

# Depression and work impairment

Heather Gilmour and Scott B. Patten

## Abstract

### Objectives

This article estimates the prevalence of depression among employed Canadians aged 25 to 64, and examines its association with work impairment, as measured by reduced work activity, mental health/general disability days, and work absence.

### Data sources

Data are from the 2002 Canadian Community Health Survey: Mental Health and Well-being and the longitudinal household component of the National Population Health Survey (1994/1995 to 2002/2003).

### Analytical techniques

Cross-tabulations were used to estimate and determine factors associated with the prevalence of depression among the employed population. Multiple logistic regression was used to examine associations between depression and work impairment while controlling for other variables. Longitudinal data for 1994/1995 to 2002/2003 were used to examine the temporal sequence of depression and work impairment.

### Main results

In 2002, almost 4% of employed people aged 25 to 64 had had an episode of depression in the previous year. Cross-sectional analysis indicates that these workers had high odds of reducing work activity because of a long-term health condition, having at least one mental health disability day in the past two weeks, and being absent from work in the past week. Longitudinally, depression was associated with reduced work activity and disability days two years later.

## Keywords

absenteeism, comorbidity, longitudinal studies, mental health, occupational health, presenteeism, psychological stress, social support

## Authors

Heather Gilmour (613-951-2114; Heather.Gilmour@statcan.ca) is with the Health Statistics Division at Statistics Canada, Ottawa, Ontario, K1A 0T6. Scott B. Patten (403-220-8752; patten@ucalgary.ca) is with the Departments of Community Health Sciences and Psychiatry, University of Calgary, 3330 Hospital Drive NW Calgary, Alberta, T2N 4N1.

Worldwide, depression is the leading cause of years lived with disability.<sup>1</sup> It can affect many aspects of life, including work. In fact, the impact of depression on job performance has been estimated to be greater than that of chronic conditions such as arthritis, hypertension, back problems and diabetes.<sup>2,3</sup>

Although the disability associated with depression may make it difficult to find and keep a job,<sup>4-6</sup> many people who have had a recent depressive episode are in the workforce. In 2002, the majority (71%) of 25- to 64-year-olds who had had a major depressive episode in the previous 12 months were employed and thus potentially dealing with the interference of depressive symptoms on their ability to do their jobs.

Depression has been associated with both absenteeism and decreased productivity (presenteeism). Estimates for the United States have placed the cost of depression at \$83.1 billion a year (2000 prices);<sup>7</sup> absenteeism and impaired work performance accounted for most of these costs (62% or \$US 51.5 billion). In Canada, productivity losses in the form of short-term disability days due to depression, or to depression and distress combined, were estimated at \$2.6 billion in 1998.<sup>8</sup>

Methods

Data sources

Canadian Community Health Survey

The Canadian Community Health Survey (CCHS) cycle 1.2: Mental Health and Well-being 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 institutions, Indian reserves, certain remote areas and the three territories, as well as 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 was randomly selected from the sampled households. More detailed descriptions of the design, sample and interview procedures can be found in other reports and on Statistics Canada's website.<sup>9,10</sup>

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, as proxy responses were not accepted. The responding sample comprised 36,984 persons aged 15 or older, with a response rate of 77%.

National Population Health Survey

Every two years since 1994/1995, the National Population Health Survey (NPHS) has collected information about the health of Canadians. The survey covers residents of households and institutions in all provinces and territories, except people on Indian reserves, on Canadian forces bases, and in some remote areas. In 1994/1995, a subset (17,626) of the randomly selected household respondents in the 10 provinces was chosen for the longitudinal panel to be followed over time. The response rate for this panel in 1994/1995 was 86.0%. The response rates were 92.8% for cycle 2 (1996/1997), 88.2% for cycle 3 (1998/1999), 84.8% for cycle 4 (2000/2001), and 80.6% for cycle 5 (2002/2003). The analysis of work impairment was based on the cycle 5 (2002/2003) longitudinal Health file (square), which contains records for all originally selected panel members about whom cycle 1 information was available, whether or not information about them was obtained in later cycles. More detailed descriptions of NPHS design, sample and interview procedures can be found in published reports.<sup>11,12</sup>

Analytical techniques

Cross-tabulations were used to estimate the prevalence of and the characteristics associated with depression for people aged 25 to 64 in the 10 provinces who were employed at the time of their CCHS interview. The sample size was 17,433, of whom 716 were classified as having had an episode of depression in the previous year.

Multivariate logistic regression models were used to assess associations between having had a major depressive episode in the 12 months before the interview, or at some earlier point, and selected types of work impairment—reduced activities at work, at least one mental health disability day in the past two weeks, and being absent from work in the past week. The models were re-run to include interaction terms between depression and job characteristics.

Separate multivariate logistic regressions were run on the 716 workers who had experienced depression in the previous year to determine if coping behaviours, emotional social support, co-worker support and supervisor support were associated with work impairment for this group.

Because of the small sample size, the multivariate models were run for men and women combined. Interactions between sex and depression were not significant in any of the models.

Associations between depression and work impairment two years later were based on longitudinal data from the NPHS. Because some variables were not available or were measured differently in the NPHS and the CCHS (see *Definitions*), the longitudinal models differ slightly from the cross-sectional models. Factors associated with reduced work activities and at least one disability day in the past two weeks due to illness or injury were examined longitudinally using repeated observations over two-year periods.<sup>13</sup> Four cohorts of observations were used for the analysis of reduced work activities, and two cohorts for the analysis of at least one disability day in the past two weeks. The baseline years for the four cohorts were 1994/1995, 1996/1997, 1998/1999 and 2000/2001. For each baseline year, all current workers aged 25 to 64 who did not report reduced activity at work were selected for the first model; for the second model, those who had not had a disability day in the past two weeks were selected.

Sample sizes for longitudinal analysis of work impairment

Cohort	Base-line	Follow-up	No reduced work activities (base-line)	Reduced work activities (follow-up)	No disability in past 2 weeks (base-line)	At least 1 disability day in past 2 weeks (follow-up)
			(base-line)	(follow-up)	(base-line)	(follow-up)
1	1994/1995	1996/1997	5,274	251	5,499	538
2	1996/1997	1998/1999	5,142	236	5,383	571
3	1998/1999	2000/2001	4,985	293	..	..
4	2000/2001	2002/2003	4,766	284	..	..
<b>Total</b>			<b>20,167</b>	<b>1,064</b>	<b>10,882</b>	<b>1,109</b>

.. not available for specific reference period

Multivariate logistic regression analysis was then used on this set of observations to examine workers' characteristics at the baseline year in relation to reporting work impairment two years later (as measured in separate models by reduced work activities and disability days in past two weeks). Certain variables in the cross-sectional multivariate analysis were not available on the longitudinal file or were available for only some cycles (self-perceived work stress, coping behaviours, comorbid anxiety disorder in the past year, alcohol or drug dependence in the past year, co-worker support, supervisor support). Although smoking was not available as a control variable in the cross-sectional analysis, it was used in the longitudinal analysis.

