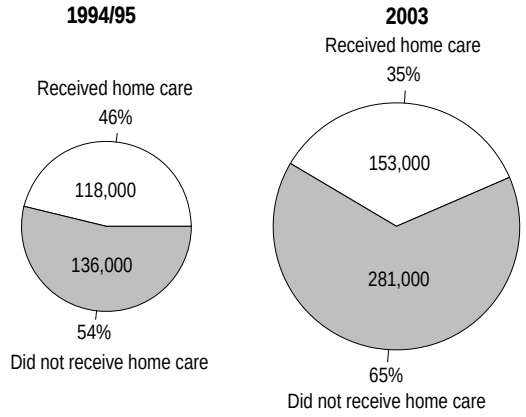
In 1994/95, an estimated 254,000 people needed help with some aspect of their personal activities (eating, bathing or dressing); nearly half of them received care (Chart 2). By 2003, the number needing help with such tasks had climbed to 434,000. Although the number receiving home care had increased to 153,000, this represented just over a third (35%) of those needing assistance.

Chart 1
Percentage receiving specific services, household population aged 18 or older receiving government-subsidized home care



* *Significantly different from estimate for 1994/95 ($p < 0.05$)*
Sources: *1994/95 National Population Health Survey; 2003 Canadian Community Health Survey*

Chart 2
Percentage and number of people receiving government-subsidized home care among those needing help with eating, bathing or dressing, household population aged 18 or older



Sources: *1994/95 National Population Health Survey; 2003 Canadian Community Health Survey*

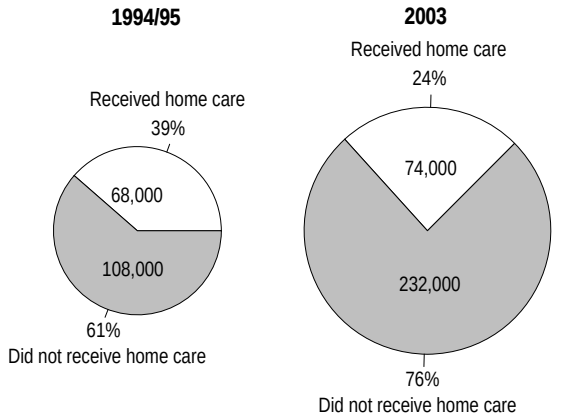
Data sources

Estimates are based on data from the 1994/95 National Population Health Survey (NPHS) and the 2003 (cycle 2.1) Canadian Community Health Survey (CCHS) for respondents aged 18 or older. The NPHS covers household and institutional residents in all provinces and territories, except persons on Indian reserves, on Canadian Forces bases and in some remote areas. In 1994/95, 17,276 of the 20,095 individuals selected agreed to participate in the NPHS, for a response rate of 86.0%. More detailed descriptions of the NPHS design, sample and interview procedures can be found in a published report.[2]

The CCHS covers the household population aged 12 or older in all provinces and territories, except all members of the regular Armed Forces and people living on Indian reserves and in some remote areas, and civilian residents of military bases. Data for cycle 2.1 were collected between January and December 2003. The overall response rate was 80.6%, and the sample size was 135,573. More detail about the sample design of the CCHS is available in a previously published report.[3]

Variance on estimates, and on differences between estimates, was calculated using the bootstrap technique, which accounts for the complex design of the surveys.[4-6] A significance level of $p < 0.05$ was used.

Chart 3
Percentage and number of people receiving government-subsidized home care among those needing help to move around in house, by receipt of government-subsidized home care, household population aged 18 or older



Sources: *1994/95 National Population Health Survey; 2003 Canadian Community Health Survey*

Similarly, in 1994/95, 39% of people who required help to move about in their homes received government-subsidized home care; by 2003, the figure had fallen to 24%, even though the absolute number receiving care had increased (Chart 3).

These findings suggest that some of the burden of care may have shifted to private home care agencies, or to family members and friends.

The percentage of people living alone who received government-subsidized home care fell slightly, but significantly, from 7.5% in 1994/95 to 5.9% in 2003. This was somewhat surprising, because the likelihood of being eligible for such services is greater for people who have no informal support.[7] Perhaps people who live alone are increasingly self-sufficient, or alternatively, are relying more on friends, neighbours or relatives.

Chronic conditions

For the most part, the likelihood that people with specific chronic conditions would receive government-subsidized home care did not change significantly. For example, in 1994/95, 11% of people with diabetes received home care, similar to the figure of 9% in 2003 (Table 2). This was also generally true when receipt of home care was examined in multiple logistic regression models, which account for the influences of all variables simultaneously (data not shown).

