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Health Reports

Volume 14, Number 4

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p   preliminary figures

r   revised figures

x   suppressed to meet the confidentiality requirements of the *Statistics Act*

E   use with caution

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Thank you

Gerry Hill recently resigned as an associate editor of *Health Reports*. Dr. Hill, a former Director of the Health Statistics Division, was both an editor and an author of several analytical articles. We thank him for his generous contributions to our publication.

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Repetitive *strain* injury

Michael Tjepkema

Abstract

Objectives
This article describes the characteristics of people who report a repetitive strain injury (RSI) and examines the association of an RSI with chronic pain and with psychological distress.

Data sources
The data are from Statistics Canada's 2000/01 Canadian Community Health Survey (CCHS) and the 1994/95 to 2000/01 National Population Health Survey (NPHS).

Analytical techniques
Cross-tabulations were used to estimate the prevalence of RSI and contact with health care professionals by selected characteristics. Multiple logistic regression models were used to determine if associations persisted after controlling for other factors, and to determine if RSIs were significantly associated with chronic pain and psychological distress.

Main results
In 2000/01, 10% of Canadians aged 20 or older reported having had an RSI serious enough to limit their usual activities at some point in the previous 12 months. Work-related activities were most often the cause, and injury to the upper body was more common than to the lower body. People with an RSI had more contacts with health care professionals and higher levels of chronic pain and psychological distress than did those without an RSI. Two years after an RSI was first reported, pain and distress levels remained high among men and had risen among women.

Key words
psychological distress, chronic pain, health care utilization, longitudinal studies

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Repetitive strain injury (RSI) is an umbrella term for a group of disorders usually caused by repetitive movements that affect the muscles, tendons and nerves[1] (see *Repetitive strain injury*). Unlike other injuries, which usually occur at a single point in time, RSIs develop over an extended period.[2] The origin and development of RSIs, however, are multifactorial and controversial.[3] Ergonomic stressors such as repetitive and forceful motions have been implicated, as have psychosocial factors.[2] Symptoms, usually pain, numbness and tingling, can last for months or years.[2] The impact of RSIs includes work disability, functional and activity limitations, and sleep disturbances.[4] More recently, RSIs have been linked with depression,[5] although whether depression follows or precedes an RSI has been debated.[6,7]

Many studies of RSI have been cross-sectional, directed at specific jobs, and have focused on either men or women. Relatively few have been longitudinal, conducted on a population basis or have analyzed the sexes separately.[8] Furthermore, much of the research has concentrated on the most severe cases of carpal tunnel syndrome.[9-16]

Data sources

The main part of this analysis is based on Statistics Canada's 2000/01 Canadian Community Health Survey (CCHS). The CCHS collects cross-sectional information about the health of Canadians every two years. Data collection for cycle 1.1 began in September 2000 and continued over 14 months. This analysis covers the household population aged 12 or older in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas.

The area frame designed for the Labour Force Survey is the primary sampling frame of the CCHS. A multistage stratified cluster design was used to sample dwellings within the area frame. A list of the dwellings was prepared, and a sample was selected from the list. The majority (83%) of the sampled households came from the area frame. Face-to-face interviews were held with respondents randomly selected from households in this frame. In some areas, a random digit dialling technique and/or a list frame of telephone numbers was used to conduct telephone interviews with the remaining 17% of the targeted sample.

In about 82% of the households selected from the area frame, one person was randomly selected; two people were randomly chosen in the remaining households. For households selected from the telephone frames, one person was randomly chosen. The response rate for the combined frame was 84.7%. A total of 6.3% of the interviews were obtained by proxy. More detailed descriptions of the CCHS design, sample and interview procedures can be found in a published report.[17]

The second part of the analysis is based on data from the National Population Health Survey (NPHS). The NPHS, which began in 1994/95, collects information about the health of Canadians every two years. It covers household and institutional residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas. The NPHS data in this article pertain to household residents in the 10 provinces.

The NPHS has both longitudinal and cross-sectional components. In 1994/95, data for household residents in the 10 provinces were collected using two questionnaires: General and Health. Socio-demographic and some basic health information was obtained for all members of sampled households from one knowledgeable household member by means of the General questionnaire. Additional, in-depth health information was collected for one randomly selected household member with the Health questionnaire. Because of the detailed nature of the Health questionnaire, proxy response was only accepted for special conditions (for example, the selected respondent was unable to provide his or her own information because of a health problem).

In 1994/95, 20,725 households participated in the NPHS, meaning that at least the General questionnaire was completed for the randomly selected respondent, representing a response rate of 88.7%. The response rate to the Health questionnaire (for the randomly selected respondents) was 96.1%. The randomly selected respondents from 1994/95—a total of 17,126—formed the basis for the longitudinal panel. In subsequent cycles, the response rates for the health component for the longitudinal panel were 93.6% (1996/97), 88.9% (1998/99) and 84.8% (2000/01). In the first three cycles, the NPHS had longitudinal and cross-sectional components, but starting in 2000/01 it became strictly longitudinal.

For the 1998/99 NPHS cross-sectional file used in this analysis, the overall response rate was 88.2% at the household level. The response rate for the randomly selected respondents in these households was 98.5%.

In 1994/95, the majority of interviews were conducted in person. In subsequent cycles, if respondents were willing and able, interviews were conducted by telephone. More detailed descriptions of the NPHS design, sample and interview procedures can be found in published reports.[18,19]

The CCHS sample used in this article is based on 113,796 respondents who were aged 20 or older in 2000/01 and indicated their repetitive strain injury (RSI) status. Of these respondents, 11,821 identified themselves as having an RSI.

The analysis that examines the immediate association of an RSI with chronic pain and psychological health is based on 13,739 NPHS respondents aged 20 or older in 1998/99. Of these respondents, 1,274 reported having had an RSI in the previous 12 months. The analysis of the two-year association of an RSI with chronic pain and psychological distress is based on 9,255 longitudinal respondents aged 20 or older in 1998/99, who were still residing in households in 2000/01 and had not reported an RSI in 1996/97. Of these, 737 identified themselves as having had an RSI in 1998/99.

With cross-sectional data from the 2000/01 Canadian Community Health Survey (CCHS), this article examines the prevalence of RSIs among Canadian men and women aged 20 or older, risk factors, and contacts with health care professionals. Cross-sectional and longitudinal data from the National Population Health Survey (NPHS) are analyzed to assess immediate and two-year associations of RSI with chronic pain and psychological distress (see *Data sources, Analytical techniques, Definitions* and *Limitations*).

Repetitive strain injury

Repetitive strain injury (RSI)—also known as cumulative trauma disorder, muscle tendon syndrome, overuse syndrome and repetitive motion injury—is a general term used to label injuries that often result from repetitive movements.[20] The exact pathophysiology is not well understood, but it is widely believed that repetitive activity damages tendons, affects circulation, and causes biomechanical stresses on the soft tissue by not allowing enough recovery time between movements.[21] Symptoms include pain, numbness and tingling in the affected body part.[2]

RSIs can be divided into two broad groups: tendon-related disorders and peripheral nerve entrapment disorders.[2] Tendon-related disorders involve inflammation of the tendon and sheath or injuries to them. Common disorders include tendinitis, tenosynovitis, epicondylitis (golfer's or tennis elbow) and rotator cuff tendinitis. Peripheral nerve entrapment disorders involve compression of a nerve. The most common is carpal tunnel syndrome, which is caused by compression to the median nerve. The second most common is cubital tunnel syndrome, caused by compression to the ulnar nerve in the cubital at the elbow.

Respondents to the National Population Health Survey (NPHS) and the Canadian Community Health Survey (CCHS) were told that *repetitive strain injuries* are caused by overuse or by repeating the same movement frequently and were given examples such as carpal tunnel syndrome, tennis elbow or tendinitis. They were asked, "In the past 12 months, did you have any injuries due to repetitive strain that were serious enough to limit your normal activities?" In the CCHS, if they answered "yes," they were asked to identify the body part most affected and the type of activity involved when the RSI occurred: sport or physical exercise; leisure or hobby; working at a job or business; household chores, other unpaid work or education; sleeping, eating or personal care; or any other activity. Multiple responses were permitted for the activity involved.

Repetitive strain injuries increasing

In 2000/01, one in ten Canadians aged 20 or older, or an estimated 2.3 million people, reported an RSI that was serious enough to limit their normal activities in the previous 12 months. This marked a steady rise since 1996/97 (Table 1), echoing other studies that showed increasing numbers of RSIs during the 1980s and early 1990s.[22-25] Men and women were equally likely to report an RSI, but the body parts affected and the activities in which the injuries originated differed between the sexes.

Table 1
Prevalence of repetitive strain injury, household population aged 20 or older, Canada excluding territories, 1996/97, 1998/99 and 2000/01

	Both sexes	Men	Women
	%	%	%
1996/97	8.0	8.2	7.9
1998/99	9.4*	9.6*	9.3*
2000/01	10.1*	9.9	10.3*

Data sources: *1996/97, 1998/99 National Population Health Survey, cross-sectional samples; 2000/01 Canadian Community Health Survey*
Note: *Comparison between 1996/97 and 1998/99 accounts for overlapping sample.*
* Significantly different from preceding period (p < 0.05)

Half work-related

Most RSIs are caused by work-related activities. According to the CCHS, 55% of RSIs had occurred while working; the next most frequently cited activity was sports or physical exercise (20%) (Table 2). Although over half of all RSIs among both sexes were work-related, this was more common among men. Men were also more likely than women to mention sports or physical exercise. Women reported activities related to chores, unpaid work or education more often than did men.

Most RSIs affected the upper body. Specifically, 25% of people with an RSI cited the neck or shoulder; 23%, the wrist or hand; 19%, the upper or lower back; and 16%, the elbow or lower arm. The remaining 17% had an injury to the lower extremity or to an unspecified body part.

Arm, leg and back injuries affected men more often than women; women more often reported

Cross-tabulations based on data from the 2000/01 Canadian Community Health Survey (CCHS) were used to estimate the prevalence of repetitive strain injury (RSI) for men and women according to selected personal and work-related characteristics and lifestyle indicators (Appendix Table A). Multiple logistic regressions were used to model the association between these variables and reporting an RSI.

The 1998/99 National Population Health Survey (NPHS) cross-sectional sample (Appendix Table B) was used to examine the association of an RSI with chronic pain and psychological distress. The 2000/01 CCHS was used to examine the association of an RSI with the number of consultations with general practitioners, chiropractors and physiotherapists in the past year. Separate analyses were done for each sex using multiple linear regressions. The independent variables included in the models were: RSI, age, marital status, education, household income, work status, obesity, leisure-time physical activity, daily smoking, arthritis, diabetes and thyroid condition. For each model, age was a continuous variable, and records with missing values for the independent variables were dropped, except for household income and obesity, for which special categories were created to deal with missing values.

The NPHS longitudinal file was used to measure two-year associations of an RSI with chronic pain and psychological distress (Appendix Table C). RSI status was determined from 1996/97 data (RSI questions were not asked in 1994/95). Respondents who did not report an RSI in 1996/97 were followed from 1998/99 to 2000/01. The 1998/99 independent variables were the same as those used in the cross-sectional analysis. To measure change, each 1998/99 outcome variable value (for example, psychological distress in 1998/99) was subtracted from the same 2000/01 outcome variable value (psychological distress in 2000/01) to determine if the value increased, decreased or was unchanged over the two years. The baseline (1998/99) score of the change variable was included in each model. The goal was to see if newly reported RSIs were associated with the change variable.

Cross-sectional data were weighted to represent the demographic makeup of the Canadian population in 1998/99 and 2000/01. Longitudinal estimates were weighted to represent the Canadian population in 1994/95. To compare trends in RSI prevalence between 1996/97 and 1998/99, a program that accounts for overlap in samples was used. To account for survey design effects, standard errors and coefficients of variation were estimated with the bootstrap technique.[26-28] The significance level was set at p < 0.05.

Table 2
Repetitive strain injury characteristics, by sex, household population aged 20 or older who reported RSI, Canada, 2000/01

	Both sexes		Men		Women	
	'000	%	'000	%	'000	%
Total	**2,283**	**100.0**	**1,098**	**100.0**	**1,185**	**100.0**
Body part†						
Neck/Shoulder	566	24.8	250	22.8*	316	26.7
Wrist/Hand	531	23.3	195	17.8*	335	28.3
Back	422	18.5	246	22.4*	176	14.9
Elbow/Lower arm	367	16.1	199	18.1*	167	14.1
Knee/Lower leg	199	8.7	108	9.9*	91	7.6
Ankle/Foot	115	5.0	57	5.2	58	4.9
Activity‡						
Working	1,233	54.6	620	57.1*	613	52.3
Sport/Physical exercise	446	19.7	275	25.3*	171	14.6
Chores/Unpaid work/						
Education	317	14.0	94	8.7*	222	19.0
Leisure/Hobby	142	6.3	63	5.8	79	6.8

Data source: 2000/01 Canadian Community Health Survey
Note: 5,237 men and 6,584 women reported RSI in 2000/01.
† Because "other" category not shown, proportions may not total 100%.
‡ Multiple responses permitted
* Significantly different from women (p < 0.05)

injuries to the neck or shoulder and wrist or hand. Research has consistently shown that women have a higher prevalence of carpal tunnel syndrome, whereas men have a higher prevalence of RSIs in the elbow.[4,29-32] These differences are likely attributable to the activities each sex undertakes. A study that controlled for job tasks found similar rates of carpal tunnel syndrome among both sexes, suggesting that the nature of the work performed and occupational exposure explain women's higher rates.[33]

Declines at older ages

Given that over half of RSIs were reported to have originated at work, it is hardly surprising that such injuries tend to affect people in the prime working years and decline at older ages (Chart 1). The pattern, however, differs between men and women (Table 3). When additional socio-demographic, work-related and lifestyle factors were taken into account, whether they were in their twenties, thirties or forties, men had about the same odds of reporting an RSI. By contrast, for women, the odds of having an RSI were significantly higher for those in their

Chart 1
Prevalence of repetitive strain injury, by age group, household population aged 20 or older, Canada, 2000/01
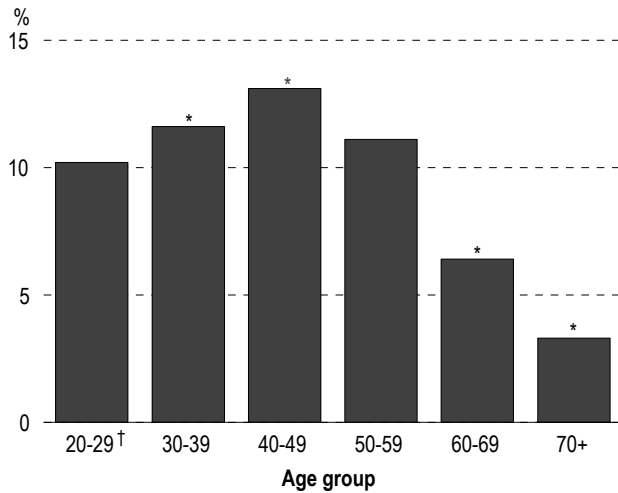
%

Age group

Data source: 2000/01 Canadian Community Health Survey
† Reference category
* Significantly different from reference category (p < 0.05)

thirties, forties or fifties, compared with those in their twenties. At older ages the odds were significantly lower for both sexes, perhaps because relatively few people are still in the workforce or doing strenuous chores at these ages.

Related to occupation

The large proportion of RSIs that were work-related may be attributable to the repetitive and forceful movements, heavy lifting and exposure to vibration that many jobs entail.[33-39] People who do not work have no exposure to workplace risk factors, so it is to be expected that in 2000/01, they were less likely than those who were working to report an RSI. Yet when the effects of other socio-demographic and lifestyle factors were taken into account, work status was not significantly associated with an RSI. Among the working population, however, occupation was.

Men who worked in sales or service; trades, transport or equipment operating; farming, forestry, fishing or mining; and processing, manufacturing or utilities had high odds of reporting an RSI, compared with those in management. Women in any occupation other than management had elevated odds of reporting an RSI. The odds were

particularly high for women in traditionally male-dominated occupations: trades, transport or equipment operating; farming, forestry, fishing or mining; and processing, manufacturing or utilities.

Stress increases risk

Psychosocial factors—a fast work pace, role ambiguity, worry, monotonous tasks and stress—have been associated with RSIs.[8,11,23,38-44] People with at least some work stress had a relatively high prevalence of RSI in 2000/01 (Chart 2). This was especially true for those women who indicated that their work was "extremely" stressful—18% reported an RSI, compared with 10% who considered their work "not at all" or "not very" stressful. Even allowing for other factors, the odds of reporting an RSI were higher among women who found that most days at work were quite or extremely stressful, compared with women who found work either not very or not at all stressful. By contrast, for men, when the effects of other factors were taken into account, work stress was not significantly associated with RSIs.

Chart 2
Prevalence of repetitive strain injury, by stress level of work, household population aged 20 to 75 who worked in past 12 months, Canada, 2000/01
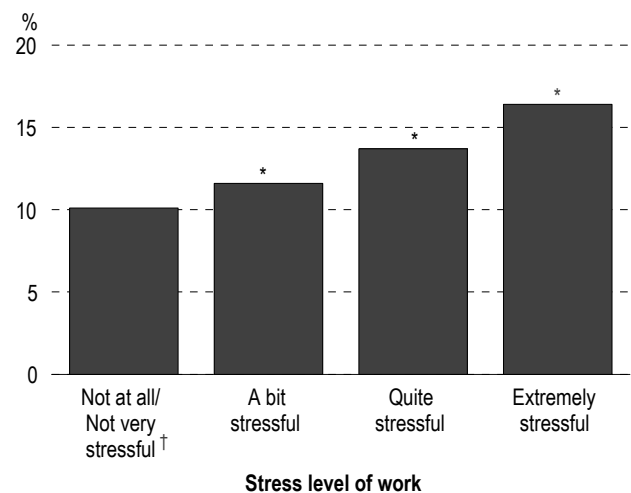
%

Stress level of work

Data source: 2000/01 Canadian Community Health Survey
† Reference category
* Significantly different from reference category (p < 0.05)

Table 3
Prevalence of and adjusted odds ratios for repetitive strain injury, by selected characteristics, household population aged 20 or older, Canada, 2000/01