All estimates and analyses were based on weighted data that reflect the age and sex distribution of the household population aged 15 or older in the 10 provinces in 2002. To account for survey design effects, standard errors and coefficients of variation were estimated with the bootstrap technique.<sup>14-16</sup>

This article is based on results from the 2002 Canadian Community Health Survey (CCHS), cycle 1.2: Mental Health and Well-being and the 1994/1995 to 2002/2003 National Population Health Survey (NPHS) (see *Methods* and *Limitations*). The prevalence of depression among employed Canadians aged 25 to 64 is estimated by selected characteristics (see *Definitions*). To assess the impact of depression in the workplace, associations with reduced work activities, disability days, and work absences are examined in multivariate models that control for sociodemographic factors, job characteristics, and physical and mental health.

In this analysis, work impairment covers both “absenteeism” and “presenteeism.” Absence from work in the past week is used as a measure of absenteeism, and reducing work activities is a measure of presenteeism. A third variable—at least one disability day in the past two weeks—combines elements of both, in that it measures days spent entirely in bed (absenteeism) and days when respondents had to cut down on activities or expend extra effort to perform them (presenteeism).

### Almost half a million

According to the 2002 CCHS, 3.7% of people aged 25 to 64 who were employed at the time of their interview (an estimated 489,000) had experienced an episode of depression in the previous year (Table 1). An additional 8% of employed people (1.05 million) had had a depressive episode sometime in their lives, but not in the previous year (data not shown).

As in the general population,<sup>17-25</sup> depression among workers was approximately twice as prevalent among women as men (Table 1); less prevalent among those who were married or in a common-law relationship (Table 1); and more prevalent among those who lived in lower-income households (Table 1). Differences by age and education were not significant.

Earlier studies have reported that depression is associated with both physical and mental comorbidity.<sup>21,25,26</sup> Results from the 2002 CCHS were similar. Workers with chronic conditions or

Table 1  
Percentage who experienced depression in past 12 months, by selected characteristics, employed population aged 25 to 64, Canada excluding territories, 2002

	Prevalence of depression in past 12 months	
	Number '000	%
<b>Total</b>	<b>489.0</b>	<b>3.7</b>
Men <sup>†</sup>	184.6	2.6
Women	304.3	5.1*
<b>Age group</b>		
25 to 44	317.2	4.1
45 to 64 <sup>†</sup>	171.8	3.2
<b>Occupation</b>		
White-collar	264.6	3.9*
Sales/Service	107.9	4.6*
Blue-collar <sup>†</sup>	77.6	2.5
<b>Weekly work hours</b>		
1 to 29	90.5	5.7*
30 to 40 <sup>†</sup>	273.5	4.1
More than 40	124.3	2.6*
<b>Work schedule</b>		
Regular day <sup>†</sup>	331.7	3.5
Regular evening/night	48.1 <sup>E</sup>	5.6* <sup>E</sup>
Irregular/Rotating shift	109.2	4.0
<b>High self-perceived work stress</b>		
Yes	260.5	6.0*
No <sup>†</sup>	216.6	2.5
<b>Marital status</b>		
Married/Common-law <sup>†</sup>	292.7	3.0
Divorced/Separated/Widowed	98.8	7.5*
Never married	96.5	5.0*
<b>Education</b>		
Postsecondary graduation	296.4	3.8
Some postsecondary	35.5 <sup>E</sup>	4.2 <sup>E</sup>
Secondary graduation or less <sup>†</sup>	151.5	3.5
<b>Household income</b>		
Low/Lower-middle/Middle	114.6	4.7*
Upper-middle/High <sup>†</sup>	344.1	3.4
<b>Chronic condition</b>		
Yes	328.2	4.9*
No <sup>†</sup>	159.8	2.5
<b>Body mass index category</b>		
Underweight/Normal <sup>†</sup>	241.0	4.0
Overweight	162.3	3.5
Obese	77.5	3.4
<b>Any anxiety disorder, past 12 months</b>		
Yes	108.3	20.0*
No <sup>†</sup>	357.4	2.9
<b>Any anxiety disorder in lifetime, not past 12 months</b>		
Yes	46.4	5.0*
No <sup>†</sup>	311.0	2.7
<b>Alcohol/Drug dependence, past 12 months</b>		
Yes	28.7 <sup>E</sup>	9.3*
No <sup>†</sup>	458.6	3.6

<sup>†</sup> Reference category

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

<sup>E</sup> use with caution (coefficient of variation 16.6% to 33.3%)

Note: Based on 17,433 respondents, of whom 716 (255 men, 461 women) experienced depression in the past 12 months.

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

alcohol or drug dependence (past 12 months) or anxiety disorders (past 12 months and lifetime) were more likely than those who did not have these problems to report that they had had a depressive episode in the previous year. Excess weight, however, was not associated with depression among workers.

### Job characteristics

A number of job-related factors—occupation, hours of work, shift work and work stress—were associated with depression.

White-collar workers and those in sales/service were more likely than blue-collar workers to have suffered from depression (Table 1). This is in line with other studies that found differences in the prevalence of depression by occupation.<sup>19,27-31</sup>

The prevalence of depression was relatively low among workers who spent more than 40 hours a week on the job, but relatively high among those who worked less than 30 hours, a discrepancy that may reflect the impact of mental health on hours worked. Individuals who had had a depressive episode in the previous year may not have been able to work a full week, while those who did not have such an episode may have been able to work longer hours.

Consistent with earlier research that found a link between mental health and shift work,<sup>32</sup> the prevalence of depression was higher among evening and night workers than among those with a regular day schedule.

And, according to the CCHS, employed people who characterized most days at work as stressful were more likely than those in less stressful work situations to have had a depressive episode in the previous year (see *Stress, coping and support*). Other research, too, has shown work stress to be related to depression and other psychological disorders.<sup>33-35</sup>

### Depressive symptoms interfere with work

CCHS respondents who had had a depressive episode in the previous year were asked how much, on a scale of 1 to 10, it had interfered with several aspects of their lives during the period when the

symptoms had been most severe. They were also asked how many days depressive symptoms had rendered them totally unable to work or carry out normal activities.

Most workers who had experienced depression in the year before they were interviewed (79%) reported that the symptoms had interfered with their ability to work to at least some degree. Almost one in five (19%) had experienced very severe interference (score of 10) (Table 2). On average, depressed workers reported 32 days in the past year during which the symptoms had resulted in their being totally unable to work or carry out normal activities.

The marked degree to which depression interfered with functioning at work is not surprising. The symptoms of depression can include fatigue or lack of energy, loss of interest, diminished ability to think or concentrate, and feeling sad, discouraged or hopeless. A number of crucial elements of job performance are particularly vulnerable to such symptoms, for instance, time management, concentration, teamwork, and overall output.<sup>36</sup>

Nonetheless, one in five (21%) workers who had experienced depression in the previous year said it had had no effect on their ability to work (Table 2).

Table 2  
Percentage distributions of work interference scores and days unable to work or carry out normal activities in past year, employed population aged 25 to 64 who experienced depression in past 12 months, Canada excluding territories, 2002

	%
<b>Work interference score</b>	
0 (none)	21
1 to 3 (mild)	26
4 to 6 (moderate)	18
7 to 9 (severe)	16
10 (very severe)	19
<b>Days unable to work or carry out normal activities</b>	
0	40
1 to 5	17
6 to 30	24
31 to 365	19
<b>Average number of days unable to work/carry out normal activities</b>	31.6

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



Even more (40%) reported never having had a day during which they had been totally unable to work or carry out normal activities. It may be that, for these workers, symptoms had not been severe enough to interfere with their duties, or that the impact had been greater on other aspects of their lives. In fact, consistent with earlier research,<sup>25</sup> the mean interference score of depressive symptoms was higher for social life and home responsibilities than for the ability to work (Table 3).

