

PREVALENCE, RISK FACTORS, AND PRIMARY CAUSES OF
DISABILITY AMONG CANADIAN SENIORS: AN ANALYSIS
OF THE 1986 AND 1991 HEALTH AND ACTIVITY
LIMITATION SURVEYS

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Prevalence, Risk Factors, and Primary Causes of Disability Among Canadian Seniors: An Analysis of the 1986 and 1991 Health and Activity Limitation Surveys

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EXECUTIVE SUMMARY

An aging Canadian population highlights the need to examine the prevalence and causes of disabilities in seniors in order to be able to meet their health care needs. This report represents a step in that direction by examining disabilities among Canadian seniors using the 1986 and 1991 Health and Activity Limitation Surveys (HALS), two nation-wide surveys assessing the prevalence and impact of disabilities in the Canadian population. From these two surveys, disabilities among noninstitutionalized seniors, 65 years of age and older, were examined.

Findings revealed that over 40% of seniors had at least one disability that impacted on activities of daily living and that one-quarter of disabled seniors were severely disabled. Risk factors that were associated with having a disability included marital status, language spoken, total household income, tenure of dwelling, number of people living in the household, and region of the country. Mobility and agility disabilities were the most common types of disabilities among seniors, with approximately 80% of disabled seniors having at least one mobility or agility disability. Further, mobility and agility disabilities tended to coexist, with approximately 70% of all seniors who had a mobility disability also having an agility disability. Arthritis/rheumatism was the medical condition that most often caused mobility and agility disabilities, followed by cerebrovascular disease, other forms of heart disease, and fractures/bone breaks. Women were more likely than men to have mobility and agility disabilities, with other risk factors associated with having mobility and agility disabilities similar to those for having any disability.

The findings of this report indicate that many Canadian seniors suffer from disabilities, particularly disabilities that affect their mobility and agility. Therefore, to have a substantial effect on reducing the impact of disabilities on Canadian seniors, efforts should be directed toward finding

effective medical interventions that reduce or control the most common conditions which result in mobility and agility disabilities. Further, finding means to reduce the negative impact that mobility and agility type impairments have on everyday living would serve to help disabled seniors.

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INTRODUCTION

Overview

This report summarizes the distribution of disabilities among noninstitutionalized seniors (65 years and older) in Canada. In addition, risk factors associated with mobility and agility disabilities, the two most prevalent types of disabilities among seniors, were examined along with the primary medical conditions responsible for these two types of disability. The findings reported are based on data from the Health and Activity Limitation Surveys conducted by Statistics Canada in 1986 and 1991.

Background/Literature Review

The population of Canada is aging. In 1994, approximately 12% of the population, representing over 3.4 million Canadians, were over 65 years of age and that number is expected to increase to over five million by the year 2021 (Statistics Canada, 1994). As the population ages, new and increased demands will be placed on the health care system. In order for Canada to meet these demands and provide appropriate primary and preventative health care services to its older citizens, it is important to better understand what seniors' health care needs will be. However, on a national level, there has been relatively little research aimed at determining what types of health care services seniors will require.

Previous research has demonstrated that seniors' health tends to decline with increasing age. For example, data from the Longitudinal Study on Aging, a national health survey conducted in the United States, found that of those 70 years of age and older, over a six year period, the majority experienced a decline in their health and their ability to perform activities of daily living (Mor,

Wilcox, Rakowski, & Hiris, 1994). In the same study, it was also found that functional decline and increased disability among seniors were associated with increased number of hospital visits. Similar findings demonstrating increased disability and decreased functioning with increasing age among seniors have been found in other studies (Strawbridge, Kaplan, Camacho, & Cohen, 1992; Badley, Yoshida, Webster, & Stephens, 1993; Forbes, Hayward, & Agwani, 1991).

In order to meet seniors' health needs through preventative and primary treatment programs, it is necessary not only to know what disabilities they will have, but also the causes of these disabilities. A number of studies have examined what medical conditions result in disabilities among seniors, and have demonstrated that, in general, the most common health conditions are arthritis/rheumatism, cerebrovascular disease, and heart disease. For example, data from the 1990 Ontario Health Survey revealed that for those 65 years and over, arthritis or rheumatism was reported as the most common chronic health problem followed by high blood pressure/hypertension and heart disease (Badley et al, 1993). Data from the Framingham study showed that osteoarthritis and heart disease were the two most common conditions among noninstitutionalized seniors (Guccione et al, 1994), and the Longitudinal Study of Aging (Boult, Kane, Louis, Boult, & McCaffrey, 1994), based on a national U. S. sample of noninstitutionalized civilians 70 years of age and older, found that arthritis, cerebrovascular disease, and coronary heart disease were the three strongest predictors of developing a functional limitation.