	Both sexes				Men				Women			
	Number	Prev-alence	Adjusted odds ratio	95% confidence interval	Number	Prev-alence	Adjusted odds ratio	95% confidence interval	Number	Prev-alence	Adjusted odds ratio	95% confidence interval
	'000	%			'000	%			'000	%		
Total	**2,283**	**10.1**	...	...	**1,098**	**10.0**	...	...	**1,185**	**10.3**	...	...
Age group												
20-29†	422	10.2	1.0	...	225	10.8	1.0	...	197	9.6	1.0	...
30-39	551	11.6*	1.1*	1.0, 1.2	278	11.7	1.0	0.9, 1.2	273	11.5*	1.2*	1.1, 1.4
40-49	668	13.1*	1.2*	1.1, 1.3	320	12.6*	1.1	0.9, 1.2	348	13.6*	1.4*	1.2, 1.6
50-59	405	11.1	1.0	0.9, 1.1	176	9.6	0.8*	0.6, 0.9	229	12.6*	1.3*	1.1, 1.5
60-69	153	6.4*	0.6*	0.5, 0.7	67	5.8*	0.5*	0.4, 0.7	86	7.0*	0.8*	0.6, 0.9
70+	83	3.3*	0.4*	0.4, 0.6	32	3.0*	0.4*	0.3, 0.6	52	3.6*	0.5*	0.4, 0.7
Marital status												
Married/Common-law	1,520	10.2	1.0	0.9, 1.1	746	9.9	1.1	1.0, 1.2	774	10.5	0.9	0.8, 1.0
Previously married	287	9.2*	1.1	1.0, 1.2	93	9.7	1.1	1.0, 1.4	195	9.0*	1.0	0.9, 1.2
Never married†	474	10.5	1.0	...	258	10.2	1.0	...	216	11.0	1.0	...
Education												
Secondary graduation or less†	830	8.8	1.0	...	404	9.0	1.0	...	426	8.6	1.0	...
At least some postsecondary	1,432	11.1*	1.1*	1.1, 1.2	682	10.6*	1.1	1.0, 1.2	750	11.6*	1.2*	1.1, 1.3
Household income												
Lowest/Lower-middle	187	8.1*	0.8*	0.7, 0.9	72	8.2*	0.8*	0.6, 1.0	115	8.1*	0.8*	0.7, 0.9
Middle	392	8.8*	0.9*	0.8, 1.0	179	8.7*	0.9	0.8, 1.0	213	8.8*	0.8*	0.7, 1.0
Upper-middle	806	11.1	1.0	0.9, 1.1	391	10.7	1.0	0.9, 1.1	415	11.6	1.0	0.9, 1.1
Highest†	721	11.5	1.0	...	387	11.3	1.0	...	333	11.7	1.0	...
Work status (age 20-75)												
Currently employed†	1,731	11.8	1.0	...	905	11.3	1.0	...	826	12.4	1.0	...
Worked in past 12 months	158	11.6	1.0	0.9, 1.2	70	10.8	1.0	0.8, 1.2	88	12.4	1.1	0.9, 1.2
Did not work in past 12 months	345	6.9*	0.9	0.7, 1.3	104	5.9*	0.8	0.4, 1.3	241	7.4*	1.1	0.7, 1.7
Occupation (age 20-75)												
Management†	182	10.1	1.0	...	113	10.0	1.0	...	69	10.3	1.0	...
Professional	316	11.6*	1.2*	1.0, 1.3	134	10.8	1.1	1.0, 1.4	182	12.2*	1.2*	1.0, 1.5
Technologist/Technician/Technical	153	10.7	1.2*	1.0, 1.4	101	10.1	1.1	0.9, 1.3	52	12.2	1.3*	1.1, 1.7
Administrative/Financial/Clerical	226	11.3	1.2*	1.0, 1.4	37	10.8	1.2	0.9, 1.5	189	11.4	1.2*	1.0, 1.5
Sales/Service	391	12.1*	1.4*	1.2, 1.6	147	10.9	1.2*	1.0, 1.5	243	12.9*	1.6*	1.3, 1.9
Trades/Transport/Equipment operating	318	13.2*	1.6*	1.4, 1.8	275	12.9*	1.5*	1.3, 1.8	43	15.0*	1.8*	1.4, 2.4
Farming/Forestry/Fishing/Mining	67	12.3*	1.6*	1.4, 1.9	48	11.2	1.5*	1.2, 1.8	20	16.2*	2.1*	1.6, 2.9
Processing/Manufacturing/Utilities	110	13.3*	1.7*	1.4, 2.0	64	11.9	1.4*	1.1, 1.8	46	16.0*	2.2*	1.7, 2.9
Other	125	12.2*	1.5*	1.2, 1.7	57	11.9	1.4*	1.1, 1.8	69	12.5	1.5*	1.2, 1.9
Work stress (age 20-75)												
Not at all/Not very stressful†	400	10.1	1.0	...	210	9.8	1.0	...	191	10.4	1.0	...
A bit stressful	678	11.6*	1.1	1.0, 1.2	355	11.4*	1.1	0.9, 1.2	323	11.9*	1.1	1.0, 1.3
Quite stressful	548	13.7*	1.2*	1.1, 1.3	275	13.5*	1.2	1.0, 1.3	273	14.0*	1.2*	1.1, 1.4
Extremely stressful	172	16.4*	1.3*	1.1, 1.5	71	14.1*	1.1	0.9, 1.4	101	18.4*	1.4*	1.2, 1.7
Life stress												
Not at all/Not very stressful†	567	7.4	1.0	...	285	7.3	1.0	...	282	7.5	1.0	...
A bit stressful	922	10.4*	1.2*	1.1, 1.3	450	10.5*	1.3*	1.1, 1.4	472	10.2*	1.2*	1.1, 1.3
Quite stressful	619	12.8*	1.4*	1.3, 1.6	293	12.5*	1.5*	1.3, 1.7	326	13.0*	1.4*	1.3, 1.6
Extremely stressful	173	15.9*	1.8*	1.6, 2.1	69	14.0*	1.7*	1.4, 2.1	104	17.5*	1.9*	1.6, 2.3
Leisure time												
Active	554	13.3*	1.6*	1.5, 1.8	294	12.9*	1.7*	1.5, 1.9	260	13.7*	1.6*	1.4, 1.8
Moderately active	575	11.7*	1.4*	1.3, 1.5	279	11.9*	1.5*	1.3, 1.7	295	11.6*	1.3*	1.2, 1.4
Inactive†	1,047	8.9	1.0	...	452	8.6	1.0	...	596	9.2	1.0	...
Obese												
No†	1,851	9.9	1.0	...	906	9.8	1.0	...	946	10.1	1.0	...
Yes	379	11.5*	1.1*	1.0, 1.2	188	10.9*	1.1	1.0, 1.2	191	12.0*	1.2*	1.1, 1.3
Daily smoker												
No†	1,659	9.5	1.0	...	776	9.4	1.0	...	883	9.6	1.0	...
Yes	622	12.2*	1.2*	1.1, 1.3	321	11.5*	1.1*	1.0, 1.2	302	12.9*	1.3*	1.1, 1.4
Arthritis/Rheumatism												
No†	1,781	9.6	1.0	...	903	9.4	1.0	...	878	9.7	1.0	...
Yes	500	12.8*	2.0*	1.9, 2.1	193	13.5*	2.1*	1.9, 2.4	307	12.5*	1.9*	1.7, 2.0
Diabetes												
No†	2,191	10.2	1.0	...	1,056	10.1	1.0	...	1,135	10.3	1.0	...
Yes	91	8.6*	1.1	0.9, 1.2	41	7.5*	1.0	0.8, 1.2	49	9.9	1.2	1.0, 1.4
Thyroid condition												
No†	2,146	10.1	1.0	...	1,076	9.9	1.0	...	1,071	10.2	1.0	...
Yes	135	11.2	1.3*	1.1, 1.5	21	10.5	1.3	1.0, 1.7	114	11.3	1.2*	1.1, 1.4

Data source: *2000/01 Canadian Community Health Survey*
Notes: *The total model is based on 112,124 respondents. The male model is based on 51,080 respondents; the female model, 61,044 respondents. "Unknown" categories for household income, obesity, physical activity and work stress were included in models to maximize sample size, but their odds ratios are not shown. "Not applicable" categories for work status, occupation and work stress were included in models, but their odds ratios are not shown. Because of missing values in other categories, 892 respondents were dropped from the male model, and 900 from the female model. Because of rounding, confidence interval with 1.0 as upper/lower limit may be significant.*
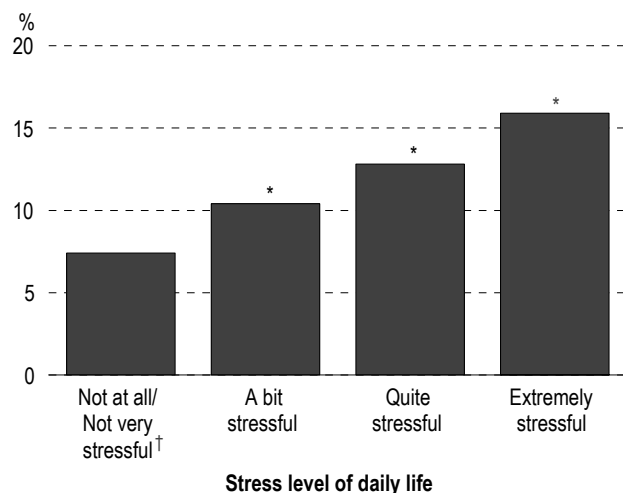*† Reference category*
* Significantly different from reference category (p < 0.05)
··· Not applicable

Day-to-day life stress was also significantly associated with reporting an RSI (Chart 3). These differences persisted for both sexes when the other potentially confounding factors were considered. Compared with men and women who described their lives as not at all or not very stressful, those experiencing higher levels of stress had elevated odds of having an RSI.

Chart 3
Prevalence of repetitive strain injury, by stress level of daily life, household population aged 20 or older, Canada, 2000/01

Data source: *2000/01 Canadian Community Health Survey*
† Reference category
* Significantly different from reference category (p < 0.05)

Other risk factors

Since sports activities and exercise accounted for about one in five RSIs, it is not surprising that both men and women with at least moderately active leisure time had significantly high odds of reporting an RSI. Also, among women, but not men, obesity was related to RSI . This may reflect carpal tunnel syndrome among women, as several studies have suggested that a higher body mass index (BMI) is related to the condition.[14,15,36,45,46] And for both sexes, the odds of having an RSI were significantly higher among daily smokers than among people who did not smoke daily.

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Health care contacts and outcomes

To measure contact with health care professionals, Canadian Community Health Survey respondents were asked, "Not counting when you were an overnight patient, 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 [list of health care professionals]?" Categories read to respondents included *family doctor or general practitioner, chiropractor,* and *physiotherapist.*

Chronic pain or discomfort was assessed by asking 1998/99 and 2000/01 National Population Health Survey (NPHS) respondents, "Are you usually free from pain or discomfort?" Those who answered "no" were asked to rank their usual pain intensity as mild, moderate or severe. Scores could range from 0 for no pain to 3 for severe pain.

Psychological distress was based on 1998/99 and 2000/01 NPHS respondents' answers to the following: During the past month, how often did you feel
…so sad that nothing could cheer you up?
…nervous?
…restless or fidgety?
…hopeless?
…worthless?
…that everything was an effort?
Each item was scored on a five-point scale: "all of the time" (score 4), "most of the time" (3), "some of the time" (2), "a little of the time" (1) or "none of the time" (0). Responses to all items were summed; the range of possible scores was 0 to 24, with higher values indicating more distress. The average score in 1998/99 was 2.9, with a standard deviation of 3.3. To deal with outlying values that skewed the distribution, scores more than two standard deviations above the mean were capped (scores greater than 10 were capped at 10). Values were capped for fewer than 6% of records in the cross-sectional 1998/99 NPHS. In the longitudinal file, about 4% of records were capped in 1998/99, and 3% in 2000/01. Cronbach's alpha for the psychological distress items was estimated at 0.794 in 1998/99.

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Consistent with other research,[47] results of the analysis of 2000/01 CCHS data show that men and women with arthritis or rheumatism had significantly higher odds of reporting an RSI than did those without the condition. As well, the odds of having an RSI were high among women with a thyroid condition.

Contacts with health care professionals

In 2000/01, men and women who reported an RSI were more likely to have contacted general practitioners, chiropractors and physiotherapists in the past 12 months than were those without an RSI, and the difference was significant for almost every body part affected (Chart 4) (see *Health care contacts and outcomes*).

These associations persisted for both sexes when other factors were taken into account. Men who reported an RSI averaged about one more consultation with general practitioners in the

Definitions

Six *age groups* were used for the first part of this analysis: 20 to 29, 30 to 39, 40 to 49, 50 to 59, 60 to 69, and 70 or older. In the multiple linear regression models, age was a continuous variable.

A respondent's *marital status* was classified into three categories: married or in a common-law relationship, previously married (divorced, separated or widowed), and never married.

Education was based on the highest level attained; two groups were established: secondary graduation or less, and at least some postsecondary.

Household income groups were based on the number of people in the household and total household income from all sources in the 12 months before the interview:

Income group	Number of household members	Household income
Lowest/Lower-middle	1 to 4	Less than $20,000
	5 or more	Less than $30,000
Middle	1 or 2	$20,000 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 and over
	3 or more	$80,000 and over

Work status for National Population Health Survey (NPHS) and Canadian Community Health Survey (CCHS) respondents aged 20 to 75 was classified into three categories: currently employed, worked in past 12 months, and did not work in past 12 months. CCHS respondents who were employed at the time of the interview or had worked in the previous 12 months were asked which of nine categories best described their occupation: 1) management; 2) professional (including accountants); 3) technologist, technician or technical; 4) administrative, financial or clerical; 5) sales or service; 6) trades, transport or equipment operating; 7) farming, forestry, fishing or mining; 8) processing, manufacturing or utilities; or 9) any other occupation.

Work stress was determined by asking CCHS respondents aged 20 to 75 who were working or who had worked at a job or business during the previous year about their main job: "Would you say that most days at work were: not at all stressful, not very stressful, a bit stressful, quite stressful, extremely stressful?" For this analysis, "not at all stressful" and "not very stressful" were combined.

Life stress was determined by asking CCHS respondents: "Thinking about the amount of stress in your life, would you say most days are: not at all stressful, not very stressful, a bit stressful, quite stressful, extremely stressful?" For this analysis, "not at all stressful" and "not very stressful" were combined.
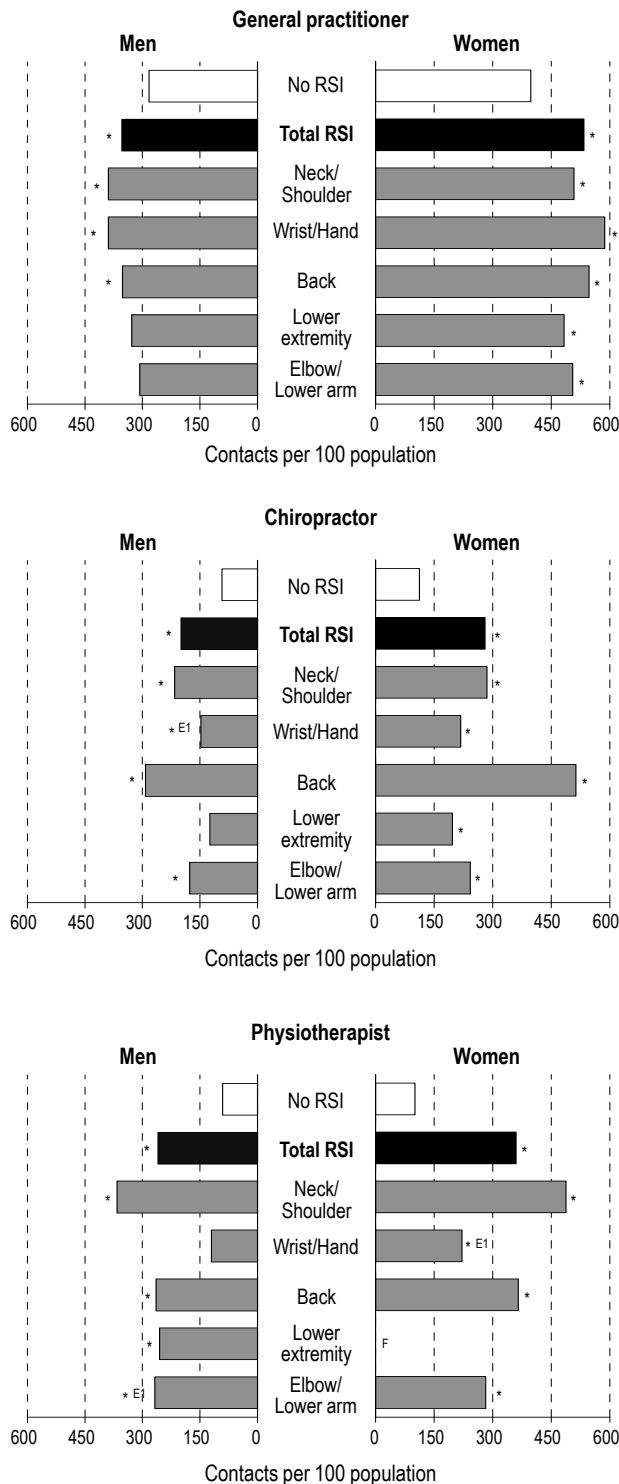
To derive *leisure-time physical activity level,* respondents' energy expenditure (EE) was estimated for each activity they engaged in during their leisure time. This was calculated by multiplying the number of times a respondent engaged in an activity over a 12-month period by the average duration in hours and by the energy cost of the activity (kilocalories expended per kilogram of body weight per hour of activity). To calculate an average daily EE for the activity, the estimate was divided by 365. This calculation was repeated for all leisure-time activities reported, and the resulting estimates were summed to provide an aggregate average daily EE. Respondents whose leisure-time EE was below 1.5 kcal/kg/day were considered physically inactive. A value between 1.5 and 2.9 kcal/kg/day indicated moderate activity. Respondents with an EE of 3.0 or more kcal/kg/day were considered active.

Obesity was defined as a body mass index of 30.0 or more, which was calculated by dividing weight in kilograms by height in metres squared. Pregnant women were excluded from this calculation.

Respondents were classified into two groups based on their smoking habits: *daily smokers* and *non-daily smokers*.

To measure the prevalence of specific chronic conditions, respondents were asked if they had any long-term conditions that had lasted or were expected to last 6 months or more and that had been diagnosed by a health care professional. A checklist of conditions was read to the respondents. Conditions considered in this analysis were *arthritis or rheumatism, diabetes* and a *thyroid condition*.

Chart 4
Contacts with health care professionals in past 12 months per 100 population aged 20 or older, by sex and body part affected by repetitive strain injury, Canada, 2000/01

General practitioner

Men / Women

No RSI
Total RSI
Neck/Shoulder
Wrist/Hand
Back
Lower extremity
Elbow/Lower arm

600 450 300 150 0 | 0 150 300 450 600
Contacts per 100 population

Chiropractor

Men / Women

No RSI
Total RSI
Neck/Shoulder
Wrist/Hand
Back
Lower extremity
Elbow/Lower arm

600 450 300 150 0 | 0 150 300 450 600
Contacts per 100 population

Physiotherapist

Men / Women

No RSI
Total RSI
Neck/Shoulder
Wrist/Hand
Back
Lower extremity
Elbow/Lower arm

600 450 300 150 0 | 0 150 300 450 600
Contacts per 100 population

Data source: *2000/01 Canadian Community Health Survey*
E1 Coefficient of variation between 16.6% and 25.0%
F Coefficient of variation greater than 33.3%
* Significantly greater than no RSI (p < 0.05)

previous year than did men without an RSI (Appendix Table D). Women with an RSI had an average of 1.37 more such contacts than did women without RSIs. The pattern was the same for contacts with chiropractors and physiotherapists (Appendix Tables E and F).

Chronic pain and distress

The consequences of RSIs can be both physical and psychological. Analyses of data from the 1998/99 NPHS indicate that 23% of men with an RSI reported chronic pain or discomfort, compared with 13% of men who did not report an RSI (data not shown). The corresponding figures for women were 31% and 16%. And even when other factors, including age and arthritis (a painful condition), were taken into account, reporting an RSI was positively associated with chronic pain for both sexes (Appendix Table G). As well, men and women with an RSI reported significantly higher levels of psychological distress than did those without an RSI. However, it is not known if the pain and psychological distress preceded or followed the RSI, or if they resulted from the RSI or from other conditions and circumstances.

RSIs can be long-lasting.[4,5,10,29,48,49] In 2000/01, the elevated levels of chronic pain and distress reported by those who had an RSI had not declined among men. And for women, reporting an RSI in 1998/99 was associated with an increase in pain and distress by 2000/01 (Appendix Table H).

Concluding remarks

Repetitive strain injuries are affecting an increasing number of Canadians. In 2000/01, about 10% of people aged 20 or older reported having had an RSI in the previous year, up from 8% in 1996/97. Although this upturn may, indeed, be due to more injuries, it could also reflect heightened awareness of RSIs.[3,20,22,30,50] Nonetheless, what makes these empirical findings important is the sheer number of people reporting such injuries—an estimated 2.3 million in 2000/01.

Over half of the RSIs resulted from work-related activities, and injuries to the upper body were more common than to the lower body. RSIs tended to

Limitations

A repetitive strain injury (RSI) identified in the National Population Health Survey (NPHS) or the Canadian Community Health Survey (CCHS) is based on self-reported information. It is not known if the RSI had actually been diagnosed by a health care professional. Some research has suggested that when people become more aware of RSIs, they are more likely to report them.[22,30,50] Therefore, the NPHS and the CCHS may overestimate the prevalence of RSIs, compared with studies that use more stringent definitions.

The severity of the RSI was not measured. Some over- or underestimation of the association between RSI and the selected variables may result from this lack of information.

The body part reported to be most affected may not be the origin of the pain. This can occur in cases of referred pain from nerve entrapments, particularly if respondents have not consulted a health care professional. Moreover, the specific type of RSI (for example, carpal tunnel syndrome, tennis elbow) is not known, although different

types and whether they are site-specific or non-specific with objective or subjective symptoms can have different risk factors and outcomes.[29,48,51] Grouping all RSIs may mask such differences and fail to detect significant associations.

It is not possible to ascertain if respondents who had contacted a general practitioner, chiropractor or physiotherapist in the previous year had done so because of their RSI.

A respondent's occupation at the time of the interview may differ from the occupation that contributed to the RSI. As well, information was not collected on job tasks that involve repetition and/or forceful movements. Associations between RSIs and selected characteristics may be affected by the absence of these variables.

The measure of respondents' energy expenditure likely underestimated total physical activity because it did not account for activity at work or while doing household chores.

affect people in their thirties and forties, underlining the seriousness of these injuries during the prime working years.

