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Utilization Patterns of Rehabilitation Therapy, Chiropractic & Psychosocial Services in Ontario

Ontario Health Survey 1996-97

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THE ARTHRITIS SOCIETY

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The Arthritis Society, Ontario Division
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University of Toronto

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An analysis of data from the
Ontario Health Survey 1996-97

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EXECUTIVE SUMMARY

The data from the 1996-97 Ontario Health Survey (OHS) were examined to describe the utilization of selected allied medical services, specifically rehabilitation, chiropractic and psychosocial therapy and counseling, among Ontario adults, to determine the prevalence of disability and chronic illness and to assess relationships between sociodemographic characteristics. Data from the 1990 OHS were used to determine service utilization attributable to a specific medical condition or complaint. Factors found to influence service utilization include gender, socioeconomic status (education and income), whether one resides in an urban or rural environment, the level of self-rated health, and age. Some of the major specific findings were:

- Over 1 million people, 11.3% of the population age 15 and over, reported "two-week disability"; i.e. during the previous 2 weeks they had spent at least one day sick in bed or reduced their activities due to a health problem. Two-week disability in males appeared to increase with age. Among females, the percent prevalence of two-week disability was relatively steady across age groups. Those with low income and only primary education experienced two-week disability more frequently, though there were large fluctuations across age groups.

- Over 1 million people (14.0% of the adult population) reported having "long term disability"; i.e. limitation in the kind and amount of activity due to a health problem, or having self reported long term disability or handicap. Long term disability was experienced more frequently by those people with low income and only primary level education.

- Of the 22 chronic conditions included in the OHS, musculoskeletal disorders (MSD), including arthritis, rheumatism, other joint problems and back problems, were the condition that affected the largest percentage of Ontarians (30.4 % of the adult population).

- Not surprisingly, only some of the investigated chronic health problems were associated with rehabilitation service use. The utilization of chiropractic services was mainly attributed to back problems, while rehabilitation therapy use was mainly attributed to other joint problems and back problems, and psychosocial service utilization was attributed to mental disorders.

- Overall, 9.9 % of the population reported consulting a chiropractor at least once in the past 12 months. The percent utilization of chiropractic services varied dramatically and unevenly with age, and was higher in women across almost all age groups. Those reporting chiropractic service use tended to be of post-secondary education, middle aged and of high income, with the main reason for consultation being back problems.

- Overall, 6.3 % of the population reported consulting rehabilitation therapy services (physiotherapist, occupational therapist, audiologist, and/or speech and language therapist) at least once in the 12-month period prior to being surveyed. The rate of utilization of rehabilitation therapy services varied only slightly with age, and was greater among those with high income, with a higher proportion of women than men having used such services. The main reasons for consultation were back problems, other joint problems, and arthritis and/or rheumatism.

- Overall, 4.1 % of the population reported using psychosocial services (social worker, psychologist or other counselor) at least once in the 12-month period prior to being surveyed. Younger adults reported approximately two times the utilization rate of older adults, with women consulting more than men. A significantly higher proportion of people reporting low income also reported psychosocial service utilization. The main reason for consultation was "mental disorders.

- The predictors of consulting the selected allied health professionals differed across provider types. The predictors of consulting a chiropractor were being middle aged, having high income, living in a rural area, having pain, a disability, a chronic condition, and high self-rated health. Predictors of rehabilitation therapy use were having pain, having a disability, a chronic condition, and high income. The predictors of psychosocial service utilization were being a young adult female with a low education and income, having pain, a disability, a chronic condition, low social support, and low self-rated health.

- Socioeconomic status (SES) has a major impact on both the health of Ontarians and their patterns of rehabilitation service use. It is related both to the prevalence of chronic health problems and disability, and to service utilization. The prevalence of disability appears to be greatest among low SES groups. However, those of low SES are the least likely to utilize rehabilitation services, suggesting a potential barrier to access for many Ontarians. Identifying such barriers and alleviating their adverse impact could help to make Ontario's rehabilitation system more efficacious and accessible.

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OVERVIEW

This report summarizes the utilization patterns of allied health services by the household population of Ontario, based upon an analysis of the 1996-97 OHS (Ontario Health Survey) with supplementary investigation of the 1990 OHS. The selected allied health services include physiotherapy, occupational therapy, speech pathology, audiology, chiropractic medicine, and psychosocial services. The association of sociodemographic characteristics and other health related variables with utilization are discussed, and the impact of individual chronic health problems on service utilization briefly addressed.

BACKGROUND

The demography of the Canadian population is such that the proportion of elderly will continue to grow faster than the total population. The first wave of the "baby boomer" generation are now entering their fifties, and this population "bulge" will hit the 65-85 age range by the third decade of this century [Statisitics Canada, 1997].

Among adults, the prevalence of chronic conditions and disability tends to increase with rising age. This pattern has considerable implications for the functional status of an increasing percentage of the population [Statistics Canada, 1996]. Why is the aging population and age distribution of chronic conditions and disability so important? The prevalence of such chronic conditions has major implications for the need for rehabilitation services. Recent increases in life expectancy, combined with the rapid growth in the population at the oldest ages, suggests an escalating call for resources associated with long term care needs [Statistics Canada, 1996]. This points to a need for public policy makers to ensure that the provision of rehabilitation and psychosocial services is adequate so that the quality of life of Ontarians is maintained.

"Rehabilitation is a goal oriented, dynamic process, which enables individuals with impairments, activity limitations and participation restrictions to identify and reach their optimal physical, mental and/or social functional level through a client-focused partnership with family, providers and the community. Rehabilitation focuses on abilities and aims to facilitate independence and social integration"[Ministry of Health, 2000-Adapted from the WHO (1983) and the CIHI Pilot project (1999)]. Rehabilitation, psychosocial and related services address individuals' bio-psycho-social needs, as well as their social and environmental contexts. The rehabilitation sector in Ontario encompasses a multidisciplinary approach to health that takes into consideration not only the physical, but also the psychological, social and environmental factors that affect health outcomes. Rehabilitation services extend beyond the biomedical model and include a variety of practices [Ministry of Health, 2000]. The rehabilitation process can occur in a variety of settings, i.e. acute care hospital, rehabilitation hospital and private or public outpatient clinics. Rehabilitation providers can be compensated from a number of different sources, such as OHIP, private supplementary insurance and/or out of pocket payment. For the purposes of this report, the definition above is used to define rehabilitation because it has been deemed appropriate in the Ontario Ministry of Health's initiative, "Managing the Seams: Making the Rehabilitation System work for People".

This report focuses on selected service provision types: rehabilitation therapy, which includes physiotherapists, occupational therapists, audiologists and speech pathologists; chiropractic medicine; and psychosocial services including psychologists, social workers and/or other counselors. The role of so-called alternative medicine is presently under debate and remains poorly defined, and so its associated provider types were excluded from our analyses. Physician services and acute care hospital utilization were also excluded because of extensive previous documentation in the greater literature.

Literature on the predictors of utilization of rehabilitation services is scarce. Studies to date have mainly examined health care utilization with respect to general physician care, specialist services, and days spent in an institutional setting. The predictors of rehabilitation use are expected to be quite different since patients may seek out such services presumably for different reasons, and despite different barriers. By helping to identify such barriers and the service gaps they create, the findings of this report can assist in the development of a rehabilitation strategy best suited for Ontarians.

Variables, such as gender, marital status, race, degree of social support, area of residence, and self-rated health have been found in the literature to be predictive of health care utilization, and are expected to be important with respect to rehabilitation service usage. A well-discussed and ubiquitous finding in the literature is that, for all causes combined, women consult their general practitioners more than do men throughout their adult life [Hunt *et al* (1999)]. This is presumably a result of the gynaecological needs of women throughout adulthood. Furthermore, women experience greater longevity and, as a result, often greater morbidity. Joung *et al* (1995) reported differences in health care utilization by marital status for physician consultation and hospital admission. Widowed and divorced people displayed considerably higher rates of utilization of physician related services. Wen, S.W. (1996) concluded that, while immigrants and other ethnocultural groups in Ontario have equal access to regular services, such groups have been found to often have lower rates of utilization of hospital emergency departments. Social support has also been suggested as a necessary predictor of health care utilization [Kouzis, (1998)], while living in rural versus urban areas has been suggested as an effector upon rates of utilization. Lastly, those with poor self-rated health have been found to utilize more acute hospital care and to have more frequent contact with general practitioners [Saag *et al*, (1998), Roos *et al* (1997)].

Determining the prevalence of chronic health problems and disability, understanding the composition and number of rehabilitation service users, and how they vary by SES and related variables, one can begin to postulate gaps between the need for treatment, rehabilitation and other supportive services.

Change in the patterns of utilization of services is an important indicator of the influence of policies and programs concerning health care [Nagi, 1980]. It must be stressed that this report is a cross sectional glance at reported service utilization in Ontario. As such, causal relationships cannot be drawn between the various factors. However, the strengths of the presented associations, while not necessarily of a causal nature, are sufficient to reveal the complexity between health care utilization and sociodemographic influences in Ontario.

RESEARCH OBJECTIVES

Goals for the analysis:

Part A

- To identify potential need for rehabilitation services among Ontarians.

Part B

- To report on the utilization of rehabilitation services in relation to sociodemographic and other health related characteristics.
- To identify characteristics of rehabilitation service users in Ontario.

Part C

- To delineate predictors of rehabilitation service utilization among Ontarians.

METHODOLOGY

Sample Design and Survey Methodology

This study analyzed data from the 1990 and 1996-97 Ontario Health Surveys (OHS). The target population of the 1990 OHS was all residents of private dwellings in Ontario during the survey period January through December 1990. Respondents were 12 years of age and older, however our analyses was restricted to 15 years and older [Ontario Ministry of Health, 1992]. Similarly, the target population of the 1996-97 OHS was household residents of Ontario during the period from October 1996 through to August 1997. Respondents were 12 years of age and older, though only data from those 15 and older were considered for these analyses. The survey did not include persons living on Indian Reserves, Canadian Military Bases and those living in extremely remote areas of Ontario. Residents of institutions, collective dwellings, homeless persons and those without a telephone were also excluded from the survey [Ontario Ministry of Health, 1996-97].

The Ontario Ministry of Health commissioned Statistics Canada to interview extra residents in Ontario as part of the National Population Health Survey, hence generating the 1996-97 OHS data file. *Detailed information about the methodology of the OHS 1996-97 is available in the OHS 1996-97 Documentation File-released by the Ontario Ministry of Health.*

Respondents were selected using a multi-stage stratified cluster sampling frame. Survey participants were contacted by telephone using a technique known as random digit dialing (RDD). If a household was contacted, one eligible participant was selected from the people living in the household to participate in the interview process. The person was interviewed over the telephone and asked all questions in the survey. One responsible adult in the household was also asked to give general information about the use of health care services, chronic health

problems and sociodemographic characteristics as a proxy for all persons living in the household [Ontario Ministry of Health, 1998].

Of all the households contacted, 78.8 percent participated in the survey, and 94.4 percent of the persons selected from the households responded to the detailed health questions [Ontario Ministry of Health, 1998] In order to assure that respondents were maximally representative of the entire provincial population, a complex weighting system was employed. That system, and the statistical methods of controlling for its variance, are discussed in the Technical Appendix.

Prior to the release of population estimates in this report, the number of respondents who contributed to the calculation of each estimate was determined. If the number was less than 30, the weighted estimate was not released and indicated by a dash (-). For estimates based on samples greater than 30, the coefficient of variation was determined, and the results were reported in accordance with the release of data guidelines in the Ontario Ministry of Health, User's Guide Volume 1, 1996-97. Population estimates associated with high sampling variability are accompanied by the letter 'q'. All estimates have been rounded to the nearest hundredth, and percentages are rounded to one decimal place.

