

Dependency, chronic conditions and pain in seniors

- *In 2003, small percentages of senior men (6%) and senior women (7%) living in private households needed help with activities of daily living (ADLs)—bathing or dressing, for example.*
- *Larger shares needed help with instrumental activities of daily living (IADLs) such as running errands and doing everyday housework: 15% of men and 29% of women.*
- *The need for assistance was closely related to chronic conditions.*
- *In some instances, the associated pain, rather than the chronic condition itself, was linked to dependency.*

Abstract

Objectives

This article presents the prevalence of dependency and selected chronic conditions among Canadians aged 65 or older living in households. Associations between chronic conditions and dependency in activities of daily living (ADL) and instrumental activities of daily living (IADL) are examined.

Data source

Estimates are based on data from the 2003 Canadian Community Health Survey.

Analytical techniques

Cross-tabulations were used to estimate the prevalence of ADL/IADL dependency and chronic conditions. Associations between chronic conditions and dependency were studied using multiple logistic regression models.

Main results

The prevalence of ADL/IADL dependency and chronic conditions increased with age. IADL dependency was more common than ADL dependency. When chronic pain was taken into account, associations between ADL dependency and arthritis/rheumatism, diabetes and urinary incontinence were no longer significant, and the association between IADL dependency and diabetes lost significance. Regardless of chronic pain, Alzheimer's disease or other dementia and the effects of stroke were significantly related to dependency.

Keywords

activities of daily living (ADL), aging, chronic illness, elderly, health behaviour, independent living, instrumental activities of daily living (IADL)

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As the very words imply, "chronic conditions" cannot be cured;¹ however, they can be treated and managed. The burden associated with chronic illness increases as people age, and may be especially challenging for seniors. The effects of some chronic conditions may even threaten seniors' ability to carry out normal activities and to continue living independently.

With today's long and increasing life expectancy, Canadian seniors may live many years with the effects of one or more chronic conditions. For example, estimates based on 2002 mortality rates indicate that a 65-year-old man will live an additional 17.2 years on average; a woman, another 20.6 years.² But at age 65, 77% of men and 85% of women have at least one chronic condition (data not shown).

This analysis uses national data from the 2003 Canadian Community Health Survey (CCHS) to estimate the prevalence of dependency and selected chronic conditions among men and women aged 65 or older living in private households. The study focuses on the relationship between chronic conditions

and dependency; specifically, needing assistance with activities of daily living (ADL) and with instrumental activities of daily living (IADL). Dependency, as defined in this analysis, is measured by the self-reported inability to perform ADL or IADL tasks without the help of another person (see *Definitions*).

Separate analyses are presented for male and female seniors. In addition to chronic conditions, each

analysis takes socio-demographic characteristics, lifestyle characteristics and chronic pain into account (see *Methods*).

Few seniors in community dependent

In the CCHS, *dependency* was identified by asking respondents if, “because of any physical condition or mental condition or health problem,” they needed

Methods

Data source

The 2003 estimates of the prevalence of chronic conditions and dependency, as well as the multivariate analyses, are based on data from cycle 2.1 of Statistics Canada's Canadian Community Health Survey (CCHS), which was conducted between January and December 2003. The CCHS collects cross-sectional information about the health of Canadians every two years. It covers the household population aged 12 or older in all provinces and territories, except regular members of the Canadian Armed Forces and residents of Indian reserves, Canadian Forces bases, and some remote areas. The sample size in 2003 was 135,573; the response rate was 80.6%. Most interviews were conducted by telephone. Data for the population aged 65 or older were used in this report: 28,617 respondents (11,412 men and 17,205 women).

Questions on chronic pain are part of the Health Utility Index (HUI). In the 2003 CCHS, the HUI was a “sub-sample” module; at the national level, it was administered to a randomly selected subset of respondents. Health regions in Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick and Québec opted to have this module administered to all respondents in their provinces. Thus, for the regression model including chronic pain, records from both the subsample and full sample were used. For the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick and Québec, all records for those aged 65 or older were used; for the remaining provinces and territories, only records for seniors from the subsample were used. This combination of subsample and full sample yielded a total sample size of 14,027 seniors (5,499 men and 8,528 women). More detail about the sample design of the CCHS is available in a previously published report.³

Analytical techniques

Cross-tabulations were used to estimate the prevalence of and the characteristics associated with dependency and chronic conditions in the household population aged 65 or older.

Two sets of multivariate logistic regression models were used to assess the associations between ADL and IADL dependency and

chronic conditions. The first set introduced socio-demographic and lifestyle variables. These variables were retained in the second set, to which chronic pain was added to examine the effect on the associations.

All analyses are based on weighted data. The weighted bootstrap procedure was used to estimate sampling error; that is, in the estimates of standard error of prevalence rates and in the calculation of confidence intervals for the odds ratios in the logistic regression models.^{4,5} This procedure fully accounts for the design effects of the CCHS. Results at the $p < 0.05$ level were considered significant.

Limitations

The analysis is based on cross-sectional data; therefore, associations between variables at only one point in time can be examined; neither causality nor the temporal ordering of events can be inferred.

ADL/IADL dependency, chronic conditions, and chronic pain were self-reported, and no other sources were available to verify their presence. Although the list of chronic conditions used in the CCHS is extensive, respondents may have had other diagnosed conditions. High blood pressure is common among seniors, but it was excluded from this analysis. While high blood pressure may be associated with other chronic conditions that lead to ADL/IADL dependency, it was not considered to be a potential cause of dependency.