RSIs take a toll not only on physical health but also on mental health. Chronic pain and psychological distress were high among people with RSIs and did not diminish over a two-year period. In addition, RSIs involve greater costs to the health care system. People who reported an RSI had significantly more contacts with general practitioners, chiropractors and physiotherapists than did those without an RSI. ●

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Appendix

Table A

Distribution of selected characteristics, by sex, household population aged 20 or older, Canada, 2000/01

	Both sexes			Men			Women		
	Sample size	Estimated population		Sample size	Estimated population		Sample size	Estimated population	
		'000	%		'000	%		'000	%
Total	113,796	22,541	100.0	51,919	11,034	100.0	61,877	11,507	100.0
Repetitive strain injury									
Yes	11,821	2,283	10.1	5,237	1,098	9.9	6,584	1,185	10.3
No	101,975	20,258	89.9	46,682	9,936	90.1	55,293	10,322	89.7
Age group									
20-29	16,428	4,139	18.4	7,522	2,094	19.0	8,906	2,045	17.8
30-39	22,860	4,756	21.1	10,697	2,375	21.5	12,163	2,381	20.7
40-49	24,393	5,106	22.7	11,841	2,538	23.0	12,552	2,567	22.3
50-59	18,708	3,650	16.2	8,969	1,829	16.6	9,739	1,822	15.8
60-69	14,030	2,397	10.6	6,367	1,154	10.5	7,663	1,243	10.8
70+	17,377	2,492	11.1	6,523	1,043	9.5	10,854	1,449	12.6
Marital status									
Married/Common-law	68,218	14,896	66.1	33,355	7,542	68.4	34,863	7,354	63.9
Previously married	24,439	3,122	13.8	7,242	955	8.7	17,197	2,167	18.8
Never married	20,985	4,501	20.0	11,268	2,529	22.9	9,717	1,972	17.1
Missing	154	22	0.1	54	7 E1	0.1 E1	100	14 E1	0.1 E1
Education									
Secondary graduation or less	51,644	9,421	41.8	23,126	4,474	40.5	28,518	4,947	43.0
At least some postsecondary	60,923	12,910	57.3	28,170	6,447	58.4	32,753	6,463	56.2
Missing	1,229	211	0.9	623	113	1.0	606	98	0.8
Household income									
Lowest /Lower-middle	15,794	2,299	10.2	5,262	888	8.0	10,532	1,412	12.3
Middle	25,232	4,476	19.9	10,725	2,054	18.6	14,507	2,422	21.0
Upper-middle	35,817	7,262	32.2	17,526	3,672	33.3	18,291	3,590	31.2
Highest	25,260	6,265	27.8	13,678	3,420	31.0	11,582	2,845	24.7
Missing	11,693	2,238	9.9	4,728	1,000	9.1	6,965	1,238	10.8
Work status									
Currently employed	68,234	14,660	65.0	35,459	7,987	72.4	32,775	6,673	58.0
Worked in past 12 months	6,409	1,359	6.0	2,859	650	5.9	3,550	709	6.2
Did not work in past 12 months	28,388	5,013	22.2	9,752	1,781	16.1	18,636	3,233	28.1
Not applicable (age 75 or older)	9,875	1,324	5.9	3,398	523	4.7	6,477	801	7.0
Missing	890	185	0.8	451	93	0.8	439	92	0.8
Occupation									
Management	8,223	1,807	8.0	4,965	1,136	10.3	3,258	671	5.8
Professional	12,141	2,730	12.1	4,824	1,241	11.2	7,317	1,489	12.9
Technologist/Technician/Technical	5,755	1,432	6.4	3,844	1,001	9.1	1,911	430	3.7
Administrative/Financial/Clerical	9,030	2,009	8.9	1,246	343	3.1	7,784	1,666	14.5
Sales/Service	15,197	3,235	14.4	5,514	1,351	12.2	9,683	1,884	16.4
Trades/Transport/Equipment operating	11,632	2,414	10.7	10,146	2,128	19.3	1,486	286	2.5
Farming/Forestry/Fishing/Mining	4,526	546	2.4	3,549	424	3.8	977	122	1.1
Processing/Manufacturing/Utilities	3,464	829	3.7	2,287	540	4.9	1,177	289	2.5
Other	4,736	1,023	4.5	1,960	474	4.3	2,776	549	4.8
Not applicable	38,296	6,346	28.2	13,165	2,308	20.9	25,131	4,039	35.1
Missing	796	170	0.8	419	88	0.8	377	81	0.7
Work stress									
Not at all/Not very stressful	19,442	3,973	17.6	9,930	2,132	19.3	9,512	1,840	16.0
A bit stressful	28,057	5,829	25.9	14,259	3,108	28.2	13,798	2,721	23.6
Quite stressful	18,041	3,998	17.7	8,658	2,040	18.5	9,383	1,957	17.0
Extremely stressful	4,683	1,051	4.7	2,121	505	4.6	2,562	546	4.7
Not applicable	37,312	6,029	26.7	12,510	2,136	19.4	24,802	3,893	33.8
Missing	6,261	1,662	7.4	4,441	1,112	10.1	1,820	549	4.8
Life stress									
Not at all/Not very stressful	41,217	7,703	34.2	19,405	3,915	35.5	21,812	3,788	32.9
A bit stressful	44,182	8,877	39.4	19,904	4,269	38.7	24,278	4,608	40.0
Quite stressful	22,903	4,846	21.5	10,184	2,343	21.2	12,719	2,503	21.8
Extremely stressful	5,293	1,087	4.8	2,317	491	4.5	2,976	596	5.2
Missing	201	27	0.1	109	15	0.1	92	12	0.1
Leisure time									
Active	22,172	4,177	18.5	11,107	2,273	20.6	11,065	1,904	16.6
Moderately active	25,674	4,892	21.7	11,308	2,349	21.3	14,366	2,543	22.1
Inactive	59,631	11,758	52.2	24,904	5,259	47.7	34,727	6,499	56.5
Missing	6,319	1,713	7.6	4,600	1,153	10.4	1,719	560	4.9
Obese									
No	91,638	18,643	82.7	42,426	9,244	83.8	49,212	9,399	81.7
Yes	18,647	3,307	14.7	9,106	1,721	15.6	9,541	1,587	13.8
Missing	3,511	591	2.6	387	69	0.6	3,124	521	4.5
Daily smoker									
No	85,796	17,380	77.1	37,787	8,217	74.5	48,009	9,163	79.6
Yes	27,801	5,116	22.7	14,009	2,786	25.2	13,792	2,330	20.2
Missing	199	45	0.2	123	31	0.3	76	14 E1	0.1 E1
Arthritis/Rheumatism									
No	89,341	18,627	82.6	43,439	9,586	86.9	45,902	9,041	78.6
Yes	24,348	3,896	17.3	8,427	1,438	13.0	15,921	2,458	21.4
Missing	107	18	0.1	53	9 E1	0.1 E1	54	9 E1	0.1 E1
Diabetes									
No	107,449	21,475	95.3	48,829	10,475	94.9	58,620	11,000	95.6
Yes	6,290	1,053	4.7	3,067	551	5.0	3,223	501	4.4
Missing	57	13 E1	0.1 E1	23	F	F	34	6 E2	0.1 E2
Thyroid condition									
No	106,592	21,316	94.6	50,807	10,826	98.1	55,785	10,490	91.2
Yes	7,113	1,210	5.4	1,082	201	1.8	6,031	1,010	8.8
Missing	91	15 E1	0.1 E1	30	8 E2	0.1 E2	61	7 E1	0.1 E1

Data source: *2000/01 Canadian Community Health Survey*
Note: *Excludes 120 respondents with unknown RSI status in 2000/01. Because of rounding, detail may not add to totals.*
E1 Coefficient of variation between 16.6% and 25.0%
E2 Coefficient of variation between 25.1% and 33.3%
F Coefficient of variation greater than 33.3%

Table B
Distribution of selected characteristics, by sex, household population aged 20 or older, Canada excluding territories, 1998/99

	Both sexes			Men			Women		
	Sample size	Estimated population		Sample size	Estimated population		Sample size	Estimated population	
		'000	%		'000	%		'000	%
Total	**13,739**	**21,621**	**100.0**	**6,242**	**10,562**	**100.0**	**7,497**	**11,059**	**100.0**
Repetitive strain injury									
Yes	1,274	2,038	9.4	586	1,013	9.6	688	1,025	9.3
No	12,465	19,583	90.6	5,656	9,550	90.4	6,809	10,034	90.7
Marital status									
Married/Common-law	8,188	14,103	65.2	4,038	7,231	68.5	4,150	6,873	62.1
Previously married	2,853	3,317	15.3	802	1,016	9.6	2,051	2,301	20.8
Never married	2,698	4,201	19.4	1,402	2,316	21.9	1,296	1,885	17.0
Education									
Secondary graduation or less	5,504	8,194	37.9	2,519	3,917	37.1	2,985	4,277	38.7
At least some postsecondary	8,223	13,401	62.0	3,715	6,629	62.8	4,508	6,772	61.2
Missing	12	F	F	8	F	F	4	F	F
Household income									
Lowest/Lower-middle	2,223	2,704	12.5	755	1,063	10.0	1,468	1,641	14.8
Middle	3,699	5,366	24.8	1,638	2,531	24.0	2,061	2,835	25.6
Upper-middle	4,599	7,562	35.0	2,258	3,843	36.4	2,341	3,719	33.6
Highest	2,406	4,586	21.2	1,238	2,472	23.4	1,168	2,115	19.1
Missing	812	1,403	6.5	353	654	6.2	459	749	6.8
Work status									
Currently employed	8,126	13,768	63.7	4,238	7,604	72.0	3,888	6,164	55.7
Worked in past 12 months	901	1,312	6.1	394	586	5.5	507	726	6.6
Did not work in past 12 months	3,547	5,261	24.3	1,203	1,849	17.5	2,344	3,412	30.9
Not applicable (age 75 or older)	1,163	1,269	5.9	407	524	5.0	756	744	6.7
Missing	2	F	F	0	0	0	2	F	F
Leisure time									
Active	2,615	4,175	19.3	1,342	2,279	21.6	1,273	1,895	17.1
Moderately active	3,247	5,230	24.2	1,485	2,634	24.9	1,762	2,595	23.5
Inactive	7,613	11,675	54.0	3,233	5,310	50.3	4,380	6,364	57.5
Missing	264	542	2.5	182	339	3.2	82	204	1.8
Obese									
No	11,323	18,079	83.6	5,227	8,921	84.5	6,096	9,158	82.8
Yes	2,152	3,144	14.5	982	1,586	15.0	1,170	1,558	14.1
Missing	264	399	1.8	33	56[E1]	0.5[E1]	231	343	3.1
Daily smoker									
No	10,269	16,382	75.8	4,499	7,775	73.6	5,770	8,606	77.8
Yes	3,446	5,191	24.0	1,729	2,759	26.1	1,717	2,432	22.0
Missing	24	49[E2]	0.2[E2]	14	F	F	10	F	F
Arthritis/Rheumatism									
No	10,890	17,827	82.5	5,300	9,185	87.0	5,590	8,643	78.2
Yes	2,842	3,778	17.5	939	1,372	13.0	1,903	2,406	21.8
Missing	7	F	F	3	F	F	4	F	F
Diabetes									
No	13,124	20,762	96.0	5,943	10,088	95.5	7,181	10,674	96.5
Yes	614	853	3.9	299	474	4.5	315	378	3.4
Missing	1	F	F	0	0	0	1	F	F
Thyroid condition									
No	12,979	20,584	95.2	6,115	10,375	98.2	6,864	10,209	92.3
Yes	758	1,035	4.8	127	188	1.8	631	847	7.7
Missing	2	F	F	0	0	0	2	F	F

Data source: *1998/99 National Population Health Survey, cross-sectional sample, Health file*
Note: *Excludes 17 respondents with unknown RSI status in 1998/99. Because of rounding, detail may not add to totals.*
E1 Coefficient of variation between 16.6% and 25.0%
E2 Coefficient of variation between 25.1% and 33.3%
F Coefficient of variation greater than 33.3%

Table C
Distribution of selected characteristics, by sex, household population aged 20 or older in 1998/99 who did not report RSI in 1996/97, Canada excluding territories

	Both sexes			Men			Women		
	Sample size	Estimated population		Sample size	Estimated population		Sample size	Estimated population	
		'000	%		'000	%		'000	%
Total	**9,255**	**18,416**	**100.0**	**4,048**	**8,959**	**100.0**	**5,207**	**9,456**	**100.0**
Repetitive strain injury									
Yes	737	1,512	8.2	332	741	8.3	405	771	8.2
No	8,512	16,896	91.8	3,712	8,212	91.7	4,800	8,684	91.8
Missing	6	F	F	4	F	F	2	F	F
Marital status									
Married/Common-law	5,664	12,107	65.7	2,719	6,245	69.7	2,945	5,861	62.0
Previously married	1,904	2,805	15.3	488	822	9.2	1,416	1,983	21.0
Never married	1,687	3,505	19.0	841	1,892	21.1	846	1,612	17.1
Education									
Secondary graduation or less	3,665	6,701	36.4	1,587	3,097	34.6	2,078	3,604	38.1
At least some postsecondary	5,589	11,713	63.6	2,460	5,860	65.4	3,129	5,853	61.9
Missing	1	F	F	1	F	F	0	0	0
Household income									
Lowest/Lower-middle	1,392	2,085	11.3	419	724	8.1	973	1,361	14.4
Middle	2,523	4,522	24.6	1,062	2,133	23.8	1,461	2,389	25.3
Upper-middle	3,205	6,599	35.8	1,517	3,333	37.2	1,688	3,266	34.5
Highest	1,675	4,177	22.7	858	2,295	25.6	817	1,882	19.9
Missing	460	1,033	5.6	192	474	5.3	268	558	5.9
Work status									
Currently employed	5,520	11,985	65.1	2,781	6,602	73.7	2,739	5,383	56.9
Worked in past 12 months	578	1,099	6.0	234	478	5.3	344	621	6.6
Did not work in past 12 months	2,402	4,350	23.6	788	1,528	17.1	1,614	2,822	29.8
Not applicable (age 75 or older)	755	982	5.3	245	352	3.9	510	630	6.7
Missing									
Leisure time									
Active	1,746	3,563	19.3	865	1,962	21.9	881	1,602	16.9
Moderately active	2,271	4,614	25.1	1,004	2,353	26.3	1,267	2,261	23.9
Inactive	5,127	9,970	54.1	2,102	4,480	50.0	3,025	5,490	58.1
Missing	111	268	1.5	77	165	1.8	34	104[E1]	1.1[E1]
Obese									
No	7,634	15,419	83.7	3,408	7,589	84.7	4,226	7,829	82.8
Yes	1,479	2,720	14.8	623	1,334	14.9	856	1,386	14.7
Missing	142	278	1.5	17	36[E2]	0.4[E2]	125	241	2.6
Daily smoker									
No	6,961	13,995	76.0	2,940	6,601	73.7	4,021	7,394	78.2
Yes	2,279	4,385	23.8	1,099	2,335	26.1	1,180	2,051	21.7
Missing	15	F	F	9	F	F	6	F	F
Arthritis/Rheumatism									
No	7,312	15,231	82.7	3,425	7,799	87.1	3,887	7,431	78.6
Yes	1,940	3,182	17.3	622	1,160	12.9	1,318	2,022	21.4
Missing	3	F	F	1	F	F	2	F	F
Diabetes									
No	8,869	17,718	96.2	3,865	8,582	95.8	5,004	9,135	96.6
Yes	385	692	3.8	183	377	4.2	202	315	3.3
Missing	1	F	F	0	0	0.0	1	F	F
Thyroid condition									
No	8,740	17,593	95.5	3,966	8,813	98.4	4,774	8,780	92.9
Yes	514	821	4.5	82	146	1.6	432	675	7.1
Missing	1	F	F	0	0	0.0	1	F	F

Data sources: *1994/95 to 2000/01 National Population Health Survey, longitudinal sample, Health file*
Note: *Excludes 968 respondents who reported RSI in 1996/97 and 4 with unknown RSI status in 1996/97. Because of rounding, detail may not add to totals.*
E1 Coefficient of variation between 16.6% and 25.0%
E2 Coefficient of variation between 25.1% and 33.3%
F Coefficient of variation greater than 33.3%

Table D
Regression coefficients relating number of general practitioner contacts in past 12 months to selected characteristics, by sex, household population aged 20 or older, Canada, 2000/01

	Number of general practitioner contacts in past 12 months						
	Men				**Women**		
	B	**95% confidence interval**	**beta**		**B**	**95% confidence interval**	**beta**
Reported RSI†	0.96*	0.73, 1.18	0.05*		1.37*	1.11, 1.63	0.06*
Age	0.00	-0.01, 0.01	0.00		-0.04*	-0.05, -0.04	-0.11*
Marital status							
Married/Common-law	0.21	-0.02, 0.44	0.02		0.26*	0.01, 0.52	0.02*
Previously married	0.45*	0.16, 0.74	0.02*		0.62*	0.30, 0.95	0.04*
Never married‡	…	…	…		…	…	…
At least some postsecondary education†	-0.16*	-0.31, -0.01	-0.01*		-0.25*	-0.43, -0.07	-0.02*
Household income							
Lowest/Lower-middle	0.76*	0.29, 1.24	0.03*		0.97*	0.62, 1.33	0.05*
Middle	0.21*	0.02, 0.40	0.01*		0.23	-0.01, 0.47	0.01
Upper-middle	0.05	-0.09, 0.20	0.00		0.06	-0.13, 0.24	0.00
Highest‡	…	…	…		…	…	…
Work status (age 20-75)							
Currently employed‡	…	…	…		…	…	…
Worked in past 12 months	0.64*	0.40, 0.89	0.03*		0.83*	0.49, 1.18	0.03*
Did not work in past 12 months	2.02*	1.60, 2.45	0.12*		1.07*	0.87, 1.27	0.07*
Leisure time							
Active	-0.44*	-0.63, -0.26	-0.03*		-0.55*	-0.74, -0.36	-0.03*
Moderately active	-0.24*	-0.40, -0.09	-0.02*		-0.39*	-0.55, -0.24	-0.02*
Inactive‡	…	…	…		…	…	…
Obese†	0.47*	0.29, 0.65	0.03*		0.90*	0.64, 1.16	0.05*
Daily smoker†	0.17	-0.03, 0.37	0.01		0.26*	0.03, 0.48	0.01*
Arthritis/Rheumatism†	1.90*	1.56, 2.23	0.11*		2.20*	1.94, 2.46	0.13*
Diabetes†	2.93*	2.24, 3.62	0.11*		2.08*	1.54, 2.62	0.06*
Thyroid condition†	1.58*	0.94, 2.22	0.04*		1.08*	0.79, 1.37	0.04*
Intercept	1.64				4.47		
Model information							
Sample size	51,125				60,985		
R^2	0.08				0.05		
Adjusted R^2	0.08				0.05		
Degrees of freedom	20				20		
	51,104				60,964		
Dropped because of missing values	794				892		

Data source: 2000/01 Canadian Community Health Survey
Note: "Unknown" categories for household income and obesity and "not applicable" category for work status were included in models to maximize sample size, but their B and beta coefficients are not shown.
† Reference category is absence of characteristic.
‡ Reference category
* $p < 0.05$
… Not applicable

Table E
Regression coefficients relating number of chiropractor contacts in past 12 months to selected characteristics, by sex, household population aged 20 or older, Canada, 2000/01

	Number of chiropractor contacts in past 12 months						
	Men				Women		
	B	95% confidence interval	beta		B	95% confidence interval	beta
Reported RSI†	0.94*	0.67, 1.21	0.05*		1.52*	1.16, 1.88	0.07*
Age	-0.01*	-0.01, 0.00	-0.02*		0.00	-0.01, 0.00	-0.01
Marital status							
Married/Common-law	0.37*	0.19, 0.55	0.03*		-0.11	-0.39, 0.16	-0.01
Previously married	0.43*	0.19, 0.67	0.02*		-0.07	-0.35, 0.22	0.00
Never married‡	…	…	…		…	…	…
At least some postsecondary education†	0.05	-0.09, 0.20	0.00		0.25*	0.09, 0.41	0.02*
Household income							
Lowest/Lower-middle	-0.34	-0.80, 0.11	-0.02		-0.49*	-0.76, -0.23	-0.03*
Middle	-0.34*	-0.53, -0.14	-0.02*		-0.21*	-0.41, -0.01	-0.01*
Upper-middle	-0.24*	-0.39, -0.09	-0.02*		0.04	-0.17, 0.25	0.00
Highest‡	…	…	…		…	…	…
Work status (age 20-75)							
Currently employed‡	…	…	…		…	…	…
Worked in past 12 months	-0.31*	-0.51, -0.10	-0.01*		-0.12	-0.53, 0.28	0.00
Did not work in past 12 months	-0.17	-0.49, 0.15	-0.01		-0.30*	-0.47, -0.13	-0.02*
Leisure time							
Active	0.13	-0.02, 0.27	0.01		0.32*	0.12, 0.53	0.02*
Moderately active	0.15	-0.02, 0.32	0.01		0.28*	0.11, 0.45	0.02*
Inactive‡	…	…	…		…	…	…
Obese†	0.08	-0.08, 0.24	0.01		0.20	-0.03, 0.43	0.01
Daily smoker†	-0.10	-0.29, 0.09	-0.01		-0.01	-0.21, 0.18	0.00
Arthritis/Rheumatism†	0.67*	0.39, 0.95	0.04*		0.69*	0.51, 0.88	0.05*
Diabetes†	-0.19	-0.42, 0.04	-0.01		-0.16	-0.41, 0.08	-0.01
Thyroid condition†	0.15	-0.32, 0.62	0.00		0.18	-0.03, 0.39	0.01
Intercept	1.06				1.20		
Model information							
Sample size	51,206				61,114		
R^2	0.01				0.01		
Adjusted R^2	0.01				0.01		
Degrees of freedom	20				20		
	51,185				61,093		
Dropped because of missing values	713				763		