Analytical Tools and Methods

To adequately analyze rehabilitation service utilization, disability and chronic conditions in the OHS 1996-97, it was necessary to derive variables to represent the service provision domains of interest:

Chiropractic Services –The OHS 1996-97 collected information on the number of consultations with a chiropractor in the past year. For the purpose of this analysis, the measure was at least one consultation with chiropractic services.

Rehabilitation Therapy –The survey collected information on the number of physiotherapist consultations and the number of consultations with a speech pathologist, audiologist, and/or occupational therapist. The measure of consultation of rehabilitation therapy used in this analysis is defined as at least one consultation with any of these providers in the past 12 months.

Psychosocial Services –The survey collected information on the number of social worker/counselor consultations and the number of consultations with a psychologist. As above, respondents were categorized as using psychosocial services if they consulted with either of these providers at least once in the past 12 months.

Chronic Conditions –The survey collected information on 22 chronic health conditions including one question on the presence of any other chronic condition. The data were collapsed into a summary variable to indicate the presence of any chronic health condition and the number of chronic conditions reported. Individual chronic health problems were also analyzed.

Two-week Disability –This variable refers to whether there were any days in the last two-weeks when the respondent stayed in bed or cut down in his or her activities because of illness or injury.

Long Term Disability –Respondents were categorized as having long term disability if they answered yes to any of the following: they are limited in the kind or amount of activities at home, limited in the kind or amount of other activities during work or leisure time, or self identified as having long term disabilities and/or handicaps.

Urban/Rural- This variable refers to living in urban or rural areas. Urban is defined as a continuously built up area having a population concentration of 1,000 or more, and a population density of 400 or more per square kilometer, based upon the most recent census.

For most of the analyses, age was collapsed into the following groups: 15-24, 25-34, 35-44, 45-54, 55-64, 65-74 and 75 +. In addition, a second age variable was created for much of the chronic condition analyses using a trichotomized grouping: 15-44, 45-64 and 65+. The education variable derived by the Ministry of Health was collapsed into the following three levels: primary, secondary, and post secondary. The total household income variable derived by the Ministry of Health was similarly collapsed into following three levels: low income, not low but less than $ 50 000 per year, and not low but greater than $ 50 000 per year.

Any not stated values ("do not knows", refusal to answer, etc.) were set as missing values and therefore excluded from the percent calculations. This was done under the assumption that the missing values would be somewhat equally distributed across all response levels.

Included in this report is a descriptive bivariate analysis and multivariate unconditional logisitic regression, performed separately for each rehabilitation sub-group to identify independent predictors of provider utilization. Multivariate logistic regressions were employed to identify determinants of consultation with chiropractic services, psychosocial services and rehabilitation therapy within the last 12 months prior to administering the survey. Each consultation variable was coded as '0' if there was no consultation with the specific health professional, and '1' if the health professional of interest had been consulted at least once in the past 12 months. The predictors of consultation were expressed as odds ratios. Odds ratios show the extent to which characteristics of individuals predict the chance of reporting rehabilitation service utilization. For a brief direction of how to interpret odd ratios, see the Technical Appendix.

To help alleviate the data limitations of the OHS 1996-97, the OHS 1990 was used to supplement our analysis because the 1990 survey design allowed information on the direct attributable cause for consultation with health professionals. *Detailed information about the methodology of the OHS 1990 is available in the OHS 1990 Documentation File-released by the Ontario Ministry of Health.*

Most tables presented, provide one of two types of information: percent prevalence or distribution. The percent prevalence is the proportion of respondents reporting the condition of interest. The distribution, on the other hand, provides a snapshot of which categories the sum total of all respondents reporting a given characteristic fall into; distributions are easily identified by the fact that all categories must sum to 100%.

All analyses were conducted using SAS statistical software for PC and UNIX, version 6.09.

Limitations of OHS data for the analysis

When interpreting and weighing the results of the analyses, the following limitations must be considered:

1. The survey used one respondent from each household to act as a proxy for the other members of the household during the telephone interview. Use of proxy respondents may result in errors in reporting due to incorrect responses made on behalf of all other household members. The extent of this potential source of error, known as the proxy effect, is difficult to determine.

2. The data available from the OHS 1996-97 did not ask for what reason a person consulted a health professional. Those experiencing a given chronic condition may seek out a service, but it is unknown whether this was due to the chronic condition. Furthermore, utilization by chronic condition is not mutually exclusive. For example, a respondent may have both arthritis and food allergies, and used rehabilitation therapy services for the former and not the latter. The result would be an artefactual increase in the percent utilization among persons with food allergies. Attributable associations were therefore not possible for the 1996-97 sample.

3. Recall bias may be a limiting factor because the surveys attempted to retrospectively capture consultation events over a 12-month period. Moreover, Roberts *et al* (1996) documented that data on the number of consults in the past 12 months may be biased toward underreporting. An attempt to remedy this bias was to operationalize utilization as a binary variable: no consults versus at least one consult.

4. The OHS 1996-97 methodology employed self-report measures for chronic conditions and health service utilization resulting in possible errors in reporting. However, it has been documented in the literature that self-report is a fairly good estimate of health care utilization across different age groups and cultures [Carsjo *et al* (1994), Reijneveld, (2000)].

5. Due to an insufficient number of respondents reporting rehabilitation therapy or psychosocial service use, stratified analysis was limited. Therefore potential barriers to service could not be examined in detail.

6. The OHS 1996-97 did not ask the source of funding for services used, whether it be public funds through the Ontario Health Insurance plan, supplementary coverage by a private insurance provider or an out of pocket expense. Therefore, the identification of financial barriers to access is unclear.

7. The OHS 1996-97 is a cross-sectional view of the population. Although a cross-sectional study can be very suggestive of possible predictors of rehabilitation service use, and

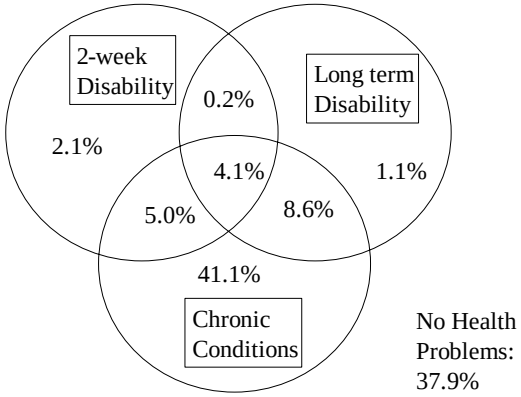
strong associations of policy significance can be identified, causality strictly cannot be inferred.

PART A: POTENTIAL NEED FOR REHABILITATION SERVICES TWO WEEK DISABILITY, LONG-TERM DISABILITY, & CHRONIC CONDITIONS

The overall prevalence and number of people with disability and/or chronic conditions is informed in part by the age structure of the population. Different age groups tend to experience different types and severities of conditions. Musculoskeletal disorders (MSD) were reported as the most prevalent chronic condition among Ontarians, followed by allergies and cardiovascular conditions. As the population ages, however, the prevalence of allergies will probably decline, while MSD and many of the more serious chronic conditions become predominant.

The overlap between chronic conditions and disability is described in the Venn diagram of figure 1A below.

FIGURE 1A – DEGREE OF OVERLAP BETWEEN CHRONIC CONDITIONS AND PREVALENCE OF DISABILITY



It is clear in figure #1A that roughly 20% of those who experience any chronic condition also report long-term or two-week disability. If less severe, controllable or seasonal chronic conditions, such as allergies, are removed from this representation, it is probable that the remaining with chronic conditions would also report disability. The relationship between chronic disease and disability is therefore of some importance to public health, since synergy between the two will inform patterns of service need and utilization. Hence it is important to describe the provincial health profile of both chronic disease and disability.

The following is a descriptive analysis of the prevalence of disability and chronic conditions among Ontarians by age, gender, education and income, and of their relationships with rehabilitation service utilization.

TWO-WEEK DISABILITY

Over 1 million people, 11.3% of the household population aged 15 and over reported two-week disability. In males, this tendency appears to increase with age. Among females, the percent prevalence of two-week disability is relatively steady across age groups (Table 1A).

Table 1A: Percent Prevalence and Number of Adults with Two-week Disability by Age & Gender

AGE GROUP	MEN		WOMEN		TOTAL	
	%	N	%	N	%	N
15-24	8.3	61 151	12.4	90 466	10.3	151 617
25-34	8.8	77 756	13.3	118 681	11.1	196 438
35-44	8.7	84 049	12.1	119 168	10.4	203 216
45-54	9.8	69 164	13.0	94 528	11.4	163 692
55-64	10.8	51 203	13.1	62 886	12.0	114 090
65-74	10.8	40 987	13.3	60 252	12.2	101 239
75+	16.3	30 508	15.9	45 194	16.0	75 701
ALL AGES	9.6	414 818	13.0	591 175	11.3	1 005 993
POPULATION BASE	4 336 661		4 545 227		8 881 888	

Overall the percent prevalence of two-week disability increased with age. At an age for which data could be released, there is a high percent prevalence of two-week disability among those with primary education. Across age groups, the prevalence of two-week disability varies only slightly between people with secondary and post secondary education (Figure 2A). Two-week disability is more prevalent among people with low income (increasing linearly with age in that group up to approximately 60 years) compared to those with middle and higher income levels. Those of middle and higher income appear to have a relatively steady percent prevalence of disability (Figure 3A).