Table 3  
Mean interference score for selected activities, employed population aged 25 to 64 who experienced depression in past 12 months, Canada excluding territories, 2002

Activity	Mean score <sup>†</sup>
Social life	5.9*
Home responsibilities	5.3*
Close relationships	4.8
Ability to work	4.6

<sup>†</sup> 0 indicates no interference; 10 indicates very severe interference.  
\* Significantly different from estimate for Ability to work ( $p < 0.05$ )  
Source: 2002 Canadian Community Health Survey: Mental Health and Well-being

Days totally unable to work, however, likely underestimates the impact of depression on job performance. This measure does not capture days when respondents came to work but could not fully carry out their assignments. In other studies, mental disorders were found to be more strongly related to days during which workers had to expend extra effort or cut back on work activities rather than to days of complete work loss.<sup>29,30,37,38</sup> As well, the former account for a greater proportion of the total economic costs of mental disorders to employers.<sup>38</sup>

### Work impairment

Workers who had experienced depression were more likely than those who had no history of depression to report several specific forms of work impairment: reduced activities due to a long-term health condition, at least one mental health disability day in the past two weeks, and absence from work in the past week (Chart 1) (see *Work impairment*).

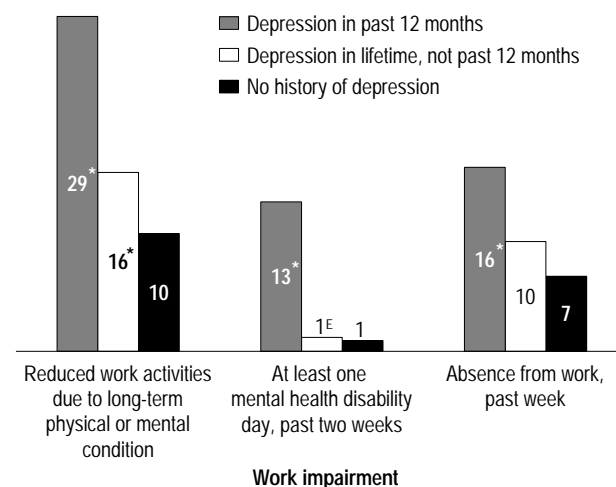
Compared with workers with no history of depression, those who had had an episode in the previous year were almost three times as likely to

report reduced work activities because of a long-term health condition (29% versus 10%). Even workers who had not experienced depression in the previous year but who had a lifetime history of depression were at increased risk of reducing their work activities (16%). However, workers with a history of depression may have intentionally cut back their activities, perhaps to reduce work stress and to minimize the risk of another episode. They could also have been experiencing sub-clinical depression, which has been linked to functional impairment.<sup>2,39</sup>

Depression was also strongly related to mental health disability days: 13% of workers who had experienced depression in the previous year reported at least one day in the past two weeks when, because of emotional or mental health or the use of alcohol or drugs, they had had to stay in bed, cut down on normal activities, or their daily activities took extra effort. By contrast, only 1% of workers with no history of depression reported a mental health disability day.

Work absences were far more common among people who had experienced depression in the previous year than among those with no history of

Chart 1  
Percentage reporting work impairment, by prevalence of depression, employed population aged 25 to 64, Canada excluding territories, 2002



\* Significantly different from estimate for No history of depression ( $p < 0.05$ )  
<sup>E</sup> use with caution (coefficient of variation 16.6% to 33.3%)  
Source: 2002 Canadian Community Health Survey: Mental Health and Well-being

## Stress, coping and support

*Self-perceived work stress* at the main job or business in the past 12 months was measured by asking: "Would you say that most days at work were: not at all stressful? not very stressful? a bit stressful? quite a bit stressful? extremely stressful?" Respondents who answered "quite a bit" or "extremely" stressful were classified as having high self-perceived work stress.

In the 2002 CCHS, all respondents were asked about coping with stress. They were also asked how often they used each of several methods of dealing with it:

- try to solve the problem
- talk to others
- avoid being with people
- negative tension reduction (drink alcohol, smoke more cigarettes than usual, use drugs or medication, eat more or less than usual, sleep more than usual)
- positive tension reduction (pray or seek spiritual help, jog or other exercise, relax by doing something enjoyable)
- blame yourself
- wish the situation would go away or somehow be finished
- try to look on the bright side of things

The negative and positive tension reduction categories are groupings of coping methods that were identified by factor analysis (Cronbach's alpha of .47 and .34, respectively). Respondents were considered to use a particular *coping behaviour* if they answered "often"/"sometimes" versus "rarely"/"never." For the negative and positive tension reduction categories, respondents were considered to use these coping behaviours if they answered "often" or "sometimes" to any one of the component questions.

On a five-point scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree), CCHS respondents were asked to rate two statements: "You were exposed to hostility or conflict from the people you worked with" and "The people you work with were helpful in getting the job done." Those who answered "agree" or "strongly agree" to the first question, or answered "disagree" or "strongly disagree" to the second were considered to have *low co-worker support*.

Respondents who answered "strongly disagree" or "disagree" to the statement, "Your supervisor was helpful in getting the job done," were considered to have *low supervisor support*.

The 2002 CCHS assesses four dimensions of social support, using an abridged version of measures in the Medical Outcomes Study (MOS).<sup>40</sup> For comparability between cross-sectional and longitudinal analysis, this study used the emotional and informational support variable, which is the expression of positive affect, empathetic understanding and encouragement of expressions of feelings and the offering of advice, information, guidance or feedback. Respondents were asked: "How often is each of the following kinds of 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?"

For each item, respondents were asked if such support was available "none of the time," "a little of the time," "some of the time," "most of the time" or "all of the time." The variable was dichotomized: respondents who answered "none of the time" or "a little of the time" to an item were categorized as having *low emotional social support*.

In the longitudinal analysis using the NPHS, perceived emotional social support was measured by four "yes"/"no" questions in cycles 1 and 2, and by the above questions in cycles 3, 4 and 5. In cycles 1 and 2, the following questions were asked:

- "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?"

In cycles 1 and 2, respondents were classified as having *low emotional social support* if they answered "no" to at least one of the four questions. In cycles 3, 4 and 5, respondents who answered "none of the time" or "a little of the time" to any of the eight questions were considered to have low emotional/social support.

depression. While 16% of workers reporting a recent episode had been absent the past week, the figure was 7% for those who had never had a depressive episode.

Depression is often accompanied by other psychiatric illnesses, substance abuse or physical conditions that can impede an individual's ability to work. To determine if the associations between depression and work impairment were statistically

significant, multivariate models that controlled for these factors and other possible confounders such as socio-demographic and job characteristics were used. Even when the effects of all these factors were taken into account, the associations between depression and work impairment persisted: workers who had had a depressive episode in the previous year had more than twice the odds of reduced work activity and work absence, and six

## Work impairment

Both the 2002 Canadian Community Health Survey (CCHS) cycle 1.2: Mental Health and Well-being and the National Population Health Survey (NPHS) contained questions about *work impairment*.