Data source: 2000/01 Canadian Community Health Survey
Notes: "Unknown" categories for household income and obesity and "not applicable" category for work status were included in models to maximize sample size, but their B and beta coefficients are not shown. Because of rounding, confidence interval with 0 as upper limit may be significant.
† Reference category is absence of characteristic.
‡ Reference category
* $p < 0.05$
… Not applicable

Table F
Regression coefficients relating number of physiotherapist contacts in past 12 months to selected characteristics, by sex, household population aged 20 or older, Canada, 2000/01

	Number of physiotherapist contacts in past 12 months						
	Men				Women		
	B	95% confidence interval	beta		B	95% confidence interval	beta
Reported RSI†	1.60*	1.21, 1.99	0.06*		2.51*	1.89, 3.13	0.09*
Age	-0.01*	-0.02, 0.00	-0.03*		0.01	-0.01, 0.02	0.01
Marital status							
Married/Common-law	0.00	-0.32, 0.33	0.00		-0.16	-0.44, 0.13	-0.01
Previously married	0.18	-0.30, 0.66	0.01		-0.16	-0.59, 0.27	-0.01
Never married‡	…	…	…		…	…	…
At least some postsecondary education†	-0.05	-0.28, 0.18	0.00		0.31*	0.05, 0.57	0.02*
Household income							
Lowest/Lower-middle	-0.03	-0.59, 0.53	0.00		0.19	-0.39, 0.77	0.01
Middle	0.10	-0.22, 0.42	0.01		-0.03	-0.35, 0.30	0.00
Upper-middle	-0.01	-0.20, 0.18	0.00		0.14	-0.13, 0.41	0.01
Highest‡	…	…	…		…	…	…
Work status (age 20-75)							
Currently employed‡	…	…	…		…	…	…
Worked in past 12 months	0.43	-0.01, 0.87	0.01		0.14	-0.27, 0.56	0.00
Did not work in past 12 months	0.55*	0.10, 1.00	0.03*		-0.01	-0.25, 0.23	0.00
Leisure time							
Active	0.09	-0.16, 0.33	0.00		0.04	-0.23, 0.31	0.00
Moderately active	-0.11	-0.32, 0.10	-0.01		0.00	-0.26, 0.26	0.00
Inactive‡	…	…	…		…	…	…
Obese†	0.04	-0.17, 0.26	0.00		0.11	-0.15, 0.36	0.00
Daily smoker†	0.09	-0.18, 0.37	0.01		0.07	-0.16, 0.31	0.00
Arthritis/Rheumatism†	1.07*	0.71, 1.42	0.05*		0.95*	0.62, 1.27	0.05*
Diabetes†	0.11	-0.25, 0.48	0.00		0.21	-0.29, 0.70	0.01
Thyroid condition†	0.52	-0.38, 1.43	0.01		0.05	-0.22, 0.33	0.00
Intercept	1.28				0.43		
Model information							
Sample size	51,202				61,114		
R²	0.01				0.01		
Adjusted R²	0.01				0.01		
Degrees of freedom	20				20		
	51,181				61,093		
Dropped because of missing values	717				763		

Data source: *2000/01 Canadian Community Health Survey*
Note: *"Unknown" categories for household income and obesity and "not applicable" category for work status were included in models to maximize sample size, but their B and beta coefficients are not shown. Because of rounding, confidence interval with 0 as upper limit may be significant.*
† Reference category is absence of characteristic.
‡ Reference category
* p < 0.05
… Not applicable

Table G
Regression coefficients relating chronic pain or discomfort and psychological distress to selected characteristics, by sex, household population aged 20 or older, Canada excluding territories, 1998/99

	Chronic pain or discomfort						Psychological distress					
	Men			Women			Men			Women		
	B	95% confidence interval	beta	B	95% confidence interval	beta	B	95% confidence interval	beta	B	95% confidence interval	beta
Reported RSI†	0.19*	0.12, 0.26	0.09*	0.23*	0.14, 0.32	0.09*	0.84*	0.53, 1.15	0.09*	0.75*	0.46, 1.03	0.07*
Age	0.00	0.00, 0.00	-0.03	0.00	0.00, 0.00	-0.01	-0.04*	-0.04, -0.03	-0.21*	-0.03*	-0.04, -0.02	-0.16*
Marital status												
Married/Common-law	0.09*	0.04, 0.13	0.06*	0.00	-0.06, 0.05	0.00	-0.20	-0.43, 0.04	-0.03	-0.69*	-0.95, -0.43	-0.11*
Previously married	0.12*	0.05, 0.19	0.06*	0.02	-0.06, 0.10	0.01	0.54*	0.14, 0.94	0.06*	-0.30	-0.67, 0.07	-0.04
Never married‡	…	…	…	…	…	…	…	…	…	…	…	…
At least some postsecondary education†	-0.02	-0.07, 0.02	-0.02	-0.06*	-0.11, -0.01	-0.04*	0.07	-0.12, 0.25	0.01	-0.04	-0.24, 0.16	-0.01
Household income												
Lowest/Lower-middle	0.10*	0.01, 0.18	0.04*	0.07	-0.02, 0.16	0.03	0.54*	0.18, 0.91	0.06*	0.73*	0.35, 1.10	0.09*
Middle	0.03	-0.03, 0.09	0.02	-0.03	-0.09, 0.04	-0.01	0.25	-0.02, 0.51	0.04	0.29*	0.00, 0.58	0.04*
Upper-middle	-0.02	-0.07, 0.03	-0.02	-0.04	-0.10, 0.02	-0.02	-0.03	-0.26, 0.19	-0.01	0.09	-0.14, 0.32	0.01
Highest‡	…	…	…	…	…	…	…	…	…	…	…	…
Work status (age 20-75)												
Currently employed‡	…	…	…	…	…	…	…	…	…	…	…	…
Worked in past 12 months	0.00	-0.06, 0.07	0.00	0.02	-0.05, 0.08	0.01	0.48*	0.06, 0.91	0.04*	0.71*	0.36, 1.05	0.06*
Did not work in past 12 months	0.20*	0.12, 0.28	0.12*	0.12*	0.06, 0.18	0.07*	1.03*	0.72, 1.34	0.15*	0.58*	0.32, 0.84	0.09*
Leisure time												
Active	-0.05*	-0.10, -0.01	-0.04*	-0.11*	-0.16, -0.06	-0.05*	-0.21*	-0.39, -0.02	-0.03*	-0.46*	-0.67, -0.24	-0.06*
Moderately active	-0.07*	-0.12, -0.03	-0.05*	-0.10*	-0.14, -0.05	-0.05*	-0.37*	-0.58, -0.16	-0.06*	-0.41*	-0.61, -0.21	-0.06*
Inactive‡	…	…	…	…	…	…	…	…	…	…	…	…
Obese†	0.01	-0.04, 0.06	0.01	0.10*	0.03, 0.17	0.05*	0.03	-0.19, 0.25	0.00	0.09	-0.16, 0.33	0.01
Daily smoker†	0.05*	0.01, 0.10	0.04*	0.11*	0.05, 0.16	0.06*	0.37*	0.16, 0.58	0.06*	0.65*	0.43, 0.86	0.09*
Arthritis/Rheumatism†	0.57*	0.48, 0.66	0.30*	0.61*	0.53, 0.69	0.33*	0.45*	0.18, 0.71	0.06*	0.70*	0.46, 0.94	0.10*
Diabetes†	0.12	-0.02, 0.26	0.04	0.18*	0.04, 0.32	0.04*	0.18	-0.27, 0.63	0.01	0.70*	0.26, 1.14	0.04*
Thyroid condition†	0.06	-0.10, 0.22	0.01	0.06	-0.04, 0.16	0.02	0.02	-0.57, 0.61	0.00	0.32*	0.02, 0.63	0.03*
Intercept	0.09			0.19			3.59			4.13		
Model information												
Sample size	6,041			7,397			5,982			7,343		
R²	0.16			0.17			0.08			0.08		
Adjusted R²	0.16			0.17			0.07			0.08		
Degrees of freedom	20			20			20			20		
	6,020			7,376			5,961			7,322		
Dropped because of missing values	201			100			260			154		

Data source: *1998/99 National Population Health Survey, cross-sectional sample, Health file*
Note: *"Unknown" categories for household income and obesity and "not applicable" category for work status were included in models to maximize sample size, but their B and beta coefficients are not shown.*
† Reference category is absence of characteristic.
‡ Reference category
* p < 0.05
… Not applicable

Table H
Regression coefficients relating change in chronic pain or discomfort and change in psychological distress between 1998/99 and 2000/01 to selected 1998/99 characteristics, by sex, household population aged 20 or older who did not report RSI in 1996/97, Canada excluding territories

	Chronic pain or discomfort						Psychological distress					
	Men			Women			Men			Women		
	B	95% confidence interval	beta	B	95% confidence interval	beta	B	95% confidence interval	beta	B	95% confidence interval	beta
Reported RSI†	0.03	-0.05, 0.11	0.01	0.13*	0.04, 0.23	0.05*	0.21	-0.21, 0.63	0.02	0.54*	0.14, 0.94	0.05*
Age	0.00	0.00, 0.00	-0.01	0.00	0.00, 0.00	0.01	-0.02*	-0.03, -0.01	-0.09*	-0.03*	-0.04, -0.02	-0.15*
Marital status												
Married/Common-law	0.02	-0.03, 0.07	0.01	0.02	-0.04, 0.07	0.01	-0.20	-0.51, 0.12	-0.04	-0.02	-0.32, 0.28	0.00
Previously married	0.07	-0.03, 0.16	0.03	0.05	-0.03, 0.13	0.03	-0.01	-0.44, 0.42	0.00	-0.12	-0.48, 0.23	-0.02
Never married‡	…	…	…	…	…	…	…	…	…	…	…	…
At least some postsecondary education†	0.00	-0.05, 0.06	0.00	-0.03	-0.08, 0.02	-0.02	0.00	-0.23, 0.23	0.00	-0.17	-0.38, 0.05	-0.03
Household income												
Lowest/Lower-middle	0.20*	0.09, 0.31	0.08*	0.05	-0.03, 0.14	0.02	0.58*	0.06, 1.10	0.06*	0.56*	0.20, 0.92	0.07*
Middle	0.09*	0.03, 0.14	0.06*	0.00	-0.08, 0.08	0.00	0.32	0.00, 0.64	0.05	0.25	-0.07, 0.57	0.04
Upper-middle	0.04	-0.01, 0.09	0.03	0.00	-0.05, 0.06	0.00	0.17	-0.08, 0.43	0.03	0.21	-0.06, 0.48	0.03
Highest‡	…	…	…	…	…	…	…	…	…	…	…	…
Work status (age 20-75)												
Currently employed‡	…	…	…	…	…	…	…	…	…	…	…	…
Worked in past 12 months	-0.05	-0.11, 0.01	-0.02	0.01	-0.07, 0.10	0.01	0.03	-0.47, 0.52	0.00	-0.22	-0.61, 0.17	-0.02
Did not work in past 12 months	0.11*	0.02, 0.21	0.06*	0.02	-0.04, 0.09	0.01	0.28	-0.09, 0.66	0.04	0.35*	0.09, 0.60	0.05*
Leisure time												
Active	-0.03	-0.09, 0.02	-0.02	-0.11*	-0.16, -0.06	-0.06*	-0.11	-0.39, 0.16	-0.02	-0.26*	-0.50, -0.01	-0.03*
Moderately active	-0.08*	-0.13, -0.03	-0.05*	-0.04	-0.10, 0.02	-0.02	-0.19	-0.44, 0.06	-0.03	-0.12	-0.34, 0.11	-0.02
Inactive‡	…	…	…	…	…	…	…	…	…	…	…	…
Obese†	-0.01	-0.07, 0.05	0.00	0.11*	0.03, 0.19	0.05*	-0.16	-0.43, 0.11	-0.02	0.10	-0.21, 0.42	0.01
Daily smoker†	0.08*	0.03, 0.14	0.06*	0.02	-0.03, 0.07	0.01	0.07	-0.18, 0.31	0.01	0.44*	0.20, 0.67	0.06*
Arthritis/Rheumatism†	0.18*	0.08, 0.29	0.09*	0.28*	0.18, 0.37	0.15*	0.31	-0.04, 0.67	0.04	0.50*	0.22, 0.77	0.07*
Diabetes†	0.17	-0.01, 0.34	0.05	0.08	-0.09, 0.24	0.02	-0.21	-0.73, 0.31	-0.01	0.11	-0.36, 0.58	0.01
Thyroid condition†	0.11	-0.10, 0.32	0.02	0.09	-0.01, 0.19	0.03	-0.08	-0.61, 0.45	0.00	0.22	-0.17, 0.62	0.02
Pain/Discomfort	-0.65*	-0.72, -0.59	-0.61*	-0.63*	-0.69, -0.58	-0.60*	-0.63*	-0.68, -0.58	-0.59*	-0.58*	-0.63, -0.54	-0.56*
Intercept	0.03			0.07			1.74			2.05		
Model information												
Sample size	3,956			5,152			3,733			5,008		
R^2	0.33			0.31			0.33			0.30		
Adjusted R^2	0.32			0.31			0.33			0.29		
Degrees of freedom	21			21			21			21		
	3,934			5,130			3,711			4,986		
Dropped because of missing values	92			55			315			199		

Data sources: 1994/95 to 2000/01 National Population Health Survey, longitudinal sample, Health file
Notes: "Unknown" categories for household income and obesity and "not applicable" category for work status were included in models to maximize sample size, but their B and beta coefficients are not shown. Respondents who reported RSI in 1996/97, or whose RSI status was unknown were excluded.
† Reference category is absence of characteristic.
‡ Reference category
* $p < 0.05$
… Not applicable

Dependent seniors at home–formal and informal help

Sylvie A. Lafrenière, Yves Carrière, Laurent Martel and Alain Bélanger

Abstract

Objectives
This article documents the number of hours of help that seniors living in private households received from formal and/or informal sources in 1996.

Data source
Data are from Cycle 11 of the General Social Survey, conducted in 1996. This analysis focuses on 1,089 respondents aged 65 or older who, because of a long-term health problem, required assistance to remain in their homes and who indicated the source of assistance and the amount of help time received.

Analytical techniques
Analysis of variance, followed by Tukey's HSD test, was used to examine differences in help time received from each source. Medians are presented using an independent medians test. Linear regression was used to model associations between the amount of help time received from each source and certain characteristics.

Main results
In 1996, dependent seniors living in the community received a median of 3 hours of help a week. Most of this assistance came from informal sources. Living arrangements and age were the major influences on hours received from informal sources. Having no surviving children and being disabled in terms of dexterity or mobility/flexibility were associated with increased hours of formal care. For those getting both types of help, increased hours from formal sources did not significantly reduce the hours received from informal sources.

Key words
aged, formal care, informal care, instrumental activities of daily living, activities of daily living

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As the baby boom generation ages, the number and proportion of elderly people in the Canadian population will increase sharply. Almost inevitably, age brings limitations that can impair an individual's ability to live independently. Many seniors require help performing some or all of the activities generally recognized as being essential to remaining in their own homes: everyday housework, grocery shopping, meal preparation and personal care.

Generally, dependent seniors who remain in their homes receive most of the help they need from an informal network of family, friends and neighbours.[1-5] Those who are older and/or have a limited informal network may rely more on formal sources such as government or non-government agencies, for-profit or not-for-profit organizations, or paid individuals.[6-8] Also, with advancing age, the likelihood of receiving help from both informal and formal sources tends to increase.[8]

Methods

Data source

This article is based on data from Cycle 11 of the General Social Survey (GSS), conducted in 1996. The GSS began in 1985 with two objectives: to gather cross-sectional information on social trends so that Canadians' living conditions and well-being could be monitored over time, and to provide information on social policy issues. Cycle 11, Social and Community Support, was developed to examine the dynamic between individuals' social networks and the help they receive and provide, and to identify unmet needs.

The target population for the GSS was all Canadian residents aged 15 or older living in private households in the 10 provinces. Residents of the Northwest and Yukon territories and full-time residents of institutions were excluded. The sample population was selected using random digit dialling. To minimize seasonal effects, data collection took place monthly from February through December 1996. Information was collected using computer-assisted telephone interviewing; therefore, households without a telephone were excluded (about 2% of the target population).

When a private household was contacted, all members of that household were listed, and basic information (age and sex, for example) was collected for each person. One household member aged 15 or older was randomly selected to answer the GSS questionnaire. If this person could not be interviewed because of health reasons, another household member provided proxy responses.

Responses were obtained from a sample of 12,756 individuals, which includes an "over-sampling" of people aged 65 or older: 1,250 sponsored by the Seniors' Directorate of Health Canada, and 700 from Québec, sponsored by l'Institut de la statistique du Québec (formerly le Bureau de la statistique du Québec). The response rate was 85.3%. Of the 5,952 respondents aged 65 or older, 1,380 (an estimated 19.6% of seniors in private households) stated that because of a long-term health problem they had received help with at least one of the following tasks: everyday housework, grocery shopping, meal preparation and personal care. Among these respondents, 1,089 (79%) indicated the source of the help and the time devoted to performing the tasks; these respondents were retained for this analysis.

Analytical techniques

The GSS contains several variables that indicate how often help is received for everyday housework, grocery shopping, meal preparation and personal care, and the time devoted to each of these tasks. These data were combined to calculate the weekly number of hours of help received from informal, formal and both sources.

Since the hours of help received do not follow a "normal" statistical distribution, the average is not an appropriate measure of central tendency. Therefore, the median was calculated. An independent medians test determined which medians were significantly different. A variance analysis was used to examine differences between the number of hours of assistance received by seniors who relied on informal sources only, on formal sources only, or on a combination of formal and informal sources. Tukey's HSD test was then used to determine which of the three groups differed significantly from the others.

Linear regression was used to model associations between the amount of help time seniors received from each source and the independent variables in the bivariate analysis: sex, age, education, living arrangements, number of surviving children, number of surviving siblings, and type of disability. A quadratic expression (age^2) was added to account for the non-linear effect of age.

Five separate regressions were modelled. The first measures the association between the various factors and the total number of hours of help received. The others measure associations between the factors and hours of assistance received by seniors who depended on informal sources only, on formal sources only, or on mixed sources. A final regression focuses on factors associated with the number of hours of help received from informal sources by seniors getting mixed assistance to determine, all else being equal, if an increase in formal hours affected the hours received from the informal network. For the multivariate analysis, the time variable was changed to compensate for the heteroscedasticity of the distribution; the time logarithm was used in the regression models.

The data were weighted so that the sample represents the population living in private households. The complex sampling design of the GSS presents a problem in deriving unbiased estimates of the variance. To partially reduce such bias, the weights were normalized (by dividing each weight by the global average weight) so their average weight was equal to 1. However, confidence intervals reported for this analysis should be viewed with caution because this method of calculation does not fully account for the survey design.

The challenges involved in properly caring for the elderly are not new. However, baby boomers have had fewer children than previous generations, so the support they can anticipate from adult children is reduced. Other factors will also affect the supply and availability of caregivers, including changes in marital status and living arrangements, and greater geographic mobility of children.

A recent study identified factors associated with the probability that dependent elderly people in private households would receive informal, formal or both types of help.[9] That study showed that 42% of those receiving help got it from informal sources only, 34% from formal sources only, and 24% from a combination of the two. However, the analysis did not assess the degree of involvement of these networks. Using data from Cycle 11 of the General Social Survey, this article examines the weekly hours of assistance community-dwelling seniors with long-term health problems received from informal and formal sources (see *Methods, Definitions* and *Limitations*). The number of hours of help from each network is analyzed and compared in terms of its importance in each of the support networks. The factors associated with increased help time from the various sources, as well as the effect of receiving formal services on informal time, is examined using multivariate analysis.