FIGURE 2A - PERCENT PREVALENCE OF TWO-WEEK DISABILITY
BY AGE & EDUCATION LEVEL

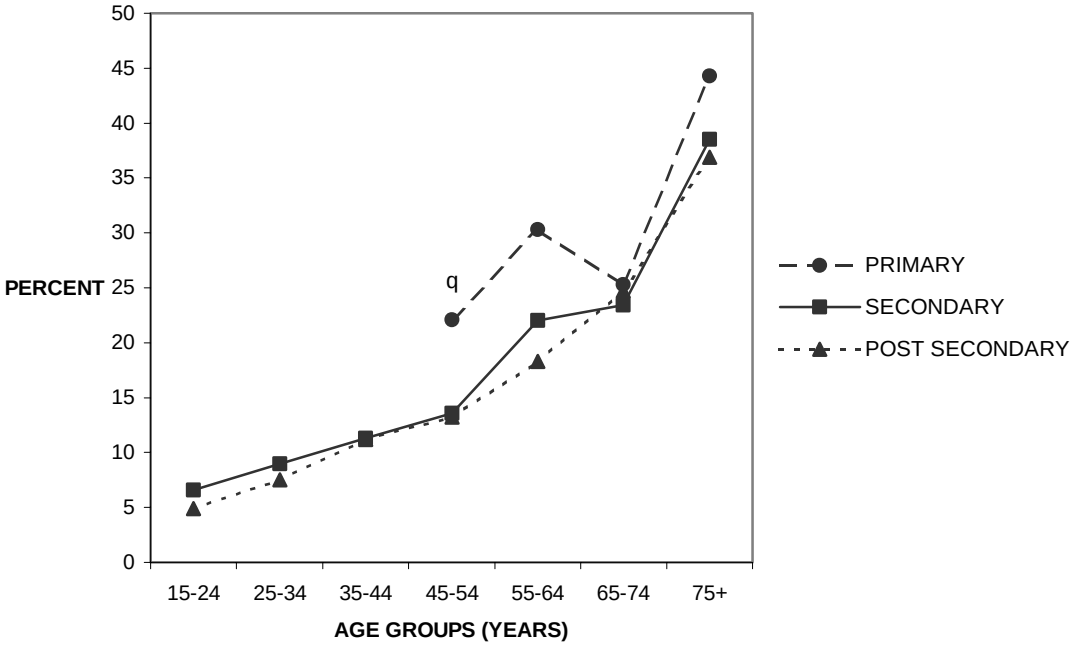
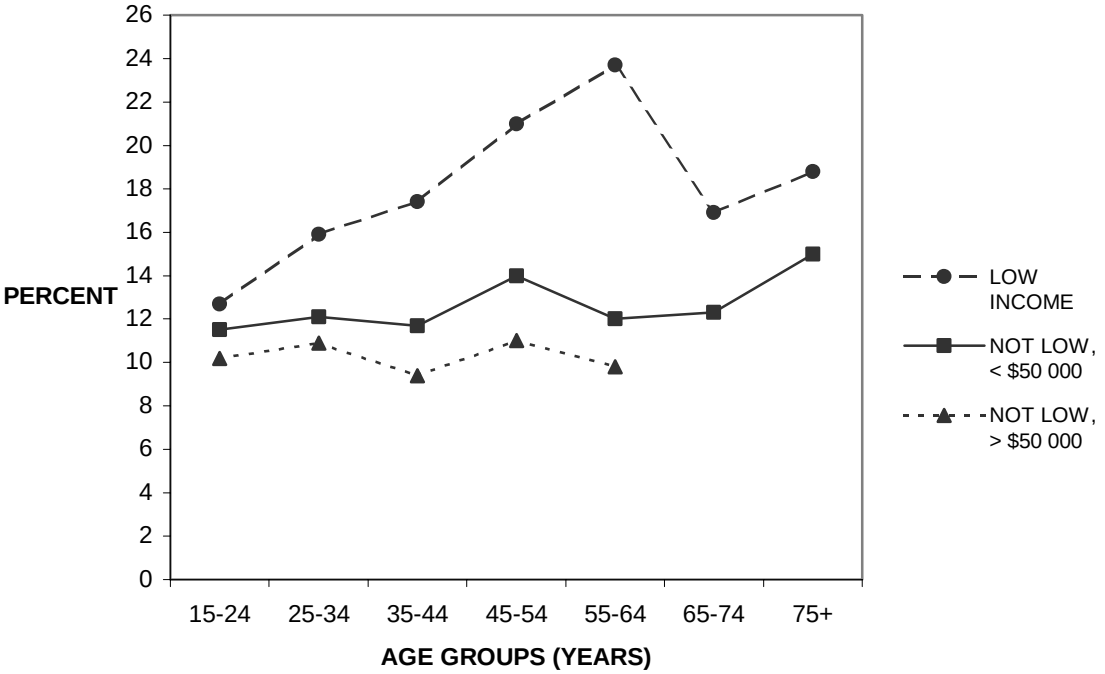


FIGURE 3A - PERCENT PREVALENCE OF TWO-WEEK DISABILITY
BY AGE & INCOME LEVEL



LONG-TERM DISABILITY

The prevalence of long-term disability is consistently higher in the older age groups. The prevalence increases with age, particularly age 55 years and older. Overall, men have a lower percent prevalence of long-term disability (Table 2A).

Table 2A: Percent Prevalence and Number of Adults with Long-term disability by Age & Gender

AGE GROUP	MEN		WOMEN		TOTAL	
	%	N	%	N	%	N
15-24	5.4	40 004	6.5	46 949	5.9	86 953
25-34	8.0	70 310	8.3	73 769	8.1	144 079
35-44	11.0	106 781	11.6	113 898	11.3	220 678
45-54	12.0	84 786	15.1	109 332	13.6	194 118
55-64	21.1	99 597	21.8	104 747	21.4	204 344
65-74	24.9	94 064	23.8	107 417	24.3	204 344
75+	37.2	69 700	41.9	119 369	40.0	189 069
ALL AGES	13.0	565 242	14.9	675 480	14.0	1 240 723
POPULATION BASE	4 336 661		4 545 557		8 881 888	

Long-term disability is more prevalent among people with low education compared to those with secondary and post-secondary education up to age 65 years (Figure 4A). Beyond age 65 years, the prevalence of long-term disability is similar at all education levels. Long-term disability is more prevalent among lower income people across all age groups. Middle income persons also have a higher prevalence of long-term disability compared to those of higher income. Generally, the percent prevalence of long-term disability increases linearly with age across income levels (Figure 5A).

FIGURE 4A - PERCENT PREVALENCE OF LONG TERM DISABILITY
BY AGE & EDUCATION LEVEL

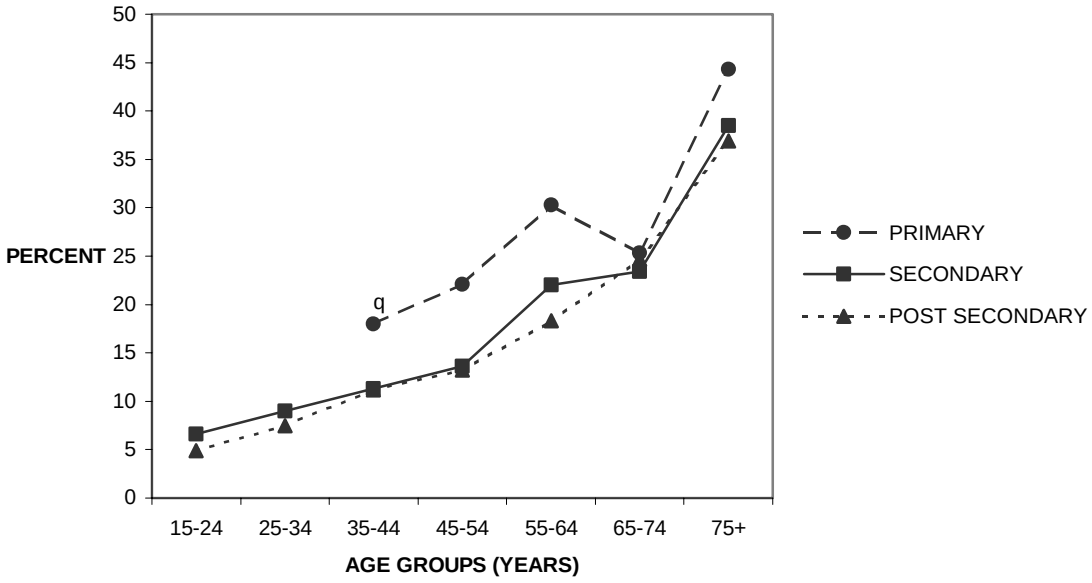
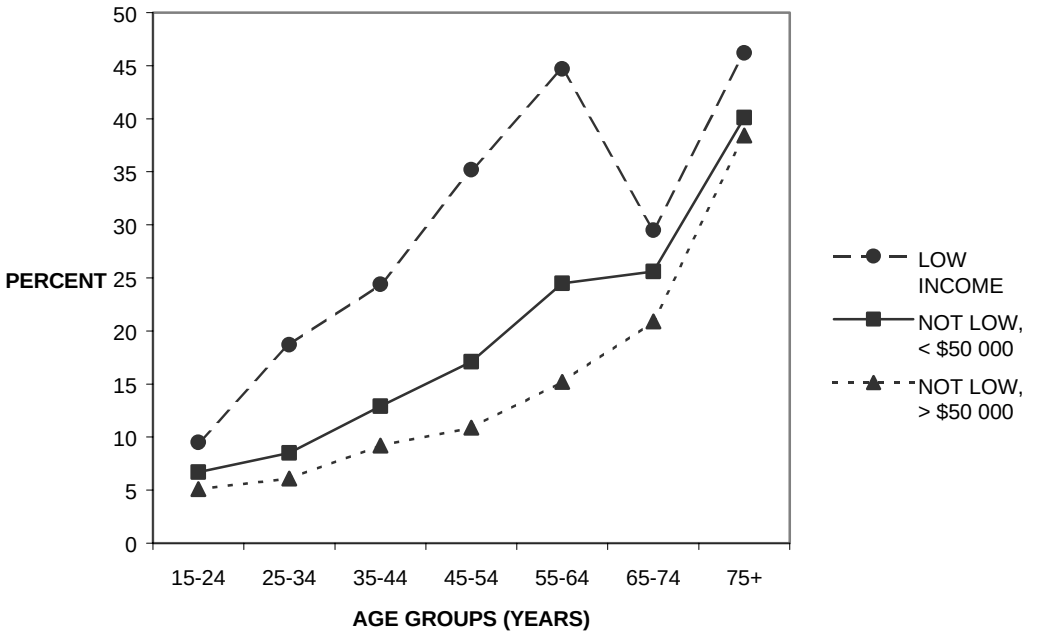


FIGURE 5A - PERCENT PREVALENCE OF LONG TERM DISABILITY
BY AGE & INCOME LEVEL



CHRONIC CONDITIONS

Of the chronic conditions, musculoskeletal disorders (MSD) including arthritis, rheumatism and back problems are reported by Ontarians as the most prevalent of the chronic conditions. MSD is reported by 30.4 % of the Ontario population, followed by non-food allergies with a prevalence of 23.0 %. Cardiovascular conditions including heart disease, hypertension and stroke are the third most reported of the chronic conditions at 16.0 %. Observing the chronic conditions individually, back problems and arthritis or rheumatism are found to be the second and third most prevalent chronic health problems reported by Ontarians behind non-food allergies (Table 3A).

Table 3A: Types of Chronic Health Problems Reported by Ontarians: Percent Prevalence and Number Reporting Individual Conditions for the Total Adult Population - OHS 1996-97.

CHRONIC CONDITION	ALL AGES		15-44		45-64		65+	
	%	N	%	N	%	N	%	N
Food Allergies	7.3	644 155	7.6	395 604	7.3	173 135	5.8	75 417
Other Allergies	23.0	2 042 653	25.2	1 309 545	21.2	505 608	17.5	227 500
Asthma	7.3	646 562	8.2	424 444	5.9	139 702	6.3	82 416
Arthritis or Rheumatism	14.9	1 320 511	4.8	246 776	21	500 966	43.9	572 769
Back Problems	15.5	1 373 870	11.8	610 950	21	500 117	20.2	262 803
High Blood Pressure	10.6	941 248	2.5	127 453	16.0	382 559	33.1	431 237
Migraine Headaches	8.6	759 440	9.4	485 800	9.2	219 515	4.2	54 125
Bronchitis or Emphysema	2.9	256 503	2.2	-	-	69 641	5.8	75 179
Sinusitis	5.0	439 617	4.1	211 266	6.3	149 183	6.1	79 168
Diabetes	3.4	297 971	0.9	47 782	5.0	118 716	10.1	131 473
Epilepsy	0.5	40 713	0.4	22 117	0.5	12 066	0.5 [q]	6 530 [q]
Heart disease	4.4	389 107	0.8	39 401	4.7	113 090	18.2	236 616
Cancer	1.7	148 774	0.4	19 680	2.2	53 110	5.8	75 984
Stomach or Intestinal Ulcers	2.4	213 246	1.9	96 655	2.9	70 136	3.6	46 455
Stroke	1.0	89 710	0.2 [q]	8 528 [q]	1.0	24 807	4.3	56 376
Urinary Incontinence	1.7	151 159	0.6	31 060	1.8	42 593	5.9	77 506
Bowel Disorder	1.8	155 125	1.1	56 010	2.2	51 359	3.7	47 756
Alzheimer's/ Dementia	-	-	-	-	-	-	1.4	18 111
Thyroid Condition	3.5	307 720	1.9	96 456	5.0	120 027	7.0	91 237
Other	5.3	473 436	3.7	192 694	6.7	159 799	9.3	120 943
POPULATION BASE	8 881 888		5 192 021		2 386 127		1 303 741	

Observing the distribution of chronic health problems by age, it appears that much of the allergies and asthma occurs among the younger age group. Conditions are relatively evenly distributed throughout the middle age group with the exception of alzheimer's/dementia. People 65 years and older reported a high prevalence of the major chronic conditions (heart disease, cancer, stroke) and alzheimer's/dementia (Table 4A).