The increasing importance of urinary incontinence as a determinant of home care is reflected in the growing proportion of home care recipients with this condition. In 1994/95, 8% of home care recipients were incontinent; by 2003,

The questions

The 1994/95 National Population Health Survey (NPHS) and the 2003 Canadian Community Health Survey (CCHS) asked respondents aged 18 or older the following yes/no question about *government-subsidized home care*: "Home care services are health care or homemaker services received at home, with the cost being entirely or partially covered by government. Examples are nursing care, help with bathing or housework, respite care, and meal delivery. Have you received any home care services in the past 12 months?" Those who had received care were asked what type:

- Nursing care
- Personal care
- Housework
- Meal preparation or delivery
- Shopping
- Other

Both surveys asked the following to establish *activities of daily living (ADL) dependency*: "Because of any condition or health problem, do you need the help of another person in: personal care such as washing, dressing, or eating? moving about inside the house?"

Level of *self-perceived health* was determined by asking: "In general, would you say your health is: excellent? very good? good? fair? poor?"

To determine the presence of *chronic conditions*, respondents were asked about any diagnosed long-term conditions that have lasted or were expected to last six months or more. *Effects of stroke, urinary incontinence, diabetes, cancer, heart disease* and *high blood pressure* were included in the list of conditions read to respondents.

Occurrence of *activity-limiting injury* was determined by asking respondents about injuries that "occurred in the past 12 months, that were serious enough to limit your normal activities. For example, a broken bone, a bad cut or burn, a sore back or sprained ankle, or a poisoning. In the past 12 months, did you have any injuries that were serious enough to limit your normal activities?"

All respondents were categorized based on their *body mass index* (BMI), a measure of weight adjusted for height. BMI is defined as weight (kilograms) divided by height (metres squared). Height and weight were self-reported by NPHS respondents. *Obese class II/III* is defined as a BMI of 35.0 or higher.

Living arrangements were defined as living alone or with others.

Respondents were asked about their *main source of income*; those who identified Canada or Québec pension, Old Age Security and Guaranteed Income Supplement, or provincial/municipal social assistance or welfare were categorized as receiving "social assistance" as their main income source.

To ascertain *hospitalization* in the past year, respondents were asked: "In the past 12 months, have you been a patient in a hospital, nursing home or convalescent home?"

the proportion had more than doubled to 17% (data not shown). This increase has serious implications for health care case managers and home care providers, as it adds to the burden of caregiving.

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Seniors' use of home care

by Gisèle Carrière

Keywords: activities of daily living, elderly, homemaker services, public welfare, social service, unmet health care needs

In the coming years, the need for home care services in Canada can be expected to increase. As the number of elderly people in the population grows, so will the prevalence of age-related chronic conditions that may jeopardize an individual's ability to live independently in the community.

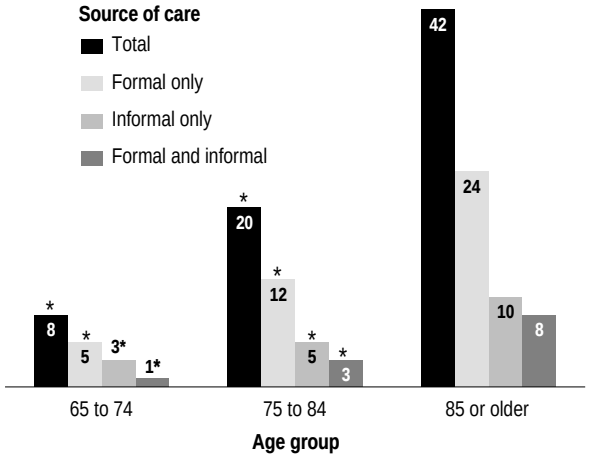
In 2003, the Canadian Community Health Survey (CCHS) collected detailed information about sources of formal and informal home care. For this report, formal home care encompasses government-subsidized health care or homemaker services, and care purchased from private agencies or provided by volunteers. Informal home care refers to help provided by family, friends or neighbours (see *The questions*).

In 2003, 5% of Canadians aged 18 or older—an estimated 1.2 million—reported that they had received some form of home care in the past 12 months (data not shown). Although over half of these recipients (648,000) were aged 18 to 64, this group made up only 3% of the 18-to-64 population. A smaller number of home care recipients were seniors, but they comprised 15% of the household population aged 65 or older. This article focuses on home care use among seniors.