Quantifying the help that the elderly household population receives from various sources provides a greater understanding of the involvement of formal and informal networks, an important issue as the elderly population increases.

Half a million receiving help

In 1996, more than half a million seniors with a long-term disability (an estimated 532,000) were living at home and reported getting help with at least one of the following activities: everyday housework, grocery shopping, meal preparation and personal care. Almost half (47%) of them were in their seventies, and more than a third (36%) were aged 80 or older (Table 1). Close to two-thirds were women. A substantial percentage lived alone (39%), although the largest group (43%) lived with their spouse, and 19% lived with others. Around three-

Table 1
Selected characteristics of dependent seniors, household population, Canada excluding territories, 1996

	Sample size	Estimated population	
		'000	%
Both sexes	**1,089**	**532**	**100.0**
Men	376	184	34.6
Women	713	348	65.4
Age group			
65-69	177	86	16.2
70-74	259	126	23.8
75-79	257	126	23.6
80-84	192	94	17.7
85+	204	100	18.7
Education†			
Elementary or less	301	147	30.5
At least some secondary	419	205	42.4
At least some postsecondary	268	131	27.1
Living arrangements			
Alone	422	206	38.7
With others, not spouse	202	99	18.5
With spouse	465	227	42.7
Surviving children†			
None	123	60	11.6
One	150	73	14.1
Two+	790	386	74.3
Surviving siblings†			
None	225	110	21.5
One	198	97	18.9
Two+	624	305	59.6
Type of disability‡			
Mobility/Flexibility	665	325	61.1
Pain and discomfort	521	254	47.8
Cognition	497	243	45.7
Communication§	319	156	29.3
Dexterity	157	76	14.4

Data source: 1996 General Social Survey
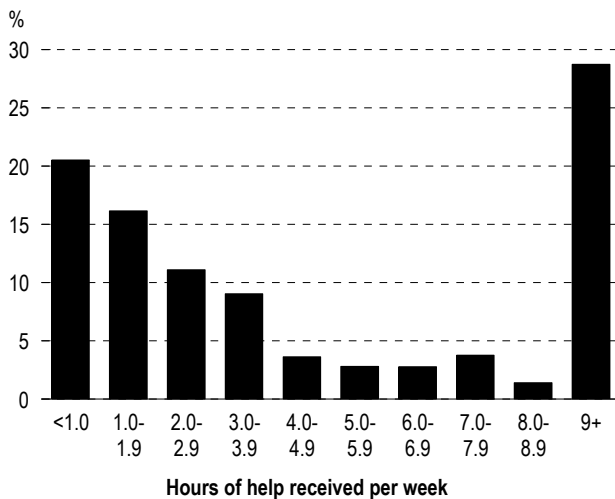*† Detail does not add to total because "missing" category excluded.*
‡ Multiple responses permitted
§ Vision, hearing, speech

quarters of them had at least two surviving children, and a similar proportion had at least one surviving sibling.

The most common disability, affecting 61% of these seniors, was a mobility/flexibility problem. Disability stemming from chronic pain and discomfort was reported by close to half (48%), and almost as many (46%) had impaired cognitive abilities. Communication problems (vision, hearing, speech) and dexterity problems were less common, affecting 29% and 14%, respectively.

Chart 1
Distribution of dependent seniors, by weekly hours of help reported, household population, Canada excluding territories, 1996

%

Hours of help received per week

Data source: 1996 General Social Survey

Chart 2
Distribution of help time reported by dependent seniors, by source of help, household population, Canada excluding territories, 1996

Data source: 1996 General Social Survey

Chart 3
Cumulative distribution of weekly hours of help reported by dependent seniors, by source of help, household population, Canada excluding territories, 1996

%

Hours of help received per week

Data source: 1996 General Social Survey
Note: A variance analysis shows a significant difference between the groups (F = 42.080; p = 0.000), and a Tukey HSD test shows a significant difference (p = 0.000) between formal and informal, and between formal and mixed. The difference between informal and mixed is not significant.
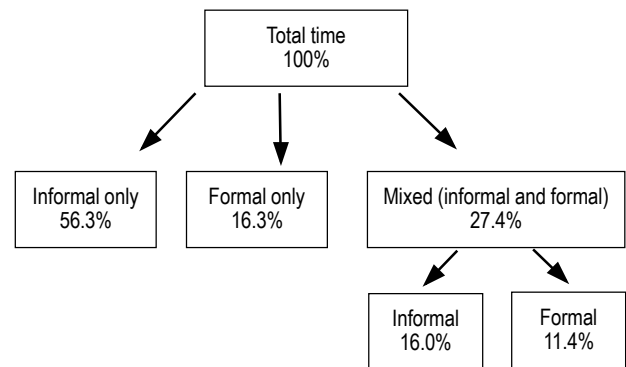
By definition, all the seniors in this analysis were receiving help because of a long-term health problem. However, a substantial number were getting by with relatively few hours of assistance: 20% reported less than an hour a week, and half, no more than three hours (Chart 1). On the other hand, 29% reported at least 9 hours. Overall, these seniors received a median of 3 hours of help a week.

Informal help dominates
Informal sources dominated in the provision of assistance to dependent elderly people in 1996 (Chart 2). More than half (56%) the total amount of help time received that year was reported by seniors who relied only on informal sources. Just 16% of the time was accounted for by those whose assistance came solely from formal sources. The remaining 27% of the time was reported by seniors who received both informal and formal help (mixed). But even within this mixed help, over half the hours came from informal sources. Thus, in total, informal networks provided close to three-quarters (72%) of all the hours of assistance that these seniors received.
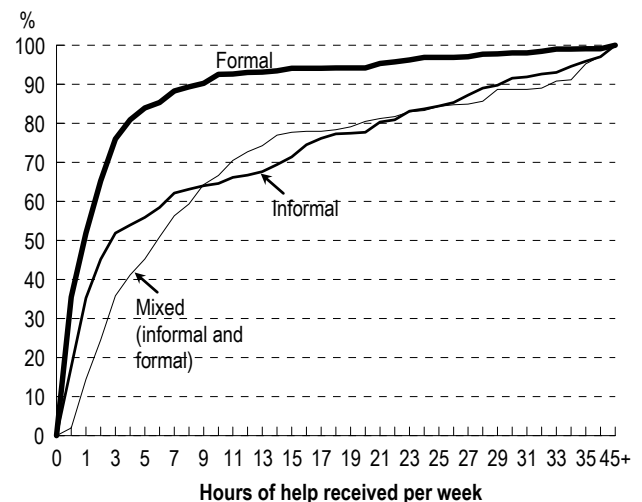
The number of hours of help that seniors received varied with the source of assistance. More

than half the people relying only on formal sources reported less than an hour a week, and just 10% reported 9 or more hours (Chart 3). By contrast, 36% of seniors receiving only informal assistance, and 36% getting mixed help, reported 9 or more hours.

Chart 4
Cumulative distribution of weekly hours of help reported by dependent seniors receiving mixed help, by source of help, household population, Canada excluding territories, 1996
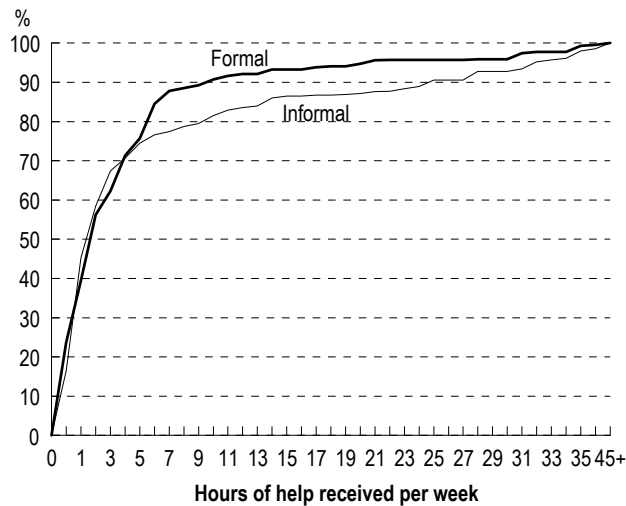
Data source: 1996 General Social Survey

Among those getting mixed help, more than 60% received no more than 3 hours a week from either formal or informal sources (Chart 4). However, 10% of mixed help recipients reported 10 or more hours from formal services, and 10% reported at least 25 hours from informal sources.

Factors associated with help time received

The median number of hours of assistance seniors received varied with their characteristics and circumstances: sex, age group, education, living arrangements, surviving children and siblings, and type of disability (Table 2). But these variables do not exist in isolation. For instance, at older ages, death of a spouse may result in living alone, and advancing age often brings higher levels of disability. The possibility of such confounding effects must be taken into account to determine which factors were significantly associated with the number of hours of assistance dependent seniors received.

Median hours of help also depended on the source. Seniors who relied exclusively on formal sources reported a median of 1.8 hours a week; for those assisted by informal sources alone, the median was 3.5 hours; and for those getting help from mixed sources, 6.5 hours.

Table 2
Median number of weekly hours of help reported by dependent seniors, by source of help, household population, Canada excluding territories, 1996

		Source of help		
	Total	**Informal only**	**Formal only**	**Mixed (informal + formal)**
		Median hours per week		
Both sexes	**3.0**	3.5	1.8	6.5
Men	**3.1**	7.0*	2.0	11.5*
Women	**3.0**	3.0*	1.8	5.5*
Age group				
65-69	**2.9***	3.5	2.0	5.5*
70-74	**3.0***	3.0	1.8	7.0*
75-79	**2.8***	3.0	1.5	6.7*
80-84	**3.0***	4.0	1.5	4.0*
85+	**4.0***	3.5	2.0	10.5*
Education				
Elementary or less	**3.5***	3.5	1.9	8.0*
At least some secondary	**2.5***	3.5	1.8	5.5*
At least some postsecondary	**2.1***	2.0	1.4	4.0*
Living arrangements				
Alone	**2.0***	1.0*	1.6*	4.0*
With others, not spouse	**9.5***	13.0*	3.0*	8.0*
With spouse	**3.0***	5.4*	1.8*	11.0*
Surviving children				
None	**3.0**	5.0	2.8*	6.0
One	**3.5**	3.5	2.0*	10.0
Two+	**3.0**	3.5	1.5*	6.0
Surviving siblings				
None	**2.0**	2.0	1.8	6.0
One	**3.1**	5.0	1.8	7.2
Two+	**3.0**	3.5	1.6	5.5
Type of disability				
Mobility/Flexibility	**4.0***	7.0*	2.3*	8.0*
Pain and discomfort	**3.0**	3.5	2.0*	6.0
Cognition	**3.7***	7.0*	2.0	7.2
Communication†	**4.5***	7.7	1.9	7.3
Dexterity	**10.5***	7.0	10.5*	14.5*

Data source: 1996 General Social Survey
† Vision, hearing, speech
* Significant difference according to independent medians test (p < 0.05)

Even when the other variables were accounted for, exclusive reliance on formal sources tended to be associated with significantly fewer hours of help than were reported by seniors whose help came only from informal sources (Table 3). By contrast, seniors receiving help from mixed sources reported significantly more hours of assistance than did those depending only on informal sources.

Table 3
Regression coefficients relating selected characteristics to total amount of help time reported by dependent seniors, household population, Canada excluding territories, 1996

	B	95% confidence interval	beta
Sex			
Men	0.178	-0.005, 0.361	0.057
Women†	...	...	...
Age (65-99)			
Age	0.019	-0.182, 0.220	0.099
Age^2	-0.000	-0.001, 0.001	-0.082
Education			
Elementary or less†	...	...	...
At least some secondary	-0.022	-0.222, 0.178	-0.007
At least some postsecondary	-0.144	-0.368, 0.081	-0.042
Living arrangements			
With spouse†	...	...	...
Alone	-0.484*	-0.687, -0.281	-0.159*
With others, not spouse	0.393*	0.150, 0.636	0.104*
Surviving children			
None	0.422*	0.167, 0.677	0.091*
One	0.151	-0.083, 0.385	0.035
Two+†	...	...	...
Surviving siblings			
None	-0.046	-0.253, 0.162	-0.013
One	0.089	-0.125, 0.302	0.023
Two+†	...	...	...
Type of disability			
Mobility/Flexibility‡	0.330*	0.153, 0.507	0.109*
Pain and discomfort‡	0.025	-0.138, 0.188	0.008
Cognition‡	0.181*	0.016, 0.345	0.061*
Communication‡§	0.054	-0.131, 0.239	0.017
Dexterity‡	0.537*	0.295, 0.779	0.127*
Missing	0.076	-0.186, 0.338	0.016
Type of help received			
Informal only†	...	...	...
Formal only	-0.647*	-0.837, -0.456	-0.207*
Mixed (informal and formal)	0.536*	0.307, 0.764	0.144*

Data source: 1996 General Social Survey
† Reference category
‡ Reference category is absence of the disability.
§ Vision, hearing, speech
* $p < 0.05$
$N = 1046$; $R^2 = 23.9$*; $df = 20$
... Not applicable

Involvement of network depends on seniors' characteristics

The number of hours of help received by seniors relying on a particular type of network varied with their socio-demographic characteristics (Table 4). Among seniors who relied only on *informal* sources, those living alone reported significantly less help time than did those who were living with a spouse.

Seniors living with others (not a spouse) received the greatest amount of informal help. The causal link, however, is uncertain. It may be that the need for help instigated this living arrangement. Sharing a household may be a way of coping with long-term health problems.

Table 4
Regression coefficients relating selected characteristics to amount of help time reported by dependent seniors, by source of help, household population, Canada excluding territories, 1996

	Informal only			Formal only			Mixed (informal + formal)		
	B	95% confidence interval	beta	B	95% confidence interval	beta	B	95% confidence interval	beta
Sex									
Men	0.254	-0.057, 0.565	0.077	0.041	-0.231, 0.312	0.016	0.073	-0.274, 0.420	0.029
Women†	...	...	...	...	...	...	...	...	...
Age (65-99)									
Age	0.355*	0.047, 0.664	1.790*	-0.320	-0.693, 0.053	-1.746	-0.207	-0.549, 0.135	-1.413
Age^2	-0.002*	-0.004, 0.000	-1.791*	0.002	0.000, 0.004	1.732	0.001	-0.001, 0.004	1.551
Education									
Elementary or less†	...	...	...	...	...	...	...	...	...
At least some secondary	0.025	-0.278, 0.327	0.007	0.032	-0.317, 0.382	0.013	-0.225	-0.593, 0.144	-0.103
At least some postsecondary	-0.141	-0.512, 0.230	-0.035	-0.025	-0.398, 0.348	-0.009	-0.292	-0.685, 0.101	-0.127
Living arrangements									
With spouse†	...	...	...	...	...	...	...	...	...
Alone	-1.259*	-1.619, -0.900	-0.347*	0.108	-0.172, 0.388	0.043	-0.532*	-0.915, -0.149	-0.251*
With others, not spouse	0.390*	0.022, 0.757	0.110*	0.212	-0.345, 0.769	0.040	-0.130	-0.555, 0.295	-0.048
Surviving children									
None	0.140	-0.309, 0.590	0.026	0.416*	0.081, 0.751	0.129*	0.284	-0.292, 0.860	0.061
One	-0.019	-0.417, 0.379	-0.004	0.362	-0.009, 0.733	0.100	0.214	-0.149, 0.577	0.077
Two+†	...	...	...	...	...	...	...	...	...
Surviving siblings									
None	-0.123	-0.485, 0.239	-0.031	0.121	-0.190, 0.433	0.041	0.014	-0.330, 0.358	0.006
One	0.129	-0.246, 0.503	0.029	-0.014	-0.332, 0.303	-0.005	0.058	-0.278, 0.395	0.023
Two+†	...	...	...	...	...	...	...	...	...
Type of disability									
Mobility/Flexibility‡	0.189	-0.100, 0.478	0.058	0.360*	0.103, 0.616	0.145*	0.473*	0.106, 0.840	0.169*
Pain and discomfort‡	-0.108	-0.370, 0.155	-0.034	0.094	-0.165, 0.352	0.038	0.088	-0.197, 0.373	0.042
Cognition‡	0.237	-0.036, 0.509	0.074	0.164	-0.103, 0.432	0.066	0.082	-0.190, 0.354	0.039
Communication‡§	0.210	-0.091, 0.510	0.062	-0.192	-0.499, 0.115	-0.065	0.082	-0.227, 0.390	0.036
Dexterity‡	0.025	-0.382, 0.432	0.005	1.435*	0.948, 1.922	0.302*	0.598*	0.265, 0.931	0.257*
Missing	-0.065	-0.510, 0.380	-0.012	0.097	-0.321, 0.514	0.025	0.416*	0.017, 0.816	0.138*

Data source: 1996 General Social Survey
Note: Because of rounding, confidence interval with 0 as upper limit may be significant.
† Reference category
‡ Reference category is absence of the disability.
§ Vision, hearing, speech
* p < 0.05
N = 485; R^2 = 20.8*; df = 18 for informal only
N = 354; R^2 = 14.9*; df = 18 for formal only
N = 207; R^2 = 25.6*; df = 18 for informal and formal
... Not applicable

Age also had a significant impact on the number of hours of assistance reported by seniors whose help came exclusively from informal sources. Weekly hours increased with advancing age up to about age 80, and then decreased. This likely reflects a greater probability of receiving formal assistance and higher rates of institutionalization as health declines with advancing age (creating a selection effect in the private household sample).

Men relying exclusively on informal sources reported a higher median number of hours of assistance than did their female counterparts. However, when the effects of the other variables were considered, the difference was no longer significant mainly because living arrangements account for the presence of a spouse. Similarly, an apparent association between hours of informal help and various disabilities disappeared when the other variables were taken into account.

Among seniors who reported that their assistance came only from *formal* sources, the number of surviving children was associated with hours of help received. Having no children significantly increased hours of formal assistance, a relationship that persisted even when the other variables were taken into account. Two types of disability—dexterity and mobility/flexibility problems—were also associated with increased help from formal sources only.

For seniors reporting *mixed* help, the number of hours was associated with living arrangements.

Table 5
Regression coefficients relating selected characteristics to amount of informal help time reported by dependent seniors receiving mixed help, household population, Canada excluding territories, 1996

	B	95% confidence interval	beta
Sex			
Men	0.163	-0.283, 0.610	0.049
Women†	...	...	...
Age (65-99)			
Age	-0.208	-0.648, 0.232	-1.079
Age^2	0.001	-0.001, 0.004	1.093
Education			
Elementary or less†	...	...	...
At least some secondary	-0.418	-0.893, 0.056	-0.146
At least some postsecondary	-0.287	-0.793, 0.218	-0.095
Living arrangements			
With spouse†	...	...	...
Alone	-1.065*	-1.561, -0.569	-0.382*
With others, not spouse	-0.229	-0.776, 0.318	-0.065
Surviving children			
None	0.568	-0.175, 1.310	0.093
One	0.509*	0.043, 0.976	0.139*
Two+†	...	...	...
Surviving siblings			
None	-0.142	-0.585, 0.300	-0.044
One	-0.319	-0.757, 0.118	-0.096
Two+†	...	...	...
Type of disability			
Mobility/Flexibility‡	0.381	-0.091, 0.854	0.104
Pain and discomfort‡	-0.077	-0.443, 0.290	-0.028
Cognition‡	0.147	-0.204, 0.497	0.052
Communication‡§	-0.052	-0.449, 0.345	-0.018
Dexterity‡	0.861*	0.421, 1.301	0.280*
Missing	0.230	-0.287, 0.747	0.058
Formal in mixed	-0.999	-0.250, 0.050	-0.088

Data source: *1996 General Social Survey*
† Reference category
‡ Reference category is absence of the disability.
§ Vision, hearing, speech
* $p < 0.05$
N = 207; R^2 = 29.0*; df = 19
... Not applicable

Those living alone received significantly less mixed help time than did those living with a spouse. As well, dexterity or mobility/flexibility problems tended to increase the hours of mixed help. Apparent relationships between mixed help time and age, sex and education were not significant when the effects of other factors such as living arrangements and health problems were accounted for.

For seniors receiving mixed help, an increase in hours from formal sources was accompanied by an apparent decrease in hours from informal sources. However, the decline was not statistically significant (Table 5). This suggests that formal sources complement, but do not replace, informal sources, a finding consistent with recent research.[10,11]

Limitations

Because the General Social Survey (GSS) is cross-sectional, it is not possible to examine how the involvement of the informal and formal networks develops over time. In addition, important characteristics of the help provider are not available. Especially in the case of the informal network, these characteristics may have significant consequences for the nature of the help available and the total number of hours that can be provided. For instance, a younger spouse in good health is likely to be more able to offer assistance than an older spouse who might have disabilities.[9] Also, the health and geographic proximity of children can affect their ability to provide help.