Table 4A: Distribution of Chronic Health Problems by Age among Ontario Adults - OHS 1996-97

CHRONIC CONDITION	ALL AGES	15-44	45-64	65+
	N	%	%	%
Food Allergies	644 155	61.4	26.9	11.7
Other Allergies	2 042 653	64.1	24.8	11.1
Asthma	646 562	65.7	21.6	12.8
Arthritis or Rheumatism	1 320 511	18.7	38.0	43.4
Back Problems	1 373 870	44.5	36.4	19.1
High Blood Pressure	941 248	13.5	40.6	45.8
Migraine Headaches	759 440	64.0	28.9	7.1
Bronchitis or Emphysema	256 503	43.5	27.2	29.3
Sinusitis	439 617	48.1	33.9	18.0
Diabetes	297 971	16.0	39.8	44.1
Epilepsy	40 713	54.3	29.6	16.0
Heart disease	389 107	10.1	29.1	60.8
Cancer	148 774	13.2	35.7	51.1
Stomach or Intestinal Ulcers	213 246	45.3	32.9	21.8
Stroke	89 710	9.5	27.7	62.8
Urinary Incontinence	151 159	20.6	28.2	51.3
Bowel Disorder	155 125	36.1	33.1	30.8
Alzheimer's/dementia	26 856	22.9	9.7	67.4
Thyroid Condition	307 720	31.4	39.0	29.7
Other	473 436	40.1	33.8	25.6
POPULATION BASE	8 881 888	5 192 021	2 386 127	1 303 741

PART B: CROSS SECTIONAL VIEW OF THE UTILIZATION PATTERNS OF REHABILTATION SERVICES IN ONTARIO

The following is a descriptive analysis of the utilization of chiropractic services, rehabilitation therapy including physical therapy, occupational therapy, speech pathology and audiology, and psychosocial services. Chiropractic services are used by the largest proportion of the population, 9.9%. Rehabilitation therapy is used by 6.3 %, and psychosocial services by 4.1 %.

CHIROPRACTIC SERVICE UTILIZATION

As mentioned, 9.9 % of the population reported consulting a chiropractor at least once in the past 12 months. The percent utilization of chiropractic services varied dramatically with age, and was higher in women (10.3 %) in all age groups, with the exception of those 65-74 years. A higher proportion of middle-aged people reported chiropractic service utilization, peaking in the 45-54 age group (13.1%) (Table 1B).

Table 1B: Percent Chiropractic Utilization and Number of Adults Consulting Chiropractors in Ontario by Age and Gender

AGE GROUP	MEN		WOMEN		TOTAL	
	%	N	%	N	%	N
15-24	7.2	53 179	7.0	51 205	7.1	104 385
25-34	8.5	74 814	10.2	90 162	9.3	164 976
35-44	11.5	110 931	12.5	122 510	12.0	233 441
45-54	12.0	84 716	14.2	102 608	13.1	187 324
55-64	10.7	50 253	11.6	55 745	11.2	105 998
65-74	9.4	35 522	8.6	38 754	8.9	74 276
75+	6.7	13 044	7.6	21 505	7.3	34 549
ALL AGES	9.5	422 459	10.3	482 489	9.9	904 949
POPULATION BASE	4 325 720		4 536 677		8 862 397	

Those reporting post secondary education also reported more chiropractic utilization than those of lesser education (Figure 1B). Moreover, chiropractic utilization was reported by a higher proportion of people reporting a high income level compared to those with low and middle level income (Figure 2B). However, it appears that chiropractic utilization declines in the middle and high income groups for those aged 55-75+ years, and remains fluctuating in the low income group. Missing values are due to an insufficient number of younger respondents with primary level education.

FIGURE 1B - PERCENT UTILIZATION OF CHIROPRACTIC SERVICES BY LEVEL OF EDUCATION & AGE AMONG ADULTS IN ONTARIO

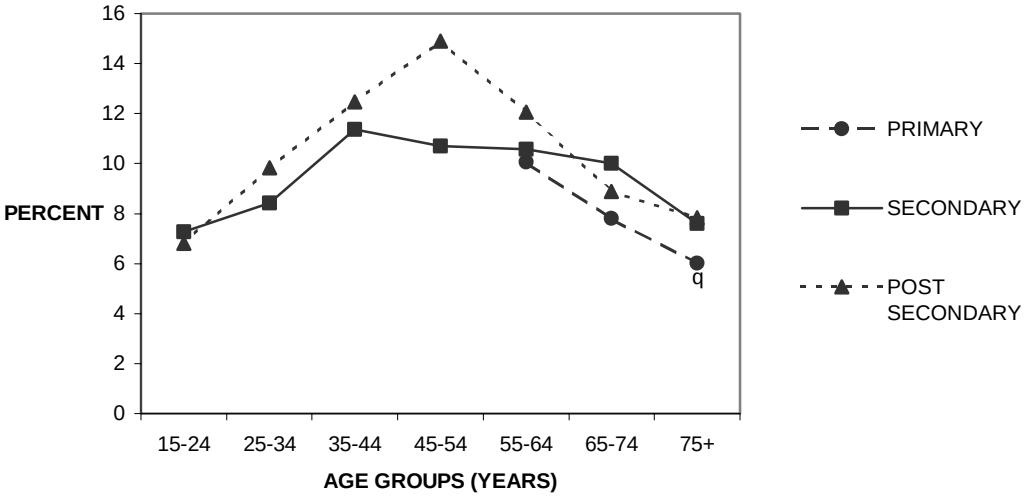
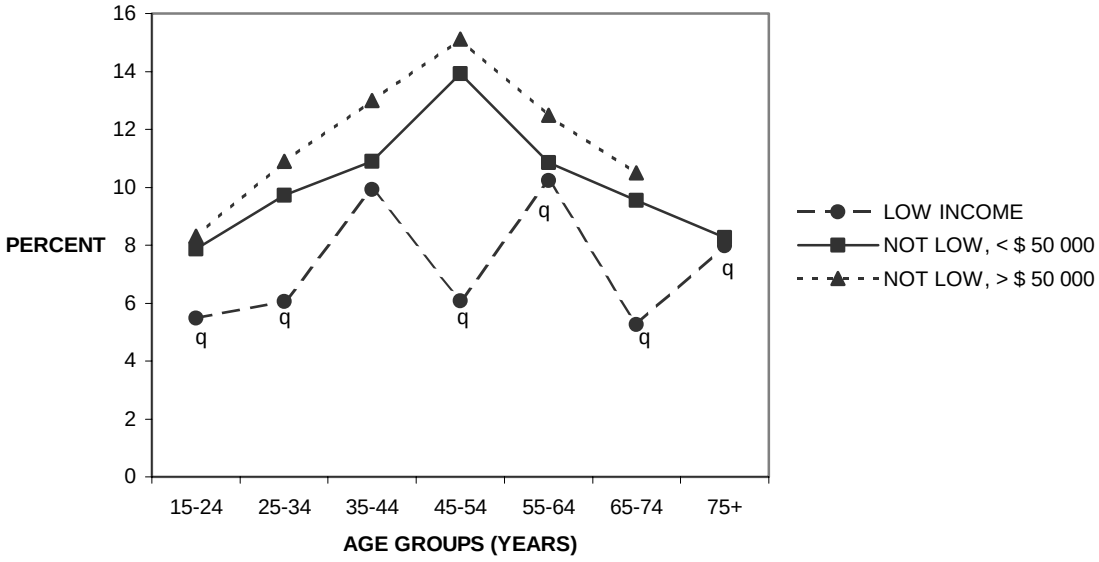


FIGURE 2B - PERCENT UTILIZATION OF CHIROPRACTIC SERVICES BY LEVEL OF INCOME & AGE AMONG ADULTS IN ONTARIO



Overall, 10.0 % of the urban population and 11.9 % of the rural population reported consulting a chiropractor at least once in the past 12 months (Table 2B).

Table 2B: Percent Utilization of Chiropractic Services and Number of Adults Consulting Chiropractors in Urban & Rural Areas of Ontario by Age and Gender

AGE GROUP	URBAN		RURAL	
	%	N	%	N
15-24	7.1	91 096	7.5	13 288
25-34	9.0	140 091	11.7	24 075
35-44	11.7	197 487	13.9	35 436
45-54	12.8	159 446	14.7	27 590
55-64	10.9	89 938	12.5	16 060
65-74	8.6	61 773	11.2	12 503
75+	7.2	30 226	8.2 [q]	4323.2 [q]
ALL AGES	10.0	770 057	11.9	133 275.2
POPULATION BASE	7 734 177		1 118 729	

Among males, chiropractic utilization appears to be greater in the rural areas across almost all age groups. The percent utilization is equivalent between rural and urban strata in the 15-24 age group. Utilization in the rural areas exceeds that of the urban for most age groups, then declines below urban rates in the 75+ age group (Figure 3B). In the rural areas, utilization is higher across all age groups (Figure 4B). And in both urban and rural areas, women consult chiropractic services more than do men.