Most seniors rely on formal care

An estimated 322,000 seniors reported that they had used only formal home care in the past 12 months (Table 1). Half as many, about 156,000, used only informal care, and 85,000 received a combination of formal and informal care.

Chart 1
Percentage of seniors who received home care in past year



* *Significantly different from corresponding estimate for 85+ age group ($p < 0.05$)*

Source: *2003 Canadian Community Health Survey*

Regardless of the source—formal, informal or mixed—women were more likely than men to receive home care. This may partially reflect the higher proportions of women at very advanced ages.

Age, in fact, was strongly related to home care use. At 85 or older, 42% of seniors reported having received home care, compared with 20% of those aged 75 to 84, and 8% of 65-to-74-year-olds (Chart 1). The pattern was similar for each source of care.

Living arrangements

Among seniors who lived with a spouse and no one else, a relatively small share (11%) had received

Table 1

Number and percentage who received home care in past year, by source of care and selected characteristics, household population aged 65 or older, Canada, 2003

	Source of care							
	Total		Formal only		Informal only		Formal and informal	
	'000	%	'000	%	'000	%	'000	%
Total	**563**	**15**	**322**	**9**	**156**	**4**	**85**	**2**
Sex								
Men	192	12*	114	7*	52	3*	26	2*
Women†	371	17	208	10	104	5	58	3
Living arrangements								
Alone	222	21*	142	13*	49	5*	31	3*
With others (with or without spouse)	130	17*	55	7	49	7*	26	3*
With spouse only†	211	11	125	6	58	3	28	1
Number of chronic conditions								
None	17	5*	11	3*	6[E]	2[E]*	F	F
1	51	8*	34	5*	12	2*	5[E]	1[E]*
2 or more†	495	18	277	10	139	5	79	3
Main source of income								
Social assistance or Old Age Security and Guaranteed Income Supplement	144	20*	86	12*	38	5*	20	3*
Other†	344	13	193	7	99	4	52	2
Missing	75	17*	43	9*	20	4	12	3

† *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
[E] *Use with caution (coefficient of variation 16.6% to 33.3%)*
[F] *Too unreliable to be published (coefficient of variation greater than 33.3%)*
Source: *2003 Canadian Community Health Survey*

home care in the past year. The figure was 17% for those who lived with other people (with or without their spouse) and 21% for those who lived alone (Table 1). Seniors living alone were also more likely than the other two groups to receive only formal care (significance testing not shown). While this may reflect a lack of informal support, it could also indicate a greater likelihood of meeting eligibility requirements for formal care among those who lived alone.

Seniors living alone had other characteristics associated with the receipt of home care. In particular, they were more likely than those who lived with a spouse to have been admitted to hospital in the previous year, and to have at least one chronic condition (data not shown). And, as expected, the proportion of seniors receiving home care increased with the number of chronic conditions.

A comparatively large percentage of seniors whose main source of income was social assistance had used home care, notably formal care.

Services provided

Housework was the most common type of home care service received by seniors (Table 2). Aside from housework, the nature of the service varied with the source of home care. For those receiving only formal care, nursing ranked second, and personal care, third. For seniors whose help came only from informal sources, both meal preparation/delivery and shopping ranked second. And for those receiving care from formal and informal sources, personal care, meal preparation/delivery, and shopping ranked second.

Table 2

Number and percentage who received home care in past year, by type of care, household population aged 65 or older, Canada, 2003

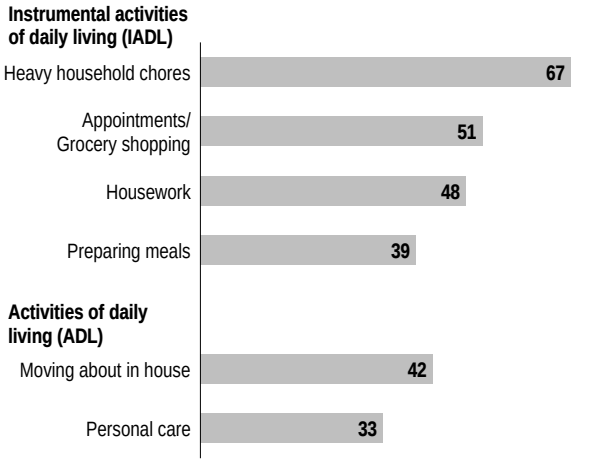
	Formal only		Informal only		Formal and informal	
Type of care	'000	%	'000	%	'000	%
Housework†	161	53	127	83	73	89
Nursing care	114	38*	17	11*	43	53*
Other health care	26	9*	7E	4*E	15	18*
Personal care	87	29*	47	31*	56	68*
Meal preparation/delivery	39	13*	80	53*	55	67*
Shopping	16	5*	82	53*	56	69*
Respite	14	5*	9E	6*E	15	19*

