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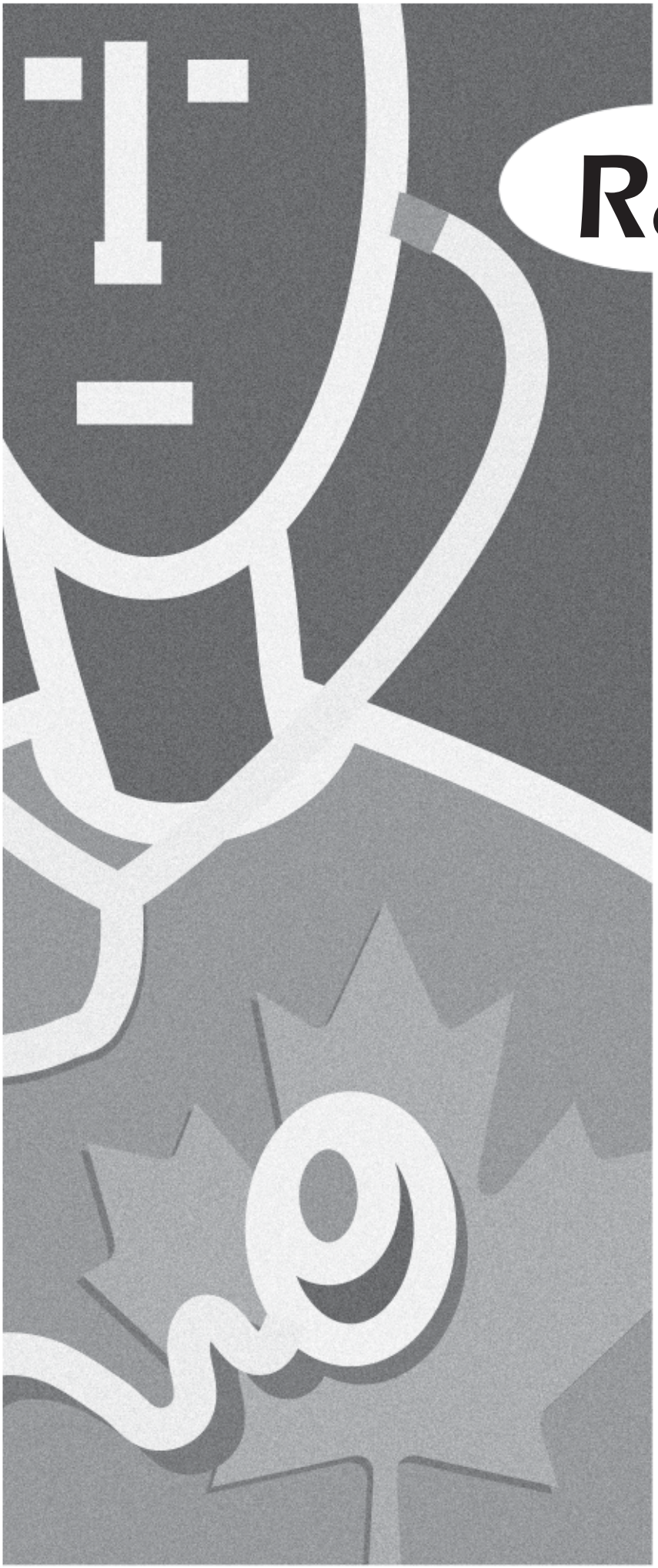

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Depression and work impairment

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

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Worldwide, depression is the leading cause of years lived with disability.[1] 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.[2,3]

Although the disability associated with depression may make it difficult to find and keep a job,[4-6] 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);[7] 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.[8]

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.[9,10]

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.[11,12]

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.[13] 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	Baseline	Follow-up	No reduced work activities (baseline)	Reduced work activities (follow-up)	No disability days in past 2 weeks (baseline)	At least 1 disability day in past 2 weeks (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	..	..
Total			**20,167**	**1,064**	**10,882**	**1,109**

.. 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.[14-16]

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,[17-25] 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.[21,25,26] 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	%
Total	**489.0**	**3.7**
Men†	184.6	2.6
Women	304.3	5.1*
Age group		
25 to 44	317.2	4.1
45 to 64†	171.8	3.2
Occupation		
White-collar	264.6	3.9*
Sales/Service	107.9	4.6*
Blue-collar†	77.6	2.5
Weekly work hours		
1 to 29	90.5	5.7*
30 to 40†	273.5	4.1
More than 40	124.3	2.6*
Work schedule		
Regular day†	331.7	3.5
Regular evening/night	48.1E	5.6*E
Irregular/Rotating shift	109.2	4.0
High self-perceived work stress		
Yes	260.5	6.0*
No†	216.6	2.5
Marital status		
Married/Common-law†	292.7	3.0
Divorced/Separated/Widowed	98.8	7.5*
Never married	96.5	5.0*
Education		
Postsecondary graduation	296.4	3.8
Some postsecondary	35.5E	4.2E
Secondary graduation or less†	151.5	3.5
Household income		
Low/Lower-middle/Middle	114.6	4.7*
Upper-middle/High†	344.1	3.4
Chronic condition		
Yes	328.2	4.9*
No†	159.8	2.5
Body mass index category		
Underweight/Normal†	241.0	4.0
Overweight	162.3	3.5
Obese	77.5	3.4
Any anxiety disorder, past 12 months		
Yes	108.3	20.0*
No†	357.4	2.9
Any anxiety disorder in lifetime, not past 12 months		
Yes	46.4	5.0*
No†	311.0	2.7
Alcohol/Drug dependence, past 12 months		
Yes	28.7E	9.3*
No†	458.6	3.6

† *Reference category*
* *Significantly different from reference category ($p < 0.05$)*
E *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.[19,27-31]

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,[32] 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.[33-35]

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.[36]

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

	%
Work interference score	
0 (none)	21
1 to 3 (mild)	26
4 to 6 (moderate)	18
7 to 9 (severe)	16
10 (very severe)	19
Days unable to work or carry out normal activities	
0	40
1 to 5	17
6 to 30	24
31 to 365	19
Average number of days unable to work/carry out normal activities	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,[25] 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†
Social life	5.9*
Home responsibilties	5.3*
Close relationships	4.8
Ability to work	4.6

† *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.[29,30,37,38] As well, the former account for a greater proportion of the total economic costs of mental disorders to employers.[38]

Work impairment

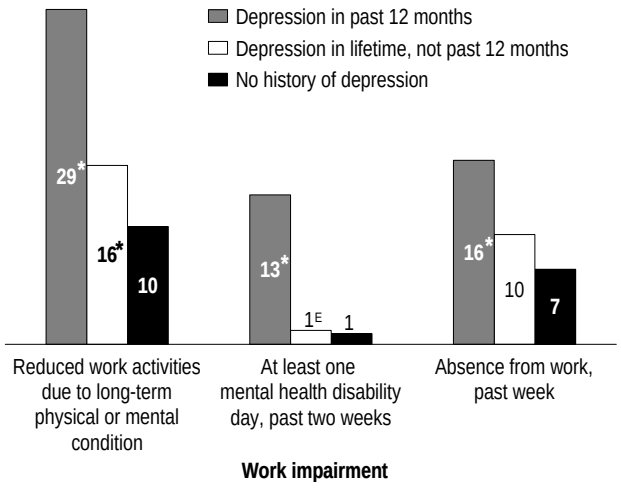
Workers who had experienced depression were more likely than those who had no history of depression to report several specific forms of work impairment: reduced activities due to a long-term health condition, at least one mental health disability day in the past two weeks, and absence from work in the 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.[2,39]

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)*
E *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).[40] 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 or 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 an 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.[32] 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.[41-47] 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
Depression						
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†	1.0	…	1.0	…	1.0	…
Sex						
Men	1.1	0.9 to 1.3	0.8	0.5 to 1.1	0.6*	0.5 to 0.7
Women†	1.0	…	1.0	…	1.0	…
Age group						
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†	1.0	…	1.0	…	1.0	…
Occupation						
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†	1.0	…	1.0	…	1.0	…
Weekly work hours						
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†	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
Work schedule						
Regular day†	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
High self-perceived work stress						
Yes	1.4*	1.2 to 1.6	1.8*	1.2 to 2.5	1.2	1.0 to 1.4
No†	1.0	…	1.0	…	1.0	…
Marital status						
Married/Common-law†	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
Education						
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†	1.0	…	1.0	…	1.0	…
Household income‡						
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†	1.0	…	1.0	…	1.0	…
Chronic condition	4.7*	3.9 to 5.7	1.9*	1.3 to 2.7	1.1	0.9 to 1.3
Body mass index category‡						
Underweight/Normal†	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
Any anxiety disorder, past 12 months	2.2*	1.6 to 2.9	5.9*	4.0 to 8.7	1.0	0.7 to 1.4
Alcohol/Drug dependence, past 12 months	1.4	0.9 to 2.2	3.8*	2.1 to 6.8	0.9	0.5 to 1.4

† *Reference category; when not noted, reference category is absence of characteristic.*
‡ *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).[48] 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.[49]

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

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).[52]

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 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.

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.

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
Coping behaviour (used often/sometimes versus rarely/never)		
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*
Support		
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*

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†	95% confidence interval	Adjusted odds ratio‡	95% confidence interval	Adjusted odds ratio†	95% confidence interval	Adjusted odds ratio‡	95% confidence interval	Adjusted odds ratio†	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
Coping behaviour (used often/sometimes versus rarely/never)												
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
Support												
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

† *Coping behaviours and support variables were entered individually into models that adjusted for depression in addition to the above variables.*
‡ *Coping behaviours and support variables were entered individually into models that ajdusted 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*

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.[53] But according to another study, the impact of residual symptoms on work resolved in 6 to 12 months.[54] 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,[4,19,37,38,55-57] data from the Canadian Community Health Survey and

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
Depression in past 12 months	1.4*	1.0 to 2.0	1.8*	1.2 to 2.6
Sex				
Men	0.9	0.7 to 1.1	0.7*	0.5 to 0.8
Women†	1.0	...	1.0	...
Age group				
25 to 44	0.8	0.7 to 1.0	1.0	0.8 to 1.3
45 to 64†	1.0	...	1.0	...
Occupation				
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	...
Weekly work hours				
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
Work schedule				
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
Marital status				
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
Education‡				
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	...
Household income‡				
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	...
Chronic condition	2.7*	2.3 to 3.1	1.8*	1.5 to 2.1
Body mass index category‡				
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
Low emotional social support	1.2	1.0 to 1.6	0.9	0.7 to 1.1
Daily smoker	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 disabilty 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, Beaudet 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 Beaudet 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, Zhoa 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.

Going to the doctor

Alice Nabalamba and Wayne J. Millar

Abstract

Objectives

This article, based on the Andersen model, describes patterns of consultation with general practitioners (GPs) and specialists among Canadians aged 18 or older. Associations with health status and other factors are examined.

Data source

Estimates are based on data from the 2005 Canadian Community Health Survey (CCHS), cycle 3.1.

Analytical techniques

Cross-tabulations were used to estimate the proportion of adult Canadians who had had a GP consultation, four or more GP consultations, or a specialist consultation in the previous year. Adjusted logistic regression models were used to examine factors associated with such consultations when the effects of health need were taken into account.

Main results

In 2005, 77% of Canadians aged 18 to 64 and 88% of seniors reported that they had consulted a GP in the previous year; 25% and 44%, respectively, had done so four or more times; and 27% and 34% had consulted a specialist. Individual health need, as measured by the presence of chronic conditions and self-reported general and mental health, was a strong determinant of service use. However, when need was taken into account, physician consultations were independently associated with age, sex, household income, race, language, urban/rural residence and having a regular family doctor. Seniors aged 75 or older and rural residents had low odds of specialist consultations, but high odds of four or more GP consultations. Visible minorities and Aboriginal people had lower odds of reporting specialist consultations than did Whites.