FIGURE 3B - PERCENT UTILIZATION OF CHIROPRACTIC SERVICES BY STRATUM & AGE AMONG ADULTS MALES IN ONTARIO

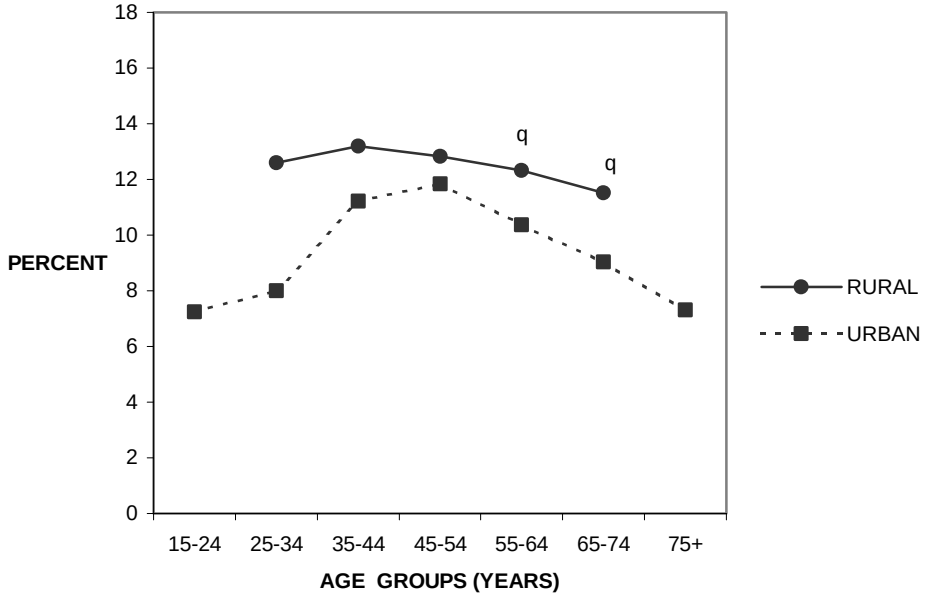
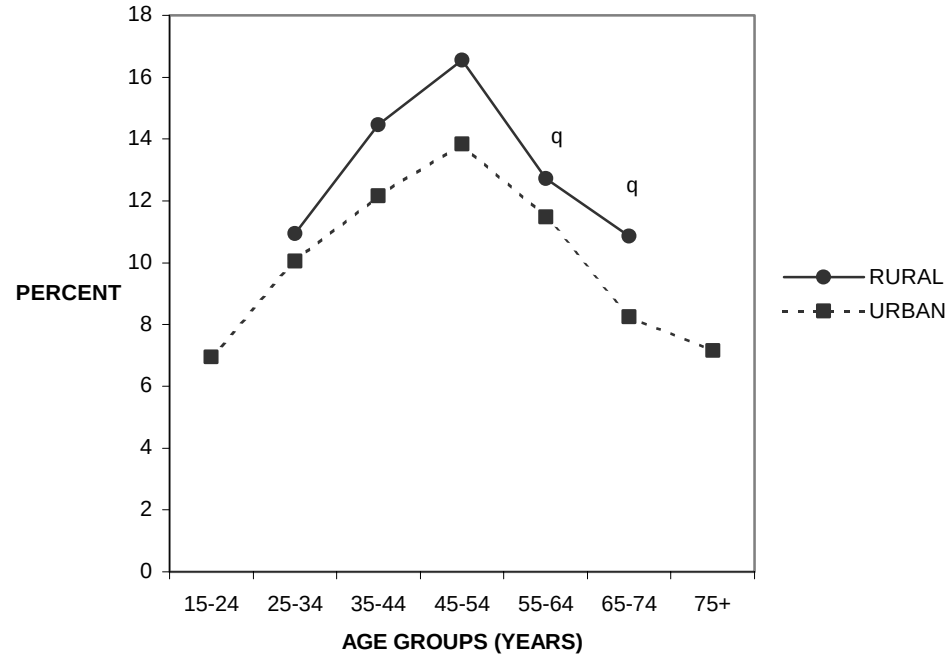


FIGURE 4B - PERCENT UTILIZATION OF CHIROPRACTIC SERVICES BY STRATUM & AGE AMONG ADULT FEMALES IN ONTARIO



REHABILITATION THERAPY UTILIZATION

Overall, 6.3 % of the population reported consulting a physiotherapist, occupational therapist, audiologist, and/or speech pathologist at least once in the past 12 months. The percent utilization of rehabilitation therapy services varied only slightly with age. A higher proportion of women than men in Ontario reported using rehabilitation therapy. This was particularly true for the age group 55-64 years in which women used rehabilitation services significantly more than did men, approximately at a ratio of 2:1 (Table 3B).

Table 3B: Percent Utilization of Rehabilitation Therapy and Number of Adults Consulting Rehabilitation Therapy in Ontario by Age and Gender

AGE GROUP	MEN		WOMEN		TOTAL	
	%	N	%	N	%	N
15-24	4.7	34 983	4.9	36 008	4.8	70 991
25-34	5.6	49 863	4.9	43 819	5.3	93 683
35-44	6.4	62 321	7.7	75 777	7.1	138 097
45-54	6.7	47 169	8.0	57 960	7.3	105 129
55-64	5.8	27 240	10.3	49 379	8.0	76 620
65-74	6.2	23 588	8.9	40 465	7.7	64 053
75+	7.4	13 886	8.4	24 040	8.0	37 926
ALL AGES	5.6	259 050	6.8	327 448	6.3	586 499
POPULATION BASE	4 336 661		4 545 227		8 881 888	

A higher proportion of people reporting post secondary education also reported rehabilitation therapy use, compared to their less educated counterparts (Figure 5B).
In contrast, a higher proportion of people with low income reported utilization of rehabilitation therapy, demonstrating that two measures of SES –education and income—can affect a public health outcome in a competing manner. Utilization among the people with low-income increased consistently from 15-24 through to 55-64 years and then declined dramatically beyond 65+ years (Figure 6B). This may be due to the high prevalence of injury among the young, and the high prevalence of chronic conditions among the late middle aged to senior group. Utilization of rehabilitation therapy in the middle and high income groups is similar and only varies slightly with age.

FIGURE 5B - PERCENT UTILIZATION OF REHABILITATION THERAPY BY LEVEL OF EDUCATION & AGE AMONG ADULTS IN ONTARIO

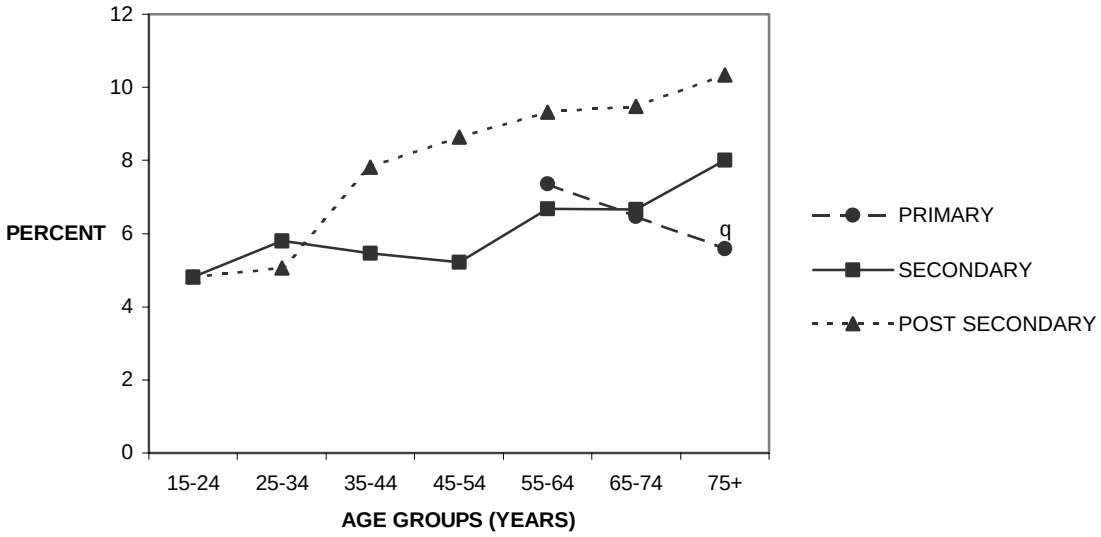
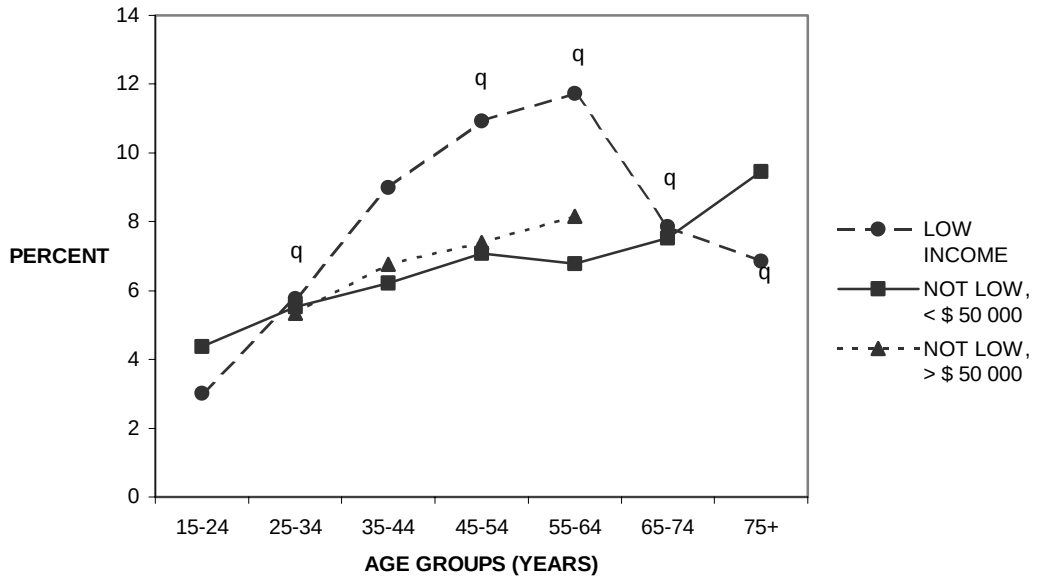


FIGURE 6B - PERCENT UTILIZATION OF REHABILITATION THERAPY BY LEVEL OF INCOME & AGE AMONG ADULTS IN ONTARIO



Overall, 6.5 % of the urban population and 5.8% of the rural population reported seeking some type of rehabilitation therapy at least once in the past 12 months (Table 4B).

Table 4B: Percent Utilization of Rehabilitation Therapy and Number of Adults Consulting Rehabilitation Therapy in Urban & Rural Areas of Ontario by Age

AGE GROUP	URBAN		RURAL	
	%	N	%	N
15-24	4.7	60648	-	-
25-34	5.0	78398	5.6	11490
35-44	7.1	119257	6.4	16323
45-54	7.3	90345	6.6	12376
55-64	8.0	65843	6.9	8790.2
65-74	7.6	54525	6.9 [q]	7710 [q]
75+	8.0	33623	-	-
ALL AGES	6.5	502 639	5.8	64 887.7
POPULATION BASE	7 734 239		1 119 440	

PSYCHOSOCIAL SERVICE UTILIZATION

Overall, 4.1 % of the population reported consulting psychosocial services (social worker, psychologist or other counselor) at least once in the past 12 months. The percent utilization of psychosocial services varied with age, the younger age groups consulting approximately twice as frequently as older adults. Women overall (4.9%) and across individual age groups reported higher utilization of psychosocial services than did men (Table 5B).

Table 5B: Percent Utilization of Psychosocial Services and Number of Adults Consulting Psychosocial Services in Ontario by Age and Gender

AGE GROUP	MEN		WOMEN		TOTAL	
	%	N	%	N	%	N
15-24	3.0	22 367	6.0	43 587	4.5	65 953
25-34	3.6	31 732	5.9	52 254	4.7	83 986
35-44	4.0	38 982	6.6	64 475	5.3	103 457
45-54	3.6	25 185	5.0	36 090	4.3	61 276
55-64	1.8 [q]	8478.7 [q]	2.8	13 175	2.3	21 654
65-74	-	-	1.6 [q]	7407.6 [q]	1.6	13 499
75+	-	-	1.9 [q]	5393.6 [q]	2.2 [q]	10 584 [q]
ALL AGES	3.2	146 164	4.9	230 969	4.1	377 132.3
POPULATION BASE	4 327 759		4 536 816		8 864 575	

Psychosocial service utilization was difficult to interpret at the descriptive level due to an insufficient number of respondents who used such services. Among those of secondary and post secondary education, the percent utilization pattern across age groups is similar. However, those with post secondary education have a greater percent utilization of services through the middle age groups, 35-64 years (Figure 7B). Missing values are due to an insufficient number of respondents who both used psychosocial services and who reported primary education. Psychosocial service utilization was reported by a higher proportion of people reporting low income, compared to those with high and middle income levels (Figure 8B). However, psychosocial service utilization among people with low-income declined dramatically in age groups after 45 years. Utilization varied only slightly with age between people with middle and high-income.

The large difference in utilization between low income and the higher income brackets may be explained by people seeking out counseling services related to social assistance and/or other factors associated with low socioeconomic status. Missing values are due to an insufficient number of older respondents using psychosocial services, hence not allowing a meaningful analysis when further stratified by income.