† *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
E *Use with caution (coefficient of variation 16.6% to 33.3%)*
Note: *Because respondents could receive more than one type of care, column total exceeds 100%.*
Source: *2003 Canadian Community Health Survey*

Many in need not receiving care

Not surprisingly, seniors who required assistance with activities of daily living (ADL) or with instrumental activities of daily living (IADL) (see *The questions*) were more likely to receive home care than were those without such needs (data not shown). However, substantial shares of seniors who required such assistance did not receive any form of home care (Chart 2). The majority who needed help with household chores or with getting to appointments/grocery shopping (both IADL tasks) received no home care. As well, sizeable proportions who required assistance with ADLs received no home care. The fact that 42% of seniors who required help with moving about in

Chart 2
Percentage of seniors with IADL or ADL needs who did *not* receive home care in past year



Source: *2003 Canadian Community Health Survey*

Data source

Information about home care is from the 2003 (cycle 2.1) Canadian Community Health Survey (CCHS).[1] Previous national health surveys had asked only about government-subsidized home care.

The CCHS covers the household population aged 12 or older in all provinces and territories, except residents of institutions, all members of the regular Armed Forces, people living on Indian reserves and in some remote areas, and civilian residents of military bases. 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. Most of the analysis in this article is based on 28,672 respondents aged 65 or older, weighted to represent an estimated population of 3.8 million.

Variance on estimates, and on differences between estimates, was calculated using the bootstrap technique, which accounts for the complex sampling design of the survey.[2,3]

Information about the amount of home care received or its duration is not available from the CCHS.

It has been reported elsewhere that informal care accounted for more than half the total "help time" provided to seniors, and formal care, the smallest amount of help time.[4] Consequently, although CCHS results show that fewer seniors relied only on informal sources, these people may have received significantly more hours of care than did those relying exclusively on formal sources.

As well, no information was collected about whether home care was necessary, sufficient or appropriate. Data on unmet home care needs reflect only the perceptions of the respondent; no external validation or clinical verification of the needs was performed.

The questions

In the 2003 Canadian Community Health Survey, respondents aged 18 or older were told that "Home care services are health care or homemaker services received at home. Examples are: nursing care, help with bathing or housework, respite care and meal delivery." They were then asked if they "received any home care services in the past 12 months, with the cost being entirely or partially covered by government." If they had, the interviewer read a list of services and marked all that applied: nursing care, other health care, personal care, housework, meal preparation or delivery, shopping, respite care, and other. Next, all respondents were asked if they had "received any [other] home care services in the past 12 months, with the cost not covered by government (for example: care provided by a spouse or friends)." (For homemaker services, interviewers were instructed to include only services provided because of a respondent's health problem or condition). Affirmative responses prompted the question, "Who provided these [other] home care services?" The interviewer read a list of categories and marked each that applied: nurse from private agency, homemaker from private agency, neighbour or friend, family member, volunteer or other.

For this report, *formal home care* was defined as services entirely or partially covered by government, private agencies, or volunteers. *Informal home care* was services provided by family, friends or neighbours. Responses indicating that an "other" person provided non-government home care were not used because these could not be definitively categorized as a formal or informal source of care. Three mutually exclusive home care sources were derived: *formal only, informal only*, or a *combination* of both. Responses of "don't know," refusals, or not stated to either question or to any source of non-governmental care meant that the respondent was excluded from the analysis (57 respondents; 0.2% of the unweighted and weighted samples aged 65 or older).

Dependency in *instrumental activities of daily living* (*IADL*) was measured by asking: "Because of any physical condition or mental condition or health problem, do you need the help of another person with: preparing meals? getting to appointments and running errands such as shopping for groceries? doing normal everyday housework? doing heavy household chores such as spring cleaning or yard work?" Dependency in *activities of daily living* (*ADL*) was measured by extending the question to include: "personal care such as washing, dressing, eating or taking medication? moving about inside the house?"