Although the studies cited provide a good overview of the prevalence and causes of disabilities among seniors, they do not provide the detailed information required to guide the development of effective health care interventions. Further, to develop national health care policies, it is desirable to have data based on a Canadian sample drawn from the entire country. In order to

meet this goal, Statistics Canada conducted Canada-wide Health and Activity Limitation Surveys (HALS) in 1986 and again in 1991. HALS was designed to assess the prevalence of disabilities among Canadians and the impact of these disabilities on daily living. Findings from the 1986 HALS demonstrated that disabilities among Canadian seniors increase with increasing age and that mobility disabilities were the most prevalent form of disability (Forbes, Hayward, & Agwani, 1991). Further findings from 1986 HALS demonstrated that a number of factors including age, gender, marital status, number of people in household, income, education, and employment status were associated with having a disability (Forbes, Hayward, & Agwani, 1991; Badley & Ibanez, 1994) and that disabilities owing to arthritis/rheumatism, a condition which afflicts many seniors (Badley, Rasooly, & Webster, 1994; Reynolds et al, 1993; Reynolds et al, 1992), negatively impacted on people's quality of life in a wide variety of areas including the ability to move about, participation in social events, and leisure activities (Badley, 1995).

This report extends the findings from HALS noted above. First, trends in seniors' disabilities were examined over the five year period between 1986 and 1991 using both HAL surveys. Second, all medical conditions, including arthritis/rheumatism, reported as causes of mobility and agility disabilities were examined for both 1986 and 1991. Thus, the goals and objectives of this report are as follows:

- 1) To report on the prevalence of and risk factors associated with disabilities among Canadian seniors.
- 2) To examine the risk factors associated with having mobility and agility disabilities among Canadian seniors.
- 3) To report on the prevalence of different types of mobility and agility disabilities among Canadian seniors.
- 4) To report on the primary medical conditions which cause mobility and agility disabilities

in Canadian seniors.

METHODS

Overview

In response to a recommendation to the parliament of Canada to obtain a national data base on the disabled in Canada, Statistics Canada conducted the Health and Activity Limitation Surveys (HALS) in 1986 and again in 1991. The main purpose of the surveys was to determine the types and level of disabilities among Canadians and the impact these disabilities had on their activities of daily living. For the purposes of the HALS, the term disability was defined as "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being" and that the restriction or lack of ability to perform an activity had lasted or was expected to last six months or more (HALS User's Guide, 1987). However, people who used a technical aid to completely remove the restriction were not considered disabled (e.g., using corrective lenses to eliminate vision problems).

Sample

A multi-staged, stratified sampling procedure was used to select the samples for both the 1986 and 1991 surveys. The sampling was stratified on whether people lived on Indian reserves versus all other areas of Canada. The first stage of sampling consisted of selecting disabled Canadians from the total population (with the exception of those in penal institutions and correctional facilities) who indicated on the 1986 or 1991 Canadian Census that they had a physical or mental disability that interfered with activities of daily living. A comparison group was also selected from those who indicated that they did not have such a disability. The second stage

consisted of administering the HALS to the disabled and nondisabled samples. However, when the survey was administered, a small percentage of those who indicated on the Census that they were not disabled were assessed as having a disability and subsequently included in the disabled group.

The 1986 HALS sample included both institutionalized and noninstitutionalized Canadians; whereas the 1991 HALS only included noninstitutionalized Canadians. Therefore, in order to facilitate comparability between the two surveys, only data from the noninstitutionalized samples were analyzed for this report.

Procedure

Canadians who indicated on the Census that they had a disability were selected for a face-to-face interview. For people unable to complete the interview themselves, usually due to their having a high level of disability, the interview was completed by proxy (approximately 12% of all cases). The comparison group of nondisabled Canadians completed a shorter telephone interview. Response rates were over 90% for both surveys (HALS User's Guide, 1987 and 1991).

Survey Instruments

Both the 1986 and 1991 HALS had similar formats and asked similar questions. All respondents completed Section A of the surveys, which asked them to indicate which of 19 physical disabilities they had, based on a modified version of the Activities of Daily Living Scale (HALS User's Guide, 1987). For each disability that respondents indicated they had, they were also asked to indicate what medical condition caused the disability, the cause of the medical condition, the duration of the disability, and aids used to overcome the disability. In addition to assessing physical

disabilities, questions were also asked concerning cognitive and emotional disabilities.

Respondents who reported that they had a least one disability completed the second part of the HALS which assessed the impact of their disability(ies) in areas such as assistance required for activities of daily living, sources of income, expenses due to the disability, employment opportunities, and barriers to transportation and leisure activities. Further, through a computer link with the Canadian census, additional demographic and household information was available for all respondents, including level of income, marital status, and living arrangements.

Derived Variables: Medical Conditions That Cause Disabilities

For each disability respondents had, they were asked to indicate the medical condition which was the primary cause of the disability. For the 1991 HALS, the primary medical conditions were coded using the International Classification of Diseases, Ninth Revision and the Musculo-Skeletal Classification list developed by Statistics Canada (HALS User's Guide, 1987 and 1991). Each medical condition reported as a cause of a disability was assigned a three digit code which corresponded to the medical condition. For example, someone who had arthritis was assigned the ICD code of 106 (arthritis/rheumatism). However, for the 1986 HALS, a finer level of coding was used and the three digit ICD codes were further broken down (for example, the code for arthritis/rheumatism was divided into two categories, one specific to arthritis/rheumatism in the toes, feet, ankles, knees, legs, and hips and the other category capturing all other types of arthritis/rheumatism).