Keywords

health services, health status, racial background, socio-economic status, language, regular family physician

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The Canada Health Act, which was adopted in 1984, mandates universal rights of access to publicly funded medically necessary health care, free of financial or other barriers. No one may be discriminated against on the basis of factors such as income, age and health status.[1]

Among the models that have been devised to examine the association between the need for health care and the use of services is that proposed by Andersen,[2,3] which assumes that three types of factors come into play when individuals seek care: the state of their health, their predisposition toward using services, and their ability to obtain services. These factors are categorized as: *need*, *predisposing* and *enabling*.

Need factors are the individual's perceived illnesses and illnesses diagnosed by health care professionals. *Predisposing* factors are characteristics of the individual that existed before the onset of illness, such as age, sex and race. *Enabling* factors include education, income and access to health care providers and health facilities.

This article, based on the Andersen model, examines the use of general practitioners and specialists by Canadians aged 18 or older (see *Methods*). Because the factors that

Methods

Data source

Estimates are based on data from the 2005 Canadian Community Health Survey (CCHS), cycle 3.1. The CCHS covers the household population aged 12 or older in all provinces and territories, except members of the regular Forces and residents of institutions, Indian reserves, Canadian Forces bases, and some remote areas. Data for cycle 3.1 were collected between January and December 2005 from a sample of 132,947 persons. The response rate was 79%. More information about the CCHS is available in a published report.[4]

This analysis focuses on two age groups: 18 to 64 (92,362 respondents) and 65 or older (28,197 respondents). Together, these 120,559 respondents represented a household population of 25 million people aged 18 or older. The two age groups were analyzed separately, because the factors related to their physician consultations tend to differ.

Analytical techniques

Rates of consultation with general practitioners (GPs) and specialists were estimated based on CCHS data weighted to represent the population of the provinces and territories in 2005. Cross-tabulations were produced to show the prevalence of physician consultations by need (number of chronic conditions, self-perceived general health, self-perceived mental health), predisposing characteristics (sex, age group, racial or cultural group), and enabling characteristics (language, education, household income, urban or rural residence, having a regular doctor) based on the Andersen model[2,3] and availability in the CCHS (see *Definitions*). Unadjusted odds ratios were estimated for each need factor in relation to a GP consultation, four or more GP consultations, and a specialist consultation. Adjusted logistic regression models were used to assess the odds of consultations when the effects of need, predisposing characteristics and enabling characteristics were controlled simultaneously.

To account for the sample design of the CCHS, the bootstrap technique was used to calculate confidence intervals and coefficients of variation and for testing the statistical significance of differences between the estimates. A significance level of $p < 0.05$ was applied in all cases.[5-7]

Limitations

This analysis could not include the full range of factors in the Andersen model. For example, attitudinal/belief variables about health and illness are among the model's predisposing factors, but questions to elicit such information were not asked by the CCHS. Similarly, the survey did not collect information about community-related variables such as health care facilities and number of doctors, which figure among the model's enabling factors.

Although the Andersen model (and this analysis) restricts "need" factors to chronic conditions and fair or poor self-perceived health, Canadians use medical services for preventive as well as illness care. As a result, the observed association between need and physician consultations is likely weaker than it would have been if need had included a broader range of factors, such as annual check-ups, gynecological care and screening.

The data were collected from household residents. Although relatively few people live in institutions, their characteristics may differ in ways that would have affected the outcomes if they had been included in the survey. And even in the household population, those who participated in the survey may have been healthier and more likely than non-respondents to engage in health-promoting behaviour such as consulting physicians.

The CCHS excludes homeless people and residents of isolated northern communities and Indian reservations. These exclusions preclude consideration of the health care received by some groups who are at high risk of illness, who may have low household income, and for whom access to physicians may be limited.

The data from the CCHS are self-reported. A potential for bias exists if some socio-demographic groups differ in their willingness to report their health status or their use of health care services.[6]

are important for seniors when they seek health care may differ from those that are important at younger ages, separate analyses were conducted for the 18-to-64 and the 65-or-older age groups.

Since the Canada Health Act came into effect, numerous studies have focused on socio-economic advantage or disadvantage in relation to the use of services.[8-19] While this analysis, too, looks at associations between household income and physician consultations, it also examines variations by sex, age, racial/cultural group, language, having a regular doctor, and urban/rural residence.

Emphasis is placed on determining if predisposing and enabling characteristics are associated with physician consultations, independent of need (chronic conditions and self-perceived general and mental health) (see *Definitions*).

Majority consulted a GP

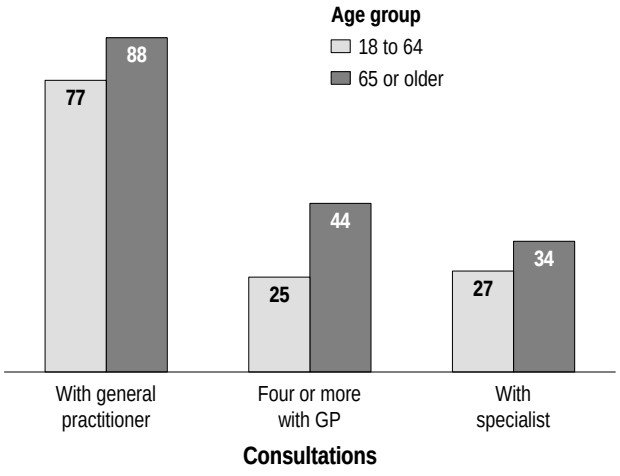
Canadians' initial contact with the health care system is frequently through a general practitioner (GP). GPs are also the main gatekeepers for specialist services.

In 2005, 77% of people aged 18 to 64 (an estimated 15.8 million) reported having consulted a GP at least once in the previous year, and 25% of them had done so four or more times (Chart 1).

GP contacts were even more common among seniors. Almost 9 out of 10 people aged 65 or older (an estimated 3.4 million) reported having consulted a GP, and 44% had had four or more contacts.

Smaller proportions of the population reported specialist consultations. Just over one-quarter of people aged 18 to 64 and more than one-third of seniors had seen a specialist at least once in the previous year.

Chart 1
Percentage reporting physician consultations in past year, by age group, household population aged 18 or older, Canada, 2005



Source: *2005 Canadian Community Health Survey*

Strong association with need

As might be expected, the likelihood of consulting physicians was strongly related to the presence of chronic conditions and to self-perceived health. And indeed, this is in line with the intention of the Canada Health Act, which aimed to provide access to care based on health status or "need."

Among people aged 18 to 64, 72% with no chronic conditions had consulted a GP in the previous year, compared with 94% of those with three or more conditions (Table 1). Similarly, about 75% who described their general or mental health as excellent or very good had been to a GP, whereas the figure was around 86% for those whose general health or mental health was fair or poor. Associations between health status and GP consultations were the same for seniors. As well, for people in both age ranges, the percentages reporting multiple GP visits or specialist consultations increased with the number of chronic conditions, and were greatest among those with fair or poor general or mental health.

Table 1
Percentage reporting physician consultations in past year, by age group and health status, household population aged 18 or older, Canada excluding territories, 2005

	Consultations					
	With general practitioner		Four or more with GP		With specialist	
Health status	18 to 64	65 or older	18 to 64	65 or older	18 to 64	65 or older
	%		%		%	
Number of chronic conditions						
None†	72.2	76.6	18.1	18.7	21.9	21.7
One	84.4*	88.4*	34.1*	40.0*	32.6*	31.6*
Two	90.7*	92.4*	51.0*	54.5*	44.6*	38.2*
Three or more	93.5*	93.7*	65.6*	68.5*	55.9*	49.0*
Self-perceived general health						
Excellent or very good†	74.4	84.5	17.9	30.0	22.5	26.5
Good	78.3*	88.5*	30.5*	45.8*	28.9*	34.9*
Fair or poor	86.6*	92.0*	55.5*	64.0*	47.4*	45.2*
Self-perceived mental health						
Excellent or very good†	75.7	87.0	21.4	40.2	24.9	34.0
Good	77.7*	88.7*	30.4*	48.4*	28.7*	33.7
Fair or poor	85.6*	91.6*	51.3*	61.4*	41.6*	40.1*

† *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
Source: *2005 Canadian Community Health Survey*

Of course, the likelihood of having chronic conditions or of reporting fair or poor health is not the same for everyone. For example, the number of chronic conditions tends to rise with age, and fair or poor health is more prevalent among people in lower income households and in rural areas (Appendix Tables A and B). As well, the prevalence of chronic conditions and fair or poor

Table 2
Unadjusted and adjusted odds ratios for physician consultations in past year, by age group and health status, household population aged 18 or older, Canada, 2005

	18 to 64				65 or older			
	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval	Unadjusted odds ratio	95% confidence interval	Adjusted odds ratio‡	95% confidence interval
General practitioner consultation								
Number of chronic conditions								
None†	1.00	...	1.00	...	1.00	...	1.00	...
One	2.09*	1.97 to 2.21	1.75*	1.63 to 1.87	2.34*	2.05 to 2.67	2.09*	1.80 to 2.43
Two	3.75*	3.29 to 4.27	2.79*	2.43 to 3.21	3.69*	3.13 to 4.37	2.91*	2.40 to 3.52
Three or more	5.56*	4.41 to 7.01	3.64*	2.86 to 4.63	4.54*	3.73 to 5.53	3.45*	2.71 to 4.40
Self-perceived general health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	1.24*	1.17 to 1.31	1.12*	1.05 to 1.19	1.42*	1.25 to 1.61	1.07	0.93 to 1.24
Fair or poor	2.22*	2.01 to 2.46	1.38*	1.22 to 1.55	2.11*	1.84 to 2.42	1.35*	1.12 to 1.62
Self-perceived mental health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	1.12*	1.05 to 1.19	1.07	1.00 to 1.16	1.17*	1.04 to 1.33	1.00	0.87 to 1.16
Fair or poor	1.90*	1.67 to 2.16	1.51*	1.29 to 1.76	1.64*	1.26 to 2.12	1.21	0.88 to 1.67
Four or more general practitioner consultations								
Number of chronic conditions								
None†	1.00	...	1.00	...	1.00	...	1.00	...
One	2.35*	2.23 to 2.47	2.02*	1.90 to 2.14	2.91*	2.58 to 3.27	2.59*	2.29 to 2.92
Two	4.73*	4.38 to 5.11	3.43*	3.12 to 3.77	5.21*	4.65 to 5.84	4.07*	3.60 to 4.60
Three or more	8.65*	7.64 to 9.79	4.81*	4.20 to 5.49	9.47*	8.36 to 10.71	6.23*	5.44 to 7.14
Self-perceived general health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	2.01*	1.90 to 2.11	1.62*	1.53 to 1.72	1.98*	1.80 to 2.17	1.48*	1.34 to 1.64
Fair or poor	5.70*	5.30 to 6.12	2.98*	2.73 to 3.27	4.16*	3.80 to 4.57	2.34*	2.08 to 2.64
Self-perceived mental health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	1.60*	1.52 to 1.69	1.21*	1.13 to 1.29	1.40*	1.29 to 1.52	1.03	0.94 to 1.13
Fair or poor	3.85*	3.52 to 4.22	2.02*	1.80 to 2.26	2.37*	2.01 to 2.79	1.23*	1.03 to 1.47
Specialist consultation								
Number of chronic conditions								
None†	1.00	...	1.00	...	1.00	...	1.00	...
One	1.73*	1.64 to 1.82	1.47*	1.39 to 1.56	1.67*	1.49 to 1.87	1.56*	1.38 to 1.76
Two	2.88*	2.67 to 3.11	2.17*	1.99 to 2.38	2.23*	1.98 to 2.52	1.98*	1.73 to 2.26
Three or more	4.52*	4.01 to 5.10	2.87*	2.52 to 3.28	3.47*	3.07 to 3.92	2.79*	2.43 to 3.19
Self-perceived general health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	1.40*	1.34 to 1.47	1.30*	1.23 to 1.37	1.49*	1.36 to 1.63	1.39*	1.26 to 1.54
Fair or poor	3.11*	2.90 to 3.33	2.20*	2.01 to 2.40	2.29*	2.08 to 2.53	2.01*	1.80 to 2.26
Self-perceived mental health								
Excellent or very good†	1.00	...	1.00	...	1.00	...	1.00	...
Good	1.21*	1.15 to 1.29	1.05	0.98 to 1.12	0.99	0.92 to 1.07	0.85*	0.78 to 0.93
Fair or poor	2.15*	1.97 to 2.36	1.37*	1.24 to 1.52	1.30*	1.10 to 1.53	0.91	0.76 to 1.08

† *Reference category*
‡ *Adjusted for sex, age, ability to converse in English or French, household income, urban/rural residence and having regular family doctor*
* *Significantly different from estimate for reference category (p < 0.05)*
Source: *2005 Canadian Community Health Survey*

health is high among some visible minorities, notably Aboriginal people.