Self-perceived unmet home care needs were measured by asking if, in the past 12 months, there was ever a time when respondents felt they needed home care services, but didn't receive them.

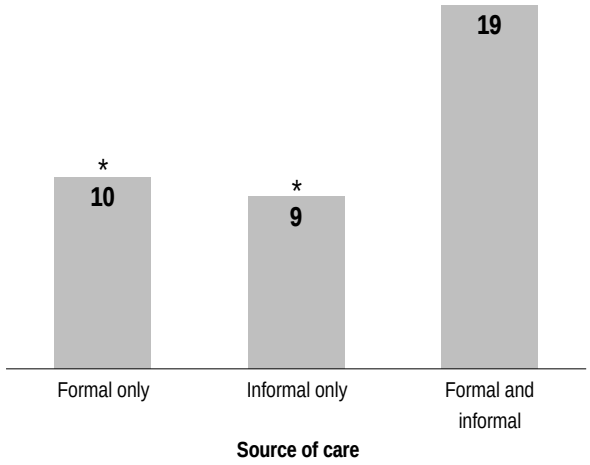
Respondents who indicated that their *main source of household income* was Old Age Security and the Guaranteed Income Supplement, or provincial or municipal social assistance, were grouped as relying on "social assistance"; all other income sources were grouped as "other."

their homes (53,000) did not report home care from any source—not even friends or family—suggests a population who may be at increased risk of injury.

Self-perceived unmet home care needs

Some seniors who received home care reported that they still had unmet home care needs (Chart 3). Among those whose care came from either formal or informal sources only, the percentages with unmet needs were 10% and 9%, respectively. Almost one-fifth (19%) of seniors who used a combination of formal and informal home care reported unmet needs. Relying on more than one source of care may reflect more complex needs, some of which remained unaddressed.

Chart 3
Percentage of senior home care recipients with self-perceived unmet home care needs, by source of care they received



* *Signficantly different from estimate for "formal and informal" ($p < 0.05$)*
Source: *2003 Canadian Community Health Survey*

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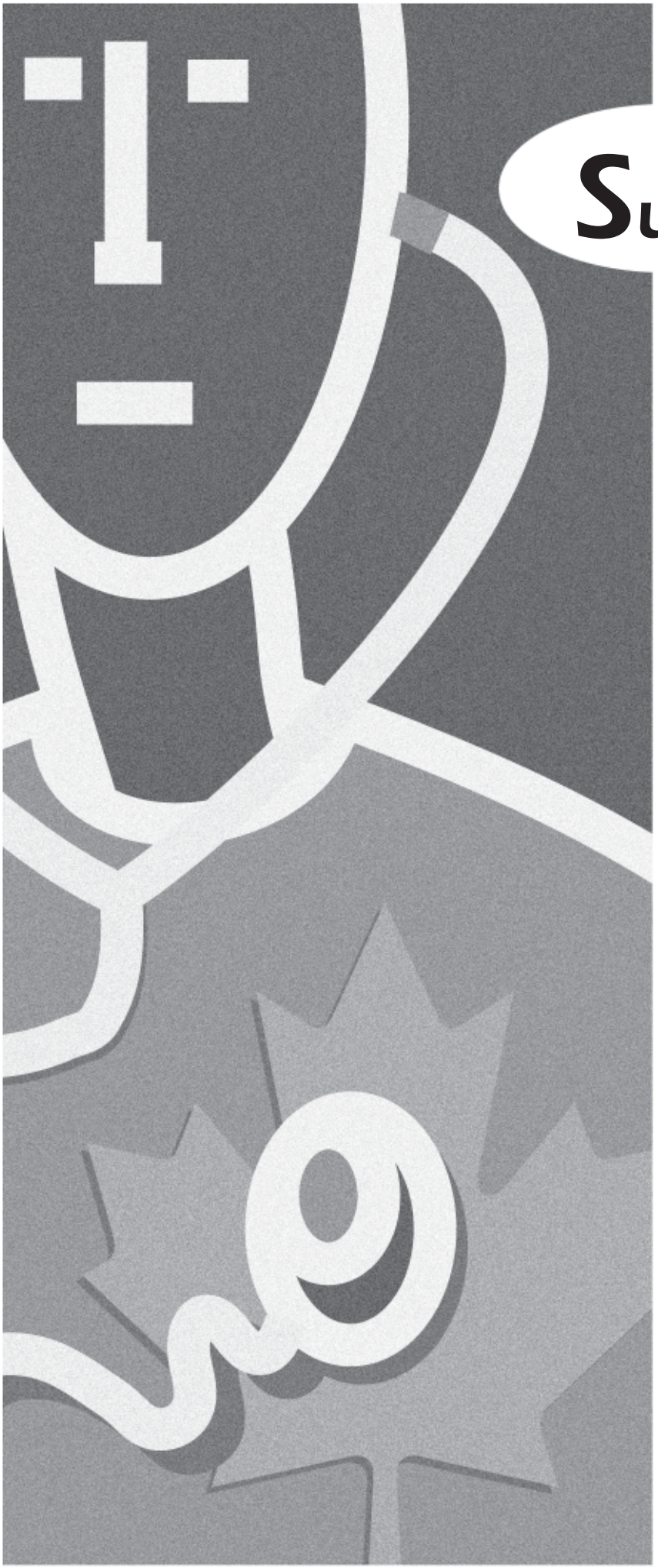