The amount of assistance, particularly informal care, that seniors living in the community report may be underestimated because the GSS results do not account for "invisible" care: organizing services, making appointments, doing errands, and so on, is often done without the knowledge of the recipient. As well, this analysis, does not consider time spent giving emotional support or checking on seniors, which may be important for their ability to continue to live in a private household.

The results do not include seniors in private households who needed help but did not receive it, or those who were living in institutions. Accordingly, the portrait drawn in this article is somewhat incomplete. For example, the finding that cognitive problems did not significantly increase the number of hours of assistance received may be because such problems often result in institutionalization.

Finally, the adequacy of the assistance that respondents received was not analyzed in this study.

Concluding remarks

According to the General Social Survey, in 1996, an estimated 532,000 seniors with long-term health problems who were living in private households received formal and/or informal help with at least one of these tasks: everyday housework, grocery shopping, meal preparation, and personal care. More than 40 minutes out of every hour of this assistance came from informal sources, such as family, friends and neighbours.

Among seniors relying only on informal sources, living arrangements and age were the major influences on the number of hours of help they received. For those relying only on formal care, having no surviving children and being disabled in terms of dexterity or mobility/flexibility were key to the number of hours of assistance. These disabilities were also associated with increased help time for seniors reporting mixed sources. It may be that formal sources are sought when disabilities become more severe. The association with such health problems may also reflect the nature of the tasks used to define dependency; day-to-day household chores and personal care require a degree of dexterity and mobility/flexibility.

The other disabilities considered—problems with communication or cognition and pain and discomfort—did not significantly affect hours of assistance received, regardless of the source. It is likely that serious cognitive problems or severe pain would preclude living at home, and that many people with such disabilities are institutionalized and so were not part of this analysis.

Dependent seniors who lived alone and were receiving help from informal sources only or from mixed sources reported fewer hours than did those living with other people. This may indicate that those who live alone are particularly vulnerable—an important issue when assessing the resources needed to enable dependent seniors to remain in their homes, particularly as the number of elderly people living alone has been increasing steadily.[12] In fact, it may be that the availability of informal help in the household allows seniors to avoid or delay residential care.

It is also telling that seniors relying on formal sources alone received considerably fewer hours of assistance than those who could count on informal support. An earlier study found that seniors who were not getting informal support had the greatest unmet needs for help with activities of daily living.[13]

The results suggest that currently the formal network complements but does not substitute for the informal network. This has implications for the services that will be necessary in the future. The population is aging, but at the same time, smaller family size will reduce the availability of informal support. Lacking the assistance of children and other relatives that was available to previous generations, baby boomers facing long-term health problems may encounter more difficulty remaining in the community, unless a greater burden is placed on the limited informal network, or more resources are made available through home care programs. ●

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Impact of chronic conditions

Susan E. Schultz and Jacek A. Kopec

Abstract

Objectives
This article compares the impact of various self-reported chronic conditions on health-related quality of life, as measured by the Health Utilities Index 3 (HUI3), for the population aged 12 or older.

Data source
The data are from the cross-sectional household component of the Health file of the 1996/97 National Population Health Survey.

Analytical techniques
The effect of 21 chronic conditions was assessed for the full sample (73,402) and in subgroups by age and sex. All analyses were weighted to represent the Canadian population at the time of the survey. The effect of each chronic condition on the HUI3 was estimated using multivariate linear regression, adjusting for age, sex and co-morbidity.

Main results
The average impact of different chronic conditions on health status varies substantially. At younger ages, urinary incontinence and arthritis/rheumatism have the greatest effect on health-related quality of life, while at older ages, Alzheimer's disease and the effects of stroke have a major impact. Assessments of the impact of any specific condition should account for the presence of other conditions.

Key words

health status index, health status indicators, sickness impact profile, health surveys, Alzheimer's disease

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As Canada and other industrialized countries moved through the "epidemiologic transition," the focus of policy and planning related to health interventions shifted from the control of infectious diseases to reducing mortality from chronic conditions. In recent years, with mortality rates at very low levels and life expectancy increasing steadily,[1] another shift has been occurring—this time from a focus on reducing mortality from chronic conditions to preventing or reducing disability.

This change in emphasis brings a number of new challenges. One is the need for methods of measuring a condition's effect on health status, which is more complicated than simply measuring how often the condition causes death. Developing valid and reliable methods for assessing the relative impact and distinguishing between chronic conditions is important when establishing program priorities and for estimating the cost burden that various conditions present.[2]

Different methodologies have been proposed for comparing the burden of chronic conditions, both in economic terms and in loss of quality of life. In the Global Burden of Disease Study, disability weights for various

Methods

Data source

The data in this analysis are from cycle 2 of the National Population Health Survey (NPHS), which was conducted in 1996/97. The NPHS collects information about the health of the Canadian population every two years. It covers household and institutional residents in all provinces and territories, except persons living on Indian reserves, on Canadian Forces bases, and in some remote areas. The NPHS has both longitudinal and cross-sectional components.

This analysis uses cross-sectional data from the Health file of the NPHS. The data pertain to the household population in the 10 provinces. The 1996/97 cross-sectional sample is made up of longitudinal respondents and respondents who were selected as part of supplemental samples, or buy-ins, in three provinces. The additional respondents for the buy-ins were chosen with the random digit dialling (RDD) technique and were included for cross-sectional purposes only.

Individual data are organized into two files: General and Health. The General file contains socio-demographic and some health information that was obtained for each member of participating households. Additional, in-depth health information was collected for one randomly selected household member. The in-depth health information, as well as the information in the General file pertaining to that individual, is found in the Health file.

In households belonging to the cross-sectional buy-in component, one knowledgeable person provided the socio-demographic and health information about all household members for the General file. As well, one household member, not necessarily the same person, was randomly selected to provide in-depth health information about himself or herself for the Health file.

In households belonging to the longitudinal component, the person providing in-depth health information about himself or herself for the Health file was the randomly selected person for that household in cycle 1 (1994/95) and was usually the person who provided information about all household members for the General file in cycle 2.

The 1996/97 cross-sectional response rates for the Health file were 93.6% for the longitudinal component and 75.8% for the RDD component, yielding an overall response rate of 79.0%. A more detailed description of the NPHS design, sample, and interview procedures can be found in published reports.[3,4]

Analytical techniques

The analyses were done using multivariate linear regression. One of the challenges of measuring the effect of a specific chronic condition on health-related quality of life is that individuals often have more than one condition, which makes it difficult to assess the impact of each one separately. In addition, interactions may occur; that is, the effect of a particular condition may be heightened or lessened by the presence of others.

To examine the relative impact of each condition in different circumstances, three analyses were conducted. Analysis I examined the effect of each condition in the absence of co-morbidity, comparing the mean HUI3 (Health Utilities Index Mark III) scores of those who reported only that condition with the scores of those who reported no chronic conditions, adjusting for age and sex. Analysis II, which concerned only respondents who reported at least one chronic condition, compared those with and without each condition, adjusting for age, sex and the number of conditions. Analysis III covered the entire population, comparing the mean HUI3 of those with and without each condition, adjusting for age, sex and all other chronic conditions. This last analysis was also carried out separately for males and females and for four age groups: 12 to 24, 25 to 44, 45 to 64, and 65 or older.

The results provide a measure of the relative impact of each condition on health-related quality of life, as measured by the HUI3, which can be used to group conditions into larger categories.[5] While no "gold standard" exists for grouping conditions based on their impact on the HUI3, Drummond[6] has suggested that a difference in HUI2 global utility scores of 0.03 represents a minimal clinically important difference. Although Drummond's recommendation pertained to the HUI2, a study[7] that compared HUI2 and HUI3 scores for Alzheimer's disease with scores for people with little or no functional impairment (such as the caregivers of Alzheimer patients) found the results for the two measures to be nearly identical. Based on this finding, 0.03 for the minimal clinically important difference is appropriate for the HUI3. Using multiples of the minimal clinically important difference as the cut-points between mild, moderate and severe conditions, the classifications are:

- No discernible impact: difference < 0.03
- Mild impact: difference 0.03 to < 0.06
- Moderate impact: difference 0.06 to < 0.09
- Severe impact: difference $\geq$ 0.09

The NPHS is a two-stage probability sample; a final survey weight represents both the selection probabilities and post-stratification adjustments to match the sample to population characteristics.[4] All analyses were weighted to represent the Canadian population in the 10 provinces in 1996/97. To account for survey design effects, standard errors and coefficients of variation were estimated with the bootstrap technique.[8-10] All analyses were carried out with SAS[11] using multivariate linear regression. Analyses I and II were done using contrasts, correcting for multiple comparisons.

diagnoses were obtained from a panel of experts using a person-trade-off protocol.[12] These were then used to estimate potential years of life lost or disability-adjusted life years. Studies of health expectancy have used the Health Utilities Index (HUI) to weight years lived in less than perfect health, estimating health-adjusted life expectancy.[13] Other research used data from the US National Health Interview Survey to calculate utilities for 130 specific conditions based on respondents' self-rated health and reported role functioning/activity limitation, using a modified version of the Health Utilities Index Mark I (HUI) to derive the weights.[14,15] Various chronic conditions have been ranked based on mean HUI scores for people

Health Utilities Index

The Health Utilities Index (HUI) is "a generic approach to the measurement of health status and the assessment of health-related quality of life."[16] It is a summary measure that incorporates functional health and societal preferences of health states and therefore comprises two components: a health status classification system and a multiattribute utility function used to value health states. The HUI was originally developed for use in assessing outcomes in low birth weight infants (HUI Mark I), and then extended for use with survivors of childhood cancer (HUI Mark II). The HUI Mark II was subsequently adapted for use with population health surveys. The resulting HUI Mark III was used in this study. Detailed information about the HUI is available elsewhere.[16-19]

The HUI Mark III (HUI3) comprises eight attributes: vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain. Based on a series of questions about usual functional ability, a respondent is assigned to one of the five or six levels for each attribute.[20] Utility-based preference scores assigned to each attribute level are then combined using the multiplicative utility function:

$$u = 1.371 \ (u1 * u2 * u3 * u4 * u5 * u6 * u7 * u8) - 0.371$$

to arrive at an overall score, or index, for each individual. Perfect health is rated at 1.000, and death, 0.000; negative scores reflect health states considered worse than death. The global utility score provides a quantitative measure of the health-related quality of life associated with an individual's health state.[20]

reporting each condition in the National Population Health Survey (NPHS), stratifying by sex, age group, and co-morbidity.[2] The impact of chronic illnesses on children in terms of activity limitation, and measures of the effect of chronic condition-related activity limitation on the education system, on the health care system and on the health status of the children in general, have also been presented.[21] Other measures used to quantify the impact of chronic illness include self-reported need for assistance with activities of daily living and the Physical Performance Test.[22]

With data from the 1996/97 National Population Health Survey (NPHS), this article estimates the impact of self-reported chronic conditions on overall health status as measured by the HUI (see *Methods, Definitions* and *Limitations*). Rather than using an absolute score, as did Mittmann et al.,[2] the analysis focuses on the difference in mean HUI scores between those who reported a diagnosed chronic condition and those who did not. This difference is interpreted as the effect of the condition on health status.

One advantage of measuring health in terms of preferences or utilities, as opposed to arbitrary scales, is that the numbers have a rational interpretation (see *Health Utilities Index*). For example, a utility of 0.80 for a particular health state implies that people would, on average, accept an intervention with at least an 80% chance of gaining perfect health and a 20% risk of death, if they were in that state. The regression coefficient for a given disease, adjusted for confounding factors, can be interpreted as the average change in health utility due to the presence of the disease.

Most people report chronic conditions

In 1996/97, more than half of Canadians aged 12 or older, an estimated 58%, reported that they had at least one chronic condition. And among the people with such conditions, a slightly greater proportion reported having two or more conditions rather than only one (Appendix Table A).

The most common condition was non-food allergies (22%) (Table 1). Back problems and arthritis/rheumatism followed (both about 14%).

The lowest prevalences were for Alzheimer's disease, epilepsy and the effects of stroke, each of which was reported by less than 1% of the population.

HUI scores vary with condition

Among people who reported chronic conditions, those with allergies or asthma had the highest mean Health Utility Index (HUI3) scores, while the lowest scores were among people with Alzheimer's disease or the effects of stroke (Table 1). Because these estimates were not adjusted for age, this difference partly reflects the age groups affected: Alzheimer's disease and stroke tend to affect seniors.

The relative impact of the various chronic conditions on health-related quality of life is evident when the HUI3 scores of people with each condition are compared with the scores of people without the condition. When people with each condition, but without co-morbidity, were compared with those with no conditions at all, Alzheimer's disease showed the most dramatic effect, with a difference in HUI3 scores of -0.31, followed by stroke, urinary incontinence and arthritis (Table 2). When age and sex were taken into account, people with no chronic conditions had an average HUI3 score of 0.93 (data not shown). By contrast, individuals with Alzheimer's disease but no other chronic condition had an average score of 0.62, a difference of -0.31 (data not shown). When only those with chronic conditions are considered, the effect was similar (-0.33). And when all the other chronic conditions, as well as age and sex were

Table 1
Prevalence of chronic conditions and unadjusted Health Utilities Index (HUI3) score, household population aged 12 or older, Canada excluding territories, 1996/97

			Unadjusted HUI3 score					
			Condition alone		With other condition(s)		Overall	
	Total with condition†	With condition, reporting no other condition	HUI3	95% confidence interval	HUI3	95% confidence interval	HUI3	95% confidence interval
	%	%						
Non-food allergies	22.3	34.6	0.95	0.95, 0.96	0.86	0.85, 0.87	0.89	0.89, 0.90
Food allergies	6.8	19.4	0.95	0.93, 0.96	0.86	0.85, 0.87	0.88	0.87, 0.89
Asthma	7.2	17.9	0.95	0.94, 0.96	0.85	0.84, 0.86	0.87	0.86, 0.88
Sinusitis	4.6	13.4	0.95	0.94, 0.96	0.83	0.81, 0.84	0.84	0.83, 0.86
Chronic bronchitis/Emphysema	2.8	12.4	0.95	0.93, 0.96	0.73	0.70, 0.75	0.76	0.73, 0.78
Thyroid condition	3.5	19.7	0.94	0.93, 0.95	0.81	0.78, 0.83	0.83	0.81, 0.85
Migraine	7.8	27.6	0.93	0.92, 0.94	0.81	0.79, 0.82	0.84	0.83, 0.85
High blood pressure	10.1	21.2	0.93	0.92, 0.94	0.79	0.77, 0.80	0.82	0.81, 0.83
Stomach/Intestinal ulcers	2.7	21.9	0.92	0.90, 0.94	0.73	0.71, 0.76	0.77	0.75, 0.80
Diabetes	3.2	18.6	0.92	0.90, 0.94	0.73	0.70, 0.75	0.76	0.74, 0.79
Glaucoma‡	1.1	12.3	0.92	0.90, 0.95	0.73	0.70, 0.77	0.76	0.72, 0.79
Epilepsy	0.6	28.9	0.91	0.88, 0.93	0.75	0.69, 0.82	0.80	0.75, 0.84
Heart disease	3.9	13.4	0.90	0.88, 0.93	0.71	0.68, 0.73	0.73	0.71, 0.75
Bowel disorders	1.5	13.5	0.90	0.84, 0.95	0.71	0.67, 0.74	0.73	0.70, 0.76
Back problems	14.1	26.7	0.89	0.88, 0.91	0.78	0.77, 0.79	0.81	0.80, 0.82
Cancer	1.5	12.6	0.88	0.85, 0.92	0.77	0.74, 0.80	0.78	0.75, 0.81
Arthritis/Rheumatism	13.8	18.0	0.86	0.85, 0.88	0.74	0.73, 0.76	0.77	0.75, 0.78
Cataracts‡	2.7	10.9	0.84	0.78, 0.91	0.67	0.64, 0.71	0.69	0.66, 0.72
Urinary incontinence	1.5	12.2	0.82	0.76, 0.89	0.61	0.58, 0.64	0.64	0.61, 0.67
Effects of stroke	0.9	7.7	0.80	0.70, 0.89	0.57	0.52, 0.62	0.58	0.54, 0.63
Alzheimer's disease‡	0.3	23.6	0.59	0.40, 0.79	0.41	0.29, 0.52	0.45	0.35, 0.55
At least one chronic condition	57.5	27.0	0.92	0.92, 0.93	0.82	0.82, 0.83	0.87	0.87, 0.87
No chronic conditions	42.5	...	...	...	...	...	0.95	0.95, 0.95

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
† Denominator does not include missing values.
‡ Respondents aged 12 to 19 with "not applicable" code were assigned to "no" group.
... Not applicable

controlled, Alzheimer's disease still showed the greatest impact on health, with a difference in HUI3 scores of -0.34 between those with and without the disease. Stroke and urinary incontinence also showed differences of 0.10 or more. By contrast, no impact on health-related quality of life was apparent for a number of common conditions, notably allergies and high blood pressure.

The estimates of the impact of chronic conditions on people who reported only one condition, compared with those who reported none, are important in that they simulate the effect of developing each condition. However, the small number of statistically significant results may be related to the fact that most people who had each condition had others as well, and this may have resulted in sample sizes too small to detect

differences for some conditions. Chronic conditions, in fact, rarely exist alone. The proportion of people with each condition who reported at least one other condition ranged from a low of 65% for those with non-food allergies to a high 92% for those with stroke.

Differences by sex and age

The impact of each condition on health-related quality of life was not the same for males and females. In addition to Alzheimer's disease, urinary incontinence and the effects of stroke, females' health status was severely affected by bowel disorders, and males', by arthritis/rheumatism, cataracts, chronic bronchitis/emphysema and epilepsy (Chart 1, Appendix Tables B and C).

Table 2
Impact[†] of chronic conditions on health-related quality of life, by presence of other conditions, household population aged 12 or older, Canada excluding territories, 1996/97

	Analysis I		Analysis II		Analysis III	
	Impact of condition with no other condition[‡]	95% confidence interval	Impact of condition with at least one other condition[§]	95% confidence interval	Overall impact of condition on total study population[††]	95% confidence interval
Alzheimer's disease[‡‡]	-0.31*	-0.57, -0.06	-0.33*	-0.43, -0.23	-0.34*	-0.42, -0.26
Effects of stroke	-0.13*	-0.25, 0.00	-0.16*	-0.22, -0.10	-0.17*	-0.22, -0.13
Urinary incontinence	-0.10*	-0.18, -0.01	-0.11*	-0.15, -0.08	-0.13*	-0.16, -0.10
Arthritis/Rheumatism	-0.05*	-0.08, -0.03	-0.05*	-0.07, -0.04	-0.09*	-0.10, -0.07
Bowel disorders	-0.05	-0.12, 0.02	-0.05*	-0.08, -0.01	-0.08*	-0.11, -0.06
Back problems	-0.05*	-0.06, -0.03	-0.03*	-0.04, -0.02	-0.06*	-0.07, -0.06
Epilepsy	-0.05*	-0.08, -0.01	-0.04	-0.10, 0.01	-0.08*	-0.12, -0.03
Cataracts[‡‡]	-0.04	-0.13, 0.04	-0.06*	-0.09, -0.02	-0.08*	-0.11, -0.06
Cancer	-0.03	-0.07, 0.01	0.01	-0.02, 0.04	-0.02	-0.04, 0.00
Migraine	-0.02*	-0.04, -0.02	0.00	-0.02, 0.01	-0.04*	-0.06, -0.03
Asthma	-0.01	-0.03, 0.00	0.04*	0.03, 0.05	-0.02*	-0.03, -0.01
Stomach/Intestinal ulcers	-0.01	-0.04, 0.02	-0.02	-0.04, 0.00	-0.05*	-0.07, -0.03
Food allergies	-0.01	-0.03, 0.01	0.06*	0.05, 0.07	0.00	-0.01, 0.01
Non-food allergies	0.00	-0.01, 0.00	0.06*	0.05, 0.07	0.00	0.00, 0.01
Heart disease	0.00	-0.03, 0.03	-0.03*	-0.05, -0.01	-0.06*	-0.08, -0.05
Diabetes	0.00	-0.03, 0.03	-0.03*	-0.05, 0.00	-0.06*	-0.07, -0.04
Chronic bronchitis/Emphysema	0.00	-0.02, 0.02	-0.02	-0.05, 0.00	-0.08*	-0.10, -0.06
Sinusitis	0.01	-0.01, 0.03	0.05*	0.04, 0.07	0.00	-0.01, 0.01
Thyroid condition	0.01	0.00, 0.03	0.03	0.01, 0.05	-0.01	-0.02, 0.01
Glaucoma[‡‡]	0.03	-0.01, 0.06	0.00	-0.04, 0.03	-0.03*	-0.05, 0.00
High blood pressure	0.03	0.01, 0.04	0.03*	0.01, 0.04	-0.01	-0.02, 0.00
Other	-0.06*	-0.10, -0.02	-0.05*	-0.07, -0.03	-0.09*	-0.10, -0.07

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
† Estimated as difference in mean Health Utilities Index (HUI3) scores between those with and without condition, adjusted for confounding factors.
‡ Adjusted for age and sex
§ Adjusted for age, sex and number of chronic conditions
†† Adjusted for age, sex and all other chronic conditions
‡‡ Respondents aged 12 to 19 with "not applicable" code were assigned to "no" group.
* Significantly different from those reporting no chronic conditions (p ≤ 0.05)

Nor was the impact of various chronic conditions the same at all ages. For example, at ages 25 to 44, only urinary incontinence and arthristis/rheumatism had a severe effect on health-related quality of life (Chart 2, Appendix Tables C and D). Among 45-to 64-year-olds, the list of conditions having a severe impact was longer: Alzheimer's disease, stroke, urinary incontinence, bowel disorders, cataracts and chronic bronchitis/emphysema. However, at these ages, the overall effect of arthritis/rheumatism was less severe than at ages 25 to 44.