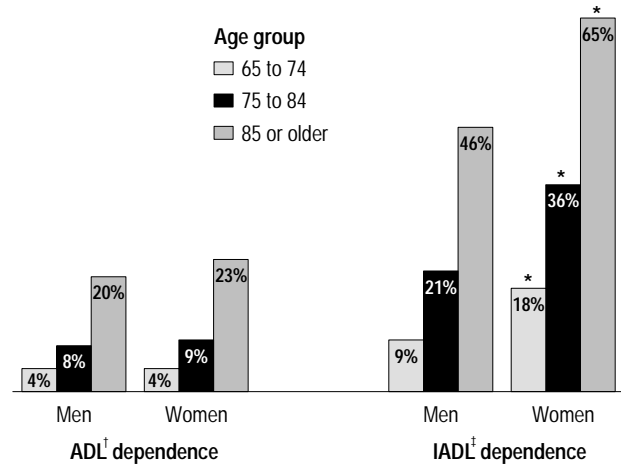
The CCHS does not measure the severity of chronic conditions, although severity would likely affect the relationship between a condition and dependency. For example, previous research has shown that ADL and IADL dependency were prevalent among people with arthritis, but the duration and severity of their disability were less, compared with people whose disability was attributed to other conditions.⁶ As well, the disabilities of those with arthritis tended to accumulate gradually rather than to occur all at once.⁶ Similarly, the degree of difficulty performing the ADL and IADL tasks is not measured, and may vary by chronic condition.

assistance performing two types of tasks: activities of daily living and instrumental activities of daily living.

Activities of daily living (ADLs) are the tasks considered vital to retaining personal independence: bathing, dressing, eating, taking medication, and moving about inside the house. People who needed assistance with any of these personal care activities were considered to be ADL-dependent.

In 2003, only 6% of senior men and 7% of senior women in the household population reported needing help to carry out any of these basic activities of daily living (Table 1). ADL dependency rises with age (Chart 1), but even at age 85 or older, the majority of household-dwelling seniors were still able to perform ADL tasks without another person's help. Just 20% of men and 23% of women in this age range were ADL-dependent. By contrast, in 1996/97 (the most recent estimates available), the majority of seniors living in institutions reported ADL dependency (80% of women; 76% of men—Health Institutions component, National Population Health Survey).

Chart 1
Prevalence of ADL and IADL dependency, by sex and age group, household population aged 65 or older, Canada, 2003



Data source: 2003 Canadian Community Health Survey
 Note: Within each category, rates for age groups are significantly different from each other.
 † Activities of daily living (e.g., bathing, taking medication)
 ‡ Instrumental activities of daily living (e.g., running errands, preparing meals)
 * Significantly different from estimate for men ($p < 0.05$)

Table 1
Prevalence of ADL and IADL dependency, by sex and by age group and selected chronic conditions, household population aged 65 or older, Canada, 2003

	ADL [†] dependency				IADL [‡] dependency			
	Men		Women		Men		Women	
	'000	%	'000	%	'000	%	'000	%
All seniors	99	6	156	7*	246	15	605	29*
65-74	38	4 [§]	45	4 [§]	90	9 [§]	201	18 ^{§*}
75-84	44	8 [§]	67	9 [§]	115	21 [§]	275	36 ^{§*}
85+	18	20 [§]	45	23 [§]	41	46 [§]	128	65 ^{§*}
Chronic conditions								
Arthritis/Rheumatism	49	8	110	9*	125	20	404	35*
Cataracts/Glaucoma	28	9	58	10	67	21	227	38*
Back problems	31	9	53	10	75	21	223	41*
Heart disease	33	9	50	13*	88	24	183	48*
Diabetes	23	9	29	12	50	20	106	42*
Thyroid condition	10 ^E	11 ^E	32	8	18	21	118	30*
Urinary incontinence	26	18	42	17	51	35	127	50*
Asthma	9 ^E	8 ^E	18	10	26	23	73	42*
Bronchitis/Emphysema/Chronic obstructive pulmonary disease	18	14	19	13	41	33	70	46*
Mental illness	16 ^E	22	26	16	34	47	78	49
Cancer	15	13	10 ^E	11 ^E	31	26	36	41*
Migraine	6 ^E	10 ^E	17 ^E	12	17	28	53	37*
Effects of stroke	25	29	24	28	45	52	57	69*
Stomach/Intestinal ulcers	8 ^E	12 ^E	12	13	19	28	45	47*
Bowel disorder/Crohn's disease/Colitis	9 ^E	21 ^E	14	14	15 ^E	32	44	43
Chemical sensitivities	F	F	6 ^E	7 ^E	7 ^E	30 ^E	31	37
Alzheimer's disease/Other dementia	20 ^E	51	20	57	30	77	29	81
Fibromyalgia	F	F	7 ^E	13 ^E	5 ^E	27 ^E	25	46*
Chronic fatigue syndrome	F	29 ^E	9 ^E	18 ^E	10 ^E	46	30	63*
Epilepsy	F	F	F	F	4 ^E	31 ^E	7 ^E	54 ^E

Data source: 2003 Canadian Community Health Survey
 † Activities of daily living (e.g., bathing, taking medication)
 ‡ Instrumental activities of daily living (e.g., running errands, preparing meals)
 § Significantly different from overall estimate for that sex ($p < 0.05$)
 * Significantly different from estimate for men ($p < 0.05$)
 E Coefficient of variation 16.6% to 33.3% (interpret with caution)
 F Coefficient of variation greater than 33.3% (suppressed because of extreme sampling variability)

Preparing meals, doing everyday housework, getting to appointments, running errands such as grocery shopping, banking and paying bills are the *instrumental activities of daily living (IADLs)* identified by the CCHS. People who needed assistance with any of these tasks were defined as IADL-dependent. While almost everyone who is ADL-dependent is also IADL-dependent (92%; data not shown), many who need help with IADLs do not need assistance with ADLs. The need for help with IADL tasks is much less of a threat to remaining independent.

In 2003, IADL dependency affected 15% of senior men and 29% of senior women living in private households (Table 1). The proportions increased sharply with age. By age 85 or older, 46% of men and 65% of women still living in private households needed assistance with IADLs.