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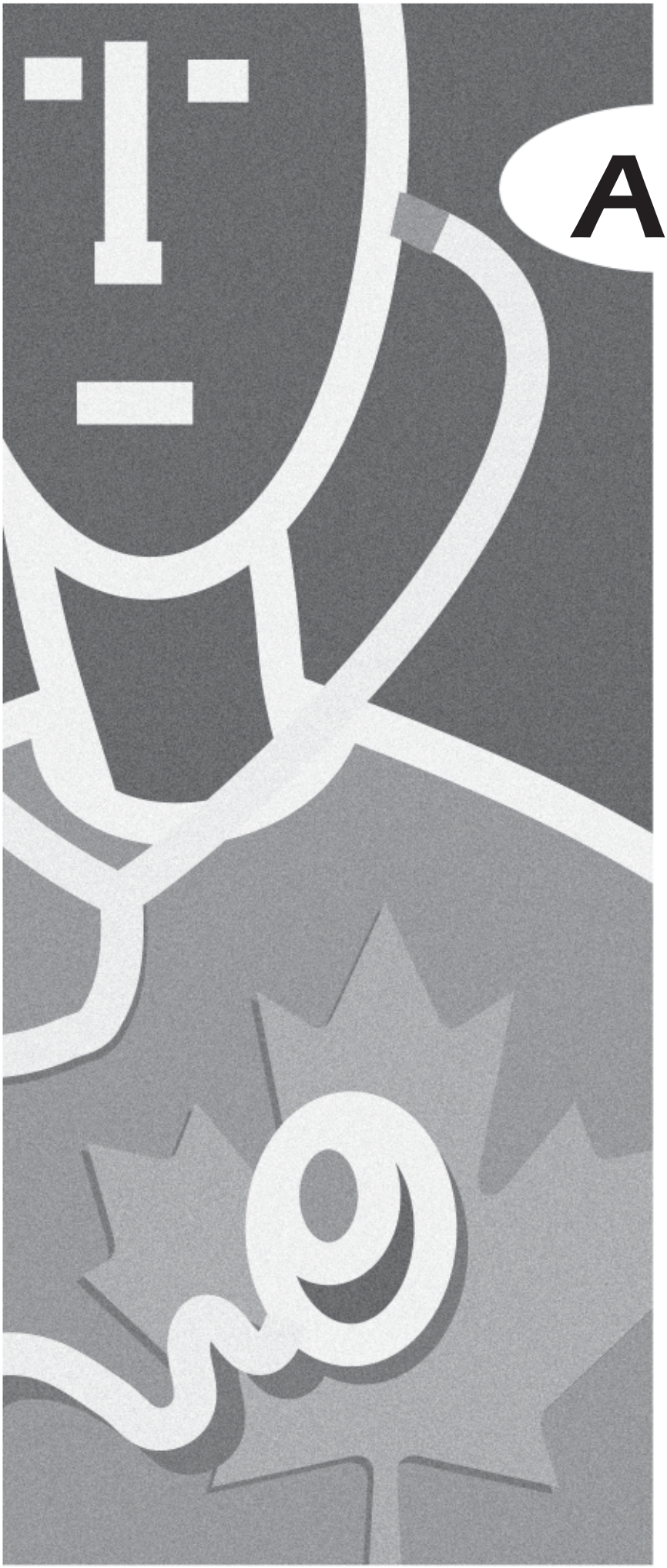