FIGURE 7B - PERCENT UTILIZATION OF PSYCHOSOCIAL SERVICES BY LEVEL OF EDUCATION & AGE AMONG ADULTS IN ONTARIO

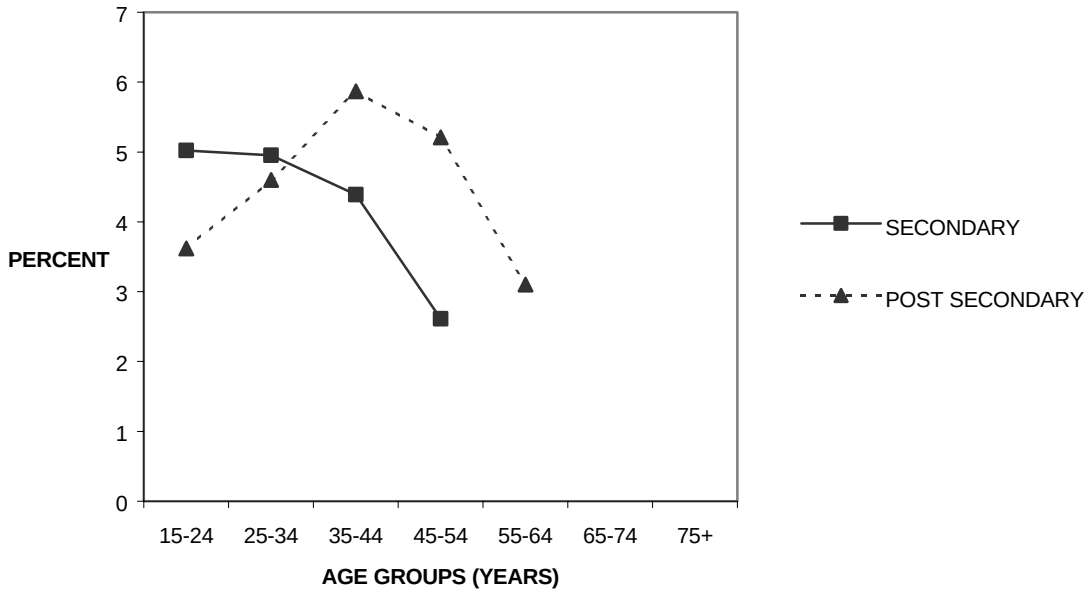
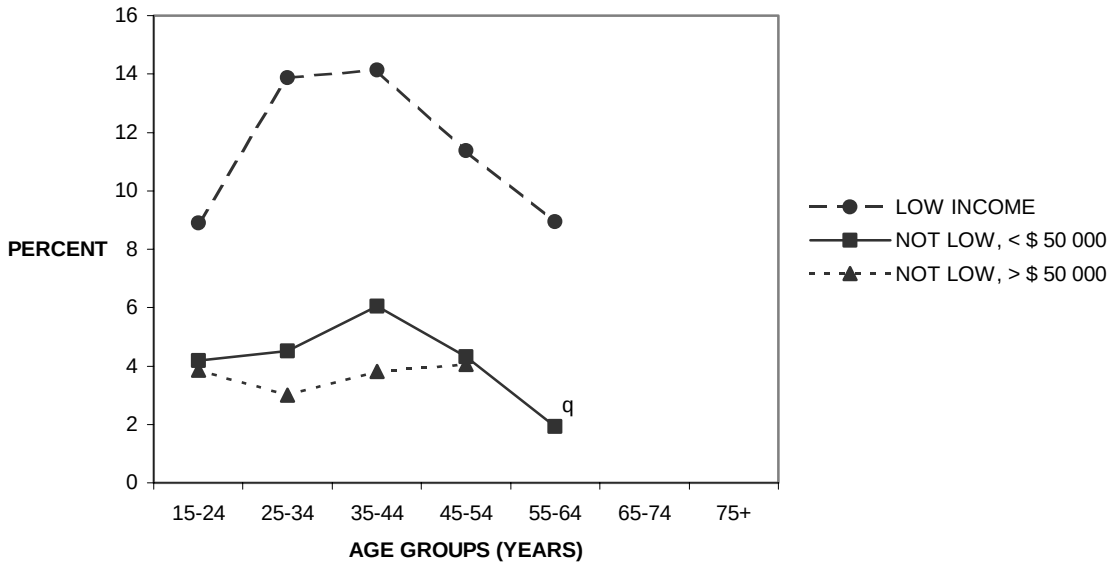


FIGURE 8B- PERCENT UTILIZATION OF PSYCHOSOCIAL SERVICES BY LEVEL OF INCOME & AGE AMONG ADULTS IN ONTARIO



Overall, 4.2 % of the urban population and 3.3% of the rural population reported consulting psychosocial services at least once in the past 12 months, with utilization in the rural areas being lower than that of the urban areas. This may be explained by limited access to such services in rural areas (Table 6B).

Table 6B: Percent Utilization of Psychosocial Services and Number of Adults Consulting Psychosocial Services in Urban and Rural Areas of Ontario by Age

AGE GROUP	URBAN		RURAL	
	%	N	%	N
15-24	4.7	60 444	-	-
25-34	4.9	75 857	3.9 [q]	7982 [q]
35-44	5.2	88 095	5.9	15 121
45-54	4.6	57 505	-	-
55-64	2.4	19 447	-	-
65-74	1.7	12 246	-	-
75+	2.2 [q]	9152.3 [q]	-	-
ALL AGES	4.2	322 747	3.3	37 275
POPULATION BASE	7 735 632		1 119 451	

General Characteristics of Rehabilitation Service Users

Of chiropractic service and rehabilitation therapy users, the majority are middle aged adults, 35-54 years, married, speak English only, are almost exclusively white, have at least a secondary education, do not have low income, and live in urban areas. The distribution of sociodemographic characteristics is slightly different for psychosocial services; the majority of users are young to early middle aged adults, 15-44 years, married, English speaking, white females having at least secondary education, and living in an urban area (Table 7B).

Table 7B: Distribution of Characteristics of Rehabilitation Services Users

Rehabilitation Service		Chiropractic Services %	Rehabilitation Therapy %	Psychosocial Services %	Population %
AGE	15-24	11.5	12.1	18.3	16.5
	25-34	18.2	16.0	23.3	20.0
	35-44	25.8	23.6	28.7	22.0
	45-54	20.7	17.9	17.0	16.1
	55-64	11.7	13.0	6.0	10.7
	65-74	8.3	10.9	3.8	9.4
	75+	3.8	6.5	2.9	5.3
	All Ages	100	100	100	100
SEX	M	47.0	44.4	38.8	48.8
	F	53.0	55.6	61.2	51.2
	Both	100	100	100	100
MARITAL STATUS	Married/ Common law	65.9	60.4	42.2	60.3
	Single	22.9	24.7	37.1	27.7
	Widowed	4.2	6.5	4.8	5.6
	Separated/ Divorced	7.0	8.4	15.9	6.5
	Total	100	100	100	100
LANGUAGE	English	84.1	83.7	80.8	85.2
	French	-	-	-	-
	Both	15.0	15.6	18.4	13.6
	Neither	-	-	-	-
	Total	100	100	100	100
RACE	White	93.9	89.9	89.2	86.7
	Non-White	6.1	10.1	10.8	13.3
	All Races	100	100	100	100
EDUCATION	Primary	7.5	9.5	9.8	7.2
	Secondary	32.9	30.4	31.1	36.6
	Post-Secondary	59.6	60.1	59.1	56.2
	All Levels	100	100	100	100

INCOME	Low	9.6	14.1	28.4	12.8
	Not Low (< $50 K)	41.3	41.8	36.2	42.9
	Not Low (> $ 50K)	50.1	44.1	35.4	44.3
	All Levels	100	100	100	100
URBAN/ RURAL	Urban	85.3	88.6	89.6	87.4
	Rural	14.7	11.4	10.4	12.6
	Total	100	100	100	100
INSURANCE	No Coverage	20.9	21.0	26.9	23.5
	At least 1 type coverage	79.1	79.0	73.1	76.5
	Total	100	100	100	100

Table 8B: Percent Utilization by Characteristics of Rehabilitation Service User across providers

Rehabilitative Service		**Chiropractic Services %**	**Rehabilitation Therapy %**	**Psychosocial Services %**
MARITAL STATUS	Now married / Common law	11.4	6.6	3.0
	Single-never married	7.3	5.0	4.8
	Widowed	7.8	7.6	3.6
	Separated / Divorced	11.3	8.6	10.5
SOCIAL SUPPORT	Low	7.5 [q]	5.4 [q]	8.4 [q]
	Medium-Low	7.1 [q]	9.9	4.6 [q]
	Medium	10.6	7.1	5.5
	Medium-Hi	10.4	6.9	6.1
	Hi	10.1	6.1	3.7
RACE	White	10.8	6.5	4.2
	Non White	4.5	4.7	3.3
LANGUAGE	English	9.8	6.2	3.9
	French	12.1	3.5	4.6
	Both	10.8	7.1	5.4
	Neither	6.3	3.6	2.4
URBAN/ RURAL	Urban	9.9	6.5	4.2
	Rural	11.9	5.8	3.3
INSURANCE	No Coverage	9.6	6.0	4.7
	At least 1 type of coverage	11.1	6.9	3.9
EDUCATION	Primary	6.7	5.4	3.6
	Secondary	9.2	5.4	3.6
	Post Secondary	11.1	7.2	4.5
INCOME	Low	6.9	7.1	9.9
	Not Low (< $50 K)	10.1	6.4	3.8
	Not Low (> $50 K)	11.6	6.4	3.6

The percent utilization of rehabilitation services is expected to be affected by chronic conditions, disability, pain and poor health. The following is a representation of service utilization by the factors stated above.

Self-rated health

Self-rated health does not appear to affect chiropractic utilization. The percent utilization across health levels varies only slightly. This may be due to a large portion of the healthy population using chiropractic services for maintenance rather than for treatment of a specific condition. Rehabilitation therapy and psychosocial service use, on the other hand, appear to have an inverse relationship to self-rated health: self-rated health declines the utilization rates of these types of services increases. The percent utilization peaks in the fair and poor health categories (Table 9B).

Number of Chronic Conditions

Service utilization reported by Ontarians across all three rehabilitation domains increases linearly with number of chronic conditions (Table 9B).

Long term Disability and Two-week Disability

Service utilization reported by Ontarians across all three rehabilitation domains is notably higher among those persons reporting disability. The difference in service use between those with and without a disability is not as dramatic among chiropractic users, perhaps due to high utilization by an otherwise healthy population for regular adjustment and treatment management (Table 9B).

Pain

Service utilization was higher among those reporting pain across all three rehabilitation domains. For chiropractic services and rehabilitation therapy, this may be explained by the high prevalence of back pain in the population (Table 9B).