The tasks with which household seniors most frequently reported needing help were running errands and doing housework—both IADLs (Chart 2). The

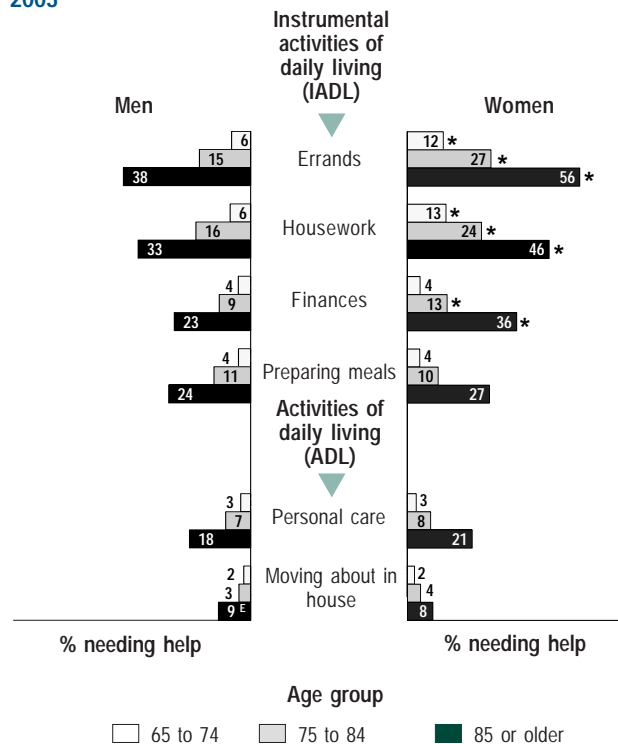
need for assistance with specific IADL and ADL tasks rose markedly with age for both men and women: in each successive age group, the proportion of seniors who needed help with any of the ADL/IADL tasks approximately doubled. Although many factors may be related to this increase in dependency, the presence of chronic conditions plays a major role.

Chronic conditions

The prevalence of most chronic conditions in the household population is generally higher for seniors than for younger adults. Of the 20 conditions covered in this analysis (see *Definitions*), 13 were more common among people aged 65 or older than among those aged 30 to 64 (Table 2). Mental disorders and migraine, however, affected higher proportions of younger adults.

The majority (81%) of seniors in the household population had at least one diagnosed chronic condition

Chart 2
Percentage who were ADL-/IADL-dependent, by sex, task and age group, household population aged 65 or older, Canada, 2003



Data source: 2003 Canadian Community Health Survey
Note: Within each category, rates for age groups are significantly different from each other.
 * Significantly different from estimate for men ($p < 0.05$)
 E Coefficient of variation 16.6% to 33.3% (interpret with caution)

Table 2
Prevalence of chronic conditions, by age group, household population aged 30 or older, Canada, 2003

	65+	30-64
	%	%
Arthritis/Rheumatism	47.3*	16.6
Cataracts/Glaucoma	24.7*	2.4
Back problems	24.1*	22.7
Heart disease	19.8*	3.5
Diabetes	13.5*	4.4
Thyroid condition	12.9*	5.9
Urinary incontinence	10.7*	2.3
Asthma	7.6	7.3
Bronchitis/Emphysema/ Chronic obstructive pulmonary disease	7.4*	3.1
Mental illness	6.1	8.8*
Cancer	5.5*	1.4
Migraine	5.4	11.9*
Effects of stroke	4.5*	0.6
Stomach/Intestinal ulcers	4.4*	3.2
Bowel disorder/Crohn's disease/Colitis	3.9*	2.6
Chemical sensitivities	2.9	2.9
Alzheimer's disease/Other dementia	2.0*	0.1 ^E
Fibromyalgia	1.9	1.9
Chronic fatigue syndrome	1.9	1.6
Epilepsy	0.6	0.6

Data source: 2003 Canadian Community Health Survey
Note: Based on self-reports from a checklist of diagnosed conditions.
 * Significantly higher than estimate for other age group ($p < 0.05$)
 E Coefficient of variation 16.6% to 33.3% (interpret with caution)
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in 2003 (Chart 3), whereas this was the case for about half (54%) of people aged 30 to 64.

Many chronic conditions are associated with aging, so it is not surprising that comorbidity is also more common among seniors. For example, 33% of seniors had three or more chronic conditions, compared with 12% of younger adults. Moreover, the average number of conditions increased at older ages, rising from 1.9 for 65- to 74-year-olds to 2.5 for those 85 or older ($p < 0.05$; data not shown).

Arthritis/Rheumatism was the chronic condition most often reported by seniors (47%) (Table 2). Almost 25% reported cataracts or glaucoma and back problems, and 20% said they had been diagnosed with heart disease. Diabetes, a thyroid condition and urinary incontinence were also relatively common, with each affecting at least 1 senior in 10.

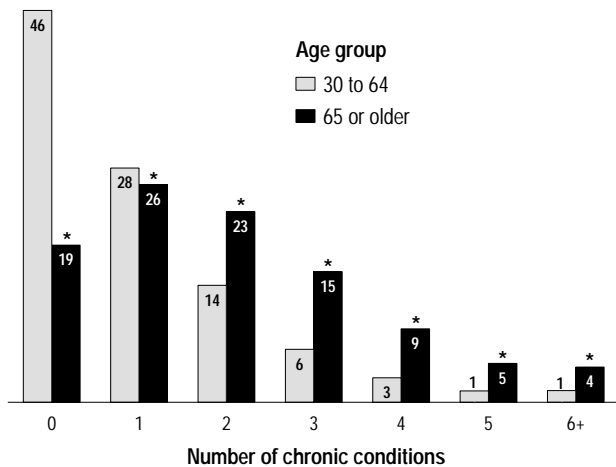
The prevalence of specific chronic conditions varied by sex (Table 3), as found in other research.⁷ For example, senior women were more likely than men to have arthritis/rheumatism, cataracts/glaucoma and back problems. But the prevalence of heart disease, diabetes, cancer, the effects of stroke, and Alzheimer's disease/other dementia was higher among senior men.

Links to dependency

The relatively high prevalence of chronic conditions at older ages and the debilitating effects of many of these conditions seem an obvious link to dependency. However, being dependent involves many factors in addition to chronic diseases. To control for the effects of possibly confounding influences, associations between chronic conditions and ADL or IADL dependency were examined using multivariate models (see *Methods*). Age, living arrangements, main source of income, among other socio-demographic and economic characteristics, were taken into account. Also considered were lifestyle and behavioural risk factors such as smoking, alcohol use, body mass index and physical activity level (Table 4, Appendix Tables A and B).