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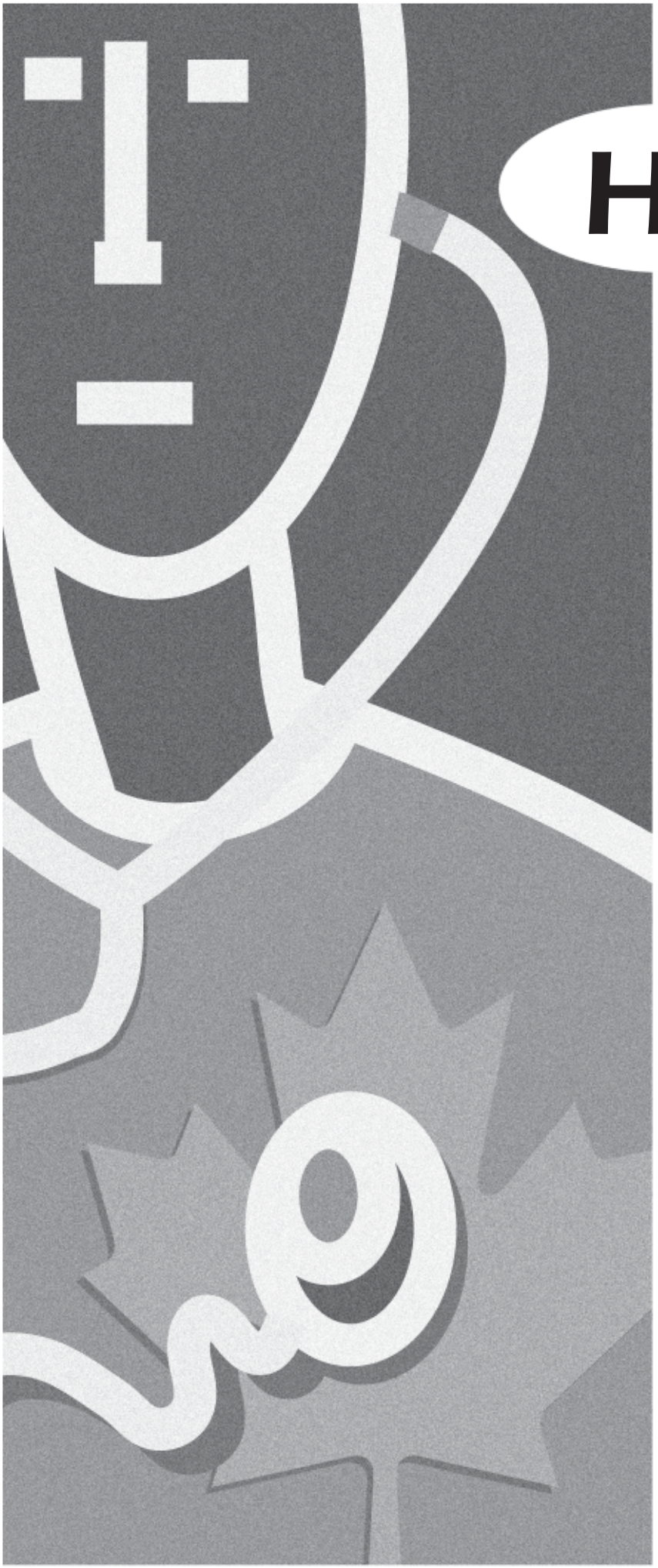

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Title	Catalogue number	Format	Price (CDN$)†‡
Guide to Health Statistics **Your gateway to health information on Statistics Canada's Web site** *(This guide provides quick and easy access to health information on Statistics Canada's Web site. It can only be used online in html format and cannot be downloaded.)*	82-573-GIE	Internet	Free
Analytical reports			
Health Reports · subscription · single issue	82-003-XPE	Paper	$63 $22
· subscription · single issue	82-003-XIE	Internet	Free Free
How Healthy are Canadians? Annual Report 2004	82-003-SIE 82-003-SPE	Internet Paper	Free $22
Statistical Report on the Health of Canadians	82-570-XIE	Internet	Free
Canadian Community Health Survey			
Canadian Community Health Survey – Mental health and well-being	82-617-XIE	Internet	Free
Canadian Community Health Survey – Optional content and related tables	82-577-XIE	Internet	Free
Canadian Community Health Survey – Profiles	82-576-XIE	Internet	Free
Access to health care services in Canada, 2001	82-575-XIE	Internet	Free
Cancer			
Cancer statistics (Cancer Incidence in Canada; Cancer Survival Statistics; Canadian Cancer Registry manuals; Cancer Record, Newsletter for Canadian Registries in Canada)	84-601-XIE	Internet	Free
Health Indicators			
Health Indicators	82-221-XIE	Internet	Free
Comparable Health Indicators – Canada, provinces and territories	82-401-XIE	Internet	Free
Health Regions – Boundaries and correspondence with census geography	82-402-XIE	Internet	Free
Heart disease			
The Changing Face of Heart Disease and Stroke in Canada	82F0076XIE	Internet	Free
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Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures and Treatments	82-562-XPB	Paper	$40