When sex, age, household income, residence and race (as well as language and having a regular family doctor) were taken into account, chronic conditions and self-perceived health continued to be potent predictors of doctor consultations (Table 2). However, the strength of the associations diminished—invariably, the odds that people with the greatest "need" (as indicated by the presence of chronic conditions and fair or poor health) would consult physicians were substantially reduced (see *Methods*). For instance, at ages 18 to 64, the unadjusted odds of a specialist consultation for an individual with at least three chronic conditions were four and a half times greater than the odds for someone with no chronic conditions. When the effects of the predisposing and enabling factors were controlled, the odds, while still greater, fell to about three times those of someone with no chronic conditions. Among seniors, the corresponding odds ratio dropped from 3.47 to 2.79.

The remainder of this analysis examines how these predisposing and enabling factors were related to the use of GPs and specialists in Canada, when controlling for need.

Consultations and age

Because advancing age is associated with declining health (Appendix Tables A and B), physician consultations tended to increase at older ages (Appendix Tables C and D). But when the level of need and the other characteristics were controlled, the relationship between age and physician consultations was less clear.

In fact, among 18- to 64-year-olds, the age gradient was no longer evident (Table 3). Compared with people aged 18 to 24, only 25- to 34-year-olds had high odds of reporting a GP consultation or multiple GP consultations, and this largely reflected frequent use of health care services by women around the time of childbirth. When women who were pregnant at the time of their CCHS interview and those who had given birth in the previous year were excluded from the analysis, 25- to 34-year-olds no longer had significantly high odds of a GP consultation or multiple GP consultations (data not shown).

By contrast, among seniors, even controlling for the other factors, advancing age continued to be associated with a greater likelihood of a GP consultation, and particularly, multiple GP consultations (Table 4). This may be because it was not possible to control for the severity of chronic conditions in the multivariate model.

The relationship between age and specialist consultations was different from that for GP consultations. Among people aged 18 to 64, 25- to 34-year-olds had significantly high odds of having consulted a specialist compared with 18- to 24-year-olds (Table 3). Even when women who were pregnant and those who had recently given birth were excluded, the odds were reduced, but remained significantly high. Among seniors, the odds of a specialist consultation were actually lower for those aged 75 or older, compared with 65- to 69-year-olds.

Higher among women

Women have consistently been found to use medical services more often than men do.[12-14, 20,21] According to the results of the 2005 CCHS, even allowing for the effects of chronic conditions, self-perceived health and the other factors, the relationship between sex and GP consultations persisted at ages 18 to 64 (Table 3). Compared with men, women in this age range had high odds of reporting a GP consultation, multiple GP visits and a specialist consultation. Although the odds were reduced, these findings held when those who were pregnant or who had given birth in the previous year were excluded (data not shown).

By contrast, among seniors, when chronic conditions, self-perceived health and the other factors were taken into account, senior women's odds of having consulted a GP or reporting multiple GP visits were statistically similar to the odds for senior men (Table 4). And the odds that elderly women had consulted a specialist in the previous year were significantly lower than the odds for elderly men.

Table 3
Adjusted odds ratios for physician consultations in past year, by selected characteristics, household population aged 18 to 64, Canada, 2005

	Consultations					
	With general practitioner		Four or more with GP		With specialist	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Health need						
Number of chronic conditions						
None†	1.00	...	1.00	...	1.00	...
One	1.75*	1.63 to 1.87	2.02*	1.90 to 2.14	1.47*	1.39 to 1.56
Two	2.79*	2.43 to 3.21	3.43*	3.12 to 3.77	2.17*	1.99 to 2.38
Three or more	3.64*	2.86 to 4.63	4.81*	4.20 to 5.49	2.87*	2.52 to 3.28
Self-perceived general health						
Excellent or very good†	1.00	...	1.00	...	1.00	...
Good	1.12*	1.05 to 1.19	1.62*	1.53 to 1.72	1.30*	1.23 to 1.37
Fair or poor	1.38*	1.22 to 1.55	2.98*	2.73 to 3.27	2.20*	2.01 to 2.40
Self-perceived mental health						
Excellent or very good†	1.00	...	1.00	...	1.00	...
Good	1.07	1.00 to 1.16	1.20*	1.13 to 1.29	1.05	0.98 to 1.12
Fair or poor	1.51*	1.29 to 1.76	2.02*	1.80 to 2.26	1.37*	1.24 to 1.52
Predisposing characteristics						
Sex						
Men†	1.00	...	1.00	...	1.00	...
Women	1.77*	1.68 to 1.86	1.84*	1.75 to 1.94	1.92*	1.82 to 2.01
Age group						
18 to 24†	1.00	...	1.00	...	1.00	...
25 to 34	1.09*	1.00 to 1.19	1.19*	1.09 to 1.30	1.21*	1.12 to 1.31
35 to 44	0.97	0.89 to 1.06	0.86*	0.79 to 0.94	1.08	0.99 to 1.17
45 to 54	1.03	0.94 to 1.13	0.79*	0.72 to 0.87	1.02	0.93 to 1.11
55 to 64	1.02	0.92 to 1.13	0.79*	0.72 to 0.87	1.09	1.00 to 1.19
Racial or cultural group						
White†	1.00	...	1.00	...	1.00	...
Black	1.13	0.91 to 1.41	1.02	0.80 to 1.28	0.74*	0.60 to 0.90
Aboriginal	1.02	0.88 to 1.17	1.34*	1.18 to 1.52	0.69*	0.61 to 0.77
Other	1.07	0.97 to 1.17	1.25*	1.14 to 1.36	0.76*	0.69 to 0.83
Enabling characteristics						
Can converse in English or French						
Yes†	1.00	...	1.00	...	1.00	...
No	0.98	0.70 to 1.38	1.58*	1.21 to 2.07	0.94	0.68 to 1.29
Household income						
Lowest	0.88*	0.81 to 0.95	1.18*	1.09 to 1.27	0.95	0.88 to 1.03
Lower-middle	0.97	0.90 to 1.05	1.10*	1.02 to 1.19	1.01	0.94 to 1.08
Middle†	1.00	...	1.00	...	1.00	...
Upper-middle	1.19*	1.10 to 1.27	1.10*	1.02 to 1.18	1.14*	1.07 to 1.23
Highest	1.24*	1.15 to 1.32	1.08*	1.00 to 1.16	1.24*	1.15 to 1.33
Residence						
Urban†	1.00	...	1.00	...	1.00	...
Rural	0.94	0.87 to 1.00	1.09*	1.01 to 1.16	0.69*	0.64 to 0.74
Has regular family doctor						
Yes†	1.00	...	1.00	...	1.00	...
No	0.23*	0.21 to 0.24	0.35*	0.32 to 0.38	0.70*	0.65 to 0.75

† *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
Source: *2005 Canadian Community Health Survey*

Table 4
Adjusted odds ratios for physician consultations in past year, by selected characteristics, household population aged 65 or older, Canada, 2005

	Consultations					
	With general practitioner		Four or more with GP		With specialist	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Health need						
Number of chronic conditions						
None†	1.00	...	1.00	...	...	...
One	2.09*	1.80 to 2.43	2.59*	2.29 to 2.92	1.56*	1.38 to 1.76
Two	2.91*	2.40 to 3.52	4.07*	3.60 to 4.60	1.98*	1.73 to 2.26
Three or more	3.45*	2.71 to 4.40	6.23*	5.44 to 7.14	2.79*	2.43 to 3.19
Self-perceived general health						
Excellent or very good†	1.00	...	1.00	...	1.00	...
Good	1.07	0.93 to 1.24	1.48*	1.34 to 1.64	1.39*	1.26 to 1.54
Fair or poor	1.35*	1.12 to 1.62	2.34*	2.08 to 2.64	2.01*	1.80 to 2.26
Self-perceived mental health						
Excellent or very good†	1.00	...	1.00	...	1.00	...
Good	1.00	0.87 to 1.16	1.03	0.94 to 1.13	0.85*	0.78 to 0.93
Fair or poor	1.21	0.88 to 1.67	1.23*	1.03 to 1.47	0.91	0.76 to 1.08
Predisposing characteristics						
Sex						
Men†	1.00	...	1.00	...	1.00	...
Women	1.01	0.90 to 1.14	1.04	0.96 to 1.13	0.83*	0.77 to 0.90
Age group						
65 to 69†	1.00	...	1.00	...	1.00	...
70 to 74	1.12	0.97 to 1.30	1.06	0.96 to 1.18	0.93	0.84 to 1.03
75 to 79	1.21*	1.03 to 1.44	1.19*	1.06 to 1.33	0.87*	0.78 to 0.97
80 to 84	1.10	0.90 to 1.34	1.54*	1.36 to 1.74	0.80*	0.71 to 0.90
85 or older	1.44*	1.15 to 1.79	1.58*	1.38 to 1.82	0.69*	0.59 to 0.80
Racial or cultural group						
White†	1.00	...	1.00	...	1.00	...
Black	2.83*	1.22 to 6.52	1.06	0.57 to 1.98	0.50*	0.28 to 0.88
Aboriginal	0.60	0.35 to 1.01	1.11	0.72 to 1.70	0.57*	0.37 to 0.90
Other	1.06	0.73 to 1.54	2.09*	1.63 to 2.69	0.76*	0.60 to 0.97
Enabling characteristics						
Can converse in English or French						
Yes†	1.00	...	1.00	...	1.00	...
No	1.79	0.93 to 3.42	1.29	0.89 to 1.85	1.11	0.75 to 1.65
Household income						
Lowest	0.86*	0.75 to 0.99	0.92	0.84 to 1.01	0.84*	0.76 to 0.93
Lower-middle	1.14	0.96 to 1.35	0.98	0.88 to 1.09	1.06	0.95 to 1.18
Middle†	1.00	...	1.00	...	1.00	...
Upper-middle	1.34*	1.04 to 1.71	0.90	0.78 to 1.03	1.30*	1.12 to 1.51
Highest	1.36*	1.03 to 1.80	0.97	0.81 to 1.17	1.48*	1.24 to 1.77
Residence						
Urban†	1.00	...	1.00	...	1.00	...
Rural	1.12	0.95 to 1.31	1.15*	1.04 to 1.27	0.62*	0.56 to 0.69
Has regular family doctor						
Yes	1.00	...	1.00	...	1.00	...
No†	0.09*	0.08 to 0.11	0.26*	0.21 to 0.32	0.77*	0.63 to 0.93

† *Reference category*
* *Significantly different from estimate for reference category ($p < 0.05$)*
Source: *2005 Canadian Community Health Survey*

Definitions

Outcomes

Three outcome measures—consultation with a general practitioner (GP), multiple general practitioner consultations, and consultation with a specialist—were examined.