In order to make the two surveys comparable in terms of identifying the primary medical conditions causing each disability, the refined categories used in the 1986 survey were recategorized

in order to make them congruent with the coding scheme used in the 1991 survey. To illustrate, using the example above, all arthritis/rheumatism cases reported in 1991 were assigned the three digit code "106". As noted, however, in the 1986 survey, the same "106" disease code was further broken down into two categories. Therefore, in order to make the coding used for the 1986 survey congruent with that of the 1991 survey, the two categories for arthritis/rheumatism used in the 1986 survey were collapsed into one category and assigned the three digit code "106".

A second difference between the 1986 and 1991 HALS in the coding used to identify medical conditions was that the 1986 HALS only provided the most common medical conditions for each type of disability, whereas, the 1991 HALS provided all the reported ICD codes for each disability. In order to make the results from the two surveys comparable, only ICD codes provided in the 1986 survey were considered for analyses in the 1991 survey.

Weighting

Due to the multi-staged, stratified sampling procedure, it was necessary to use weights for all analyses in order to have estimates correctly reflect the Canadian population. Each survey respondent was assigned a weight corresponding to the number of people that respondent represented based on the Canadian Census. These weights were used for all analyses which generated population estimates. However, despite the fact that this weighting procedure produces accurate population estimates, the weighting procedure results in inaccurate significance tests and confidence intervals. Therefore, in order to produce more accurate significance tests and confidence intervals, for all logistic regression analyses, the weights were rescaled by dividing the weight for each survey respondent by the average weight of all respondents used in the analyses (HALS User's

Guide, 1987).

Strengths of the Health and Activity Limitation Surveys

The strengths of the 1986 and 1991 HALS derive largely from the comprehensive sampling and number of different topics assessed by the two surveys. Specifically, the major strengths of the HALS include:

- 1) Nation-wide sampling of all Canadians 15 years of age and older.
- 2) Results which were easily compared between surveys due to a similar sampling procedure and comparable items being asked for both surveys.
- 3) Assessment of not only the prevalence and causes of disabilities, but also the impact disabilities had on economic, social, work, and leisure activities.
- 4) A computer link with the 1986 and 1991 Census, providing for additional censal information on respondents.

Limitations of the Health and Activity Limitation Surveys

Despite the strengths represented in the HALS, there were also several limitations that should be considered when interpreting the findings presented in this report. They are as follows:

- 1) The results presented only reflect Canadians who lived in households and not those who were institutionalized. Therefore, some of the most severely disabled may not be represented in the results presented in this report.
- 2) Respondents were only allowed to indicate that they had a medical condition if it caused a disability. Therefore, people with medical conditions who were not disabled were not identified. Thus, it was not possible to compare those who had a medical condition which caused a disability to those who had the same condition, but were not disabled.
- 3) Respondents were only able to indicate one condition as being primarily responsible for causing a disability. Thus, the actual number of medical conditions respondents may have had are under reported.
- 4) Approximately 12% of the surveys in the disabled sample were answered by someone other

than the selected respondent. In these cases, the proxy respondent may have provided incorrect responses on behalf of the person for whom they were a proxy.

- 5) The sample size for the 1991 survey was smaller than for the 1986 survey. This prevented age categories from being broken down into 5-year cohorts for the 1991 survey due to the instability such breakdowns would represent owing to the small sample size within each 5-year cohort.

Data Analyses

Population Characteristics of Canadian Seniors

The population characteristics of Canadian seniors are provided for the 1986 and 1991 surveys.

Risk Factors Associated with Having a Disability Among Canadian Seniors

Descriptive statistics are provided breaking down disability status (whether or not a respondent reported having any disability) by different demographic factors for both the 1986 and 1991 surveys. Unadjusted and adjusted odds ratios are also provided to indicate the degree of association between each demographic factor and disability status.

Types of Disabilities Experienced by Canadian Seniors

The percentage of Canadian seniors who experienced each of five types of physical disabilities are provided for men and women for the 1986 and 1991 surveys.

Types of Mobility and Agility Disabilities Experienced by Canadian Seniors

The percentage of Canadian seniors who have each of the five types of mobility disabilities and seven types of agility disabilities assessed by HALS are provided for men and women for the 1986 and 1991 surveys.

Medical Conditions Causing Different Types of Mobility and Agility Disabilities

The most common medical conditions reported as causes of mobility and agility disabilities are provided for men and women seniors for the 1986 and 1991 surveys.

Factors Associated with Mobility and Agility Disabilities Among Canadian Seniors

Descriptive statistics are provided breaking down whether or not a senior had a mobility or agility disability by different demographic factors for both the 1986 and 1991 surveys. Unadjusted and adjusted odds ratios are also provided to indicate the degree of association between each demographic factor and disability status.

RESULTS

Characteristics of Seniors in Canada: 1986 vs 1991

Table 1 presents an overview of the population characteristics of Canadian seniors in 1986 and 1991. Overall, there was little change in their characteristics over the five year period. Women comprised the majority of seniors (approximately 57% in both 1986 and 1991). Slightly under 58% of seniors in both years were married and slightly over a third were either divorced, separated, or widowed. The majority of seniors spoke English only (approximately 70%). Just over 60% of seniors lived in single houses and approximately 70% owned their residences. Half of all seniors lived in households of two people, with the remaining half approximately equally split between those living alone and those living in households of more than two.

The only major difference between 1986 and 1991 was in total household income. In 1986, the majority of seniors had a total household income under \$10,000 (54.9%), whereas in 1991, the majority of seniors had an income between \$10,000-\$24,999 (50.4%). This difference probably reflects the effects of inflation over the five year period between 1986 and 1991 as well as a possible increase in real income.