CCHS respondents who had had a major depressive episode in the past 12 months were asked about the period lasting one month or longer when their feelings of depression were most severe. They were then asked, on a scale of 0 to 10 (0 means no interference; 10 means very severe interference), how much these feelings interfered with: their ability to work at a job, home responsibilities, close relationships, and social lives. The mean *interference score* of depressive symptoms on each domain was calculated. For the ability to work at a job, interference score categories of 0 (none), 1 to 3 (mild), 4 to 6 (moderate), 7 to 9 (severe), and 10 (very severe) were also used.

*Days in past year unable to work or carry out normal activities* measures how often in the previous year respondents were totally unable to work or carry out their normal activities because of depression.

For the CCHS, *reduced work activities* was based on a response of "often" or "sometimes" (versus "never") to the question: "Does a long-term physical or mental condition or health problem reduce the amount or kind of activities you can do at work?" The NPHS question was similar, but responses were categorized as "yes" or "no."

Respondents were asked if, during the past two weeks, they had stayed in bed all or most of the day (including nights in hospital) or cut down on normal activities because of illness or injury. They were also asked about days, not counting days in bed, when it had taken extra effort to perform up to their usual level at work or in other daily activities. In each case, respondents were asked a follow-up question: "Was that due to your emotional or mental health or your use of alcohol or drugs?" For cross-sectional analysis, respondents were considered to have had *at least one mental health disability day in the past two weeks* if they reported at least one day in that period when they had stayed in bed or cut down on normal activities or that their daily activities required extra effort because of their emotional or mental health or their use of alcohol or drugs.

For the longitudinal analysis based on the NPHS, respondents who reported at least one day in the past two weeks when they had stayed in bed all or most of the day or cut down on normal activities because of illness or injury were considered to have had *at least one disability day in the past two weeks due to illness or injury*. The NPHS did not ask the follow-up question to determine if this was because of emotional or mental health or the use of alcohol or drugs.

In the CCHS, *absence from work last week* was measured by asking: "Last week, did you have a job or business from which you were absent?"

times the odds of reporting a mental health disability day, compared with those who had no history of depression (Table 4).

### Interactions with job characteristics

The association between depression and work impairment may be particularly strong for people in specific employment situations. Consequently, the models for work impairment were rerun with interaction terms between depression and occupation, working hours and work schedule.

The interaction between depression and white-collar occupations was positive for reduced work activities (odds ratio 2.88; 95% confidence interval 1.36 to 6.12). That is, although white-collar workers were generally less likely than blue-collar workers to reduce their work activities (Table 4), white-collar workers who had had a recent episode of depression were actually more likely to do so (data not shown). This difference may reflect a greater impact of depressive symptoms on activities that are more common in white-collar jobs, compared with other occupations.

An association between depression and reduced work activities also emerged for people who regularly worked evenings or nights rather than days (odds ratio 2.88; 95% confidence interval 1.04 to 7.95). A previous study showed relationships between working an evening shift and psychosocial problems, chronic conditions, sleep problems, and distress.<sup>32</sup> Thus, it may be that depressive symptoms compound the impact of other health problems that are associated with shift work, thereby resulting in greater work impairment.

### Coping and support

In numerous studies, coping strategies and levels of support have been associated with the risk of depression and other mental illnesses.<sup>41-47</sup> Few studies have examined whether these factors are related to the job performance of workers with mental disorders.

CCHS results show that workers who had had a recent depressive episode often used different coping mechanisms than did other workers (see *Stress, coping and support*). Workers who had had a

Table 4  
Adjusted odds ratios relating depression and selected characteristics to work impairment outcomes, employed population aged 25 to 64, Canada excluding territories, 2002

	Reduced work activities due to long-term physical or mental health condition		At least one mental health disability day, past two weeks		Absence from work, past week	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
<b>Depression</b>						
Past 12 months	2.4*	1.7 to 3.4	6.2*	4.0 to 9.4	2.3*	1.5 to 3.3
Lifetime, not past 12 months	1.3*	1.0 to 1.8	0.9	0.5 to 1.5	1.4	0.9 to 2.1
No history of depression <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Sex</b>						
Men	1.1	0.9 to 1.3	0.8	0.5 to 1.1	0.6*	0.5 to 0.7
Women <sup>‡</sup>	1.0	...	1.0	...	1.0	...
<b>Age group</b>						
25 to 44	1.2	1.0 to 1.4	0.8	0.6 to 1.1	0.9	0.8 to 1.2
45 to 64 <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Occupation</b>						
White-collar	0.7*	0.6 to 0.8	1.0	0.7 to 1.5	1.0	0.8 to 1.2
Sales/Service	1.0	0.8 to 1.2	1.1	0.7 to 1.8	0.7*	0.6 to 1.0
Blue-collar <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Weekly work hours</b>						
1 to 29	1.2	1.0 to 1.5	1.1	0.7 to 1.7	0.9	0.7 to 1.2
30 to 40 <sup>†</sup>	1.0	...	1.0	...	1.0	...
More than 40	1.0	0.8 to 1.2	0.5*	0.3 to 0.7	0.8*	0.7 to 1.0
<b>Work schedule</b>						
Regular day <sup>†</sup>	1.0	...	1.0	...	1.0	...
Regular evening/night	1.0	0.8 to 1.4	1.7	1.0 to 3.0	1.2	0.8 to 1.7
Irregular/Rotating shift	1.2	1.0 to 1.4	1.5	1.0 to 2.3	1.2	0.9 to 1.5
<b>High self-perceived work stress</b>						
Yes	1.4*	1.2 to 1.6	1.8*	1.2 to 2.5	1.2	1.0 to 1.4
No <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Marital status</b>						
Married/Common-law <sup>†</sup>	1.0	...	1.0	...	1.0	...
Divorced/Separated/Widowed	1.0	0.8 to 1.3	1.2	0.7 to 2.0	1.1	0.8 to 1.4
Never married	1.1	0.9 to 1.3	1.7*	1.1 to 2.5	0.7*	0.5 to 0.9
<b>Education</b>						
Postsecondary graduation	0.9	0.8 to 1.1	0.9	0.6 to 1.3	1.0	0.8 to 1.2
Some postsecondary	1.1	0.8 to 1.5	0.8	0.4 to 1.6	1.0	0.7 to 1.4
Secondary graduation or less <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Household income<sup>‡</sup></b>						
Low/Lower-middle/Middle	1.1	0.9 to 1.3	1.0	0.7 to 1.6	0.9	0.7 to 1.2
Upper-middle/High <sup>†</sup>	1.0	...	1.0	...	1.0	...
<b>Chronic condition</b>						
	4.7*	3.9 to 5.7	1.9*	1.3 to 2.7	1.1	0.9 to 1.3
<b>Body mass index category<sup>‡</sup></b>						
Underweight/Normal <sup>†</sup>	1.0	...	1.0	...	1.0	...
Overweight	1.2	1.0 to 1.4	1.4	0.9 to 2.1	1.2	1.0 to 1.5
Obese	1.5*	1.2 to 1.8	0.9	0.6 to 1.4	1.0	0.8 to 1.4
<b>Any anxiety disorder, past 12 months</b>						
	2.2*	1.6 to 2.9	5.9*	4.0 to 8.7	1.0	0.7 to 1.4
<b>Alcohol/Drug dependence, past 12 months</b>						
	1.4	0.9 to 2.2	3.8*	2.1 to 6.8	0.9	0.5 to 1.4

<sup>†</sup> Reference category; when not noted, reference category is absence of characteristic.