To determine consultation with a GP, respondents to the Canadian Community Health Survey (CCHS) were asked, "Not counting when you were an overnight patient in the hospital, in the past 12 months, how many times have you seen or talked on the telephone with a family doctor or general practitioner about your physical, emotional or mental health?" Respondents who had contacted a GP at least once were classified as having consulted a general practitioner in the previous year. This definition includes telephone consultations as well as face-to-face visits, but less than 2% of respondents reported a telephone consultation.

A derived variable was constructed to measure the number of GP consultations. The average number of GP consultations in the previous year was three; frequent use was defined as four or more consultations.

To measure consultation with a specialist, respondents were asked, "Not counting overnight hospital stays in the past 12 months, how many times have you seen or talked on the telephone with other medical doctors (such as a surgeon, allergist, gynecologist, or psychiatrist) about your physical, emotional or mental health." Respondents who had contacted a specialist at least once were classified as having consulted a specialist in the previous year.

Health need

Number of chronic conditions is an indicator of need. Respondents were asked if they had "long-term conditions that had lasted or were expected to last six months or more and that had been diagnosed by a health professional." The interviewer read a list of conditions; those included in this analysis were coronary heart disease, diabetes, high blood pressure, stroke, cancer, arthritis, stomach ulcer, asthma and emphysema.

Self-perceived general health was assessed with the question, "In general, would you say your health is: excellent, very good, good, fair or poor?"

Self-perceived mental health was assessed with the question, "In general, would you say your mental health is: excellent, very good, good, fair or poor?"

Predisposing characteristics

Separate analyses were conducted for the 18-to-64 age group and for seniors (65 or older). Five *age groups* were established in each category: 18 to 24, 25 to 34, 35 to 44, 45 to 54 and 55 to 64; and 65 to 69, 70 to 74, 75 to 79, 80 to 84, and 85 or older.

To determine *racial/cultural group*, the CCHS interviewer read the following statement: "People living in Canada come from many different cultural and racial backgrounds," and then asked if the respondent was White, Black, South Asian (for example, East Indian, Pakistani, Sri Lankan), Southeast Asian (for example, Cambodian, Indonesian, Laotian, Vietnamese), Filipino, Latin American, Arab, West Asian (for example, Afghan, Iranian), Japanese, Korean, Aboriginal, or other. For this analysis, racial/cultural group was classified into four categories: White, Black, Aboriginal, and all other visible minority groups.

Enabling characteristics

Respondents were asked, "In what languages can you conduct a conversation?" For this analysis, *language* was classified into two groups: English or French (if they were among the languages in which the respondent could comfortably converse) and other (if English or French was not among those languages).

Level of education, based on the highest level attained, was classified into four groups: less than secondary graduation, secondary graduation, some postsecondary, and postsecondary graduation.

Household income was derived by calculating the ratio between the total income of the respondent's household in the past 12 months and the 2004 low income cutoff (LICO) corresponding to the number of people in the household and the size of the community. The low income cutoff is the threshold at which a household would typically spend a larger portion of its income than the average household on food, shelter and clothing. The ratios were sorted from smallest to largest, and adjusted ratios were calculated by dividing the original ratios by a factor of 10 to convert them into ratios less than or equal to one. The ratios were grouped in deciles across Canada (10 intervals, each with approximately the same number of respondents). The deciles were generated using weighted data. These deciles were then grouped into five household income categories: lowest, lower-middle, middle, upper-middle, and highest, plus a missing category.

In the CCHS, urban or rural *residence* is a derived variable and is based on census geography. Urban areas are continuously built-up areas having a population concentration of 1,000 or more and a population density of 400 or more per square kilometre, based on current census population counts. All other areas are considered to be rural, and include about 5% of postal codes where information about urban status is missing.

Having a regular family doctor was determined with the question, "Do you have a regular family doctor?"

Household income and education

Earlier studies have documented associations between the use of health care services in Canada and socio-economic factors, even after the introduction of universal health insurance.[9-18] Data from the 2005 CCHS support these findings, at least with regard to physician consultations.

Univariate analyses indicate that people aged 18 to 64 in the highest income groups were more likely than those in the middle income group to have consulted a GP in the previous year, while those in the lowest income households were less likely (Appendix Table C). For seniors, the income gradient was not as strong; only those in the lowest income households had a significantly low rate of GP consultations (Appendix Table D). Associations between GP use and education were also evident in both age groups; people with less than secondary graduation were less likely to have consulted a GP, compared with those with postsecondary graduation.

In the multivariate model, which controlled for need and other factors, the relationship between household income and GP consultations persisted for 18- to 64-year-olds, and became even stronger for seniors (Tables 3 and 4). Education was not considered in the multivariate analysis because of its high correlation with income.

In the univariate analyses, for both age groups, multiple GP consultations were most common among people in low income households. (The same was true for low education.) When need and the other factors were considered, the income gradient was no longer evident for seniors, but for 18- to 64-year-olds, those in both lower and upper income households were more likely than those in middle income households to report multiple GP consultations.

For specialist contacts, the relationship with household income was clear. When the effects of need and the other factors were taken into account, at ages 18 to 64, the odds of reporting a consultation were significantly high for people in upper-middle and highest income households, compared with those in middle-income households (Table 3). Among seniors, the odds of a specialist consultation were significantly high for people in higher income households, and significantly low for those in the lowest income households (Table 4).

Visible minorities

At ages 18 to 64, the odds that members of visible minority groups would report a GP consultation were statistically similar to those for Whites when need and factors such as age and household income were taken into account (Table 3). However, the odds of multiple GP consultations were higher for Aboriginal people and other visible minorities, compared with Whites.

Among seniors, the odds of a GP consultation were high for Black people, compared with Whites. As well, other visible minorities in this age group had significantly high odds of multiple GP consultations.

Specialist consultations were a different matter. Whether they were aged 18 to 64 or seniors, Aboriginal people, Blacks and other visible minorities had significantly low odds of having had a specialist consultation in the previous year.

Language

Language has been cited as a potential barrier to the use of health care services,[22] but according to the results of the 2005 CCHS, this was not the case for GP consultations. When need and the other factors were taken into account, at ages 18 to 64, the odds of consulting a GP were similar among those who could converse comfortably in English or French and those who could not. And people who could not converse in English or French had significantly high odds of reporting multiple GP consultations.

For seniors, the odds of a GP consultation and multiple GP contacts were not significantly related to language, but this was partly attributable to having "racial or cultural group" in the model. When that characteristic was excluded, the odds of a GP consultation and multiple GP consultations for seniors who could not converse in English or French were about twice those for seniors who could (data not shown).

When all the factors were considered, there was initially no relationship between specialist

consultations and language. But when racial or cultural group was excluded, the odds of a specialist consultation were significantly low for 18- to 64-year-olds who could not converse in English or French (data not shown). The finding that language was not related to specialist service use among seniors persisted (data not shown).

Urban/Rural residence

The use of health care services has been shown to be associated with geographic location.[23] Health care providers, especially medical specialists, tend to be concentrated in urban areas. For people in rural locales, access to such services is often inconvenient.[24]

The results of the 2005 CCHS show that rural residents were just as likely as urban dwellers to have GP consultations, even when need and the other factors were considered (Tables 3 and 4). Moreover, rural residents in both age groups had significantly higher odds than did people in urban communities of having multiple GP consultations.

The use of specialist services, however, was lower among people in rural areas. Whether they were aged 18 to 64 or seniors, rural residents had significantly low odds of a specialist consultation, compared with people in urban areas.

Having a regular physician

In 2005, a substantial share of adult Canadians reported that they did not have a regular family doctor. At ages 18 to 64, the proportion was 16% (an estimated 3.3 million), and among the elderly, almost 5% (an estimated 186,000) (data not shown).

Not surprisingly, whether they were aged 18 to 64 or seniors, people without a family doctor were far less likely to report consultations with GPs, let alone specialists (Appendix Tables C and D). However, these people also tended to be in better health—they were less likely than those who had a doctor to have three or more chronic conditions or to report fair or poor general or mental health (Appendix Tables A and B). Yet even allowing for these need factors and the other characteristics, people who did not have a family doctor had significantly low odds of GP and specialist consultations.

Concluding remarks

According to results from the 2005 Canadian Community Health Survey (CCHS), individual health needs—as measured by chronic conditions and self-perceived general and mental health—were strong determinants of physician consultations. However, consistent with Andersen's theory, when sex, age, race, language, household income, urban or rural residence and having a regular family doctor were taken into account, the strength of the associations between health need and physician consultations diminished. While chronic conditions and self-perceived health continued to be potent predictors, these other factors were independently related to the likelihood of going to the doctor, particularly specialists.

Some groups were relatively unlikely to consult specialists, even though such services are also covered by the provisions of the Canada Health Act. In a number of cases, these were the same groups who reported repeated visits to GPs. For instance, the odds of a specialist visit were significantly low for very old people, residents of low income households, visible minorities and rural residents. At the same time, very old people, other visible minorities, rural residents and people aged 18 to 64 who were Aboriginal or lived in low income households all had high odds of reporting four or more GP consultations.

About 3.5 million Canadian adults do not have a regular family doctor. While this group tended to be in relatively good health, even when that was taken into account, they were particularly unlikely to have had a physician consultation.

Twenty years after the introduction of the Canada Health Act, several factors beyond need were significantly associated with the likelihood of having seen a doctor. The results of this analysis indicate that socio-economic status remains a factor in the use of physicians' services. In addition, several other factors—sex, age, race, language, and residence—were associated with individuals' likelihood of consulting a doctor, independent of the state of their health. ●

References

1 Madore O. *The Canada Health Act: Overview and Options.* Ottawa: Economics Division, Parliamentary Research Branch, Library of Parliament, May 2004.

2 Andersen R, Newman J. Societal and individual determinants of medical care utilization in the United States. *Milbank Memorial Fund Quarterly* 1973; 51: 95-124.

3 Andersen RM. Revisting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior* 1995; 36(1): 1-10.

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

5 Korn EL, Graubard MA. Epidemiological studies utilizing surveys: Accounting for the sampling design. *American Journal of Public Health* 1991; 81(9): 1166-73.

6 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.

7 Rust KF, Rao JNK. Variance estimation for complex surveys using replication techniques. *Statistical Methods in Medical Research* 1996; 5(3): 283-310.

8 Eyles J, Birch S, Newbold KB. Delivering the goods? Access to family physician services in Canada: A comparison of 1985 and 1991. *Journal of Health and Social Behaviour* 1995; 36: 322-32.

9 Hay DI. Socioeconomic status and health status: A study of males in the Canada Health Survey. *Social Science and Medicine* 1988; 27(12): 1317-25.

10 Badgley RF. Social and economic disparities under Canadian health care. *International Journal of Health Services* 1991; 21(4): 659-71.

11 Broyles RW, Manga P, Binder DA, et al. The use of physician services under a national health insurance scheme: An examination of the Canada Health Survey. *Medical Care* 1983; 21(11): 1037-54.

12 Humphries KH, van Doorslaer E. Income-related health inequality in Canada. *Social Science & Medicine* 2000; 50(5): 663-71.