ADL dependency does, of course, have a more devastating impact than does IADL dependency because the tasks involve basic personal care, and the inability to perform them often results in a move into long-term care.⁸ Even when socio-demographic, economic and

Chart 3
Percentage distribution of household population aged 30 or older, by number of chronic conditions and age group, Canada, 2003



Data source: 2003 Canadian Community Health Survey
Note: Based on self-reports from a checklist of diagnosed conditions.
* Significantly different from estimate for 30-to-64 age group ($p < 0.05$)

Table 3
Prevalence of chronic conditions, by sex, household population aged 65 or older, Canada, 2003

	Men %	Women %
Arthritis/Rheumatism	37.7	54.7*
Cataracts/Glaucoma	19.6	28.7*
Back problems	21.6	26.1*
Heart disease	21.8*	18.1
Diabetes	15.6*	11.9
Thyroid condition	5.3	18.7*
Urinary incontinence	8.9	12.0*
Asthma	6.9	8.1*
Bronchitis/Emphysema/ Chronic obstructive pulmonary disease	7.6	7.3
Mental illness	4.4	7.5*
Cancer	7.1*	4.2
Migraine	3.6	6.8*
Effects of stroke	5.2*	3.9
Stomach/Intestinal ulcers	4.2	4.5
Bowel disorder/Crohn's disease/Colitis	2.8	4.9*
Chemical sensitivities	1.5	4.0*
Alzheimer's disease/Other dementia	2.4*	1.7
Fibromyalgia	1.1 ^E	2.6*
Chronic fatigue syndrome	1.3	2.3*
Epilepsy	0.7 ^E	0.6 ^E

Data source: 2003 Canadian Community Health Survey
Note: Based on self-reports from a checklist of diagnosed conditions.
* Significantly higher than estimate for opposite sex ($p < 0.05$)
E Coefficient of variation 16.6% to 33.3% (interpret with caution)

Definitions

The prevalence of *chronic conditions* was based on self-reports of diagnosed illness. The Canadian Community Health Survey (CCHS) used a checklist of conditions. Respondents were asked about any “long-term health conditions that have lasted or are expected to last six months or more and that have been diagnosed by a health professional.” This analysis considered 20 chronic conditions: arthritis or rheumatism, asthma, Alzheimer’s disease or other dementia, back problems, bowel disorder/Crohn’s disease/colitis, cancer, cataracts or glaucoma, chemical sensitivities, bronchitis/emphysema/chronic obstructive pulmonary disease, chronic fatigue syndrome, diabetes, effects of stroke, epilepsy, fibromyalgia, heart disease, mental illness, migraine, thyroid condition, stomach/intestinal ulcers, and urinary incontinence. Chemical sensitivities (men only), chronic fatigue syndrome (men only), and epilepsy were excluded from multivariate analysis because of small sample sizes.

Respondents who answered “no” to “Are you usually free of pain or discomfort?” were defined as having *chronic pain*. Pain was further classified as mild, moderate or severe.

Three senior *age groups* were established: 65 to 74, 75 to 84, and 85 or older.

Education was grouped as: less than secondary graduation, secondary graduation, some postsecondary, and postsecondary graduation.

Main source of income comprises:

- employment or investment income—wages and salaries, income from self-employment, and dividends and interest
- government transfers, public pensions and public insurance—Employment Insurance, Worker’s Compensation, benefits from the Canada or Québec pension plans, Old Age Security and Guaranteed Income Supplement, Child Tax Benefit, and provincial/municipal social assistance/welfare
- private pension—retirement pensions, etc.
- other/none—child support, alimony, other (e.g., rental income) and no independent income.

Living arrangements were based on the relationship between the respondent and other household members: living alone; living with spouse or partner; and living with others (family or non-family).

Residence was either urban or rural. Respondents living in a census metropolitan area (CMA) or a census agglomeration (CA) were classified as urban, and those living outside such areas, rural. Generally, a CMA is a geographic area with a population of at least 100,000 and a CA is a geographic area of at least 10,000 people. (See the 1996 *Census Dictionary* for complete definitions.⁹⁾

Smoking status was grouped into four categories based on current and former smoking habits: never smokers; daily/occasional smokers; quit less than 10 years ago; and quit 10 or more years ago. “Never smokers” are those who have never smoked an entire cigarette, or former occasional smokers who have smoked less than 100 cigarettes in their life. The two “quit” categories refer to former occasional or daily smokers.

Alcohol use was determined by asking:

- During the past 12 months, have you had a drink of beer, wine, liquor or any other alcoholic beverage?
- Have you ever had a drink?
- During the past 12 months, how often did you drink alcoholic beverages?
- How often in the past 12 months have you had five or more drinks on one occasion?

Five categories of *alcohol use* were established: never in lifetime; never in past 12 months; occasional—drank less than once a week and had five or more drinks on one occasion less than monthly; weekly—drank once a week or more frequently and had five or more drinks on one occasion less than monthly; and heavy—drank once a week or more and had five or more drinks on one occasion more frequently than once a month.

Body mass index (BMI) is calculated by dividing self-reported weight in kilograms by the square of self-reported height in metres. Cut-offs from the International BMI guidelines for adults aged 18 or older were used to classify respondents into four groups¹⁰: underweight (BMI less than 18.5), normal (18.5 to 24.9), overweight (25.0 to 29.9) and obese (30 or more).

Leisure-time physical activity is based on total accumulated energy expenditure (EE) during leisure time. EE 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 bodyweight per hour of activity). To calculate an average daily EE for an 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 with an EE of 1.5 or more kcal/kg/day were considered active. Respondents whose leisure-time EE was below 1.5 kcal/kg/day were considered inactive.

lifestyle characteristics were taken into account (Table 4), ADL dependency in both sexes was related to the presence of arthritis/rheumatism, diabetes, urinary incontinence, bronchitis/emphysema/chronic obstructive pulmonary disease (COPD), the effects of stroke, and Alzheimer’s disease. For men, back problems, cancer and bowel disorders were also important, and for women, mental illness.