Variations in the impact of particular conditions across population groups are not always easy to explain. Some conditions, such as bowel problems or chronic bronchitis/emphysema, seem to have a great effect on older individuals' health-related quality of life. The reasons for the differential impact of the same condition across age and sex groups may be related to interaction effects that heighten or lessen the effect of specific conditions.

Assessing effects

Based on the analysis of the population as a whole and using the criteria outlined in the Methods,[6] Alzheimer's disease, urinary incontinence and the effects of stroke were classified as having a severe impact on health-related quality of life. Arthritis/ rheumatism, bowel disorders, chronic bronchitis/ emphysema, back problems, epilepsy, heart disease and cataracts had a moderate impact. The effect of asthma, migraine, diabetes, stomach/intestinal ulcers and glaucoma was relatively mild, while the remaining conditions were considered to have no impact.

This classification of conditions makes clinical sense, even though a few results may seem surprising. For example, asthma and cancer showed relatively little impact on health-related quality of life. However, a cross-sectional study found that most people diagnosed with cancer did not have pain or limited physical or mental function. In fact, many

Chart 1

Impact† of selected chronic conditions on health-related quality of life, by sex, household population aged 12 or older, Canada excluding territories, 1996/97
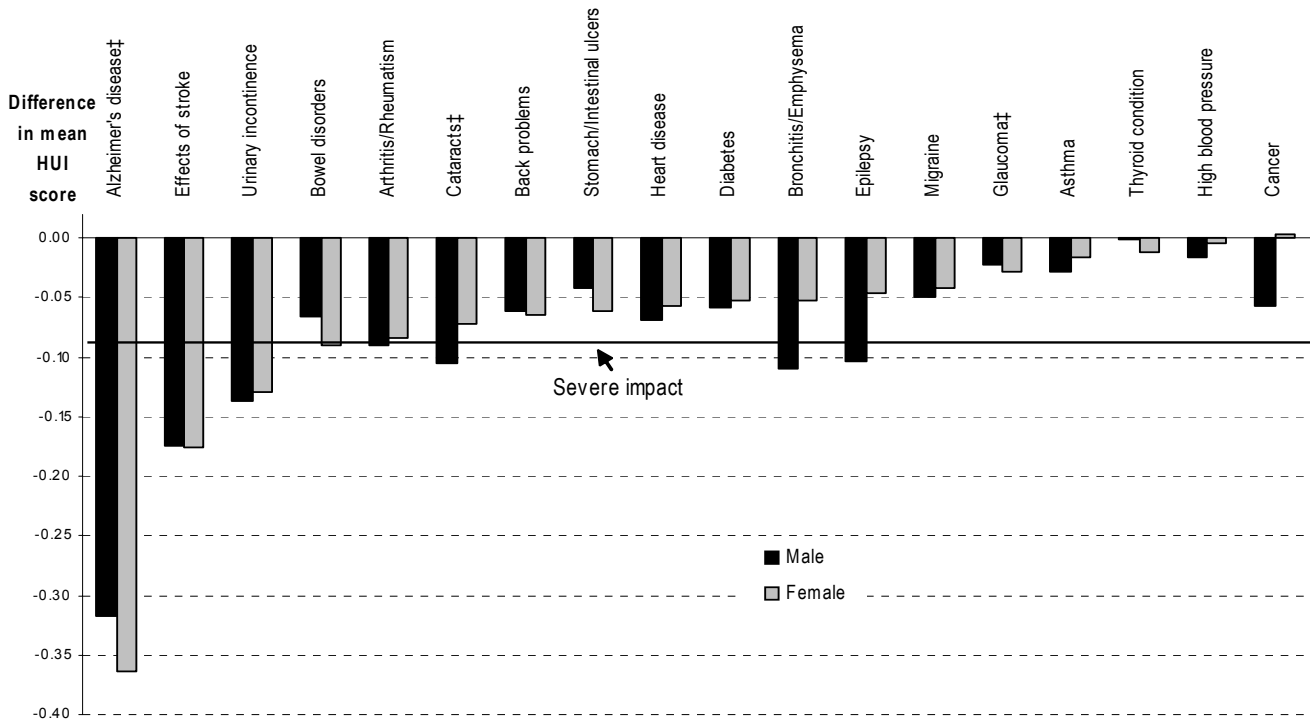
Chart 2
Impact† of selected chronic conditions on health-related quality of life, by age group, household population aged 12 or older, Canada excluding territories, 1996/97

Age 12-24

Age 25-44

Age 45-64

Age 65+
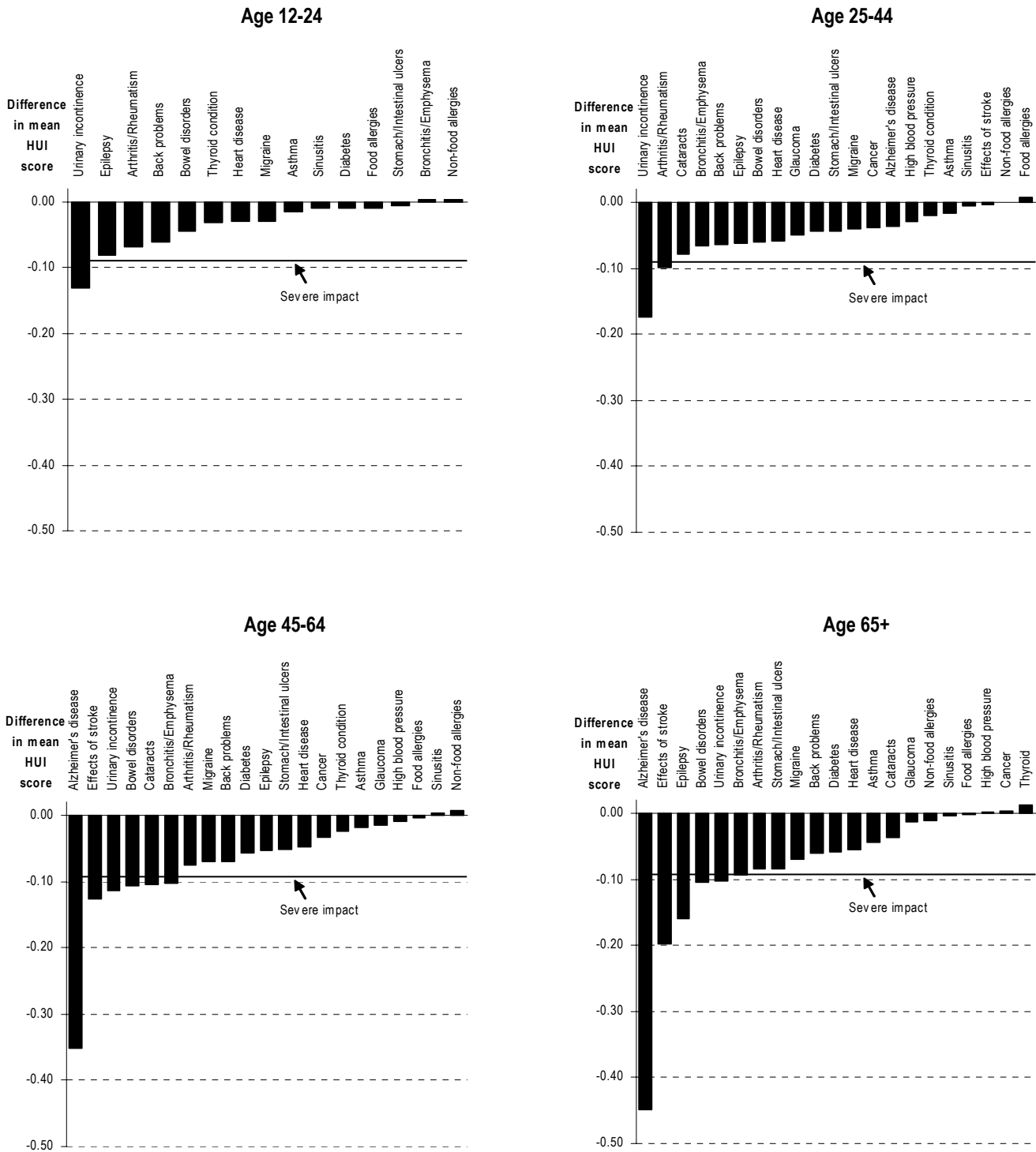
Data source: 1996/97 National Population Health Survey, cross-sectional sample, Health file
† Estimated as difference in mean Health Utilities Index (HUI3) score between those with and without condition, adjusted for age and all other conditions (p ≤ 0.05).

may have been successfully treated. Similarly, asthma is not, in the majority of cases, associated with the attributes that comprise the HUI, such as pain, mobility problems, or decline in emotional health. The results of this analysis of NPHS data are similar to those reported in other research based on US data and adjusted for co-morbidity.[14]

A 2000 study used data from the 1990 Ontario Health Survey to look at the mean HUI3 of people with arthritis and stroke, comparing each group with a reference group that had neither condition.[23] The estimates of the impact of stroke were somewhat larger than the estimates in this analysis of NPHS data, but the estimate for arthritis was remarkably similar. To a great extent, the larger coefficient for stroke in the earlier study is due to the exclusion of people with arthritis from the reference group.

Other studies have reported absolute mean utilities for people with various conditions.[2,14] However, absolute utilities alone do not provide accurate information about the impact a condition has on health-related quality of life. For example, in this analysis, the average HUI3 score of people

reporting arthritis was 0.77. It would be inappropriate to infer that the impact of arthritis is to reduce health utility by -0.23, or relative to perfect health, because most people without arthritis are not in perfect health. The adjusted coefficient for arthritis was -0.09.

In the Global Burden of Disease Study,[12] the disability weights for comparable conditions were much higher than the effects estimated in this analysis. However, the weights for that study were derived from an expert panel, using the person-trade-off technique, rather than population data. It is possible that the study participants considered

Definitions

The National Population Health Survey collected information on the following *chronic conditions*, defined as "long-term conditions that have lasted or are expected to last six months or more and that have been diagnosed by a health professional": food allergies, non-food allergies, asthma, arthritis/rheumatism, back problems excluding arthritis, high blood pressure, migraine, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of a stroke, urinary incontinence, bowel disorders such as Crohn's disease or colitis, Alzheimer's disease or other dementia, cataracts, glaucoma, and thyroid condition.

Although the analysis includes all respondents aged 12 or older, the questions about Alzheimer's disease, cataracts and glaucoma were not asked for those younger than 18. To ensure that all analyses included the same respondents, the responses for these three conditions for people in the 12 to14 and 15 to 19 age groups were changed from "not applicable" to "no."

Four *age groups* were established: 12 to 24, 25 to 44, 45 to 64, and 65 or older. In all analyses, age was treated as a continuous variable.

Limitations

National Population Health Survey (NPHS) data are self- or proxy-reported, and the degree to which they are inaccurate because of reporting error is unknown. Because responses were not verified by an independent source, it is not possible to know if respondents who reported a chronic condition had actually received a professional diagnosis. Some studies have suggested decreased accuracy of reporting for less severe conditions.[24] If the proportion of false positives among those reporting a given condition was large, the effect may have been diluted.

No information about the severity of chronic conditions is available from the NPHS. And, of course, the effect of chronic conditions that were not included in the NPHS could not be measured or taken into account.

The HUI3 may not be sensitive enough to capture the impact of relatively minor health problems, such as allergies.[5] The results of this analysis should not be regarded as evidence that these conditions have no effect on health-related quality of life.

The household component of the NPHS used in this analysis excludes the institutionalized population, many of whom have a much poorer health-related quality of life than do people living in the community. As well, the random-digit dialling technique, which was used for the large buy-in component, would not likely reach the sickest segment of the household population.

The reported confidence intervals should be interpreted with caution. The point estimates from linear regression may be slightly biased because of a skewed distribution of the outcome variable.[25] An alternative would have been to dichotomize the HUI3 and use logistic regression.[5,25] However, the possibility of a small bias should be outweighed by the advantage of being able to interpret the results in terms of utilities.

more severe cases or more advanced stages of disease.

Utilities have also been measured directly in patients with various clinical diagnoses. Such data are difficult to compare with the results of this analysis because the spectrum of disease in a selected group of patients probably differs from that observed in a random population sample. Furthermore, studies that measure patient utilities relative to perfect health may not accurately reflect the effect of disease in the average patient who may have other health problems.

Concluding remarks

In the past, attempts to assess the relative severity of chronic conditions focused primarily on mortality. More recently, the move has been toward summary measures of population health, such as health expectancy, which combine mortality and morbidity.[13] A limitation of this approach is that estimates of health expectancy and cause-deleted health expectancy are also heavily weighted by mortality. By focusing on health-related quality of life, this analysis of data from the National Population Health Survey provides an additional piece of the burden of disease picture.

The results may have implications for health policy, as they give some indication of the benefits that can be achieved through disease prevention and other health interventions. In this analysis, the impact of individual conditions was generally smaller than that suggested by some previous studies. Economic models for cost-benefit analyses that use utilities derived from expert panels or selected patient groups, as well as models based on unadjusted population data, may overestimate potential gains in quality of life from disease prevention programs. Furthermore, this analysis suggests that future models should take into account differences in disease impact according to age and sex. ●

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Appendix

Table A
Distribution of selected characteristics, household population aged 12 or older, Canada excluding territories, 1996/97

	Sample size	Estimated population				Sample size	Estimated population	
		'000	%				'000	%
Total	**73,402**	**24,595**	**100.0**		**Effects of stroke**			
Sex					Yes	868	217	0.9
Men	34,265	12,099	49.2		No	72,505	24,371	99.1
Women	39,137	12,495	50.8		Missing	29	6^{E1}	0.0^{E1}
Age group					**Epilepsy**			
12-24	12,120	5,134	20.9		Yes	446	158	0.6
25-44	28,900	9,709	39.5		No	72,935	24,431	99.3
45-64	19,019	6,335	25.8		Missing	21	6^{E2}	0.0^{E2}
65+	13,363	3,416	13.9		**Food allergies**			
Number of chronic conditions					Yes	5,335	1,667	6.8
None	28,766	10,392	42.3		No	67,987	22,908	93.1
One	19,110	6,598	26.8		Missing	80	20	0.1
Two+	24,997	7,479	30.4		**Glaucoma†**			
Missing	529	125	0.5		Yes	1,013	272	1.1
Alzheimer's disease†					No	72,343	24,312	98.9
Yes	245	67	0.3		Missing	46	10^{E1}	0.0^{E1}
No	73,134	24,518	99.7		**Heart disease**			
Missing	23	F	F		Yes	3,695	946	3.8
Arthritis/Rheumatism					No	69,661	23,632	96.1
Yes	13,063	3,400	13.8		Missing	46	16^{E2}	0.1^{E2}
No	60,274	21,175	86.1		**High blood pressure**			
Missing	65	F	F		Yes	8,676	2,471	10.0
Asthma					No	64,623	22,099	89.9
Yes	5,467	1,778	7.2		Missing	103	25	0.1
No	67,896	22,807	92.7		**Migraine**			
Missing	39	10^{E2}	0.0^{E2}		Yes	5,804	1,915	7.8
Back problems					No	67,566	22,670	92.2
Yes	12,097	3,483	14.2		Missing	32	9^{E2}	0.0^{E2}
No	61,259	21,096	85.8		**Non-food allergies**			
Missing	46	16^{E2}	0.1^{E2}		Yes	16,221	5,499	22.4
Bowel disorders					No	57,104	19,078	77.6
Yes	1,520	375	1.5		Missing	77	17^{E1}	0.1^{E1}
No	71,844	24,211	98.4		**Sinusitis**			
Missing	38	9^{E1}	0.0^{E1}		Yes	38	1,126	4.6
Chronic bronchitis/Emphysema					No	69,576	23,460	95.4
Yes	2,429	690	2.8		Missing	38	9^{E2}	0.0^{E2}
No	70,933	23,895	97.2		**Stomach/Intestinal ulcers**			
Missing	40	10^{E2}	0.0^{E2}		Yes	2,245	666	2.7
Cancer					No	71,093	23,911	97.2
Yes	1,359	368	1.5		Missing	64	17^{E1}	0.1^{E1}
No	72,003	24,216	98.5		**Thyroid condition**			
Missing	40	11^{E2}	0.0^{E2}		Yes	2,852	865	3.5
Cataracts†					No	70,502	23,717	96.4
Yes	2,679	659	2.7		Missing	48	13^{E2}	0.1^{E2}
No	70,682	23,928	97.3		**Urinary incontinence**			
Missing	41	7^{E1}	0.0^{E1}		Yes	1,596	370	1.5
Diabetes					No	71,773	24,216	98.5
Yes	2,706	788	3.2		Missing	33	8^{E1}	0.0^{E1}
No	70,661	23,798	96.8					
Missing	35	9^{E1}	0.0^{E1}					

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
Note: *Because of rounding, detail may not add to totals.*
† Respondents aged 12 to 19 with "not applicable" code were assigned to "no" group.
E1 Coefficient of variation between 16.6% and 25.0%
E2 Coefficient of variation between 25.1% and 33.3%
F Coefficient of variation greater than 33.3%

Table B
Impact† of chronic conditions on health-related quality of life, by sex, household population aged 12 or older, Canada excluding territories, 1996/97

	Male		Female	
	Overall impact of condition on total study population	**95% confidence interval**	**Overall impact of condition on total study population**	**95% confidence interval**
Alzheimer's disease‡	-0.32*	-0.42, -0.21	-0.36*	-0.48, -0.24
Effects of stroke	-0.17*	-0.23, -0.12	-0.18*	-0.25, -0.10
Urinary incontinence	-0.14*	-0.18, -0.09	-0.13*	-0.16, -0.09
Chronic bronchitis/ Emphysema	-0.11*	-0.14, -0.07	-0.05*	-0.08, -0.03
Epilepsy	-0.10*	-0.17, -0.04	-0.05	-0.11, 0.02
Cataracts‡	-0.10*	-0.15, -0.06	-0.07*	-0.10, -0.04
Arthritis/Rheumatism	-0.09*	-0.10, -0.07	-0.08*	-0.10, -0.07
Heart disease	-0.07*	-0.09, -0.05	-0.06*	-0.08, -0.03
Bowel disorders	-0.07*	-0.11, -0.03	-0.09*	-0.12, -0.06
Back problems	-0.06*	-0.07, -0.05	-0.06*	-0.07, -0.05
Diabetes	-0.06*	-0.08, -0.03	-0.05*	-0.08, -0.03
Cancer	-0.06*	-0.10, -0.01	0.00	-0.02, 0.03
Migraine	-0.05*	-0.07, -0.03	-0.04*	-0.06, -0.03
Stomach/Intestinal ulcers	-0.04*	-0.06, -0.02	-0.06*	-0.09, -0.04
Asthma	-0.03*	-0.04, -0.01	-0.02	-0.03, 0.00
High blood pressure	-0.02	-0.03, 0.00	0.00	-0.02, 0.01
Glaucoma‡	-0.02	-0.05, 0.01	-0.03	-0.06, 0.01
Sinusitis	0.00	-0.02, 0.02	0.00	-0.02, 0.02
Thyroid condition	0.00	-0.03, 0.03	-0.01	-0.03, 0.01
Food allergies	0.01	-0.01, 0.02	0.00	-0.02, 0.01
Non-food allergies	0.01	0.00, 0.01	0.00	-0.01, 0.01
Other	-0.08*	-0.10, -0.06	-0.10*	-0.12, -0.08