13 Dunlop S, Coyte PC, McIssac W. Socio-economic status and the utilisation of physicians' services: results from the Canadian National Population Health Survey. *Social Science & Medicine* 2000; 51(1): 123-33.

14 McIssac W, Goel V, Naylor D. Socio-economic status and visits to physicians by adults in Ontario, Canada. *Journal of Health Service Research Policy* 1997; 2(2): 94-102.

15 Katz SJ, Hofer TP, Manning WG. Hospital utilization in Ontario and the United States: The impact of socioeconomic status and health status. *Canadian Journal of Public Health* 1996; 87(4): 253-6.

16 Quan H, Fong A, De Coster C, et al. Variation in health services utilization among ethnic populations. *Canadian Medical Association Journal* 2006; 174(6): 787-815.

17 Rotermann, M. Seniors' health care use. *Health Reports* (Statistics Canada, Catalogue 82-003) 2006; 16(Suppl.): 33-46.

18 van Doorslaer E, Masseria C, Koolman X. Inequalities in access to medical care by income in developed countries. *Canadian Medical Association Journal* 2006; 174(2): 177-83.

19 Chen AW, Kazanjian A. Rate of mental health service utilization by Chinese immigrants in British Columbia. *Canadian Journal of Public Health* 2005; 96(1): 49-51.

20 Cleary PD, Mechanic D, Greenley JR. Sex differences in medical care utilization: an empirical investigation. *Journal of Health and Social Behavior* 1982; 23(2): 106-19.

21 Millar WJ, Beaudet MP. Health facts from the 1994 National Population Health Survey. *Canadian Social Trends* (Statistics Canada, Catalogue 11-008) 1996; Spring: 24-7.

22 Becker G. Deadly inequality in the health care 'safety net': uninsured ethnic minorities' struggle to live with life-threatening illnesses. *Medical Anthropology Quarterly* 2004; 18(2): 258-75.

23 Rowland D, Lyons B. Triple jeopardy: rural, poor and uninsured. *Health Services Research* 1989; 23(6): 975-1004.

24 Wardman D, Clement K, Quantz D. Access and utilization of health services by British Columbia's rural Aboriginal population. *International Journal of Health Care Quality Assurance.* 2005; 18(2-3): 26-31.

Appendix

Table A
Health status of household population aged 18 to 64, by selected characteristics, Canada, 2005

	Three or more chronic conditions	Fair or poor general health	Fair or poor mental health
	%	%	%
Total	**2.5**	**9.2**	**5.0**
Sex			
Men†	2.2	8.9	4.6
Women	2.7*	9.4	5.4*
Age group			
18 to 24†	0.2	5.4	4.9
25 to 34	0.3*	5.0	4.1*
35 to 44	0.9*	7.4*	5.1
45 to 54	3.0*	11.3*	5.8*
55 to 64	8.5*	17.0*	5.2
Racial or cultural group			
White†	2.6	9.0	4.9
Black	1.6*	8.9	4.0E
Aboriginal	4.5*	16.5*	9.1*
Other	1.3*	8.7	4.9
Can converse in English or French			
Yes†	2.5	9.1	5.0
No	2.1	17.5*	9.2E
Household income			
Lowest	4.6*	17.9*	9.9*
Lower-middle	2.8*	10.1*	5.5*
Middle†	2.1	7.5	4.4
Upper-middle	1.7*	6.4*	3.4*
Highest	1.5*	4.8*	2.7*
Residence			
Urban†	2.4	9.0	5.0
Rural	3.4*	11.3*	5.0
Has regular family doctor			
Yes†	2.8	9.7	5.2
No	0.8*	6.4*	4.3*

† *Reference category*
* *Significantly different from estimate for reference category (p < 0.05)*
E *use with caution (coefficient of variation 16.6% to 33.3%)*
Note: *Except for household income, missing values were excluded when calculating prevalence estimates.*
Source: *2005 Canadian Community Health Survey*

Table B
Health status of household population aged 65 or older, by selected characteristics, Canada, 2005

	Three or more chronic conditions	Fair or poor general health	Fair or poor mental health
	%	%	%
Total	**18.0**	**26.3**	**5.2**
Sex			
Men†	16.8	26.3	5.1
Women	18.9*	26.4	5.2
Age group			
65 to 69†	13.8	19.6	4.0
70 to 74	17.4*	23.8*	4.4
75 to 79	20.5*	31.1*	5.6*
80 to 84	22.5*	34.3*	7.2*
85 or older	21.8*	34.3*	7.6*
Racial or cultural group			
White†	18.4	25.6	4.7
Black	16.5E	41.2*	8.3E
Aboriginal	29.0*	37.4*	8.6E
Other	14.0*	28.9	8.4*E
Can converse in English or French			
Yes†	18.0	25.6	4.8
No	20.7	36.6*	13.9*E
Household income			
Lowest	22.6*	33.4*	6.8*
Lower-middle	17.9*	25.5*	4.8*
Middle†	15.3	20.2	3.4
Upper-middle	14.5	17.2	2.6E
Highest	10.7*	11.8*	2.2E
Residence			
Urban†	17.6	25.9	5.0
Rural	21.9*	31.1*	6.6*
Has regular family doctor			
Yes†	18.4	26.7	5.2
No	9.9*	19.4*	5.2E

† *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: *Except for household income, missing values were excluded when calculating prevalence estimates.*
Source: *2005 Canadian Community Health Survey*

Table C

Percentage reporting physician consultations in past year, by selected characteristics, household population aged 18 to 64, Canada, 2005

	Consultations		
	With general practitioner	Four or more with GP	With specialist
	%	%	%
Total	**76.6**	**24.9**	**26.5**
Sex			
Men†	70.1	18.8	20.2
Women	82.6*	30.9*	32.8*
Age group			
18 to 24†	71.6	21.0	21.6
25 to 34	74.1*	24.5*	25.4*
35 to 44	74.9*	22.3	25.1*
45 to 54	79.3*	25.3*	27.5*
55 to 64	82.7*	31.7*	32.8*
Racial or cultural group			
White†	76.9	24.2	27.7
Black	75.2	23.5	20.9*
Aboriginal	76.0	33.2*	22.3*
Other	76.1	27.7	21.7*
Can converse in English or French			
Yes†	78.2	24.7	26.7
No	76.7	40.5*	24.5
Education			
Less than secondary	73.3*	29.4*	23.6*
Secondary graduation	76.0*	24.7	23.5*
Some postsecondary	75.4*	23.4	26.7
Postsecondary graduation†	77.9	24.2	28.1
Household income			
Lowest	74.6*	31.8*	27.4
Lower-middle	75.5	26.3	26.3
Middle†	76.8	23.9	26.9
Upper-middle	78.3*	23.2	27.0
Highest	78.7*	21.4*	23.2*
Residence			
Urban†	76.8	24.7	26.9
Rural	74.5*	26.6*	21.8*
Has regular family doctor			
Yes†	82.3	27.7	28.2
No	47.2*	10.2*	17.8*

† *Reference category*
* *Significantly different from estimate for reference category (p < 0.05)*
Note: *Except for education and household income, missing values were excluded when calculating prevalence estimates.*
Source: *2005 Canadian Community Health Survey*

Table D

Percentage reporting physician consultations in past year, by selected characteristics, household population aged 65 or older, Canada, 2005

	Consultations		
	With general practitioner	Four or more with GP	With specialist
	%	%	%
Total	**87.8**	**44.3**	**34.3**
Sex			
Men†	87.0	42.5	36.7
Women	88.4*	45.7*	32.4*
Age group			
65 to 69†	85.7	37.9	35.0
70 to 74	88.1*	42.2*	35.3
75 to 79	88.8*	46.9*	34.7
80 to 84	89.2*	52.9*	33.0
85 or older	90.0*	53.6*	29.9*
Racial or cultural group			
White†	87.9	43.3	35.4
Black	95.5*	52.0	22.6*E
Aboriginal	81.7*	50.1	23.4*
Other	90.3	58.6*	29.7*
Can converse in English or French			
Yes†	87.8	43.7	34.8
No	93.6*	62.4*	32.9
Education			
Less than secondary	87.1*	47.4*	30.7*
Secondary graduation	88.0	43.8	33.9*
Some postsecondary	89.1	41.4	41.6
Postsecondary graduation†	89.2	41.7	38.7
Household income			
Lowest	86.6*	49.8*	32.2*
Lower-middle	88.9	44.5	36.1
Middle†	89.3	43.9	37.6
Upper-middle	90.0	39.1*	38.8
Highest	89.8	38.1*	41.4
Residence			
Urban†	87.9	44.1	34.9
Rural	87.2	46.4*	26.8*
Has regular family doctor			
Yes†	90.1	45.8	34.8
No	42.2*	14.4*	24.5*

† *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: *Except for education and household income, missing values were excluded when calculating prevalence estimates.*
Source: *2005 Canadian Community Health Survey*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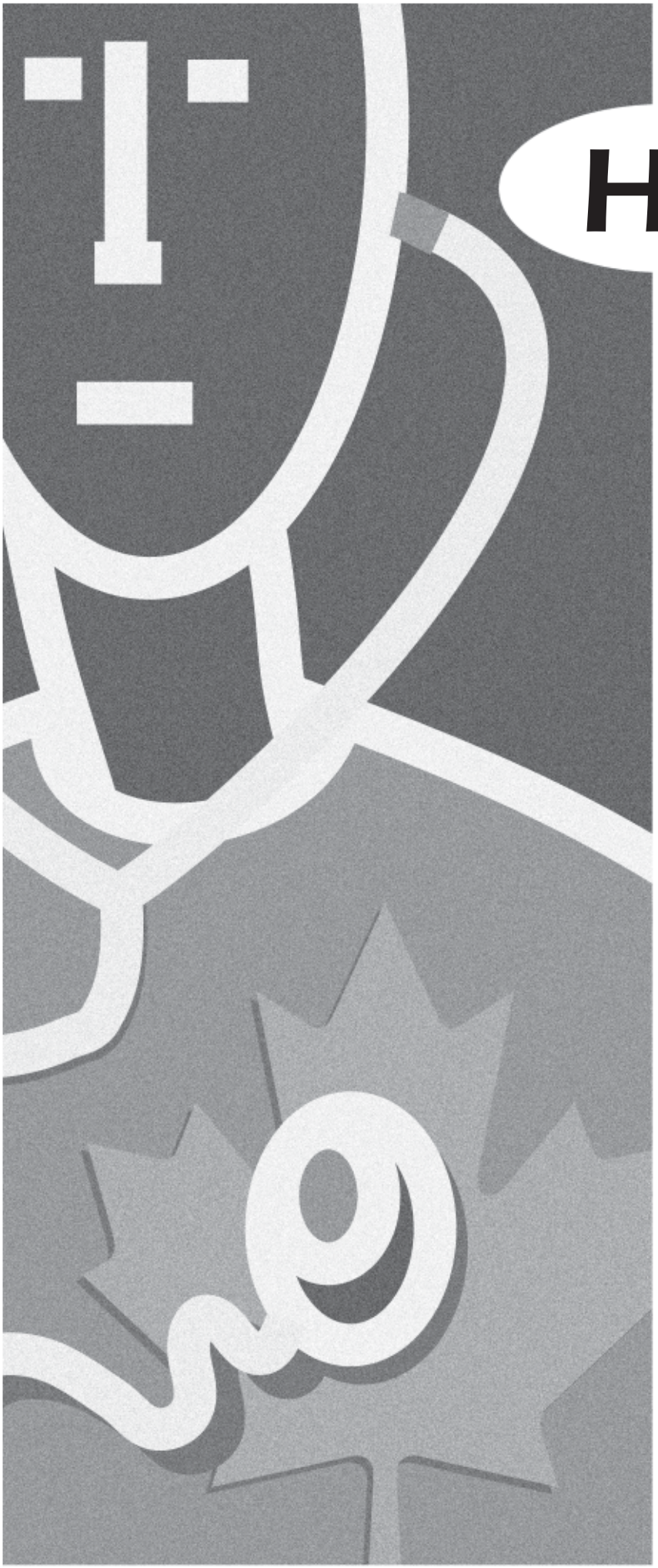

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Second or subsequent births to teenagers

by Michelle Rotermann

Keywords: low birthweight, low income, poverty, pregnancy in adolescence

Compared with women in their twenties and thirties, teenagers are much less likely to give birth. For example, in 2003, there were 14.5 live births per 1,000 girls aged 15 to 19, compared with 96.1 per 1,000 women aged 25 to 34—the age group with the highest fertility rate.[1] Moreover, the fertility rate among teenagers has fallen almost steadily since the mid-1970s.[2,3] Even so, a substantial number of teen girls give birth each year, and some bear more than one baby before turning 20.