Most individuals who are ADL-dependent are also IADL-dependent; therefore, conditions related to ADL dependency also tended to be associated with IADL dependency. In addition, IADL dependency was related to heart disease for both sexes, to mental illness and migraine for men, and to cataracts/glaucoma, back problems, asthma, cancer, chronic fatigue syndrome and fibromyalgia for women.

As might be expected, having more than one chronic condition increases the likelihood of dependency. The effect of comorbidity on dependency was examined

with a multivariate model controlling for socio-demographic, lifestyle and behavioural risk factors. The results showed that the odds of ADL or IADL dependency among seniors increased significantly with each additional chronic condition (data not shown).

Some conditions that were strongly associated with dependency, notably Alzheimer’s disease/other dementia and the effects of stroke, are relatively rare among seniors still living in the community. Again, this reflects the high proportion of people with these conditions who require institutional care. Thus, although such conditions have a major impact on the individuals involved, they affect a small percentage of seniors living in private households (Table 2). By contrast, several other conditions that were consistently associated with dependency were among the most prevalent among household-dwelling seniors: arthritis/rheumatism, diabetes, urinary incontinence, and bronchitis/emphysema/COPD, for example.

Table 4
Adjusted odds ratios relating selected chronic conditions to ADL and IADL dependency, without and with controlling for chronic pain, household population aged 65 or older, Canada, 2003

Chronic conditions [†]	Men				Women			
	ADL dependency		IADL dependency		ADL dependency		IADL dependency	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	Adjusted odds ratio	Adjusted Odds ratio	Adjusted Odds ratio	Adjusted Odds ratio	Adjusted Odds ratio	Adjusted Odds ratio	Adjusted Odds ratio	Adjusted Odds ratio
Arthritis/Rheumatism	1.50*	1.09	1.56*	1.15	1.69*	1.06	1.62*	1.33*
Cataracts/Glaucoma	1.02	1.00	0.99	0.69	0.93	0.87	1.17*	1.29*
Back problems	1.41*	1.19	1.46*	1.44*	1.21	1.06	1.77*	1.40*
Heart disease	1.16	1.43	1.62*	1.88*	1.11	1.03	1.55*	1.54*
Diabetes	1.52*	1.01	1.34*	1.12	1.35*	0.88	1.64*	1.17
Thyroid condition	1.25	0.72	1.01	0.74	1.04	0.92	0.96	0.91
Urinary incontinence	1.81*	1.72	1.81*	2.00*	1.65*	1.13	1.70*	1.36*
Asthma	0.91	0.68	1.15	0.90	1.30	1.55	1.70*	1.49
Bronchitis/Emphysema/Chronic obstructive pulmonary disease	2.22*	2.34*	2.06*	2.38*	1.51*	1.58	1.34*	1.28
Mental illness	1.56	1.20	3.16*	2.16*	1.78*	2.09*	2.05*	2.58*
Cancer	1.97*	2.39	1.75*	2.15*	1.25	1.28	1.50*	0.97
Migraine	1.25	0.74	1.73*	1.76	1.34	1.10	1.15	0.91
Effects of stroke	3.49*	4.38*	3.59*	4.69*	3.04*	2.08*	3.21*	3.38*
Stomach/Intestinal ulcers	1.23	1.03	1.22	0.65	1.02	0.64	1.33	1.18
Bowel disorder/Crohn's disease/Colitis	1.82*	0.56	1.01	1.91	1.28	1.54	1.17	1.31
Chemical sensitivities	...	...	1.20	0.37	0.67	1.63	1.11	1.06
Alzheimer's disease/Other dementia	5.25*	5.88*	6.29*	17.64*	5.45*	6.02*	4.08*	5.23*
Fibromyalgia	0.44	0.17	0.51	0.75	1.65	0.96	1.93*	1.66
Chronic fatigue syndrome	...	...	1.10	1.07	1.74	0.95	2.86*	1.18
Chronic pain								
None [‡]	...	1.00	...	1.00	...	1.00	...	1.00
Mild	...	3.27*	...	1.62	...	4.15*	...	1.65*
Moderate	...	2.01*	...	3.75*	...	3.68*	...	3.46*
Severe	...	3.54*	...	4.49*	...	6.68*	...	4.64*

Data source: 2003 Canadian Community Health Survey

Notes: Both models controlled for age, education, main source of income, living arrangements, urban/rural residence, smoking status, alcohol use, body mass index and leisure-time physical activity (see Appendix Tables A and B for complete results). In addition, model 2 controlled for chronic pain. Epilepsy was excluded from all models because of small sample sizes.

† Reference category (for chronic conditions, absence of the condition is the reference category)

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

... Not applicable

Chronic pain and dependency

Many chronic conditions associated with high odds of dependency are accompanied by chronic pain. In fact, chronic pain itself was significantly associated with both ADL and IADL dependency in 2003, independent of chronic conditions (Table 4). Even mild pain increased the odds that seniors would be dependent.

Controlling for chronic pain attenuated the relationship between ADL dependency and arthritis/rheumatism, diabetes, and urinary incontinence for both sexes. Among men, this was also the case for back problems, cancer and bowel disorders, and among women, for bronchitis/emphysema/COPD. These results indicate that, for some illnesses, chronic pain is the most important feature in their relationship with ADL dependency.

The nature of IADLs (for example, running errands, managing finances) is much different from that of ADLs. Consequently, whether or not they are in pain, many community-dwelling seniors may still need help with IADLs. In fact, even when pain was taken into account, several conditions that were no longer associated with ADL dependency were still associated with IADL dependency. For instance, in the absence of pain, men with back problems or cancer did not have significantly high odds of ADL dependency, but their odds of IADL dependency remained high. The same was true for women with arthritis/rheumatism, and for both sexes with urinary incontinence.