The number of disabled seniors was virtually identical between 1986 and 1991, with over 40% having at least one disability (41.3% and 42.5%, in 1986 and 1991, respectively). Of those who were disabled, just over a third were mildly disabled, just over another third were moderately disabled, and just over a quarter were severely disabled.

Table 1. Population Characteristics of Canadian Seniors: Health and Activity Limitation Surveys

		1986 (%)	1991 (%)
Gender	Male	43.1	42.9
	Female	56.9	57.1
Geographic Location	Urban	77.8	82.0
	Rural	22.2	18.0
Type of Dwelling	Single	61.1	60.6
	Other	38.9	39.4
Marital Status	Single	7.1	8.5
	Now married	57.4	57.6
	Divorced/separated/widowed	35.5	33.9
Official Language	English only	70.7	68.7
	French only	14.5	13.5
	Both English and French	11.1	12.7
	Neither English nor French	3.6	5.0
Region of Canada	Atlantic (NFLD, NS, PEI, NB)	9.3	8.7
	Quebec	24.0	24.2
	Ontario	36.9	37.7
	Prairies (MAN, SASK, ALTA)	16.7	15.9
	British Columbia	13.0	13.3
	Yukon and North West Territories	0.1	0.1
Total Household Income	Less than \$10,000	54.9	30.2
	\$10,000-\$24,999	35.1	50.4
	\$25,000-\$34,999	5.2	8.1
	\$35,000 and over	4.8	11.3
Number of Persons in Household	One person	27.8	26.2
	Two persons	50.5	51.7
	Three or more persons	21.7	22.1
Tenure of Dwelling	Owned	68.6	71.5
	Rented	29.7	26.2
Disabled	Yes	41.3	42.5
	No	58.7	57.5
Degree of Disability*	Mild	36.4	39.4
	Moderate	37.1	35.2
	Severe	26.6	25.4

*Includes only people who reported a disability.

Factors Associated with Having a Disability Among Seniors

Tables 2 and 3 present disability status (whether or not a person was disabled) broken down by population characteristics, along with unadjusted and adjusted odds ratios. The pattern of results in terms of risk factors associated with having a disability were similar between 1986 and 1991. There was little difference between men and women in their risk for being disabled, although after adjusting for other variables, men were at elevated risk for having a disability in 1986. The relationship between marital status and disability also tended to vary between surveys. In 1986, single and married seniors were approximately equally likely to be disabled, with divorced, separated, and widowed seniors at an elevated risk for having a disability. However, in 1991, both single and divorced, separated, or widowed seniors were at elevated risk for being disabled compared to seniors who were married. Seniors who spoke neither English nor French, particularly in 1991, were at decreased risk for being disabled.

In both surveys, total household income was strongly related to disability status, with increases in income associated with a lower likelihood being disabled, to the point where individuals in the highest income bracket (those earning \$35,000 and over) had only one-half the risk of being disabled compared to seniors in the lowest income bracket (those earning under \$10,000), after adjusting for other demographic variables.

Tenure of dwelling was associated with disability status, with seniors who owned their own place of residence at lower risk for experiencing a disability. However, the type of dwelling lived in (single house vs other types) was not related to disability status, nor was geographic location. Seniors living alone tended to be at increased risk for being disabled, although this elevated risk was

Table 2. Risk Factors Associated With Disabilities Among Seniors: Health and Activity Limitation Survey, 1986

		Percent Disabled	Unadjusted Odds Ratio	Adjusted Odds Ratio*
Gender	Male	40.8	referent	referent
	Female	41.7	1.04 (0.89-1.20)	0.75 (0.63-0.90)
Geographic Location	Urban	41.2	referent	referent
	Rural	41.9	1.03 (0.86-1.23)	1.02 (0.84-1.24)
Type of Dwelling	Single House	40.5	referent	referent
	Other	42.7	1.10 (0.25-4.88)	0.98 (0.78-1.23)
Marital Status	Single	36.9	referent	referent
	Married	37.7	1.03 (0.77-1.39)	0.80 (0.56-1.14)
	Divorced/separated/widowed	48.1	1.58 (1.17-2.15)	1.61 (1.16-2.24)
Official Language	English only	42.6	referent	referent
	French only	36.6	0.78 (0.63-0.96)	1.16 (0.80-1.69)
	Both English and French	41.5	0.95 (0.75-1.21)	1.28 (0.95-1.72)
	Neither English nor French	34.5	0.71 (0.47-1.06)	0.62 (0.40-0.96)
Region of Canada	Atlantic (NFLD, NS, PEI, NB)	48.8	referent	referent
	Quebec	34.8	0.56 (0.42-0.74)	0.47 (0.32-0.69)
	Ontario	43.0	0.79 (0.61-1.03)	0.88 (0.67-1.17)
	Prairies (MAN, SASK, ALTA)	44.0	0.82 (0.61-1.10)	0.89 (0.65-1.20)
	British Columbia	39.5	0.69 (0.50-0.94)	0.75 (0.54-1.05)
	Yukon/North West Territories	61.6	1.68 (0.14-20.2)	1.59 (0.12-21.3)
Total Household Income	Less than \$10,000	45.2	referent	referent
	\$10,000-\$24,999	38.7	0.77 (0.65-0.89)	0.70 (0.59-0.83)
	\$25,000-\$34,999	28.3	0.48 (0.33-0.69)	0.45 (0.31-0.65)
	\$35,000 and over	30.0	0.52 (0.36-0.75)	0.49 (0.33-0.72)
Number of Persons in Household	One person	44.6	referent	referent
	Two persons	40.4	0.84 (0.71-1.00)	1.45 (1.11-1.89)
	Three or more persons	39.3	0.81 (0.65-0.99)	1.21 (0.92-1.59)
Tenure of Dwelling	Owned	39.4	referent	referent
	Rented	45.4	1.27 (1.09-1.49)	1.34 (1.06-1.70)