<sup>‡</sup> Missing category included in models to maximize sample size, but odds ratios not shown.

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

... not applicable

**Notes:** Analysis of reduced work activities due to long-term physical or mental health condition was based on 16,154 respondents, of whom 1,890 reported reduced work activity; 1,279 were dropped because of missing values. Analysis of two-week mental health disability days was based on 16,502 respondents, of whom 279 reported two-week mental health disability days; 931 were dropped because of missing values. Analysis of absence from work in the past week was based on 16,513 respondents, of whom 1,231 were absent from work in the past week; 920 were dropped because of missing values. Because of rounding, some odds ratios with lower/upper confidence intervals of 1.0 were statistically significant.

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



## Definitions

The Canadian Community Health Survey (CCHS) and the National Population Health Survey (NPHS) used different methods to measure *major depressive disorder*. 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).<sup>48</sup> The CCHS questionnaire is available at <http://www.statcan.ca/english/sdds/0039ti.htm>, and the algorithm used to measure the 12-month prevalence of depression is available in the Annex of the 2004 *Health Reports* supplement.<sup>49</sup>

The NPHS used a subset of questions from the *Composite International Diagnostic Interview*, according to the method of Kessler et al.,<sup>50</sup> to define depression. The questions cover a cluster of symptoms listed in the *Diagnostic and Statistical Manual of Mental Disorders, Third Revised Edition*.<sup>51</sup>

CCHS estimates of the number of people with a major depressive episode excluded those who had experienced a lifetime episode of mania, but the NPHS estimates did not.

The *working age* population was defined as those aged 25 to 64, and for this analysis, was divided into two age groups: 25 to 44 and 45 to 64.

Respondents were classified as currently *employed* if they had worked the week before the interview or had a job or business from which they had been absent.

For the CCHS, *occupation* was based on the question, "Which of the following best describes your occupation?" The response categories were classified into three groups: white-collar (management; professional; technologist, technician or technical occupation; administrative, financial or clerical), sales or service, and blue-collar (trades, transport or equipment operator; farming, forestry, fishing or mining; processing, manufacturing or utilities). For the NPHS, occupation was categorized as white-collar (administrative and professional), sales or service, and blue-collar, based on the 1991 Standard Occupational Classification (SOC).<sup>52</sup>

*Weekly work hours* were classified into three categories: 1 to 29, 30 to 40, and more than 40, based on the question, "About how many hours a week [do/did] you usually work at your [job/business]? If you usually [work/worked] extra hours, paid or unpaid, please include these hours."

*Work schedule* was based on the question, "Which of the following best describes the hours you usually [work/worked] at your [job/business]?" Three work schedule categories were used in this analysis: regular day (regular daytime schedule or shift); regular evening/night (regular evening shift, regular night shift); and irregular/rotating shift (rotating shift, split shift, on call, irregular schedule, or other).

If a respondent had more than one job at the time of the interview, the variables used for occupation, weekly work hours and work schedule were based on the main job, which is the one with the most weekly hours.

*Marital status* was categorized as: married or common-law; divorced, separated or widowed; and never married.

Based on their highest level of *education*, respondents were grouped into three categories: postsecondary graduation, some postsecondary, and secondary graduation or less.

*Household income* was based on the number of people in the household and total household income from all sources in the 12 months before the 2002 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

To measure *chronic conditions*, the CCHS asked respondents about long-term conditions that had lasted or were expected to last six months or longer, and that had been diagnosed by a health care professional. Interviewers read a list of conditions. This analysis considered 18 physical conditions: asthma; arthritis or rheumatism; back problems excluding fibromyalgia and arthritis; high blood pressure; migraine; chronic bronchitis, emphysema or COPD; diabetes; epilepsy; heart disease; cancer; stomach or intestinal ulcers; the effects of a stroke; bowel disorder/Crohn's disease or colitis; Alzheimer's disease or other dementia; cataracts; glaucoma; and thyroid disorder. The longitudinal analysis using the NPHS considered 14 conditions: asthma; arthritis or rheumatism; back problems excluding arthritis; high blood pressure; migraine; chronic bronchitis or emphysema; diabetes; epilepsy; heart disease; cancer; stomach or intestinal ulcers, the effects of a stroke; Alzheimer's disease or other dementia; and glaucoma.

Body mass index (BMI) is calculated by dividing weight in kilograms by height in metres squared. Three *BMI categories* were used in this analysis: underweight/normal (BMI less than 25), overweight (25 to 29), or obese (more than 30).

Respondents were considered to have had any *anxiety disorder, past 12 months* if they met the diagnostic criteria for social phobia, panic disorder or agoraphobia in the 12 months before the interview.

*Any anxiety disorder, lifetime, not past 12 months* refers to respondents who met the criteria for social phobia, panic disorder or agoraphobia at some point in their life, but not during the 12 months before the interview.

*Alcohol/Drug dependence, past 12 months* refers to respondents who met the criteria for dependence on alcohol or illicit drugs in the 12 months before the interview.

Respondents were considered to be *daily smokers* if they answered "daily" to the question, "At the present time, do you smoke cigarettes daily, occasionally or not at all?" This variable was available only in the NPHS.

depressive episode were more likely to report that they cope with stress by avoiding people, using negative means of tension reduction (such as smoking or drinking more than usual), blaming themselves or wishing it would go away; they were less likely to talk to others or “look on the bright

### Limitations

The World Mental Health version of the Composite International Diagnostic Interview (CIDI), which was used in the Canadian Community Health Survey (CCHS): Mental Health and Well-being, has yet to be validated. Therefore, the extent to which clinical assessments by health care professionals would agree with assessments based on CCHS data is not known.

In this study, the association between depression and work impairment was based on self-reported data rather than objective measures of work impairment. The degree of bias stemming from recall error or from the impact of depression on respondents' perceptions of their own work impairment is not known.

Some variables used in cross-sectional analysis were not included in the longitudinal National Population Health Survey (NPHS) (alcohol and drug dependence, anxiety disorder, self-perceived work stress, coping, co-worker support, supervisor support) or were defined slightly differently (depression in previous year, at least one disability day in past two weeks, chronic conditions, low emotional social support, occupation). Consequently, the cross-sectional and longitudinal models are similar but not identical.

Because NPHS interviews are conducted every two years, work impairment subsequent to depression reported at the baseline interview pertains to the situation two years later. If depression-associated work impairment occurred within this two-year interval, it would not be captured in the survey. Therefore, longitudinal associations between depression and subsequent work impairment may be underestimated.

As a result of a skip-pattern error, no information was collected on the pregnancy status of 2,093 employed women aged 25 to 49 at the time of their CCHS interview. Therefore, those who were pregnant and whose weight exceeded their non-pregnant weight may have been placed in an incorrect BMI category. However, the impact of this oversight on the prevalence and odds ratios reported in this paper is probably negligible.