Nonetheless, when pain was controlled for, the association between several chronic conditions and IADL dependency was no longer statistically significant. Among men, this was the case for arthritis/rheumatism, diabetes and migraine. Among women, the association disappeared for diabetes, asthma, bronchitis/emphysema/chronic obstructive pulmonary disease, cancer, chronic fatigue syndrome and fibromyalgia.

Beyond pain

For extremely debilitating conditions, the association with dependency persisted when controlling for pain (Table 4). Regardless of the presence of pain, men and women with Alzheimer's disease or other dementia, or with the effects of stroke, had high odds of needing help with ADL tasks. However, although these conditions severely compromise an individual's independence, they affect a relatively small share of the household population of seniors. Women, but not men, with mental illness also had high odds of being ADL-dependent, as did men with bronchitis/emphysema/COPD.

The effects of Alzheimer's disease/other dementia, stroke and mental illness are also evident for IADL dependency for both sexes, even when controlling for pain. Similarly, for both men and women, back problems, heart disease and urinary incontinence remained associated with IADL dependency. As well, women with cataracts/glaucoma or arthritis/rheumatism had high odds of IADL dependence, as did men with cancer or bronchitis/emphysema/COPD.

Concluding remarks

Many seniors depend on others for help with tasks such as housework, meal preparation and financial management and, in more serious circumstances, with basic functions such as personal care and moving around in their homes. Such dependency may threaten their ability to live independently in the community.

In this study, a substantial number of chronic conditions were shown to be associated with dependency among Canadian seniors. In some instances, being dependent was related to the pain accompanying a condition, not the condition itself. That is, statistically significant relationships between many chronic conditions and dependency disappeared when chronic pain was considered. The results of this analysis suggest that effective pain management may reduce the amount of dependency associated with chronic conditions among Canadian seniors, and ultimately, enhance their ability to continue living in the community. ■

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Table A
Adjusted odds ratios relating selected chronic conditions to ADL or IADL dependency, without and with controlling for chronic pain, male household population aged 65 or older, Canada, 2003

	ADL dependency		ADL dependency controlling for chronic pain		IADL dependency		IADL dependency controlling for chronic pain	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Chronic conditions[†]								
Arthritis/Rheumatism	1.5*	1.1, 2.0	1.1	0.6, 1.9	1.6*	1.3, 1.9	1.1	0.8, 1.6
Cataracts/Glaucoma	1.0	0.7, 1.4	1.0	0.6, 1.6	1.0	0.8, 1.3	0.7	0.5, 1.0
Back problems	1.4*	1.0, 1.9	1.2	0.7, 2.1	1.5*	1.2, 1.8	1.4*	1.1, 2.0
Heart disease	1.2	0.9, 1.6	1.4	0.9, 2.3	1.6*	1.3, 2.0	1.9*	1.4, 2.5
Diabetes	1.5*	1.0, 2.3	1.0	0.5, 1.9	1.3*	1.0, 1.7	1.1	0.8, 1.7
Thyroid condition	1.3	0.8, 2.0	0.7	0.4, 1.4	1.0	0.7, 1.4	0.7	0.5, 1.2
Urinary incontinence	1.8*	1.3, 2.5	1.7	0.9, 3.2	1.8*	1.4, 2.4	2.0*	1.3, 3.0