*Adjusted for all other demographic variables

Table 3. Risk Factors Associated With Disabilities Among Seniors: Health and Activity Limitation Survey, 1991

		Percent Disabled	Unadjusted Odds Ratio	Adjusted Odds Ratio*
Gender	Male	40.7	referent	referent
	Female	43.9	1.14 (0.88-1.46)	0.90 (0.67-1.21)
Geographic Location	Urban	42.1	referent	referent
	Rural	44.5	1.10 (0.80-1.52)	0.94 (0.65-1.36)
Type of Dwelling	Single House	42.6	referent	referent
	Other	42.3	0.99 (0.77-1.28)	0.74 (0.51-1.08)
Marital Status	Single	49.3	referent	referent
	Married	38.7	0.65 (0.41-1.02)	0.88 (0.50-1.55)
	Divorced/separated/widowed	47.4	0.93 (0.58-1.49)	1.07 (0.63-1.84)
Official Language	English only	43.2	referent	referent
	French only	47.2	1.17 (0.81-1.69)	1.40 (0.77-2.55)
	Both English and French	43.1	0.99 (0.68-1.45)	1.19 (0.73-1.92)
	Neither English nor French	19.3	0.31 (0.15-0.64)	0.35 (0.17-0.75)
Region of Canada	Atlantic (NFLD, NS, PEI, NB)	49.9	referent	referent
	Quebec	39.9	0.67 (0.41-1.09)	0.53 (0.28-1.00)
	Ontario	40.3	0.68 (0.43-1.08)	0.77 (0.47-1.28)
	Prairies (MAN, SASK, ALTA)	49.4	0.98 (0.58-1.64)	1.11 (0.65-1.90)
	British Columbia	40.6	0.68 (0.40-1.18)	0.82 (0.46-1.43)
	Yukon/North West Territories	48.4	0.94 (0.01-63.0)	1.17 (0.01-93.6)
Total Household Income	Less than \$10,000	45.5	referent	referent
	\$10,000-\$24,999	44.1	0.94 (0.71-1.26)	0.82 (0.59-1.13)
	\$25,000-\$34,999	35.8	0.67 (0.40-1.11)	0.59 (0.34-1.01)
	\$35,000 and over	32.2	0.82 (0.57-1.17)	0.53 (0.32-0.88)
Number of Persons in Household	One person	48.6	referent	referent
	Two persons	38.9	0.67 (0.50-0.91)	0.81 (0.52-1.26)
	Three or more persons	43.6	0.82 (0.57-1.17)	0.95 (0.59-1.52)
Tenure of Dwelling	Owned	39.6	referent	referent
	Rented	48.2	1.42 (1.07-1.88)	1.51 (1.01-2.27)

*Adjusted for all other demographic variables

reduced (and even reversed in 1986) after adjusting for other demographic variables. The region of the country where seniors lived was also associated with disability status. In general, seniors from the Atlantic region (Newfoundland, Nova Scotia, Prince Edward Island, New Brunswick) and Yukon/North West Territories were at highest risk for having a disability, followed by seniors from the Prairie region (Manitoba, Saskatchewan, Alberta), particularly in 1991.

Types of Disabilities Experienced by Seniors

Table 4 presents the percentage of seniors who experienced each of the five types of physical disabilities assessed by HALS. In both 1986 and 1991, over 40% seniors had at least one disability. Mobility and agility disabilities were the two most common types of disabilities, and were more prevalent among women than men. However, it should be noted that it was quite common for seniors who had mobility disabilities to also have agility disabilities. In both 1986 and 1991, 70% of seniors who had a mobility disability also had an agility disability (72.1% and 70.0% in 1986 and 1991, respectively). Hearing and seeing disabilities were the next two most prevalent types of disability, occurring in approximately 18% and 10% of seniors, respectively. Men were more likely than women to experience hearing disabilities, whereas, women were more likely than men to experience seeing disabilities. Speaking disabilities were experienced by 2.2% of seniors, and were more prevalent among men than women.