Early childbearing can have serious consequences for both the babies and their mothers. Infants born to teenagers are more apt to experience adverse birth outcomes and die during their first year of life than are infants born to older women.[4-9] As well, the education and employment opportunities of the teens who have babies are often curtailed. Consequently, young mothers and their children are likely to be economically disadvantaged.[10-15] And those girls who have more than one baby while still in their teens may face even greater challenges.

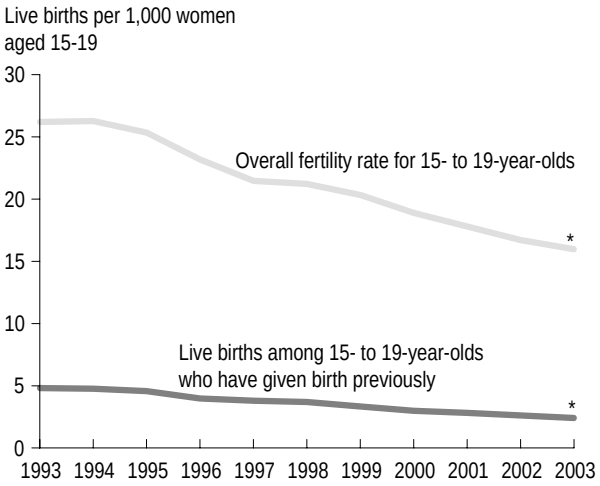
This article describes 1993-to-2003 trends in second or subsequent births to girls aged 15 to 19. Provincial/Territorial and neighbourhood income differences are presented, and the prevalence of low birthweight is examined. The figures are based on the most recently available data from the Canadian Vital Statistics Database, which includes information from birth registrations (see *The data*).

Teen births declining

Registration of birth is required by law in all provinces and territories. However, in 1996, Ontario introduced birth registration fees,[16] and as of 2000, up to 4,000 (3%) births in that province may not have been registered.[1,17] This is particularly likely for children born to teenage mothers and babies who died within days of birth (one-quarter of Ontario infant deaths do not have a matching birth registration).[1,18,19] Because births to teenagers are the focus of this article, Ontario data have been excluded from the analysis.

From 1993 through 2003, the rate of *second or subsequent* births to Canadian teenagers (excluding Ontario residents) declined from 4.8 to 2.4 births per 1,000 15- to 19-year-old girls. This drop partly reflects a downturn in the overall teen fertility rate (Chart 1). As a proportion of all teen births, those that were second or subsequent fell from 18.5% in 1993 to 15.2% in 2003 (data not shown). Nonetheless, during that period, nearly 25,000 Canadian teenagers gave birth to their second or subsequent child (data not shown).

Chart 1
Fertility rates, women aged 15 to 19, Canada excluding Ontario, 1993 to 2003



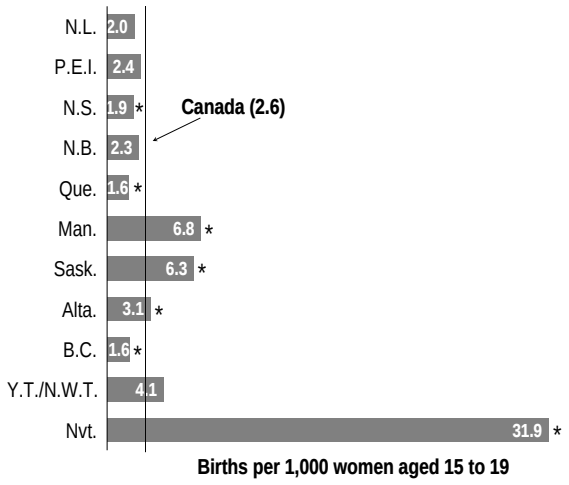
* *Test for trend is statistically significant ($p < 0.05$).*
Source: *Canadian Vital Statistics Database, 1993 to 2003*

Provincial/Territorial variations

The rate of second or subsequent births among teens varied across the country. For the 2001-to-2003 period, the average annual rate was strikingly high in Nunavut (31.9 per 1,000 girls aged 15 to 19), and was also above the national average (2.6) in Manitoba (6.8), Saskatchewan (6.3) and Alberta (3.1) (Chart 2). Rates were below the national level in Nova Scotia, Quebec and British Columbia.

Provinces and territories with high rates of second or subsequent births to teens tended to have relatively large numbers of Aboriginal residents.[20,21] Unlike the Canadian population overall, Aboriginal peoples have not experienced the trend toward delayed first births.[22] For example, in 1999, more than 1 in 5 First Nations babies were born to mothers aged 15 to 19,[23] whereas the comparable figure for Canada as a whole was 1 in 20 (data not shown).

Chart 2
Average annual rate of second or subsequent births, women aged 15 to 19, by province and territory, Canada excluding Ontario, 2001 to 2003



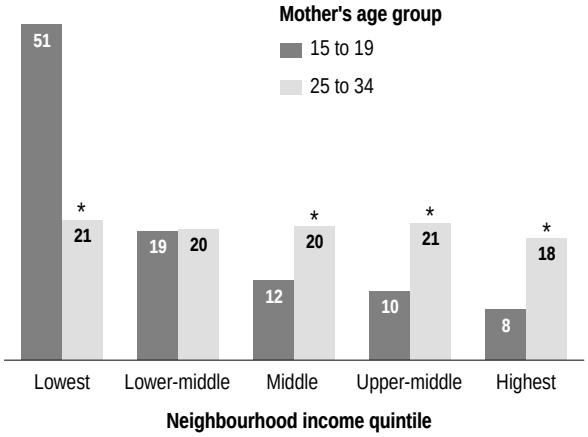
** Signficantly different from estimate for Canada excluding Ontario (p < 0.05)*
Source: *Canadian Vital Statistics Database, 2001 to 2003*

Neighbourhood income

Canadian birth registrations do not contain information about socio-economic status. For this analysis, neighbourhood income data from the census, which were linked to the birth data by means of the mother's postal code, were used to approximate household income.

Teenagers delivering their second or subsequent child were highly concentrated in low-income neighbourhoods. Half the 15- to 19-year-olds who had a second or subsequent child in the 2001-to-2003 period resided in neighbourhoods that were in the lowest quintile of the neighbourhood income distribution (Chart 3). By contrast, 25- to 34-year-old women who had a second or subsequent child in that period were fairly evenly distributed across the income groups.

Chart 3
Percentage distribution of women aged 15 to 19 and 25 to 34 who had a second or subsequent birth, by neighbourhood income quintile, Canada excluding Ontario, 2001 to 2003



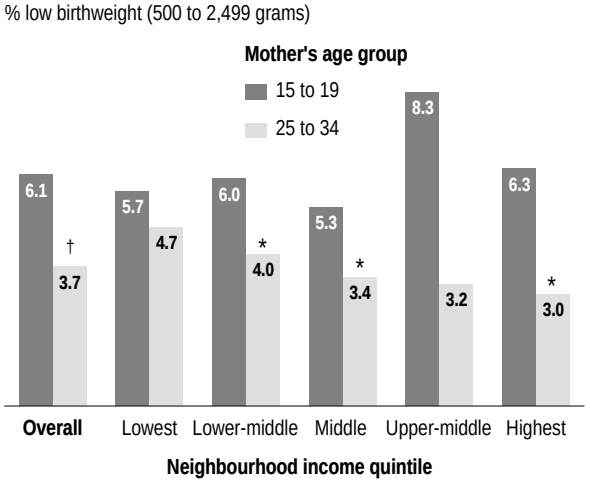
** Significantly different from corresponding estimate for ages 15 to 19 (p < 0.05)*
Source: *Canadian Vital Statistics Database, 2001 to 2003*

Low birthweight

A newborn's chances of survival are closely associated with birthweight. Low-birthweight infants (less than 2,500 grams) have higher mortality and more physical health problems than do babies whose weight at birth was normal.[4-6,9,24]

In the 2001-to-2003 period, the proportion of second or subsequent births that were low-birthweight was significantly higher for teen mothers than for mothers aged 25 to 34: 6.1% versus 3.7% (Chart 4). Rates of low birthweight among second or subsequent births to teen mothers did not vary significantly by neighbourhood income quintile. By contrast, among women aged 25 to 34, these rates were higher in low-income neighbourhoods. This suggests that for teens who have a second or subsequent child, the risk of low birthweight is elevated, regardless of their household income.

Chart 4
Percentage of second or subsequent births that were low birthweight, by neighbourhood income quintile and mother's age group, Canada excluding Ontario, 2001 to 2003



* *Significantly lower than estimate for previous neighbourhood income quintile ($p < 0.05$)*
† *Significantly lower than overall estimate for ages 15 to 19 ($p < 0.05$)*
Source: *Canadian Vital Statistics Database, 2001 to 2003*

The data

Data on live births are from the Vital Statistics Database, which contains information collected by the Vital Statistics Registry in each province and territory. The unit of analysis, unless otherwise specified, is the mother, not each birth. Therefore, mothers of twins and triplets were counted once. The vast majority (99%) of mothers aged 15 to 19 and 25 to 34 gave birth to a single baby.

Because birth registration practices differ across the country,[25] births under 500 grams were excluded. A small number of records had no information about birthweight, duration of pregnancy and/or the total number of live births to the mother, so they were also excluded.

The *teenage fertility rate* is the number of live births per 1,000 women aged 15 to 19.

Low birthweight is defined as less than 2,500 grams. Multiple births (twins, triplets) were considered to have been low birthweight if one infant weighed less than 2,500 grams.

Income data are not recorded on birth registrations. Associations between income and birth outcomes could be estimated only at the neighbourhood level and may mask individual variations within geographic areas.

To determine *neighbourhood income quintile*, the postal code for the mother's usual place of residence was linked to the appropriate 2001 dissemination area (formerly enumeration area), the smallest level of geography for which census data are compiled.[26,27] Neighbourhood income per person equivalent is a measure of household income adjusted for household size. All dissemination areas within a given region were ranked into quintiles by that indicator. Income quintiles could not be assigned to 7.5% (375) of 15- to 19-year-old and 4.1% (8,603) 25- to 34-year-old mothers of second or subsequent births. Rural postal codes accounted for the majority of records that could not be coded.

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References

1 Statistics Canada. *Births, 2003* (Catalogue 84F0210) Ottawa: July, 2005.

2 Statistics Canada. *Births and Deaths, 1995* (Catalogue 84-210) Ottawa: 1996.

3 Statistics Canada. *Pregnancy Outcomes, 2006* (Catalogue 82-224) Ottawa: March, 2006.

4 Wilkins R, Sherman GJ, Best PAF. Birth outcomes and infant mortality by income in urban Canada, 1986. *Health Reports* (Statistics Canada, Catalogue 82-003) 1991; 3(1): 7-31.