Asthma	0.9	0.6, 1.5	0.7	0.3, 1.6	1.2	0.8, 1.6	0.9	0.6, 1.5
Bronchitis/Emphysema/Chronic obstructive pulmonary disease	2.2*	1.5, 3.2	2.3*	1.2, 4.5	2.1*	1.6, 2.6	2.4*	1.6, 3.6
Mental illness	1.6	1.0, 2.6	1.2	0.5, 3.0	3.2*	2.3, 4.4	2.2*	1.2, 4.0
Cancer	2.0*	1.3, 3.0	2.4	0.8, 7.2	1.8*	1.3, 2.4	2.1*	1.1, 4.3
Migraine	1.3	0.6, 2.5	0.7	0.2, 2.4	1.7*	1.1, 2.8	1.8	0.9, 3.5
Effects of stroke	3.5*	2.3, 5.3	4.4*	2.3, 8.3	3.6*	2.6, 4.9	4.7*	2.7, 8.0
Stomach/Intestinal ulcers	1.2	0.7, 2.1	1.0	0.5, 2.0	1.2	0.8, 1.9	0.6	0.3, 1.2
Bowel disorder/Crohn's disease/Colitis	1.8*	1.1, 3.2	0.6	0.1, 2.2	1.0	0.6, 1.7	1.9	1.0, 3.7
Chemical sensitivities	...	...	...	...	1.2	0.7, 2.2	0.4	0.1, 1.4
Alzheimer's/Other dementia	5.3*	2.9, 9.4	5.9*	2.5, 13.7	6.3*	3.5, 11.2	17.6*	7.9, 39.4
Fibromyalgia	0.4	0.1, 1.8	0.2	0.0, 6.7	0.5	0.1, 1.8	0.8	0.2, 2.8
Chronic fatigue syndrome	...	...	...	...	1.1	0.6, 2.2	1.1	0.2, 4.6
Chronic pain								
None [‡]	1.0	...	...	...	1.0	...
Mild	...	...	3.3*	1.5, 7.0	...	...	1.6	1.0, 2.7
Moderate	...	...	2.0*	1.1, 3.8	...	...	3.8*	2.5, 5.7
Severe	...	...	3.5*	1.3, 9.7	...	...	4.5*	2.2, 9.3
Age (continuous variable)	1.0*	1.0, 1.1	1.0	1.0, 1.1	1.1*	1.1, 1.1	1.1*	1.1, 1.1
Education[‡]								
Less than secondary graduation	1.3	0.9, 1.8	1.4	0.8, 2.6	1.2	1.0, 1.5	1.4	0.9, 2.0
Secondary graduation	1.4	1.0, 2.1	3.0*	1.4, 6.6	1.2	0.9, 1.6	1.4	0.9, 2.4
Some postsecondary	0.9	0.5, 1.6	0.3	0.1, 1.5	1.0	0.7, 1.5	0.4	0.2, 1.1
Postsecondary graduation [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Main source of income								
Employment/Investment	1.1	0.7, 1.7	1.3	0.5, 3.1	1.0	0.7, 1.3	1.5	0.9, 2.7
Government transfers, public pensions, public insurance	1.2	0.8, 1.7	1.1	0.6, 2.1	1.5*	1.2, 1.8	1.7*	1.2, 2.5
Private pension [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Other/None	0.8	0.3, 2.1	0.4	0.1, 2.3	1.7	0.9, 3.2	3.0*	1.3, 6.9
Living arrangements								
Alone	0.8	0.6, 1.2	1.1	0.7, 1.8	1.6*	1.3, 1.9	2.1*	1.6, 3.0
With spouse/partner [‡]	1.0	...	1.0	...	1.0	...	1.0	...
With others	1.7*	1.2, 2.3	2.8*	1.5, 5.1	1.7*	1.3, 2.1	1.5	1.0, 2.4
Residence								
Urban	1.4*	1.0, 1.9	0.8	0.5, 1.5	1.2*	1.0, 1.5	1.1	0.8, 1.6
Rural [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Smoking status[‡]								
Never [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Daily/Occasional	0.9	0.6, 1.4	1.5	0.8, 2.9	1.4*	1.0, 1.9	2.1*	1.3, 3.6
Quit < 10 years	0.9	0.5, 1.7	0.9	0.4, 2.2	1.5*	1.1, 2.2	2.1*	1.1, 3.9
Quit ≥ 10 years	1.2	0.8, 1.7	1.4	0.8, 2.5	1.4*	1.1, 1.7	2.0*	1.3, 3.0
Alcohol use[‡]								
Never, lifetime	1.7	0.9, 3.4	3.8*	1.3, 11.8	2.3*	1.4, 3.9	3.2*	1.6, 6.4
Never, past 12 months	1.4	1.0, 2.1	2.2*	1.1, 4.6	1.6*	1.3, 2.1	1.8*	1.1, 2.8
Occasional	1.1	0.7, 1.6	1.6	0.7, 3.7	1.4*	1.1, 1.9	1.6*	1.0, 2.5
Weekly [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Heavy	0.9	0.4, 2.0	0.4	0.1, 1.5	1.0	0.7, 1.5	0.8	0.4, 1.5
Body mass index (BMI)[‡]								
Underweight (< 18.5)	3.9*	2.1, 7.4	5.4*	1.9, 15.3	1.8*	1.1, 3.0	1.8	0.7, 4.4
Acceptable weight (18.5-24.9) [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Overweight (25.0-29.9)	0.9	0.7, 1.2	2.4*	1.3, 4.5	0.8	0.7, 1.0	1.3	0.9, 1.9
Obese (≥ 30.0)	1.0	0.6, 1.5	1.5	0.7, 3.2	1.1	0.8, 1.5	1.3	0.8, 1.9
Leisure-time physical activity								
Active [‡]	1.0	...	1.0	...	1.0	...	1.0	...
Inactive	6.1*	4.1, 9.1	5.4*	2.8, 10.2	2.8*	2.2, 3.6	2.0*	1.3, 2.9