Table 4. Percent of Seniors Who Experienced Each of the Following Types of Physical Disabilities: Health and Activity Limitation Surveys

Type of Disability	1986			1991		
	Women	Men	Total	Women	Men	Total
Any Disability	41.7	40.8	41.3	43.9	40.7	42.5
Mobility	34.0	25.4	30.3	33.9	26.0	30.5
Agility	27.1	22.3	25.0	28.8	21.8	25.8
Hearing	14.9	21.8	17.9	15.8	19.7	17.5
Seeing	11.5	7.3	9.7	11.5	8.6	10.3
Speaking	1.7	2.8	2.2	1.9	2.6	2.2
Total Weighted N's	1,412,755	1,072,019	2,484,774	1,658,539	1,248,372	2,906,911

Table 5 presents the percentage of Canadian seniors who had each of the five types of mobility disabilities and seven types of agility disabilities that were assessed by HALS. Women were more likely than men to have all types of mobility and agility disabilities, with the exception of trouble cutting food, which was equally prevalent in women and men. Among the five types of mobility disabilities assessed by HALS, trouble walking 400 meters, trouble walking up and down stairs, and trouble standing for 20 minutes were the three most prevalent mobility disabilities, each experienced by just over one fifth of all seniors. Among the seven agility type disabilities assessed by HALS, trouble bending and picking up objects and trouble cutting toenails were the two most prevalent conditions, each experienced by over 15% of all seniors.

Table 5. Percent of Seniors Who Reported Each Type of Mobility and Agility Disability:
Health and Activity Limitation Surveys

Disability	1986			1991		
	Women	Men	Total	Women	Men	Total
Any Mobility Disability	34.0	25.4	30.3	33.9	26.0	30.5
Trouble walking 400 meters	24.1	18.7	21.8	23.7	17.3	21.0
Trouble walking up/down stairs	23.4	17.8	21.0	23.5	17.0	20.7
Trouble carrying 5 kilogram object	22.5	11.7	17.9	21.4	13.2	17.9
Trouble moving room to room	5.7	4.3	5.1	6.1	4.4	5.4
Trouble standing 20 minutes	24.1	17.6	21.3	23.0	16.5	20.2
Any Agility Disability	27.1	22.3	25.0	28.8	21.8	25.8
Trouble bending/picking up objects	16.4	14.2	15.5	16.6	13.4	15.2
Trouble dressing/undressing	5.8	4.9	5.4	5.4	5.2	5.3
Trouble getting in/out of bed	6.2	4.7	5.5	5.8	4.9	5.4
Trouble cutting toenails	17.2	14.2	15.9	18.9	15.5	17.4
Trouble grasping or handling	9.2	6.4	8.0	8.1	6.1	7.2
Trouble reaching	11.6	7.1	9.7	11.0	7.5	9.5
Trouble cutting own food	3.4	3.4	3.4	3.5	3.4	3.5

Medical Conditions Associated with Mobility-Agility Disabilities

Mobility and agility disabilities comprised the majority of disabilities among seniors, accounting for over 80% of seniors who were disabled (81.0% and 82.3% in 1986 and 1991, respectively). Therefore, for subsequent analyses, seniors who reported having at least one mobility or agility disability have been grouped together and classified as having a mobility-agility disability. Table 6 presents the primary medical conditions seniors reported were the cause of their mobility-

Table 6. Percent of Seniors with Mobility-Agility Disabilities Who Reported the Following Medical Conditions As a Cause of Their Disability: Health and Activity Limitation Surveys

Medical Condition	1986			1991		
	Women	Men	Total	Women	Men	Total
Arthritis/rheumatism	35.1	21.9	30.1	38.0	19.5	31.1
Other forms heart disease	5.9	5.0	5.5	8.9	11.3	9.8
Cerebrovascular disease	3.5	6.4	4.6	2.0	5.4	3.3
Fractures/breaks of bones	3.1	1.6	2.6	6.8	2.8	5.3
Paralysis	1.1	2.0	1.4	0.6	2.2	1.1
Hereditary and degenerative disorders of CNS	0.7	1.5	1.0	1.9	3.5	2.5
Damaged/removed discs	2.4	2.2	2.3	1.5	1.7	1.6
Absence/missing/ amputated	0.4	1.4	0.8	1.4	3.0	2.0
Other disorders of CNS	0.3	0.3	0.3	0.8	2.2	1.4
Nonspecific/ill-defined/unknown	16.4	13.3	15.2	25.8	25.5	25.7
Other specified and unspecified	6.1	5.1	5.7	12.7	13.8	13.1
Other re: mobility-agility	72.8	74.7	73.5	65.7	67.0	66.2

Note: Column percentages total over 100% because seniors could report different medical conditions as causes of different types of mobility-agility disabilities.

agility disabilities. In both 1986 and 1991, arthritis/rheumatism, which was the cause of over 30% of mobility-agility disabilities, was by far the most prevalent medical condition causing mobility-agility disabilities and was almost twice as prevalent among women than men. Other forms of heart disease, cerebrovascular disease, and fractures/bone breaks were the next three most prevalent medical conditions causing mobility-agility disabilities. Between 1986 and 1991, there was approximately a two-fold increase in the prevalence of both other forms of heart disease and fractures/bone breaks between 1986 and 1991. Men were more likely than women to have cerebrovascular disease, whereas women were more likely than men to have fractures/bone breaks.

Paralysis, hereditary and degenerative disorders of the central nervous system, damage/removed discs, absence/missing/amputated, and other disorders of the central nervous system were also reported as causes of mobility-agility disabilities.