5 Chen J, Millar WJ. Birth outcome, the social environment and child health. *Health Reports* (Statistics Canada, Catalogue 82-003) 1999; 10(4): 57-67.

6 Smith GC, Pell JP. Teenage pregnancy and risk of adverse perinatal outcomes associated with first and second births: population based retrospective cohort study. *British Medical Journal* 2001; 323: 1428-9. Available at: http://bmj.bmjjournals.com/cgi/content/full/323/7311/476. Accessed December 29, 2005.

7 Millar WJ, Strachan J, Wadhera S. Trends in low birth weight. *Canadian Social Trends* (Statistics Canada, Catalogue 11-008) 1993; Spring(28): 26-9.

8 Fraser AM, Brockert JE, Ward RH. Association of young maternal age with adverse reproductive outcomes. *The New England Journal of Medicine* 1995; 332(17): 1113-7.

9 Health Surveillance, Alberta Health and the Neonatal Research Unit, University of Calgary. *Maternal Risk Factors in Relationship to Birth Outcome, 1999*. Available at: http://www.health.gov.ab.ca/resources/publications. Accessed December 20, 2005.

10 Berthelot JM, Houle C, Knighton T et al. Healthcare utilization during the first year of life: the impact of social and economic background. *Labour Markets, Social Institutions, and the Future of Canada's Children* (Statistics Canada, Catalogue 89-553) 2000: 145-56.

11 De Wit ML. Educational attainment and timing of childbearing among recent cohorts of Canadian women: A further examination of the relationship. *Canadian Journal of Sociology* 1994; 19(4): 499-512.

12 Wellings K, Wadsworth J, Johnson A, et al. Teenage fertility and life chances. *Journal of Reproduction and Fertility* 1999; 4: 184-90.

13 Combs-Orme T. Health effects of adolescent pregnancy: implications for social workers. *Families in Society: The Journal of Contemporary Human Services* 1993; 74(6): 344-54.

14 Grogger J, Bronars S. The socioeconomic consequences of teenage childbearing: Findings from a natural experiment. *Family Planning Perspectives* 1993; 25(4): 156-74.

15 Hollander D. Young, minority and disadvantaged women exhibit least favorable pregnancy-related health behavior. *Family Planning Perspectives* 1995; 27(6): 259-60.

16 Bienefeld M, Woodward GL, Ardal S. Underreporting of live births in Ontario: 1991-1997. *Central East Health Information Partnership*, February, 2001.

17 Statistics Canada. *Quality Measures-Vital Statistics-Birth Database Bulletin*. Available at: http://www.statcan.ca/english/sdds/document/3231_D2_T9_V1_E.pdf. Accessed December 29, 2005.

18 Woodward G, Bienefeld MK, Ardal S. Under-reporting of live births in Ontario: 1991-1997. *Canadian Journal of Public Health* 2003; 94(6): 463-7.

19 Association of Public Health Epidemiologists in Ontario. *Live Birth Data — Bulletin*. Available at: http://www.apheo.ca/indicators/pages/resources/data%20sources/live_birth_data.htm. Accessed February 16, 2006.

20 Statistics Canada. *Projections of the Aboriginal Populations, Canada, Provinces and Territories, 2001 to 2017* (Catalogue 91-547) Ottawa: 2005

21 Statistics Canada. *Aboriginal Peoples of Canada: A Demographic Profile, 2001* (Catalogue 96F0030) Ottawa: 2003

22 Health Canada. Understanding variation: Fertility trends in some Canadian sub-populations. *Health Policy Research Bulletin*, 10, May, 2005. Available at: http://www.hc-sc.gc.ca/sr-sr/pubs/hpr-rps/bull/2005-10-chang-fertility/index_e.html. Accessed January, 2006.

23 Health Canada, First Nations and Inuit Health Branch. *A Statistical Profile on the Health of First Nations in Canada*. Ottawa: Minister of Health Canada, 2005.

24 Wen SW, Kramer MS, Liu S, et al. Infant mortality by gestational age and birth weight in Canadian provinces and territories, 1990-1994 births. *Chronic Diseases in Canada* 2000; 21(1): 14-22.

25 Joseph KS, Kramer MS, Allen AC, et al. Infant mortality in Alberta and all of Canada. *Canadian Medical Association Journal* 2005; 172(7): 856-7.

26 Statistics Canada. *Postal Code Conversion File (PCCF), Reference Guide* (Catalogue 92F0153) Ottawa: 2005.

27 Wilkins R. *PCCF+ Version 4F User's Guide. Automated Geographic Coding Based on the Statistics Canada Postal Code Conversion Files* (Catalogue 82F0086) Ottawa: 2005.

Medically unexplained physical symptoms

by Jungwee Park and Sarah Knudson

Keywords: chronic fatigue syndrome, fibromyalgia, multiple chemical sensitivity

A substantial number of Canadians report symptoms of conditions that cannot be definitively identified through physical examination or medical testing.[1] Known as "medically unexplained physical symptoms," or "MUPS," they characterize conditions such as chronic fatigue syndrome, fibromyalgia and multiple chemical sensitivity.[2-5] The lack of consistent explanations from physical and laboratory assessments has caused confusion and controversy about these conditions. Many people, including some health care professionals, do not believe that these conditions exist, attributing the symptoms to a variety of other causes. However, for the people who are affected, the symptoms are real and frequently debilitating.

Based on information from the 2002 and 2003 Canadian Community Health Survey (CCHS), this article describes the prevalence of MUPS and the characteristics of Canadians who report having these conditions. It also examines co-morbidity with psychiatric disorders, and associations with dependency, self-perceived mental health, and the use of health care services.

Symptoms overlap

Chronic fatigue syndrome (CFS), fibromyalgia (FM) and multiple chemical sensitivity (MCS) are characterized by clusters of symptoms originating from several different organ systems, which remain medically unexplained.[6] These conditions share key symptoms,[1-4] and individuals often meet the criteria for more than one of them.

Extreme tiredness is the most salient symptom of *chronic fatigue syndrome*. Also known as myalgic encephalomyelitis, CFS is mostly determined by negative diagnosis; that is, a patient is said to have the syndrome only when other medical conditions with similar symptoms have been ruled out.[5,7]

The diagnostic criterion for *fibromyalgia* is pain lasting three months or more in at least 11 of 18 specified areas.[5] The pain is often, but not necessarily, accompanied by symptoms that are common to CFS, such as cognitive impairment, headache, sore throat, weakness, fatigue, depression and digestive problems.[5,7]

Those who suffer from *multiple chemical sensitivity* develop a variety of symptoms when they are exposed to synthetic chemicals in doses that usually have no noticeable effect. Among the symptoms triggered by chemical exposure are changes in heart rate, difficulty breathing, rashes, nausea, headache, and confusion.[8] The duration, severity and nature of these reactions vary greatly, and symptoms may last for days.

More than one million

According to the 2003 Canadian Community Health Survey, 5% of Canadians aged 12 or older, an estimated 1.2 million people, reported having been diagnosed with at least one of three MUPS conditions: 1.3% reported CFS; 1.5%, FM; and 2.4%, MCS (Table 1). Among individuals with MUPS, about 14% had at least two of the three conditions (data not shown).

For each of the three conditions, prevalence rates for women were more than twice those for men (Table 1). As well, the overall prevalence of MUPS rose with age from 1.6% at ages 12 to 24 to 6.9% at ages 45 to 64. This pattern was similar for each of the three conditions. Even when variables such as household income, education and marital status were taken into account, the age-sex differences remained significant (data not shown).

The likelihood of reporting MUPS was associated with socio-economic status. The overall

Table 1

Prevalence of medically unexplained physical symptoms (MUPS), household population aged 12 or older, Canada, 2003

	Total MUPS		Chronic fatigue syndrome		Fibromyalgia		Multiple chemical sensitivity	
	'000	%	'000	%	'000	%	'000	%
Total	**1,185**	**4.5**	**341**	**1.3**	**393**	**1.5**	**643**	**2.4**
Sex								
Male†	325	2.5	106	0.8	77	0.6	180	1.4
Female	860	6.4*	235	1.7*	316	2.4*	463	3.4*
Age								
12 to 24	89	1.6*	22	0.4*	15	0.3E*	58	1.1*
25 to 44	329	3.5*	91	1.0*	97	1.0*	186	2.0*
45 to 64	543	6.9*	159	2.0*	208	2.7*	289	3.7*
65 or older	224	6.0*	70	1.9*	73	1.9*	110	2.9*
Household income								
Lowest	142	7.0*	57	2.8*	45	2.2*	69	3.4*
Lower-middle	255	5.8*	88	2.0*	85	2.0*	136	3.1*
Upper-middle	339	4.5	89	1.2	110	1.5	183	2.4
Highest	253	3.1*	53	0.7*	91	1.1*	145	1.8*
Education (age 25 to 64)								
Less than secondary graduation	164	6.8*	53	2.2*	59	2.4*	76	3.1
Secondary graduation	157	4.9	42	1.3	58	1.8	83	2.6
Some postsecondary	55	5.1	13	1.2	19	1.8	33	3.1
Postsecondary graduation	474	4.7*	136	1.3	163	1.6*	269	2.7
Marital status (age 25 or older)								
Married†	602	4.7	165	1.3	216	1.7	321	2.5
Divorced/Separated/Widowed	153	8.6*	48	2.7*	57	3.2*	84	4.7*
Never married	118	4.3	36	1.3	32	1.2*	70	2.6

* *Significantly different from estimate for reference category ($p < 0.05$)*
† *Reference category; if no category is indicated, reference is total.*
E *Coefficient of variation 16.6% to 33.3% (interpret with caution)*
Note: *Because some respondents have more than one condition, detail adds to more than total MUPS.*
Source: *2003 Canadian Community Health Survey, cycle 2.1*

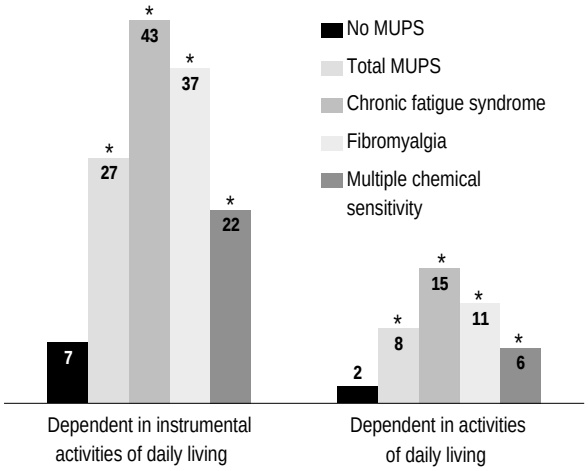
prevalence rate and the rate for each of the three conditions were significantly above the national figures among residents of the lowest income households, and significantly below the national level among people in the highest income households. Similarly, a relatively high proportion of people with less than secondary graduation reported MUPS, while the proportion was lower among postsecondary graduates. However, the relationship between educational attainment and the three individual conditions was less straightforward.

Compared with married people, those who were no longer married were almost twice as likely to report each of the three conditions. This association with marital status remained significant when the effects of the other socio-demographic variables were accounted for.