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
† Estimated as difference in mean Health Utilities Index (HUI3) score between those with and without condition, adjusted for age and all other conditions.
‡ Respondents aged 12 to 19 with "not applicable" code were assigned to "no" group.
* Significantly different from those reporting no chronic condition (p ≤ 0.05)

Table C

Classification of chronic conditions according to impact on health-related quality of life,† by sex and age group, household population aged 12 or older, Canada excluding territories, 1996/97

	Total	Male	Female	Age group			
				12-24	25-44	45-64	65+
Alzheimer's disease‡	severe	severe	severe	...	none	severe	severe
Effects of stroke	severe	severe	severe	...	none	severe	severe
Urinary incontinence	severe	severe	severe	severe	severe	severe	severe
Arthritis/Rheumatism	severe	severe	moderate	moderate	severe	moderate	moderate
Bowel disorders	moderate	moderate	severe	none	moderate	severe	severe
Bronchitis/Emphysema	moderate	severe	mild	none	moderate	severe	severe
Back problems	moderate	moderate	moderate	moderate	moderate	moderate	moderate
Epilepsy	moderate	severe	mild	none	moderate	none	none
Cataracts‡	moderate	severe	moderate	...	none	severe	mild
Heart disease	moderate	moderate	moderate	none	none	mild	moderate
Diabetes	moderate	moderate	mild	none	none	moderate	moderate
Stomach/Intestinal ulcers	mild	mild	moderate	none	mild	mild	moderate
Migraine	mild	mild	mild	mild	mild	moderate	moderate
Glaucoma‡	mild	none	none	...	none	none	none
Cancer	none	moderate	none	none	none	none	none
Asthma	none	mild	none	none	none	none	mild
Thyroid condition	none	none	none	...	none	none	none
High blood pressure	none	none	none	...	mild	none	none
Sinusitis	none	none	none	none	none	none	none
Food allergies	none	none	none	none	none	none	none
Non-food allergies	none	none	none	none	none	none	none

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
† Health Utilities Index (HUI3) score
‡ Respondents aged 12 to 19 with "not applicable" code were assigned to "no" group.
··· Not applicable

Table D

Impact† of each chronic condition on health-related quality of life, by age group, household population aged 12 or older, Canada excluding territories, 1996/97

	Age 12-24		Age 25-44		Age 45-64		Age 65+	
	Overall impact of condition on total study population	95% confidence interval	Overall impact of condition on total study population	95% confidence interval	Overall impact of condition on total study population	95% confidence interval	Overall impact of condition on total study population	95% confidence interval
Alzheimer's disease	...	...	-0.04	-0.09, 0.02	-0.35*	-0.59, -0.11	-0.45*	-0.53, -0.37
Effects of stroke	0.00	-0.06, 0.05	-0.13*	-0.19, -0.06	-0.20*	-0.25, -0.15		
Urinary incontinence	-0.13*	-0.22, -0.04	-0.17*	-0.25, -0.10	-0.11*	-0.17, -0.06	-0.10*	-0.14, -0.07
Arthritis/Rheumatism	-0.07*	-0.11, -0.02	-0.10*	-0.12, -0.08	-0.08*	-0.09, -0.06	-0.08*	-0.10, -0.06
Bowel disorders	-0.04	-0.10, 0.01	-0.06*	-0.09, -0.03	-0.11*	-0.16, -0.05	-0.10*	-0.16, -0.05
Back problems	-0.06*	-0.08, -0.04	-0.06*	-0.08, -0.05	-0.07*	-0.08, -0.06	-0.06*	-0.08, -0.04
Epilepsy	-0.08	-0.17, 0.00	-0.06*	-0.10, -0.03	-0.05	-0.13, 0.03	-0.16	-0.32, 0.00
Cataracts	...	...	-0.08	-0.23, 0.07	-0.10*	-0.18, -0.03	-0.04*	-0.06, -0.01
Cancer	-0.01	-0.11, 0.08	-0.04	-0.09, 0.01	-0.03	-0.07, 0.01	0.00	-0.03, 0.04
Migraine	-0.03*	-0.06, -0.01	-0.04*	-0.05, -0.03	-0.07*	-0.09, -0.05	-0.07*	-0.11, -0.03
Asthma	-0.01	-0.03, 0.00	-0.02	-0.03, 0.00	-0.02	-0.04, 0.00	-0.04*	-0.08, -0.01
Stomach/Intestinal ulcers	0.00	-0.06, 0.05	-0.04*	-0.06, -0.02	-0.05*	-0.08, -0.02	-0.08*	-0.13, -0.04
Food allergies	-0.01	-0.03, 0.01	0.01	-0.01, 0.02	0.00	-0.02, 0.01	0.00	-0.04, 0.03
Non-food allergies	0.00	0.00, 0.01	0.00	-0.01, 0.01	0.01	-0.01, 0.02	-0.01	-0.04, 0.01
Heart disease	-0.03	-0.10, 0.03	-0.06	-0.12, 0.00	-0.05*	-0.07, -0.02	-0.06*	-0.08, -0.03
Diabetes	-0.01	-0.06, 0.05	-0.04	-0.10, 0.01	-0.06*	-0.08, -0.03	-0.06*	-0.09, -0.03
Chronic bronchitis/Emphysema	0.00	-0.03, 0.04	-0.07*	-0.10, -0.03	-0.10*	-0.14, -0.06	-0.09*	-0.13, -0.05
Sinusitis	-0.02	-0.05, 0.02	-0.01	-0.02, 0.01	0.00	-0.02, 0.02	0.00	-0.04, 0.03
Thyroid condition	...	...	-0.02	-0.05, 0.01	-0.02	-0.05, 0.00	0.01	-0.01, 0.04
Glaucoma	...	...	-0.05	-0.13, 0.03	-0.01	-0.05, 0.02	-0.01	-0.04, 0.02
High blood pressure	...	...	-0.03*	-0.05, -0.01	-0.01	-0.02, 0.00	0.00	-0.02, 0.02
Other	-0.10*	-0.15, -0.06	-0.08*	-0.10, -0.06	-0.11*	-0.14, -0.08	-0.08*	-0.11, -0.05

Data source: *1996/97 National Population Health Survey, cross-sectional sample, Health file*
† Estimated as difference in mean Health Utilities Index (HUI3) score between those with and without condition, adjusted for sex and all other conditions.
* Significantly different from those reporting no chronic condition (p ≤ 0.05)
··· Not applicable

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Marriages, 2000

A total of 157,395 couples were married in 2000, up 1.1% from 155,742 in 1999. The crude marriage rate remained stable for the fourth consecutive year, at 5.1 marriages per 1,000 population.

In Québec, where common-law unions have traditionally been a more prevalent option than in other provinces, the number of marriages increased for the first time in 12 years. A total of 24,912 Québec couples married in 2000, an increase of 8.7% over the previous year, resulting in a crude marriage rate of 3.4 per 1,000 population. Although this was the province's highest rate since 1995, it was the lowest marriage rate for a Canadian province. The number of marriages also rose in British Columbia and the Atlantic provinces, notably New Brunswick with a jump of 7.2%.

On average, brides were 31.7 years old, and grooms, 34.3. The average age of first-time brides was 28.0, and of first-time grooms, 30.0. The majority (65.3%) of marriages were the first for both the bride and groom, although close to a third (32.6%) involved at least one divorced partner.

Information on methods and data quality is available in the Integrated Meta Data Base: survey number 3232. To order *Marriages, 2000* (84F-212XPB, $20) or custom tabulations, contact Client Custom Services (613-951-1746; hd-ds@statcan.ca). To enquire about the concepts, methods or data quality, contact Patricia Tully (613-951-1759; patricia.tully@statcan.ca) or Leslie Geran (613-951-5243; leslie.geran@statcan.ca), Health Statistics Division, Statistics Canada.

Deaths, 2000

In 2000, life expectancy at birth increased slightly for both sexes. A woman born that year could expect to live 82.0 years; a man, 76.7 years. This represents increases of 0.3 and 0.5 years, respectively, over 1999. The gap in life expectancy between the sexes narrowed from 5.4 years in 1999 to 5.2 years in 2000, continuing a 20-year trend.

The total number of deaths in 2000 was 218,062. This marked the first year-over-year decrease (0.7%) in the number since 1981. The overall decline, however, was solely attributable to a drop in male

deaths. The 111,742 male deaths represented a 1.7% decrease from 1999, whereas the 106,320 female deaths were a slight (0.4%) increase.

The overall decline in deaths and an increase in Canada's population combined to yield a crude mortality rate of 7.1 deaths per 100,000 population in 2000—the lowest rate since 1994.

Just over one-third (35%) of deaths in 2000 were due to diseases of the circulatory system; malignant neoplasms or cancers accounted for another 29%. Among diseases of the circulatory system, the most common causes of death were ischemic heart disease (19%) and cerebrovascular disease (7%).

To order shelf tables or custom tabulations for *Deaths 2000* (4F0211XPB, $20), contact Client Custom Services (613-951-1746; hd-ds@statcan.ca). For more information about the concepts, methods or data quality, contact Patricia Tully (613-9510-1759; patricia.tully@statcan.ca) or Leslie Geran (613-951-5243; leslie.geran@statcan.ca), Health Statistics Division, Statistics Canada.

Induced (therapeutic) abortions, 2000

In 2000, Canadian women obtained 105,427 abortions, a slight decrease (0.2%) from 105,666 in 1999. At 15.4 abortions per 1,000 women, the 2000 abortion rate was unchanged from 1999. The ratio of induced abortions per 100 live births increased from 31.3 in 1999 to 32.2 in 2000.

Induced abortions continued to be most common among women in their twenties, who accounted for 51% of those performed in 2000. The rate was 26 abortions per 1,000 women aged 20 to 29.

Between 1999 and 2000, induced abortion rates rose in all provinces, except Ontario, Manitoba and British Columbia. Rates are based on induced abortions performed on Canadian residents in hospitals and clinics in Canada, and legal abortions obtained by Canadian women in the United States.

Selected tables for 1996 to 2000 are available in the "Canadian Statistics" module of Statistics Canada's web site (www.statcan.ca). Information on methods and data quality is available in the Integrated Meta Data Base: survey number 3209. Data on induced abortions in 2000 were collected by the Canadian Institute for Health Information;

for more information on the database, contact Media Relations (613-241-7860, ext. 4004), Canadian Institute for Health Information. For information on long-term trends in induced abortions, or to enquire about the concepts, methods or data quality, contact Paula Woollam (613-951-0879), Health Statistics Division, Statistics Canada.

Health Indicators, 2003(1)

2001 Census data at the health region level are available in *Health Indicators*, an Internet-based publication. The census data have also been incorporated into the product's map feature.

The most recent version of *Health Indicators* also provides updated information, by health region, on selected hospitalizations and readmission rates and other measures related to the health-care system, life expectancy, mortality, cancer incidence, and population estimates and unemployment rates.

Produced by Statistics Canada and the Canadian Institute for Health Information, *Health Indicators* contains statistical measures, based on standard

definitions and methods, of population health and the health care system, that are comparable at the national, provincial/territorial and health region level.

Health Indicators 2003(1) is available free on Statistics Canada's Web site (www.statcan.ca). From the "Our products and services" page, under "Browse our Internet publications," choose "Free," then "Health." Information on methods and data quality is available in the Integrated Meta Data Base: survey numbers, including related surveys, 3207, 3233, 3604, 3701 and 3901. For more information, contact Brenda Wannell (613-951-8554; brenda.wannell@statcan.ca), Health Statistics Division, Statistics Canada, or Anick Losier (613-241-7860), Canadian Institute for Health Information. ●

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Fax: (613) 951-1584,
or visit our Internet site: www.statcan.ca

Title		Catalogue number	Format	Price (CAN$)†‡
Health Reports	· subscription	82-003-XPE	Paper	$58
	· single issue			$20
	· subscription	82-003-XIE	Internet	$44
	· single issue			$15
How Healthy are Canadians? Annual Report 2002		82-003-SIE	Internet	Free
		82-003-SPE	Paper	$20
Health Indicators, electronic publication		82-221-XIE	Internet	Free
Comparable health indicators - Canada, provinces and territories		82-401-XIE	Internet	Free
Health Statistics at a Glance *(Replaced by Health Indicators, electronic publication)*		82F0075XCB	CD-ROM	$100
Health Regions 2000 – Boundaries, Geographic Information and Population Estimates		82F0082XCB	CD-ROM	$60
Guide to Health Statistics *(This provides quick and easy access to health information on Statistics Canada's web site. It can only be used online in html format and cannot be downloaded.)*		82-573-GIE	Internet	Free
Statistical Report on the Health of Canadians		82-570-XIE	Internet	Free
Report on Smoking in Canada, 1985 to 2001		82F0077-XIE	Internet	Free
Health Care in Canada 2000 – A First Annual Report		82-222-XIE (and http://www.cihi.ca)	Internet	Free
Canadian Community Health Survey				
Access to health care services in Canada, 2001		82-575-XIE	Internet	Free
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Cancer Incidence in Canada *(For 1994 to 1996, available through Client Custom Services Unit)*				
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The Changing Face of Heart Disease and Stroke in Canada		82F0076XIE	Internet	Free
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Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures and Treatments		82-562-XPB	Paper	$40
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Life Tables, Canada, Provinces and Territories, 1995-1997		84-537-XIE	Internet	$15

† All prices exclude sales tax.
‡ See inside cover for shipping charges.

Title	Catalogue number	Format	Price (CAN$)†‡
National Population Health Survey			
National Population Health Survey Overview 1994-95	82-567-XPB	Paper	$10
	82-567-XIB	Internet	$8
National Population Health Survey Overview 1996-97	82-567-XPB	Paper	$35
	82-567-XIB	Internet	$26
User's guide for the public use microdata file			
National Population Health Survey 1998-99 - Household Component	82M0009GPE	Paper	$50
National Population Health Survey 1996-97 - Household Component	82M0009GPE	Paper	$50
National Population Health Survey 1996-97 - Health Care Institutions	82M0010GPE	Paper	$50
(See also section on Microdata files)			
Occupational Surveillance			
Occupational Surveillance in Canada: Cause-specific mortality among workers, 1965-1991	84-546-XCB	CD-ROM	$500
Residential Care			
Residential Care Facilities, 1998-99			
(These data are available as custom tabulations through the Client Custom Services Unit.)			
Vital Statistics			
Shelf tables			
Health Statistics Division produces shelf tables for the following, from data year 1996.			
General Summary of Vital Statistics	84F0001XPB	Paper	$20
Causes of Death	84F0208XPB	Paper	$20
Mortality - Summary List of Causes	84F0209XPB	Paper	$20
Mortality - Summary List of Causes, 1997	84F0209XIB	Internet	Free
Births	84F0210XPB	Paper	$20
Deaths	84F0211XPB	Paper	$20
Marriages	84F0212XPB	Paper	$20
Divorces	84F0213XPB	Paper	$20
Leading Causes of Death	84F0503XPB	Paper	$20
(These shelf tables can be ordered through the Client Custom Services Unit.)			
Other			
Validation study for a record linkage of births and deaths in Canada	84F0013XIE	Internet	Free
Postal Code Conversion File Plus (PCCF+)	82F0086XDB	Diskette	Free
(To obtain the PCCF+, clients must have purchased the PCCF)			
Historical Information			
Vital Statistics Compendium, 1996	84-214-XPE	Paper	$45
	84-214-XIE	Internet	$33

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‡ See inside cover for shipping charges.

Health Statistics Division provides a custom tabulation service to meet special resource needs and supplement published data on a fee-for-service basis. Custom tables can be created using a variety of health and vital statistics data sources maintained by the Division.

To order custom tabulations, contact:

Client Custom Services Unit
Health Statistics Division
Statistics Canada
Ottawa, Ontario
K1A 0T6
Telephone: (613) 951-1746
Fax: (613) 951-0792
Email: HD-DS@statcan.ca

Microdata Files

To order the products listed below, contact:

Client Custom Services Unit
Health Statistics Division
Statistics Canada
Ottawa, Ontario
K1A 0T6
Telephone: (613) 951-1746
Fax: (613) 951-0792
Email: HD-DS@statcan.ca

Canadian Community Health Survey	Product number	Format	Price (CAN$)†‡
Canadian Community Health Survey, 2000-2001 - Cycle 1.1 PUMF (public-use microdata file)	82M0013XCB	CD-ROM	$2,000
Cross-sectional data in Flat ASCII files, User's Guide, data dictionary, indexes, layout, Beyond 20/20 Browser for the Health File			Free for Health Sector

National Population Health Survey public-use microdata files

Cycle 4, 2000-01

Custom tables	Household	82C0013	Price varies with information requirements

Cycle 3, 1998-99

Household	Cross-sectional data in Flat ASCII files, User's Guide, data dictionary, indexes, layout, Beyond 20/20 Browser for the Health File	82M0009XCB	CD-ROM	$2,000
Custom tables	Household Institutions	82C0013 82C0015		Price varies with information requirements. Price varies with information requirements.

Cycle 2, 1996-97

Household	Cross-sectional Flat ASCII Files, Beyond 20/20 Browser for the Health File	82M0009XCB	CD-ROM	$500
Health care institutions	Cross-sectional Flat ASCII File	82M0010XCB	CD-ROM	$250 Clients who purchase the 1996/97 Household file will receive the Institutions file free of charge.
Custom tables	Household Institutions	82C0013 82C0015		Price varies with information requirements. Price varies with information requirements.

Cycle 1, 1994-95

Household	Data, Beyond 20/20 Browser Flat ASCII Files, User's Guide	82F0001XCB	CD-ROM	$300
Health care institutions	Flat ASCII Files	82M0010XDB	Diskette	$75
Custom tables	Household Institutions	82C0013 82C0015		Price varies with information requirements. Price varies with information requirements.

† All prices exclude sales tax.
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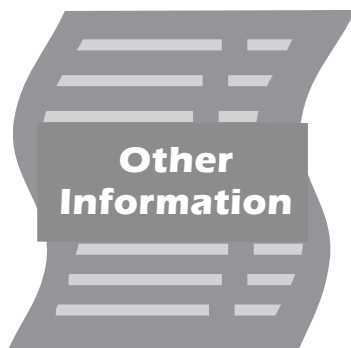
POPULATION HEALTH SURVEYS

Canadian Community Health Survey (CCHS)

Cycle 1.1: CCHS was conducted by Statistics Canada to provide cross-sectional estimates of health determinants, health status and health system utilization for 133 health regions across Canada, plus the territories.

Cycle 1.2: CCHS-Mental Health and Well-being is being conducted by Statistics Canada to provide provincial cross-sectional estimates of mental health determinants, mental health status and mental health system utilization.

Cycle 2.1: CCHS will be conducted by Statistics Canada to provide cross-sectional estimates of health determinants, health status and health system utilization for 134 health regions across Canada.

National Population Health Survey (NPHS)

Household - The household component includes household residents in all provinces, with the principal exclusion of populations on Indian Reserves, Canadian Forces Bases and some remote areas in Québec and Ontario.

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

North - The northern component includes household residents in both the Yukon and the Northwest Territories with the principal exclusion of populations on Indian Reserves, Canadian Forces Bases and some of the most northerly remote areas of the Territories.

Joint Canada - United States Health Survey (JCUHS)

The Joint Canada - United States Health Survey (JCUHS) will collect information from both Canadian and U.S. residents, about their health, their use of health care and their functional limitations.

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

Canadian Statistics

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

For more information, visit our web site at http://www.statcan.ca, under "Canadian Statistics," and then click on "Health."

Statistical Research Data Centres

Statistics Canada, in collaboration with the Social Sciences and Humanities Research Council (SSHRC), has launched an initiative that will help strengthen the country's social research capacity, support policy-relevant research, and provide insights on important issues to the Canadian public. The initiative involves the creation of nine research data centres at McMaster University in Hamilton, the Université de Montréal, Dalhousie University, and the Universities of Toronto, Waterloo, Calgary, Alberta, New Brunswick (Fredericton), and British Columbia. Prospective researchers who wish to work with data from the surveys must submit project proposals to an adjudicating committee operating under the auspices of the SSHRC and Statistics Canada. Approval of proposals will be based on the merit of the research project and on the need to access detailed data. The centres and research projects will be evaluated periodically to assess security standards and the success of analysis resulting from the projects. Researchers will conduct the work under the terms of the *Statistics Act*, as would any other Statistics Canada employee. This means that the centres are protected by a secure access system; that computers containing data will not be linked to external networks; that researchers must swear a legally binding oath to keep all identifiable information confidential; and that the results of their research will be published by Statistics Canada. For more information, contact Garnett Picot (613-951-8214), Business and Labour Market Analysis Division.