Factors Associated with Having a Mobility-Agility Disability Among Seniors

Logistic regression analyses, presented in Tables 7 and 8, revealed that factors associated with overall disability also tended to be associated with having a mobility-agility disability. Total household income, renting as opposed to owning a home, marital status (particularly in 1986), region of Canada, and language spoken were risk factors associated with having a mobility-agility disability. However, unlike for overall disability, sex was related to having a mobility-agility disability in both 1986 and 1991, with females having a higher risk than males, although this higher risk was reduced after adjusting for other demographic variables.

Table 7. Risk Factors Associated with Mobility-Agility Disabilities Among Seniors:
Health and Activity Limitation Survey, 1986

		Percent Disabled	Unadjusted Odds Ratio	Adjusted Odds Ratio*
Gender	Male	29.8	ref	ref
	Female	36.3	1.35 (1.28-1.41)	1.00 (0.95-1.05)
Geographic Location	Urban	33.5	ref	ref
	Rural	33.4	0.99 (0.94-1.04)	1.02 (0.96-1.08)
Type of Dwelling	Single House	32.2	ref	ref
	Other	35.5	1.16 (1.11-1.21)	1.07 (1.00-1.14)
Marital Status	Single	28.7	ref	ref
	Married	30.0	1.06 (0.97-1.16)	0.82 (0.74-0.91)
	Divorced/separated/widowed	40.1	1.66 (1.52-1.82)	1.57 (1.43-1.73)
Official Language	English only	34.8	ref	ref
	French only	29.6	0.79 (0.74-0.84)	1.08 (0.97-1.21)
	Both English and French	32.8	0.91 (0.85-0.98)	1.17 (1.07-1.27)
	Neither English nor French	25.6	0.64 (0.57-0.73)	0.53 (0.46-0.60)
Region of Canada	Atlantic (NFLD, NS, PEI, NB)	40.2	ref	ref
	Quebec	28.0	0.58 (0.53-0.63)	0.50 (0.45-0.56)
	Ontario	33.9	0.76 (0.71-0.82)	0.85 (0.78-0.92)
	Ontario	36.9	0.87 (0.80-0.95)	0.94 (0.86-1.02)
	Prairies (MAN, SASK, ALTA)	33.2	0.74 (0.67-0.81)	0.83 (0.75-0.91)
	Prairies (MAN, SASK, ALTA)	41.9	1.07 (0.54-2.12)	0.99 (0.49-2.02)
	British Columbia Yukon/North West Territories			
Total Household Income	Less than \$10,000	38.0	ref	ref
	\$10,000-\$24,999	30.0	0.70 (0.67-0.73)	0.68 (0.65-0.72)
	\$25,000-\$34,999	21.8	0.45 (0.41-0.51)	0.47 (0.42-0.53)
	\$35,000 and over	19.7	0.40 (0.35-0.45)	0.42 (0.38-0.48)
Number of Persons in Household	One person	36.3	ref	ref
	Two persons	32.9	0.86 (0.82-0.91)	1.60 (1.49-1.73)
	Three or more persons	31.3	0.80 (0.75-0.85)	1.32 (1.22-1.42)
Tenure of Dwelling	Owned	31.6	ref	ref
	Rented	37.9	1.32 (1.26-1.38)	1.31 (1.22-1.40)

*Adjusted for all other demographic variables

Table 8. Risk Factors Associated with Mobility-Agility Disabilities Among Seniors:
Health and Activity Limitation Survey, 1991

		Percent Disabled	Unadjusted Odds Ratio	Adjusted Odds Ratio*
Gender	Male	30.1	ref	ref
	Female	38.6	1.47 (1.30-1.64)	1.16 (1.01-1.33)
Geographic Location	Urban	35.4	ref	ref
	Rural	33.3	0.91 (0.78-1.06)	0.83 (0.70-0.99)
Type of Dwelling	Single House	33.9	ref	ref
	Other	36.6	1.13 (1.00-1.27)	0.72 (0.60-0.86)
Marital Status	Single	39.8	ref	ref
	Married	30.0	0.65 (0.53-0.80)	0.95 (0.73-1.22)
	Div/sep/wid	42.3	1.11 (0.89-1.37)	1.26 (0.99-1.61)
Official Language	English only	35.5	ref	ref
	French only	38.2	1.13 (0.95-1.33)	1.10 (0.84-1.45)
	Both Eng and Fr	36.3	1.04 (0.87-1.24)	1.09 (0.88-1.36)
	Neither Eng nor Fr	16.5	0.36 (0.26-0.50)	0.38 (0.26-1.20)
Region of Canada	Atlantic (NFLD, NS, PEI, NB)	39.8	ref	ref
	Quebec	33.5	0.76 (0.61-0.95)	0.66 (0.49-0.88)
	Ontario	34.7	0.81 (0.65-1.00)	0.85 (0.67-1.06)
	Prairies (MAN, SASK, ALTA)	38.7	0.96 (0.76-1.21)	1.01 (0.79-1.29)
	British Columbia	30.9	0.68 (0.53-0.89)	0.76 (0.58-0.98)
	Yukon/North West Territories	38.4	0.94 (0.14-6.44)	1.15 (0.16-8.51)
Total Household Income	Less than \$10,000	36.9	ref	ref
	\$10,000-\$24,999	37.3	1.02 (0.89-1.16)	0.89 (0.77-1.03)
	\$25,000-\$34,999	27.8	0.66 (0.52-0.83)	0.63 (0.49-0.81)
	\$35,000 and over	24.4	0.55 (0.45-0.69)	0.56 (0.44-0.71)
Number of Persons in Household	One person	42.6	ref	ref
	Two persons	31.1	0.61 (0.53-0.70)	0.87 (0.71-1.06)
	Three or more persons	35.1	0.73 (0.62-0.86)	0.94 (0.76-1.17)
Tenure of Dwelling	Owned	31.4	ref	ref
	Rented	42.3	1.60 (1.41-1.82)	1.62 (1.34-1.95)