Smoking, a potential confounder in the relationship between depression and work impairment, was not available in the 2002 CCHS, and so could not be accounted for in the cross-sectional multivariate analysis. However, it was included in the longitudinal analysis using NPHS data.

side” (Table 5). As well, workers who had experienced depression in the previous year were more likely than those who had not to report that they had low levels of co-worker support, supervisor support and emotional social support.

In multivariate analysis, most of these coping behaviour and support variables were associated with work impairment among employed people overall (Table 6). But when only workers who had had a depressive episode in the previous year were considered, just two variables were significant: looking on the bright side and low co-worker support.

Looking on the bright side reduced the odds that workers with depression would have had at least one mental health disability day in the past two weeks. However, it is possible that the coping strategies included in the CCHS are influenced by depressive symptoms. Because depressed people often have a negative perspective, the association with looking on the bright side may reflect workers with mild, rather than severe, depression.

Table 5  
Percentage using selected coping behaviours and having low levels of support, employed population aged 25 to 64, by prevalence of depression, Canada excluding territories, 2002

	Depression in past 12 months	
	Yes	No
<b>Coping behaviour (used often/sometimes versus rarely/never)</b>		
Try to problem solve	97.4	97.2
Wish it would go away	90.9	76.4*
Positive tension reduction	90.8	91.9
Look on bright side	88.1	95.3*
Negative tension reduction	82.0	53.1*
Talk to others	76.1	82.7*
Blame myself	74.2	49.7*
Avoid people	66.0	32.7*
<b>Support</b>		
Low co-worker support	47.0	32.2*
Low supervisor support	24.2	16.9*
Low emotional social support	23.9	12.2*

\* Significantly different from estimate for those with depression in past 12 months ( $p < 0.05$ )

Note: Based on 17,433 respondents, of whom 716 (255 men, 461 women) had experienced depression in the past 12 months; 16,662 had not experienced depression (8,662 men, 8,000 women), and 55 records were missing data on depression (28 men, 27 women).

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

Low co-worker support increased the odds that depressed workers would have been absent from work in the previous week. But because this analysis is cross-sectional, the direction of the association cannot be determined: it is not clear whether low co-worker support influenced work absence or vice versa.

**Long-term associations**

With cross-sectional data, it is not possible to say if depression leads to work impairment, or if workers who are limited in what they can do on the job are more likely to experience depression. Longitudinal data from the National Population Health Survey (NPHS) can shed some light on the temporal sequence of these events.

Compared with workers who had not had a recent depressive episode, the odds were high that those who had experienced depression in the 12 months before their NPHS interview would report reducing work activities or taking disability days at follow-up two years later (Table 7). This association

suggests that the effects of depression on job performance can be long-lasting.

A 2005 study also found that many people in remission from a depressive episode still experience symptoms that affect social functioning.<sup>53</sup> But according to another study, the impact of residual symptoms on work resolved in 6 to 12 months.<sup>54</sup> In the NPHS longitudinal model, it was not possible to control for psychiatric comorbidity, which may have played a role in the development of a new case of work impairment.

**Concluding remarks**

Based on data from the 2002 Canadian Community Health Survey, nearly half a million workers aged 25 to 64 (close to 4%) had had an episode of depression in the previous year, and an additional million had experienced depression at some point in their lives.

Consistent with other research,<sup>4,19,37,38,55-57</sup> data from the Canadian Community Health Survey and

Table 6  
Adjusted odds ratios relating coping behaviour and support to selected work impairment outcomes, by prevalence of depression, employed population aged 25 to 64, Canada excluding territories, 2002

	Reduced work activities due to long-term physical or mental health condition				At least one mental health disability day, past two weeks				Absence from work, past week			
	All workers		Workers with depression in past 12 months		All workers		Workers with depression in past 12 months		All workers		Workers with depression in past 12 months	
	Adjusted odds ratio <sup>†</sup>	95% confidence interval	Adjusted odds ratio <sup>†</sup>	95% confidence interval	Adjusted odds ratio <sup>†</sup>	95% confidence interval	Adjusted odds ratio <sup>†</sup>	95% confidence interval	Adjusted odds ratio <sup>†</sup>	95% confidence interval	Adjusted odds ratio <sup>†</sup>	95% confidence interval
<b>Coping behaviour (used often/sometimes versus rarely/never)</b>												
Try to problem solve	0.8	0.5 to 1.3	0.9	0.3 to 2.7	0.7	0.3 to 1.6	0.8	0.1 to 9.4	1.0	0.6 to 1.7	...	...
Wish it would go away	1.3*	1.1 to 1.6	0.6	0.2 to 1.5	2.1*	1.2 to 3.9	0.6	0.2 to 1.6	0.9	0.7 to 1.2	0.8	0.3 to 2.3
Positive tension reduction	0.9	0.6 to 1.2	0.5	0.2 to 1.6	1.1	0.6 to 2.2	2.1	0.6 to 7.2	0.7	0.5 to 1.2	0.4	0.1 to 1.4
Look on bright side	0.9	0.6 to 1.2	0.7	0.3 to 1.4	0.5*	0.3 to 0.8	0.3*	0.1 to 0.7	0.9	0.5 to 1.6	1.4	0.5 to 4.1
Negative tension reduction	1.4*	1.2 to 1.7	0.8	0.4 to 1.8	3.1*	2.0 to 4.8	2.6	0.8 to 8.6	1.2	1.0 to 1.4	1.2	0.5 to 3.0
Talk to others	0.8*	0.6 to 0.9	1.0	0.5 to 1.8	0.7*	0.5 to 1.0	0.6	0.3 to 1.2	0.9	0.6 to 1.2	1.6	0.7 to 3.8
Blame myself	1.1	0.9 to 1.3	1.7	0.9 to 3.3	1.3	0.9 to 1.8	1.3	0.6 to 2.8	1.1	0.9 to 1.4	1.4	0.7 to 2.9
Avoid people	1.1	0.9 to 1.3	1.0	0.5 to 1.7	1.4	1.0 to 2.0	0.7	0.4 to 1.5	1.1	0.9 to 1.4	1.3	0.6 to 2.7
<b>Support</b>												
Low co-worker support	1.1	1.0 to 1.3	1.1	0.6 to 2.1	1.7*	1.2 to 2.3	0.8	0.4 to 1.9	1.1	0.9 to 1.4	1.9*	1.0 to 3.7
Low supervisor support	1.0	0.8 to 1.2	1.3	0.7 to 2.4	1.7*	1.2 to 2.5	1.1	0.5 to 2.4	1.3	1.0 to 1.7	1.1	0.5 to 2.4
Low emotional social support	1.5*	1.2 to 1.8	1.5	0.8 to 2.7	1.9*	1.3 to 2.8	1.7	0.8 to 3.6	0.7	0.5 to 1.1	1.1	0.5 to 2.5

<sup>†</sup> Coping behaviours and support variables were entered individually into models that adjusted for depression in addition to the above variables.  
<sup>‡</sup> Coping behaviours and support variables were entered individually into models that adjusted for sex, age group, occupation, weekly work hours, work schedule, self-perceived work stress, marital status, education, household income, chronic conditions, weight, any anxiety disorder in past 12 months, alcohol/drug dependence in past 12 months.  
 ... not applicable (Too few respondents reported rarely/never using behaviour to produce a meaningful odds ratio.)  
 \* p < 0.05