Table 9B: Percent Utilization of Rehabilitation Services by Health Related variables and Provider

Rehabilitation Service		Chiropractic Services %	Rehabilitation Therapy %	Psychosocial Services %
SELF-RATED HEALTH	Excellent	8.8	4.9	2.9
	Very Good	10.1	5.1	3.2
	Good	10.1	6.8	4.4
	Fair	12.4	13.0	7.6
	Poor	10.0	17.0	14.2
# OF CHRONIC CONDITIONS	None	5.8	3.4	2.4
	One	10.9	6.1	3.9
	Two	13.6	8.6	4.8
	Three	16.7	9.8	6.8
	Four +	16.8	16.3	8.6
LONG TERM DISABILITY	No long term disability	9.6	4.7	3.2
	Long term disability	14.2	18.1	9.6
TWO WEEK DISABILITY	No two week disability	9.6	5.6	3.4
	Two week disability	14.7	14.2	8.9
PAIN	No pain	9.0	4.8	3.4
	Pain	16.4	16.3	8.7

Table 10B: Distribution of Health Related Variables by Rehabilitation Services Provider

Rehabilitation Service		Chiropractic Services %	Rehabilitation Therapy %	Psychosocial Services %	Population %
SELF-RATED HEALTH	Excellent	22.5	18.2	16.5	25.1
	Very Good	39.8	31.9	29.4	39.0
	Good	25.7	57.5	29.4	25.5
	Fair	9.3	15.4	14.8	7.7
	Poor	2.7	7.0	9.9	2.7
	Total	100	100	100	100
# OF CHRONIC CONDITIONS	None	23.4	21.5	24.7	41.3
	One	28.8	24.8	25.5	26.8
	Two	20.2	19.9	17.9	15.1
	Three	13.4	12.3	13.7	8.2
	Four +	14.2	21.5	18.2	8.6
	Total	100	100	100	100
LONG TERM DISABILITY	No long term disability	80.5	61.4	67.0	86.0
	Long term disability	19.5	38.6	33.0	14.0
	Total	100	100	100	100
TWO WEEK DISABILITY	No two week disability	83.6	75.4	75.2	88.7
	Two week disability	16.4	24.6	24.8	11.3
	Total	100	100	100	100
PAIN	No pain	79.3	67.5	73.3	87.0
	Pain	20.7	32.5	26.7	13.0
	Total	100	100	100	100

Observing the general trend in utilization of services by chronic condition in the OHS 1996-97, we see high reported consultation of chiropractors by people also reporting back problems. Similarly, people reporting high utilization of rehabilitation therapists also reported back problems, arthritis/rheumatism, urinary incontinence, and/or stroke. Individuals reporting bowel disorder and/or bronchitis or emphysema reported high utilization of psychosocial services (Table 11B). A similar trend in utilization is also found in the OHS 1990, however some of the chronic condition categories are notably different, and the rehabilitation therapy domain was limited to physiotherapy consultation (Table 12B). Many of the conditions reported to have high percent utilization did not appear to be related to the service. This is an artefact of the 1996-97 data that arises due to our inability to attribute utilization to any specific condition. The percent utilization of rehabilitation services presented below suggests a high degree of comorbidity throughout the population.

Table 11B: Percent Utilization of Rehabilitation Services and Number of Adults Consulting by Reported Chronic Condition OHS 1996-97

CHRONIC CONDITION	CHIROPRACTIC SERVICES		REHABILITATIVE THEARPY		PSYCHOLOGICAL & COUNSELLING SERVICES	
	%	N	%	N	%	N
Food Allergies	16.7	107 317	9.7	62 702	7.3	47 070
Other Allergies	12.8	261 237	9.1	185 081	6.0	123 259
Asthma	13.0	84 073	9.7	62 962	7.6	49 168
Arthritis or Rheumatism	12.9	169 618	13.3	175 539	5.2	67 897
Back Problems	28.6	392 251	14.8	203 164	6.9	94 607
High Blood Pressure	10.2	96 294	9.5	89 207	4.0	37 961
Migraine Headaches	15.2	115 014	10.6	80 270	8.3	62 874
Bronchitis or Emphysema	12.6	32 338	10.7	27 492	9.2	23 522
Sinusitis	15.8	69 314	11.6	50 840	6.0	26 570
Diabetes	10.2	30 482	9.5	28 346	5.8	17 389
Epilepsy	-	-	-	-	-	-
Heart disease	10.3	39 962	12.4	48 384	5.1	19 890
Cancer	10.0	14 888	9.0	13 314	6.3 [q]	9 279.5 [q]
Stomach or Intestinal Ulcers	12.4	26 515	12.0	25 547	9.1	19 288
Stroke	7.6 [q]	6 813.6 [q]	14.7	13 184	8.5 [q]	7 582.8 [q]
Urinary Incontinence	10.0	15 059	16.6	25 120	8.2	12 338
Bowel Disorder	17.6	27 222	15.0	23 221	10.6	16.384
Alzheimer's/ dementia	-	-	-	-	-	-
Thyroid Condition	13.5	41 545	10.8	33 091	6.5	19 800
Other	13.9	65 689	12.7	60 123	8.9	42 234

(-) estimates are of unacceptable quality to release

Table 12B: Percent Utilization of Rehabilitation Services and Number of Adults Consulting by Reported Chronic Condition OHS 1990

CHRONIC CONDITION	CHIROPRACTIC SERVICES		PHYSIOTHEARPY		PSYCHOLOGICAL & COUNSELLING SERVICES	
	%	N	%	N	%	N
Skin diseases	10.6	67 595	8.4	53 721	6.2	39 469
Allergies	13.0	173 548	8.6	114 814	6.4	85 230
Asthma	12.7	36 586	11.2	32 240	8.8	25 267
Arthritis or Rheumatism	11.0	116 465	12.9	136 103	4.8	50 916
Back Problems	27.3	189 884	20.3	141 407	8.4	58 290
Other Joint Problems	15.2	55 184	20.5	74 201	7.8	28 391
High Blood Pressure	9.6	70 611	8.9	65 970	4.3	31 661
Bronchitis or Emphysema	8.4	16 158	11.7	22 518	8.1	15 617
Speech	-	-	27.3 [q]	7298.4 [q]	-	-
Diabetes	9.6	19 763	9.6	19 804	4.4	9 066.4
Epilepsy	-	-	-	-	15.6[q]	7 468.6
Heart disease	9.3	29 839	8.1	26 203	5.0	16 200
Cancer	10.8	15 856	9.9	14 444	5.4 [q]	7980.9 [q]
Stomach or Intestinal Ulcers	11.0	24 255	10.5	23 029	7.0	15 430
Circulatory/ Stroke	11.2	25 411	13.0	29 465	6.0	13 587
Urinary Incontinence	8.9	15 417	10.8	18 695	7.5	13 009
Digestive disorder/Bowel	12.3	36 499	13.5	40 242	9.9	29 295
Thyroid Condition	10.3	21 885	10.4	22 105	5.4	11 544
Other	13.0	51 213	9.5	37 605	8.9	35 179

(-) estimates are of unacceptable quality to release

Using the data from the OHS 1990, an analysis of the reason for consultation was preformed to determine the types of client groups seen by the rehabilitation providers. Twenty-eight percent of those reporting MSD saw a chiropractor in the past 12 months due to the MSD condition. The percent utilization attributable to MSD for chiropractic services is inflated dramatically by back problems which accounted for 21.4% of the attributable utilization. Twenty-two and one half percent reported consulting a physiotherapist in the past 12 months due to MSD. The percent utilization attributable to MSD for physiotherapy is also largely influenced by back and other joint problems.

The dominant attributable reason for psychosocial consultation was the "other systems" category accounting for mental disorders (Table 13B). The large number of missing values is due to an insufficient number of respondents reporting rehabilitation utilization attributable to a condition to produce a reliable estimate. The missing values may be explained by the fact that many of the conditions listed may not be directly related to rehabilitation services.

Table 13B: Percent Utilization of Rehabilitation Services Attributable to the Reported Health Problem OHS 1990

REPORTED HEALTH CONDITION	CHIROPRACTIC SERVICES	PHYSICAL THERAPY	PSYCHOLOGICAL & COUNSELLING SERVICES
	%	%	%
Arthritis and Rheumatism	2.1	1.8	-
Back Problems	21.4	9.5	-
Other joint problems	4.5	11.2	-
Hypertension	-	-	-
Heart Disorders	-	-	-
Circulatory/ Stroke	-	-	-
Acute Respiratory Disease	-	-	-
Chronic Pulmonary Disease ie. Asthma	-	-	-
Cancer	-	-	-
Digestive System Disorders	-	-	-
Urinary/ Kidney Problems	-	-	-
Endocrine, Nutritional, Metabolic Diseases	-	-	-
Sensory Disorders	-	-	-
Allergies	-	-	-
Other Systems (Blood, skin, nervous system & mental disorders)	0.6	0.7	2.7
Symptoms (Migraine, injury, poisoning)	1.4	0.7	1.2

(-) estimates are of unacceptable quality to release

PART C: PREDICTORS OF CONSULTING REHABILITATION SERVICES IN ONTARIO

A multivariate logistic regression was preformed to determine what variables predict the use of rehabilitation services when the effects of competing covariates are controlled for. Most of the covariates included in the constructed models were already discussed elsewhere in this report. Variables coding for education and income were introduced as ordinal constructs increasing from low to high. The variable coding for marital status reflected four levels: presently married, common-law or living with a partner; single and never married; widowed; and separated or divorced.

Table 1C shows the odds ratios of utilizing rehabilitation services by age, education level, sex, income level, urban/rural stratum, the presence of pain, levels of disability and the number of chronic conditions. The odds ratio shows the extent to which the above variables predict the chance of reporting rehabilitation service utilization; *please see the Technical Appendix for guidance on how to interpret odds ratios*. The magnitude and direction of these associations may be different for the different types of rehabilitation service. For example, if an individual reported having long term disability, then his odds of reporting utilization of rehabilitative therapy is 3.79 times higher than if s/he reported no long term disability.

Table 1C shows the determinants of consulting the three rehabilitation domains during the past 12 months. As shown in table 1C, age was inversely associated with chiropractic and psychosocial consultation, meaning that one is less likely to consult if one is older. Age was also found to be inversely associated with rehabilitative therapy utilization, however with no statistical significance.

Gender was not significantly associated with consultation of chiropractic services or rehabilitation therapy, but women were found to have a greater chance of consulting psychosocial services than were men.

Low education was associated with utilization of psychosocial services; education was not in the chiropractic logistic model and was insignificant in the rehabilitation therapy model. Higher income levels were associated with chiropractic and rehabilitation therapy utilization, but the relationship is the opposite for psychosocial service utilization.

Living in a rural area was associated with chiropractic consultation, but was found to be insignificant with respect to rehabilitation therapy and psychosocial service use.

Long term disability, two-week disability, pain and the number of chronic conditions reported were all significantly associated with consultation across rehabilitation domains.

Our findings show that being single, widowed, or divorced increased the odds of using psychosocial services while being single decreased the odds of chiropractic consultation and widowed, or separated/divorced were not found to be statistically significant. Furthermore, being non-white was inversely associated with chiropractic consultation but was not a factor in other rehabilitation domains. Social support was inversely associated with psychosocial service utilization, while poor self-rated health was positively associated with psychosocial services but predicted a tendency to eschew chiropractic consultation.

Interaction terms

A statistical interaction in a regression model occurs when the level of a given variable affects the extent and direction of one or more other variables' association with the outcome of interest. To best interpret the significant interaction terms in the logistic model, probability plots were generated to reveal the true relationship between age and education level, between disability and the number of chronic conditions (See Appendix 1).

From the probability plots, the 35-44 age group with post secondary education has a greater probability of using rehabilitation therapy. The middle age group (35-44 years) with post secondary education has a greater probability of using psychosocial services, while the probability of using psychosocial services is greater for those having long term disability among those having one or more chronic conditions. The probability of using chiropractic services is lower for those having long-term disability for all numbers of chronic conditions (0-4+). The probability of using chiropractic services is slightly greater for those having two-week disability compared to those not reporting this type of disability for all numbers of chronic conditions (0-4+).