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Title	Catalogue number	Format	Price (CDN$)†‡
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Induced Abortion Statistics	82-223-XIE	Internet	Free
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Life Tables, Canada, Provinces and Territories, 1995-1997	84-537-XIE	Internet	$15
National Population Health Survey			
National Population Health Survey Overview, 1994-95	82-567-XPB 82-567-XIB	Paper Internet	$10 $8
National Population Health Survey Overview, 1996-97	82-567-XPB 82-567-XIB	Paper Internet	$35 $26
User's guide for the public use microdata file			
National Population Health Survey, 1998-99 – Household Component	82M0009GPE	Paper	$50
National Population Health Survey, 1996-97 – Household Component	82M0009GPE	Paper	$50
National Population Health Survey, 1996-97 – Health Care Institutions	82M0010GPE	Paper	$50
(See also section on Microdata files)			
Occupational surveillance			
Occupational Surveillance in Canada: Cause-specific mortality among workers, 1965-1991	84-546-XCB	CD-ROM	$500
Residential care			
Residential Care Facilities, 1998-99 *(Available as custom tabulations through the Client Custom Services Unit.)*			
Smoking			
Report on Smoking in Canada, 1985 to 2001	82F0077-XIE	Internet	Free
Vital statistics			
General Summary of Vital Statistics	84F0001XPB	Paper	$22
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Mortality - Summary List of Causes	84F0209XPB	Paper	$20
Mortality - Summary List of Causes, 1997	84F0209XIB	Internet	Free
Births	84F0210XPB	Paper	$20
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Vital Statistics Compendium, 1996	84-214-XPE 84-214-XIE	Paper Internet	$45 $33
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Validation study for a record linkage of births and deaths in Canada	84F0013XIE	Internet	Free
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Email: HD-DS@statcan.ca

Microdata files

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Statistics Canada
Ottawa, Ontario
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Telephone: (613) 951-1746
Fax: (613) 951-0792
Email: HD-DS@statcan.ca

Canadian Community Health Survey		Product number	Format	Price (CDN$)†‡
Canadian Community Health Survey, 2000-2001 Cycle 1.1 public-use microdata file Cross-sectional data in flat ASCII files, User's Guide, data dictionary, indexes, layout, Beyond 20/20 Browser for the health file		82M0013XCB	CD-ROM	$2,000 Free for the Health Sector
National Population Health Survey				
Cycle 4, 2000-01				
Custom tables	Household	82C0013	Price varies with information requirements	
Cycle 3, 1998-99				
Household	Cross-sectional data in flat ASCII files, User's Guide, data dictionary, indexes, layout, Beyond 20/20 browser for the health file	82M0009XCB	CD-ROM	$2,000
Custom tables	Household Institutions	82C0013 82C0015	Price varies with information requirements. Price varies with information requirements.	
Cycle 2, 1996-97				
Household	Cross-sectional data in flat ASCII files, Beyond 20/20 browser for the health file	82M0009XCB	CD-ROM	$500
Health care institutions	Cross-sectional flat ASCII file	82M0010XCB	CD-ROM Clients who purchase 1996/97 Household file will receive Institutions file free of charge.	$250
Custom tables	Household Institutions	82C0013 82C0015	Price varies with information requirements. Price varies with information requirements.	
Cycle 1, 1994-95				
Household	Data, Beyond 20/20 browser flat ASCII files, User's Guide	82F0001XCB	CD-ROM	$300
Health care institutions	Flat ASCII files	82M0010XDB	Diskette	$75
Custom tables	Household Institutions	82C0013 82C0015	Price varies with information requirements. Price varies with information requirements.	

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Population health surveys

Canadian Community Health Survey (CCHS)

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

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

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

National Population Health Survey (NPHS)

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

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

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

Health Services Access Survey (HSAS)

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

Joint Canada/United States Survey of Health (JCUSH)

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

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

Canadian statistics

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

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

The Research Data Centres Program

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

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

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

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