Date source: 2003 Canadian Community Health Survey

Notes: Analysis based on 11,072 men for ADL dependency model; 11,042 men for IADL dependency model. When controlling for chronic pain, analysis based on 5,487 men for ADL model; 5,482 men for IADL model. 340 respondents were dropped from ADL model because of missing values; 370 from IADL model; 154 from ADL model controlling chronic pain; 159 from IADL model controlling chronic pain.

[†] Reference category (for chronic conditions, "none" is reference category)

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

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

... Not applicable

Table B
Adjusted odds ratios relating selected chronic conditions to ADL or IADL dependency, without and with controlling for chronic pain, female household population aged 65 or older, Canada, 2003

	ADL dependency		ADL dependency controlling for chronic pain		IADL dependency		IADL dependency controlling for chronic pain	
	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval	Adjusted odds ratio	95% confidence interval
Chronic conditions[†]								
Arthritis/Rheumatism	1.7*	1.3, 2.2	1.1	0.7, 1.6	1.6*	1.4, 1.9	1.3*	1.1, 1.7
Cataracts/Glaucoma	0.9	0.7, 1.2	0.9	0.6, 1.3	1.2*	1.0, 1.4	1.3*	1.0, 1.7
Back problems	1.2	1.0, 1.5	1.1	0.7, 1.6	1.8*	1.5, 2.0	1.4*	1.1, 1.8
Heart disease	1.1	0.9, 1.4	1.0	0.7, 1.5	1.6*	1.3, 1.8	1.5*	1.2, 2.0
Diabetes	1.4*	1.0, 1.7	0.9	0.5, 1.5	1.6*	1.4, 2.0	1.2	0.8, 1.7
Thyroid condition	1.0	0.8, 1.4	0.9	0.6, 1.4	1.0	0.8, 1.1	0.9	0.7, 1.2
Urinary incontinence	1.7*	1.3, 2.1	1.1	0.8, 1.7	1.7*	1.4, 2.0	1.4*	1.0, 1.8
Asthma	1.3	0.9, 1.9	1.5	0.9, 2.8	1.7*	1.4, 2.1	1.5	1.0, 2.3
Bronchitis/Emphysema/Chronic obstructive pulmonary disease	1.5*	1.1, 2.0	1.6	0.9, 2.6	1.3*	1.1, 1.7	1.3	0.9, 1.8
Mental illness	1.8*	1.3, 2.4	2.1*	1.1, 3.8	2.1*	1.7, 2.5	2.6*	1.8, 3.7
Cancer	1.3	0.8, 2.0	1.3	0.6, 2.7	1.5*	1.1, 2.0	1.0	0.6, 1.7
Migraine	1.3	0.9, 2.0	1.1	0.5, 2.4	1.2	0.9, 1.5	0.9	0.6, 1.4
Effects of stroke	3.0*	2.2, 4.1	2.1*	1.0, 4.1	3.2*	2.3, 4.4	3.4*	2.1, 5.5
Stomach/Intestinal ulcers	1.0	0.7, 1.5	0.6	0.3, 1.2	1.3	1.0, 1.8	1.2	0.8, 1.8
Bowel disorder/Crohn's Disease/Colitis	1.3	0.9, 1.7	1.5	0.9, 2.7	1.2	0.9, 1.5	1.3	0.8, 2.1
Chemical sensitivities	0.7	0.4, 1.1	1.6	0.7, 4.0	1.1	0.8, 1.5	1.1	0.7, 1.7
Alzheimer's disease/Other dementia	5.5*	3.0, 9.8	6.0*	2.5, 14.5	4.1*	2.0, 8.3	5.2*	1.9, 14.3
Fibromyalgia	1.7	0.8, 3.5	1.0	0.4, 2.4	1.9*	1.3, 3.0	1.7	0.8, 3.6
Chronic fatigue syndrome	1.7	0.9, 3.4	0.9	0.3, 2.8	2.9*	1.6, 5.3	1.2	0.5, 2.6
Chronic pain								
None [‡]	1.0	...	...	...	1.0	...
Mild	...	...	4.2*	2.5, 7.0	...	...	1.7*	1.2, 2.4
Moderate	...	...	3.7*	2.3, 5.8	...	...	3.5*	2.5, 4.8
Severe	...	...	6.7*	3.7, 12.2	...	...	4.6*	3.0, 7.1
Age (continuous variable)	1.1*	1.1, 1.1	1.1*	1.1, 1.1	1.1*	1.1, 1.1	1.1*	1.1, 1.1
Education[†]								
Less than secondary graduation	1.0	0.8, 1.3	1.2	0.7, 1.9	0.9	0.7, 1.0	0.9	0.7, 1.2
Secondary graduation	1.0	0.7, 1.3	1.2	0.6, 2.1	0.8*	0.7, 0.9	0.7*	0.5, 1.0
Some postsecondary	1.4	0.9, 2.2	0.9	0.4, 2.1	1.0	0.8, 1.3	0.9	0.4, 2.1
Postsecondary graduation [†]	1.0	...	1.0	...	1.0	...	1.0	...
Main source of income								
Employment/Investment	1.3	0.9, 1.9	0.6	0.3, 1.1	1.1	0.9, 1.4	1.1	0.7, 1.7
Government transfers, public pensions, public insurance	1.0	0.7, 1.3	0.5*	0.3, 0.7	1.0	0.9, 1.2	0.8	0.6, 1.0
Private pension [†]	1.0	...	1.0	...	1.0	...	1.0	...
Other/None	0.6	0.2, 2.6	1.3	0.4, 4.0	1.3	0.7, 2.3	1.5	0.6, 3.5
Living arrangements								
Alone	0.9	0.7, 1.2	1.1	0.7, 1.7	1.0	0.9, 1.2	1.1	0.8, 1.4
With spouse/partner [†]	1.0	...	1.0	...	1.0	...	1.0	...
With others	1.1	0.8, 1.5	1.1	0.7, 1.8	1.4*	1.2, 1.7	1.2	0.9, 1.7
Residence								
Urban	1.0	0.8, 1.3	1.2	0.8, 1.7	1.1	1.0, 1.3	1.1	0.9, 1.5
Rural [†]	1.0	...	1.0	...	1.0	...	1.0	...
Smoking status								
Never [†]	1.0	...	1.0	...	1.0	...	1.0	...
Daily/Occasional	0.8	0.5, 1.2	0.9	0.5, 1.6	1.4*	1.1, 1.8	1.1	0.8, 1.6
Quit < 10 years	1.3	0.9, 1.9	1.4	0.7, 2.8	1.6*	1.2, 2.0	1.8*	1.2, 2.6
Quit ≥ 10 years	0.8	0.7, 1.1	0.7	0.4, 1.0	1.1	0.9, 1.2	1.1	0.9, 1.5
Alcohol use								
Never, lifetime	1.6*	1.1, 2.5	3.4*	1.9, 6.1	1.7*	1.3, 2.1	1.5*	1.0, 2.3
Never, past 12 months	1.7*	1.2, 2.4	4.5*	2.7, 7.6	1.8*	1.5, 2.2	1.9*	1.3, 2.7
Occasional	1.1	0.8, 1.5	1.5	0.9, 2.4	1.2*	1.0, 1.4	1.2	0.8, 1.7
Weekly [†]	1.0	...	1.0	...	1.0	...	1.0	...
Heavy	1.4	0.5, 4.1	0.0	0.0, 0.0	1.1	0.6, 2.0	1.2	0.3, 4.6
Body mass index (BMI)								
Underweight (< 18.5)	1.2	0.8, 1.9	1.8	0.9, 3.5	1.5*	1.0, 2.2	1.1	0.7, 1.7
Acceptable weight (18.5-24.9) [†]	1.0	...	1.0	...	1.0	...	1.0	...
Overweight (25.0-29.9)	1.0	0.8, 1.3	0.9	0.6, 1.4	1.0	0.8, 1.1	0.8*	0.6, 1.0
Obese (≥ 30.0)	1.6*	1.2, 2.2	1.8*	1.1, 3.0	1.5*	1.2, 1.8	1.4	1.0, 2.0
Leisure-time physical activity								
Active [†]	1.0	...	1.0	...	1.0	...	1.0	...
Inactive	2.1*	1.5, 2.8	1.8*	1.1, 3.0	2.1*	1.8, 2.4	2.4*	1.8, 3.3

Data source: 2003 Canadian Community Health Survey

Notes: Analysis based on 16,651 women for ADL dependency model; 16,638 women for IADL dependency model. When controlling for chronic pain, analysis based on 8,510 women for ADL model; 8,496 women for IADL model. 554 respondents were dropped from ADL model because of missing values; 594 from IADL model; 259 from ADL model controlling chronic pain; 252 from IADL model controlling chronic pain.

† Reference category (for chronic conditions, "none" is reference category)

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

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

... Not applicable