*Adjusted for all other demographic variables

DISCUSSION

Using data from the 1986 and 1991 Health and Activity Limitation Surveys, this report examined the prevalence of disabilities among Canadian seniors and then further investigated risk factors associated with and medical conditions which cause mobility and agility disabilities, the two most prevalent disabilities experienced by Canadian seniors.

Overall, it is clear that many seniors suffer from disabilities, with over 40% reporting a disability of some kind, and approximately a quarter of disabled seniors classified as severely disabled. A number of factors were found to be associated with having a disability including total household income, marital status, language spoken, owning vs renting a home, and the region of Canada where seniors lived. Of these risk factors, one of the strongest was total household income, with seniors at the highest income level at only half the risk for having a disability compared to those at the lowest income level. This relationship remained even after controlling for sex, geographic location, type of dwelling, marital status, official language spoken, region of Canada, number of persons living in the household, and tenure of dwelling. Because of the strength of the association between disability and income, it is important to examine this relationship further. Of particular importance is exploring the causal link between these two variables in order to determine whether having a high income reduces the risk of developing a disability, or whether having a disability results in a lower likelihood of being able to work in high paying occupations, thereby leading to lower income.

Seniors who were married were at lower risk for being disabled as well as seniors who did not speak either English or French. Although seniors unable to speak either French or English may

indeed be at lower risk for having a disability, there is also the possibility that they may not have understood or interpreted the questions related to disabilities in the same manner as English or French speakers, thereby leading to responses which may not have reflected their disability status in the same manner as English or French speakers.

Seniors who owned their own home were less likely to be disabled than those who rented. Although this may be a function of income, the relationship between tenure of dwelling and disability status remained even after adjusting for income and other demographic variables used in the analyses. Part of the relationship may be explained, however, by the fact that people with disabilities are probably less likely to be able to perform the activities necessary to maintain a home, and therefore, having a disability results in people moving from their homes to rented dwellings.

The findings also suggest that seniors in some regions of Canada were more likely to have a disability than in others. In particular, people in Atlantic Canada (Newfoundland, Nova Scotia, Prince Edward Island, and New Brunswick) and Yukon/North West Territories were at increased risk for having a disability. Further, there were indications that between 1986 and 1991, the risk of having a disability increased in the Prairie region (Manitoba, Saskatchewan, Alberta) relative to the rest of the country.

Mobility and agility disabilities were by far the most common type of disability among Canadian seniors, with slightly under a third of all seniors experiencing mobility disabilities and a quarter experiencing agility disabilities. Further, mobility and agility disabilities tended to coexist with one another, with approximately 70% of seniors with a mobility disability also having an agility disability. Mobility disabilities most common among seniors were trouble walking 350 meters, trouble walking up or down stairs, and trouble standing for 20 minutes, with over 20% of all seniors

having these types of disabilities. The most common agility disabilities were trouble bending and picking up objects and trouble cutting own toenails, with over 15% of all seniors having these two types of disability.

The medical conditions which were found to be the primary causes of mobility-agility disabilities were consistent with previous studies (Boult, Kane, Louis, Boult, & McCaffrey, 1994; Guccione et al, 1994; Badley et al, 1993). Arthritis/rheumatism was the most prominent condition resulting in mobility-agility disabilities, reported as the primary cause for approximately 30% of all mobility-agility disabilities. Females were more likely than males to report arthritis/rheumatism as the cause of a mobility-agility disability. Cerebrovascular disease, other forms of heart disease, and fractures/bone breaks were the next most prevalent medical conditions causing mobility-agility disabilities, with a relatively large increase between 1986 and 1991 in the prevalence of other forms of heart disease and fractures/bone breaks.

The risk factors associated with having a mobility-agility disability were similar to those for having any disability, except that women were more likely to than men to have mobility and agility disabilities, although their elevated risk was reduced when geographic location, type of dwelling, marital status, official language spoken, region of Canada, total household income, number of persons living in the household, and tenure of dwelling were taken into account. One reason that females may have more mobility and agility disabilities than males is that they appeared to be more prone to having arthritis, by far the most prevalent medical condition causing mobility and agility disabilities.

Overall, the findings presented indicate that the majority of disabled seniors in Canada suffer from disabilities that affect their mobility and agility. Therefore, to have a substantial effect on

reducing the impact of disabilities on Canadian seniors, efforts should be directed toward finding effective medical interventions that reduce or control the most common conditions which result in mobility and agility disabilities. Further, finding means to reduce the impact of mobility and agility type impairments on everyday living would greatly help disabled seniors. For example, designing areas to be more accessible by people with mobility difficulties or developing aids to help reduce the impact of agility disabilities (such as developing devices to help open jar lids or to reduce bending when house cleaning) would serve to reduce the impact of conditions which result in disabilities among seniors.

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