Note: Because of rounding, odds ratios with lower/upper confidence intervals of 1.0 were statistically significant.  
 Source: 2002 Canadian Community Health Survey: Mental Health and Well-being

Table 7  
Adjusted odds ratios relating depression and selected characteristics to new case of work impairment over a two-year period, employed population aged 25 to 64, Canada excluding territories, 1994/1995 to 2002/2003

	Reduced work activities due to long-term physical or mental condition		At least one disability day in past two weeks due to illness or injury	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
<b>Depression in past 12 months</b>	1.4*	1.0 to 2.0	1.8*	1.2 to 2.6
<b>Sex</b>				
Men	0.9	0.7 to 1.1	0.7*	0.5 to 0.8
Women†	1.0	...	1.0	...
<b>Age group</b>				
25 to 44	0.8	0.7 to 1.0	1.0	0.8 to 1.3
45 to 64†	1.0	...	1.0	...
<b>Occupation</b>				
White-collar	0.8	0.7 to 1.0	1.2	0.9 to 1.5
Sales/Service	0.8*	0.6 to 1.0	1.0	0.8 to 1.3
Blue-collar†	1.0	...	1.0	...
<b>Weekly work hours</b>				
1 to 29	1.2	0.9 to 1.6	0.9	0.7 to 1.2
30 to 40†	1.0	...	1.0	...
More than 40	1.0	0.8 to 1.2	0.8*	0.7 to 1.0
<b>Work schedule</b>				
Regular day†	1.0	...	1.0	...
Regular evening/night	1.3	0.9 to 1.9	1.2	0.8 to 1.9
Irregular/Rotating shift	1.1	0.9 to 1.4	1.2	1.0 to 1.4
<b>Marital status</b>				
Married/Common-law†	1.0	...	1.0	...
Divorced/Separated/Widowed	1.2	0.9 to 1.4	1.4*	1.1 to 1.7
Never married	1.3*	1.0 to 1.7	1.2	0.9 to 1.6
<b>Education‡</b>				
Postsecondary graduation	0.7*	0.5 to 0.9	1.0	0.8 to 1.4
Some postsecondary	0.7*	0.5 to 1.0	1.0	0.7 to 1.4
Secondary graduation or less†	1.0	...	1.0	...
<b>Household income‡</b>				
Low/Lower-middle/Middle	1.1	0.9 to 1.3	0.9	0.8 to 1.1
Upper-middle/High†	1.0	...	1.0	...
<b>Chronic condition</b>	2.7*	2.3 to 3.1	1.8*	1.5 to 2.1
<b>Body mass index category‡</b>				
Underweight/Normal†	1.0	...	1.0	...
Overweight	1.1	0.9 to 1.3	1.1	0.9 to 1.4
Obese	1.3*	1.0 to 1.7	1.4*	1.1 to 1.9
<b>Low emotional social support</b>	1.2	1.0 to 1.6	0.9	0.7 to 1.1
<b>Daily smoker</b>	1.4*	1.2 to 1.7	1.2	1.0 to 1.5

† Reference category; when not noted, reference category is absence of characteristic.

‡ Missing category included in models to maximize sample size, but odds ratio not shown.

\* Significantly different from estimate for reference category ( $p < 0.05$ )  
... not applicable

**Notes:** Analysis of reduced work activities due to a long-term physical or mental condition was based on 18,995 records, with 994 events of reduced work activity; 1,172 records were dropped because of missing values. Analysis of at least one disability day in past two weeks due to illness or injury was based on 10,032 records, with 1,013 events of at least one disability day; 850 records were dropped because of missing values. Because of rounding, an odds ratio with a lower confidence interval of 1.0 was statistically significant.

**Source:** 1994/1995 to 2002/2003 National Population Health Survey, longitudinal Health file (square)

the National Population Health Survey suggest that depression is associated with work absences and with lost productivity in the form of reduced activity. The cross-sectional and longitudinal analyses both show that depression has associations with work impairment that persist even when the effects of sociodemographic, job and health characteristics are taken into account.

The findings in this article highlight the importance of white-collar occupations and night/evening work schedules in the link between depression and work impairment. As well, coping by “looking on the bright side” and co-worker support may buffer the impact of depression on job performance. ●

## References

- 1 Ustun TB, Yuso-Mateos JL, Chatterji S, et al. Global burden of depressive disorders in the year 2000. *British Journal of Psychiatry* 2004; 184: 386-92.
- 2 Wells KB, Stewart A, Hays RD, et al. The functioning and well-being of depressed patients. Results from the Medical Outcomes Study. *Journal of the American Medical Association (JAMA)* 1989; 262(7): 914-9.
- 3 Kessler RC, Greenberg PE, Mickelson KD, et al. The effects of chronic medical conditions on work loss and work cutback. *Journal of Occupational and Environmental Medicine* 2001; 43(3): 218-25.
- 4 Lerner D, Adler DA, Chang H, et al. Unemployment, job retention, and productivity loss among employees with depression. *Psychiatric Services* 2004; 55(12): 1371-8.
- 5 Marcotte DE, Wilcox-Gok V. Estimating the employment and earnings costs of mental illness: recent developments in the United States. *Social Science and Medicine* 2001; 53(1): 21-7.
- 6 Virtanen M, Kivimaki M, Elovainio M, et al. Mental health and hostility as predictors of temporary employment: evidence from two prospective studies. *Social Science and Medicine* 2005; 61(10): 2084-95.
- 7 Greenberg PE, Kessler RC, Birnbaum HG, et al. The economic burden of depression in the United States: how did it change between 1990 and 2000? *Journal of Clinical Psychiatry* 2003; 64(12): 1465-75.
- 8 Stephens T, Joubert N. The economic burden of mental health problems in Canada. *Chronic Diseases in Canada* 2001; 22(1): 18-23.
- 9 Béland Y, Dufour J, Gravel R. *Sample Design of the Canadian Mental Health Survey. Proceedings of the Survey Methods Section, 2001.* Vancouver: Statistical Society of Canada, 2001: 93-8.