Dependency

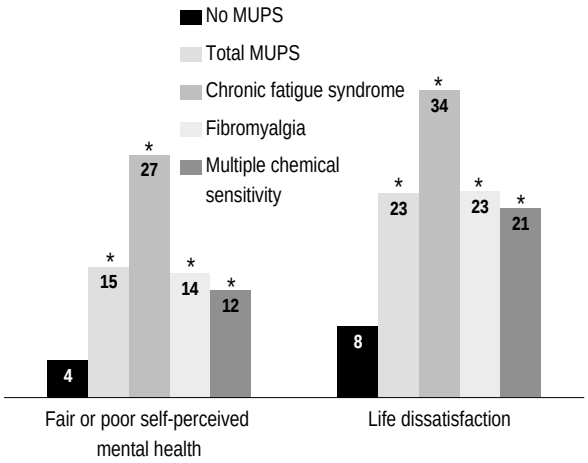
Significantly high percentages of people with MUPS reported some degree of dependency (Chart 1). More than a quarter (27%) of them needed help with instrumental activities of daily living such as preparing meals, doing everyday housework, getting to appointments and running errands; this compared with 7% of people without MUPS. As well, 8% of individuals with MUPS reported that they needed assistance with personal activities of daily living such as bathing, dressing, eating, taking medication, and moving about inside the house; the figure was 2% among people who did not report MUPS. Even when socio-demographic factors were taken into account, the association between MUPS and dependency remained significant (data not shown)

Chart 1
Percentage dependent, by presence of medically unexplained physical symptoms (MUPS), household population aged 12 or older, Canada, 2003



** Significantly different from estimate for no MUPS (p < 0.05)*
Source: *2003 Canadian Community Health Survey, cycle 2.1*

Chart 2
Percentage with fair or poor self-perceived mental health and life dissatisfaction, by presence of medically unexplained physical symptoms (MUPS), household population aged 12 or older, Canada, 2003



** Significantly different from estimate for no MUPS (p < 0.05)*
Source: *2003 Canadian Community Health Survey, cycle 2.1*

Mental health and well-being

Not surprisingly, substantial proportions of people with MUPS had a negative perception of their physical health (data not shown). They were also more likely than people who did not have MUPS to view their mental health as fair or poor: 15% versus 4%. As well, close to one-quarter (23%) of people with MUPS were dissatisfied with their lives, compared with 8% of those who were not afflicted (Chart 2).

Mental disorders

An extensive literature has shown MUPS to be strongly and consistently associated with psychosocial distress and psychiatric disorders.[6,9] According to the 2002 CCHS, individuals with MUPS were more likely than people without MUPS to have psychiatric disorders. The analysis in this article focuses on the past 12-month prevalence of major depressive disorder, bipolar I disorder, panic disorder, social anxiety disorder, and agoraphobia. Respondents who met the criteria for at least one of these five conditions were considered to have a mental disorder.

Table 2
Prevalence of at least one mental disorder† in past 12 months, by presence of medically unexplained physical symptoms (MUPS), household population aged 15 or older, Canada excluding territories, 2002

	Prevalence of mental disorder
	%
No MUPS	8.1
No MUPS but other chronic condition(s)‡	9.9§
Total MUPS	21.3*
Chronic fatigue syndrome	36.4*
Fibromyalgia	25.1*
Multiple chemical sensitivity	13.9*

** Significantly different from estimate for no MUPS (p < 0.05)*
† Major depressive disorder, bipolar I disorder, panic disorder, social anxiety disorder, or agoraphobia
‡ Asthma, arthritis or rheumatism, back problems, high blood pressure, migraine, chronic bronchitis, emphysema, diabetes, epilepsy, heart disease, cancer, ulcers, effects of stroke, bowel disorder, or thyroid disorder
§ Significantly different from estimate for total MUPS (p < 0.05)
Source: *2002 Canadian Community Health Survey: Mental Health and Well-being, cycle 1.2*

The questions

The prevalence of *medically unexplained physical symptoms (MUPS)* was based on self-reports of diagnosed illness. Cycles 1.2 and 2.1 of the Canadian Community Health Survey (CCHS) used a checklist of conditions. Respondents were asked about "long-term health conditions that have lasted or are expected to last six months or more and that have been diagnosed by a health professional." Interviewers read a list of conditions including chronic fatigue syndrome, fibromyalgia, and chemical sensitivities. Respondents who answered positively to at least one of these three conditions were classified as suffering from MUPS.

The prevalence of *other chronic conditions* was determined in the same way. Asthma, arthritis or rheumatism, back problems, high blood pressure, migraine, chronic bronchitis, emphysema, diabetes, epilepsy, heart disease, cancer, ulcers, the effects of stroke, bowel disorder, and thyroid disorder were considered in this analysis.

To assess *dependency*, respondents were asked, "Because of any physical condition or mental condition or health problem, do you need the help of another person . . .," and they were read a list of activities. Dependency in instrumental activities of daily living was considered to be present if respondents reported needing help with at least one of the following:

- preparing meals
- getting to appointments and running errands such as shopping for groceries
- doing everyday housework
- looking after personal finances such as making bank transactions or paying bills

Dependency in activities of daily living was considered to be present if respondents reported needing help with either of the following:

- personal care such as washing, dressing, eating or taking medication
- moving about inside the house

In accordance with the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) protocol, cycle 1.2 of the CCHS assessed mental disorders using the definitions and criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*.[10] The analysis in this article focuses on the past 12-month prevalence of five mental disorders: major depressive disorder, bipolar I disorder, panic disorder, social anxiety disorder, and agoraphobia.[11] Respondents who met the criteria for at least one of these conditions were considered to have a mental disorder.

Consultations with family doctor/general practitioner was based on the question: "In the past 12 months, how many times have you seen or talked on the telephone about your physical, emotional or mental health with a family doctor or general practitioner?"

Consultations with specialists was based on the question: "In the past 12 months, how many times have you seen, or talked on the telephone about your physical, emotional or mental health with any other medical doctor (such as surgeon, allergist, orthopedist, gynaecologist, or psychiatrist)?"

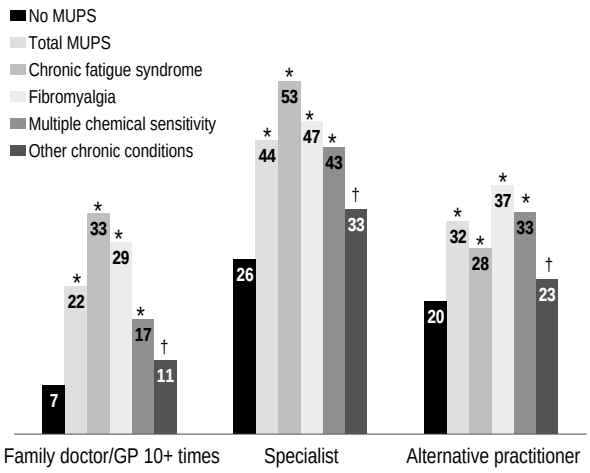
Consultations with alternative practitioners was based on two questions: "In the past 12 months, have you seen or talked to an alternative health care provider such as an acupuncturist, homeopath or massage therapist about your physical, emotional or mental health?" and "In the past 12 months, how many times have you seen or talked on the telephone about your physical, emotional or mental health with a chiropractor?" Respondents who replied affirmatively to the first question or answered "at least one time" to the second were considered to have consulted an alternative practitioner.

More than one-fifth (21%) of people with MUPS had at least one of these disorders, compared with 8% of those who did not have MUPS and 10% of people with other chronic physical conditions such as asthma, diabetes, migraine, cancer and heart disease (Table 2). The prevalence of psychiatric disorders was particularly common among people with CFS: 36%. But although the prevalence of mental disorders was high among people with MUPS, some research suggests that the stress of having unexplained symptoms may lead to mental health problems—in many cases, MUPS precedes psychiatric symptoms.[12]

Consultations with health care providers

Patients with MUPS tend to report a relatively large number of medical consultations. Compared with people without MUPS, and even with those who had other chronic conditions, individuals with MUPS were more likely to seek assistance from both conventional and alternative health care providers (Chart 3). In 2003, 22% of MUPS

Chart 3
Percentage who consulted health care providers in past year, by presence of medically unexplained physical symptoms (MUPS), household population aged 12 or older, Canada, 2003



* *Significantly different from estimate for no MUPS ($p < 0.05$)*
† *Significantly different from estimate for total MUPS ($p < 0.05$)*
Source: *2003 Canadian Community Health Survey, cycle 2.1*

The data

The estimated prevalence of chronic fatigue syndrome, fibromyalgia and multiple chemical sensitivity, as well as "total MUPS" (medically unexplained physical symptoms), is based on data from cycle 2.1 of the Canadian Community Health Survey (CCHS), conducted from January through December 2003. The CCHS 2.1 covered the household population aged 12 or older. It excluded members of the regular Armed Forces and residents of Indian reserves, military bases, health care institutions and some remote areas. The sample consisted of 135,573 respondents aged 12 or older; the overall response rate was 80.6%.

The estimated prevalence of mental disorders is based on data from cycle 1.2 of the CCHS, which began in May 2002 and was conducted over eight months. The CCHS 1.2 covered people aged 15 or older living in private households in the 10 provinces. It excluded members of the regular Armed Forces and residents of the three territories, Indian reserves, military bases, health care institutions and some remote areas. The sample consisted of 36,984 respondents aged 15 or older; the overall response rate was 77%.

All differences were tested to ensure statistical significance; that is, that they did not occur simply by chance. To account for survey design effects, standard errors and coefficients of variation were estimated using the bootstrap technique.[13,14] A significance level of $p < 0.05$ was applied in all cases.

patients reported having consulted their family doctor or general practitioner more than 10 times in the past year; 7% of people without MUPS had done so. Over 40% of people with MUPS had consulted specialists versus 26% of those without MUPS. And 32% of all MUPS patients sought help from alternative practitioners, compared with 20% of people without MUPS. These high consultation rates, however, may reflect multiple referrals.

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References

1 Richardson RD, Engel CC. Evaluation and management of medically unexplained physical symptoms. *The Neurologist* 2004; 10(1): 18-30.

2 Aaron LA, Buchwald D. A review of the evidence for overlap among unexplained clinical conditions. *Annals of Internal Medicine* 2001; 134(Pt 2): 868-81.

3 Buchwald D, Garrity D. Comparison of patients with chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivities. *Archives of Internal Medicine* 1994; 154(18): 2049-53.

4 Jason LA, Taylor RR, Kennedy CL. Chronic fatigue syndrome, fibromyalgia, and multiple chemical sensitivities in a community-based sample of persons with chronic fatigue syndrome-like symptoms. *Psychosomatic Medicine* 2000; 62: 655-63.

5 Zavestoski S, Brown P, McCormick S, et al. Patient activism and the struggle for diagnosis: Gulf War illnesses and other medically unexplained physical symptoms in the US. *Social Science & Medicine* 2004; 58(1): 161-75.

6 Escobar JI, Hoyos-Nervi C, Gara M. Medically unexplained physical symptoms in medical practice: A psychiatric perspective. *Environmental Health Perspectives* 2002; 110(Suppl. 4): 631-6.

7 Hydén L-C, Sachs L. Suffering, hope and diagnosis: on the negotiation of chronic fatigue syndrome. *Health* 1988; 2(2): 175-93.

8 Lamielle M. *Multiple Chemical Sensitivity and the Workplace*. Voorhees, New Jersey: National Center for Environmental Health Strategies, Inc., 2002.

9 Richardson, RD Engel CC. Evaluation and management of medically unexplained physical symptoms. *The Neurologist* 2004; 10(1): 18-30.

10 American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Washington, DC: American Psychiatric Association, 2000.

11 Statistics Canada. Definitions of mental disorders in the Canadian Community Health Survey: Mental Health and Well-being. *Health Reports* (Statistics Canada, Catalogue 82-003) 2004; 15(Suppl.): 49-63.

12 Richman JA, Jason LA. Gender biases underlying the social construction of illness states: the case of chronic fatigue syndrome. *Current Sociology* 2001; 49(3): 15-29.

13 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): 209-217.

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