- 10 Statistics Canada. *Canadian Community Health Survey (CCHS): Mental Health and Well-being—Cycle 1.2*. Available at <http://www.statcan.ca/english/concepts/hs/index.htm>. Accessed March 10, 2006.
- 11 Swain L, Catlin G, Beudet MP. The National Population Health Survey—its longitudinal nature. *Health Reports* (Statistics Canada, Catalogue 82-003) 1999; 10(4): 69-82.
- 12 Tambay JL, Catlin G. Sample design of the national population health survey. *Health Reports* (Statistics Canada, Catalogue 82-003) 1995; 7(1): 29-42.
- 13 Statistics Canada. *National Population Health Survey, Cycle 6 (2004-2005), Household Component, Longitudinal Documentation*. Ottawa: Health Statistics Division, Statistics Canada, 2006.
- 14 Rao JNK, Wu CFJ, Yue K. Some recent work on resampling methods for complex surveys. *Survey Methodology* (Statistics Canada, Catalogue 12-001) 1992; 18(2): 209-17.
- 15 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5: 281-310.
- 16 Yeo D, Mantel H, Liu TP. Bootstrap variance estimation for the National Population Health Survey. *Proceedings of the Annual Meeting of the American Statistical Association, Survey Research Methods Section, August 1999*. Baltimore: American Statistical Association, 1999.
- 17 Beudet MP. Depression. *Health Reports* (Statistics Canada, Catalogue 82-003) 1996; 7(4): 11-25.
- 18 Offord DR, Boyle MH, Campbell D, et al. One-year prevalence of psychiatric disorder in Ontarians 15 to 64 years of age. *Canadian Journal of Psychiatry* 1996; 41(9): 559-63.
- 19 De Marco RR. The epidemiology of major depression: implications of occurrence, recurrence, and stress in a Canadian community sample. *Canadian Journal of Psychiatry* 2000; 45(1): 67-74.
- 20 Noble RE. Depression in women. *Metabolism* 2005; 54(5 Suppl. 1): 49-52.
- 21 Weissman MM, Bland RC, Canino GJ, et al. Cross-national epidemiology of major depression and bipolar disorder. *Journal of the American Medical Association (JAMA)* 1996; 276(4): 293-9.
- 22 Hasin DS, Goodwin RD, Stinson FS, et al. Epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcoholism and Related Conditions. *Archives of General Psychiatry* 2005; 62(10): 1097-106.
- 23 Piccinelli M, Wilkinson G. Gender differences in depression. Critical review. *British Journal of Psychiatry* 2000; 177: 486-92.
- 24 Kuehner C. Gender differences in unipolar depression: an update of epidemiological findings and possible explanations. *Acta Psychiatrica Scandinavica* 2003; 108(3): 163-74.
- 25 Kessler RC, Berglund P, Demler O, et al. The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association (JAMA)* 2003; 289(23): 3095-105.
- 26 Verhaak PF, Heijmans MJ, Peters L, et al. Chronic disease and mental disorder. *Social Science and Medicine* 2005; 60(4): 789-97.
- 27 Wilhelm K, Kovess V, Rios-Seidel C, et al. Work and mental health. *Social Psychiatry and Psychiatric Epidemiology* 2004; 39(11): 866-73.
- 28 Zimmerman FJ, Christakis DA, Vander SA. Tinker, tailor, soldier, patient: work attributes and depression disparities among young adults. *Social Science and Medicine* 2004; 58(10): 1889-901.
- 29 Dewa CS, Lin E. Chronic physical illness, psychiatric disorder and disability in the workplace. *Social Science & Medicine* 2000; 51(1): 41-50.
- 30 Kessler RC, Frank RG. The impact of psychiatric disorders on work loss days. *Psychological Medicine* 1997; 27(4): 861-73.
- 31 Eaton WW, Anthony JC, Mandel W, et al. Occupations and the prevalence of major depressive disorder. *Journal of Occupational Medicine* 1990; 32(11): 1079-87.
- 32 Shields M. Shift work and health. *Health Reports* (Statistics Canada, Catalogue 82-003) 2002; 13(4): 11-33.
- 33 Tennant C. Work-related stress and depressive disorders. *Journal of Psychosomatic Research* 2001; 51(5): 697-704.
- 34 Wang J. Work stress as a risk factor for major depressive episode(s). *Psychological Medicine* 2005; 35(6): 865-71.
- 35 Shields M. Stress and depression in the employed population. *Health Reports* (Statistics Canada, Catalogue 82-003) 2006; 17(4): 11-29.
- 36 Burton WN, Pransky G, Conti DJ, et al. The association of medical conditions and presenteeism. *Journal of Occupational and Environmental Medicine* 2004; 46(6 Suppl.): S38-S45.
- 37 Lim D, Sanderson K, Andrews G. Lost productivity among full-time workers with mental disorders. *The Journal of Mental Health Policy and Economics* 2000; 3(3): 139-46.
- 38 Stewart WF, Ricci JA, Chee E, et al. Cost of lost productive work time among US workers with depression. *Journal of the American Medical Association (JAMA)* 2003; 289(23): 3135-44.
- 39 Martin JK, Blum TC, Beach SR, et al. Subclinical depression and performance at work. *Social Psychiatry and Psychiatric Epidemiology* 1996; 31(1): 3-9.
- 40 Sherbourne CD, Stewart AL. The MOS social support survey. *Social Science and Medicine* 1991; 32(6): 705-14.
- 41 Niedhammer I, Goldberg M, Leclerc A, et al. Psychosocial factors at work and subsequent depressive symptoms in the Gazel cohort. *Scandinavian Journal of Work, Environment & Health* 1998; 24(3): 197-205.
- 42 Stansfeld S. Work, personality and mental health. *British Journal of Psychiatry* 2002; 181: 96-8.
- 43 Park KO, Wilson MG, Lee MS. Effects of social support at work on depression and organizational productivity. *American Journal of Health Behavior* 2004; 28(5): 444-55.
- 44 Bisschop MI, Kriegsman DM, Beekman AT, et al. Chronic diseases and depression: the modifying role of psychosocial resources. *Social Science and Medicine* 2004; 59(4): 721-33.



- 45 Ramage-Morin PL. Panic disorder and coping. *Health Reports* (Statistics Canada, Catalogue 82-003) 2004; 15(Suppl.): 31-43.
- 46 Shields M. Social anxiety disorder—beyond shyness. *Health Reports* (Statistics Canada, Catalogue 82-003) 2004; 15(Suppl.): 45-61.
- 47 Wilkins K. Bipolar I disorder, social support and work. *Health Reports* (Statistics Canada, Catalogue 82-003) 2004; 15(Suppl.): 21-30.
- 48 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association, 2000.
- 49 Statistics Canada. Annex. *Health Reports* 2004; 15(Suppl.): 65-79.
- 50 Kessler RC, McGonagle KA, Zhao S et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. Results from the National Comorbidity Survey. *Archives of General Psychiatry* 1994; 51: 8-19.
- 51 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Third Edition*. Washington, DC: American Psychiatric Association, 1980.
- 52 Statistics Canada. *Standard Occupational Classification (SOC) 1991 - Canada*. Available at <http://www.statcan.ca/english/subjects/standard/soc/1991/soc91-menu.htm>. Accessed September 6, 2006.
- 53 Kennedy N, Foy K. The impact of residual symptoms on outcome of major depression. *Current Psychiatry Reports* 2005; 7(6): 441-6.
- 54 Mojtabai R. Residual symptoms and impairment in major depression in the community. *American Journal of Psychiatry* 2001; 158(10): 1645-51.
- 55 Kouzis AC, Eaton WW. Emotional disability days: prevalence and predictors. *American Journal of Public Health* 1994; 84(8): 1304-7.
- 56 Lerner D, Adler DA, Chang H, et al. The clinical and occupational correlates of work productivity loss among employed patients with depression. *Journal of Occupational and Environmental Medicine* 2004; 46(6 Suppl.): S46-S55.
- 57 Wang PS, Beck A, Berglund P, et al. Chronic medical conditions and work performance in the health and work performance questionnaire calibration surveys. *Journal of Occupational and Environmental Medicine* 2003; 45(12): 1303-11.