Table 2C shows the determinants of consulting the three types of rehabilitation services during the past 12 months. Regarding chiropractic utilization an individual with back problems is 4 times more likely to consult a chiropractic than an individual with no back problems, adjusting for the presence of all other chronic conditions. Having arthritis and/or back problems increases the likelihood of consulting rehabilitation therapy.

Regarding psychosocial services, having arthritis reduced the chance of utilization, while back problems were not statistically predictive of psychosocial service use. Having diabetes, cancer, and stroke were also found to increase the odds of consulting psychosocial services. This is possibly due to diabetics, cancer and stroke patients requiring counseling to deal with their ailment.

Table 1C: The odds of utilization by sociodemographics and other health related characteristics

Variables	Chiropractic Services		Rehabilitation Therapy		Psychosocial Services	
	odds ratio	**99 % confidence interval**	**odds ratio**	**99 % confidence interval**	**odds ratio**	**99 % confidence interval**
Age						
15-24	Reference					
25-34	1.08	0.86-1.36	1.15	0.52-2.52	0.50	0.22-1.14
35-44	1.22	0.97-1.54	0.70	0.33-1.48	**0.26**	**0.12-0.58**
45-54	**1.28**	**1.00-1.64**	0.58	0.27-1.24	**0.19**	**0.08-0.46**
55-64	0.96	0.73-1.26	0.62	0.31-1.26	**0.05**	**0.02-0.14**
65-74	0.70	0.52-0.95	0.61	0.30-1.22	**0.05**	**0.02-0.15**
75+	**0.57**	**0.39-0.83**	**0.42**	**0.19-0.92**	**0.06**	**0.02-0.19**
Female	1.00	0.89-1.12	1.08	0.94-1.24	**1.31**	**1.10-1.56**
Increasing	--	--	0.93	0.64-1.35	**0.61**	**0.42-0.90**
Education level						
Increasing	**1.25**	**1.14-1.37**	**1.18**	**1.06-1.31**	**0.70**	**0.62-0.79**
Income level						
Urban	**0.80**	**0.69-0.94**	1.15	0.93-1.42	1.14	0.87-1.49
Long-term disability	**1.50**	**1.12-2.03**	**2.56**	**2.15-3.05**	**2.19**	**1.48-3.23**
2 week disability	**1.70**	**1.31-2.21**	**1.54**	**1.29-1.83**	**1.53**	**1.23-1.89**
# of conditions	**1.47**	**1.39-1.55**	**1.24**	**1.17-1.31**	**1.25**	**1.15-1.35**
Presence of Pain	**1.46**	**1.27-1.69**	**1.59**	**1.37-1.86**	**1.29**	**1.05-1.59**
Marital Status						
Married	reference					
Single	**0.82**	**0.69-0.98**	-	--	**1.30**	**1.02-1.64**
Widowed	0.78	0.58-1.06			**1.91**	**1.18-3.09**
Separated/divorced	**0.89**	**0.72-1.11**			**2.31**	1.79-2.98
Non-white	**0.50**	**0.40-0.63**	--	--	--	--
Low Social Support	--	--	--	--	**1.93**	**1.34-2.77**
Low Self - rated health	**0.89**	**0.83-0.94**	--	--	**1.23**	**1.12-1.35**
Interaction terms – disability and number of chronic condition						
# conditions x long-term disability	**0.84**	**0.76-0.94**	**0.82**	**0.73-0.92**	0.89	0.76-1.02
# conditions x two-week disability	**0.87**	**0.78-0.97**	--	--	--	--
Interaction terms – education and age in decades						
Edage 25-34	--	--	0.98	0.60-1.61	**1.71**	**1.02-2.86**
Edage 35-44	--	--	1.40	0.88-2.24	**2.60**	**1.58-4.28**
Edage 45-54	--	--	1.56	0.97-2.51	**2.49**	**1.46-4.26**
Edage 55-64	--	--	1.44	0.90-2.30	**3.86**	**2.02-7.36**
Edage 65-74	--	--	1.44	0.91-2.29	**2.12**	**1.04-4.31**
Edage 75+	--	--	**1.69**	**1.00-2.85**	1.76	0.73-4.26

Significant results are highlighted
-- not in logistic model

Table 2C: The odds of utilization by independent chronic condition

Variable	Chiropractic Services		Rehabilitation Therapy		Psychosocial Services	
	Odds ratio	**99 % confidence interval**	**Odds ratio**	**99 % confidence interval**	**Odds ratio**	**99 % confidence interval**
Age						
15-24	Reference					
25-34	0.98	0.78-1.23	1.07	0.48-2.37	0.48	0.21-1.10
35-44	1.10	0.87-1.40	0.63	0.29-1.33	**0.27**	**0.12-0.60**
45-54	1.14	0.89-1.47	0.52	0.24-1.11	**0.18**	**0.08-0.44**
55-64	0.95	0.71-1.26	0.56	0.27-1.14	**0.05**	**0.02-0.15**
65-74	0.84	0.62-1.15	0.61	0.30-1.23	**0.06**	**0.02-0.17**
75+	0.74	0.49-1.09	**0.41**	**0.19-0.92**	**0.05**	**0.02-0.19**
Female	1.12	0.99-1.25	1.09	0.95-1.26	**1.35**	**1.13-1.61**
Increasing Education level	--	--	0.91	0.63-1.33	**0.60**	**0.41-0.88**
Increasing Income level	**1.28**	**1.17-1.40**	**1.17**	**1.06-1.30**	**0.69**	**0.61-0.78**
Urban	**0.82**	**0.71-0.96**	1.16	0.94-1.43	1.14	0.87-1.49
Long-term disability	0.92	0.77-1.09	**2.50**	**2.11-2.98**	**1.74**	**1.37-2.20**
2 week disability	**1.24**	**1.05-1.45**	**1.55**	**1.30-1.84**	**1.52**	**1.23-1.88**
Presence of Pain	**1.25**	**1.07-1.46**	**1.49**	**1.28-1.74**	**1.36**	**1.12-1.66**
Marital Status						
Married	Reference					
Single	**0.82**	**0.69-0.98**	--	--	**1.29**	**1.01-1.63**
Widowed	0.83	0.61-1.13			**1.99**	**1.23-3.22**
Separated/ divorced	0.89	0.72-1.12			**2.34**	**1.82-3.02**
Non-white	**0.50**	**0.40-0.62**	--	--	--	--
Low Social support	--	--	--	--	**1.95**	**1.36-2.79**
Low Self-rated health	**0.90**	**0.85-0.96**	--	--	**1.24**	**1.13-1.36**
Arthritis	0.82	0.72-1.01	**1.34**	**1.12-1.62**	**0.76**	**0.59-0.99**
Back problems	**4.64**	**4.03-5.33**	**1.78**	**1.50-2.10**	1.13	0.91-1.42
Heart disease	0.91	0.68-1.23	1.04	0.78-1.39	1.01	0.65-1.57
Stroke	0.64	0.33-1.23	1.19	0.72-1.96	**2.04**	**1.00-4.15**
Migraine	1.04	0.87-1.24	1.05	0.85-1.29	1.05	0.82-1.34
Diabetes	0.98	0.72-1.34	0.96	0.69-1.33	**1.54**	**1.01-2.34**
Cancer	0.85	0.55-1.29	0.72	0.45-1.15	1.34	0.74-2.42
High Bp	0.89	0.74-1.09	1.02	0.82-1.26	0.90	0.66-1.24
All allergies	1.01	0.88-1.17	1.11	0.94-1.31	1.08	0.87-1.34
All other	**0.66**	**0.55-0.78**	**1.34**	**1.12-1.62**	**0.65**	**0.50-0.85**
Interaction terms – education and age in decades						
Edage 25-34	--	--	0.99	0.61-1.63	**1.75**	**1.05-2.94**
Edage 35-44	--	--	1.46	0.92-2.34	**2.60**	**1.58-4.28**
Edage 45-54	--	--	**1.61**	**1.00-2.59**	**2.64**	**1.55-4.52**
Edage 55-64	--	--	1.51	0.95-2.40	**3.98**	**2.08-7.61**
Edage 65-74	--	--	1.44	0.91-2.30	**2.10**	**1.03-4.28**

Edage 75+	--	--	**1.76**	**1.05-2.98**	1.88	0.77-4.58

Significant results are highlighted, (--) not in logisitic model

DISCUSSION

There are very few population-based analyses of the predictors of rehabilitation service utilization. This report asked the questions: Who needs rehabilitation services? Who is using rehabilitation services? And what are the predictors of service use? Factors associated with utilization across rehabilitation domains were compared. As mentioned, when interpreting the findings presented, there are a number of limitations of the OHS 1996-97 data that must be considered, such as the reliability and validity of self report measures and proxy respondents, the inability to attribute etiologic conditions to reasons for contact with rehabilitation providers, possible recall bias and the inability to infer causation from cross sectional data.

Over one million people in Ontario are affected by some type of disability, and over two million people reported being burdened with a musculoskeletal disorder. The experience of chronic conditions and/or disability has been identified as an important factor in the health experience of the population, and is related to the use of rehabilitation services. Having a disability or chronic pain was found, on average, to increase consultation patterns by approximately two times across all rehabilitation providers. Disability, number of chronic conditions and pain were identified as important predictors of all rehabilitation services investigated, however other characteristics were also found to be important.

In our analysis of sociodemographic and other health related variables, we found many associations previously documented in the literature. It has been shown in Canada that those with high levels of education and income utilize physician specialist services more than do their low SES counterparts, despite universal coverage [Dunlop *et al* (1997), Vecchia *et al* (1987), Kephart *et al* (1998)]. In our analysis, the same is true for chiropractic and rehabilitation therapy consultation, suggesting that those with higher levels of education and income can access, and thereby benefit more from, the health care system. Consistent with previous literature [Nagi *et al* (1980), Everson *et al* (1998), and Badley (unpublished)], rehabilitation therapy and chiropractic service utilization is greater among the young and well educated. However, the same relationship is not true for psychosocial services. Psychosocial service utilization is greatest among young to middle aged persons with low SES. Predictors of psychosocial service use are consistent with those documented in the literature for physician and hospital services; low socio-economic groups use acute hospital care more and have more contacts with general practitioners [Roos *et al* (1997)]. In contrast, the predictors of rehabilitation therapy and chiropractic services were high income and education. Strain (1991) documented that a strong belief in the value of health maintenance activities is associated with a greater use of service overall, suggesting that preventative health beliefs may promote use of the health care system. Considering our findings and those presented in the literature, high education may be associated with preventative health beliefs hence better utilization of the health care system. However, further exploration of this possible association is necessary.

A significant difference in utilization between genders for chiropractic services and rehabilitation therapy was not identified in our analyses. However, a significant gender difference was observed for those seeking psychosocial services. Among other possible

contributing factors, this may reflect the difference in prevalence of mental disorders between men and women, or the extent to which the sexes differ in their access or willingness to pursue such services.

Other health related variables, such as marital status, race, social support, area of residence, and self- rated health were also found to be associated with consultation of rehabilitation providers. Our findings show that being widowed, single or divorced decreased the odds of chiropractic consultation while increasing the odds of psychosocial service usage, suggesting that, since the predictors of chiropractic and rehabilitation therapy consultation are very different from other health care services, their mechanisms and barriers to access will also be different. Policy directions should therefore recognize and address these differences.

Consistent with previous research, we found that, among non-whites, the percent utilization of services was consistently lower across all three rehabilitation domains. Our findings also support the inclusion of social support in explaining rehabilitation service utilization. Social support was considered present if respondents reported that they feel they have someone they can confide in, someone they can count on, someone who gives advice, and someone who makes them feel loved. High social support was associated with chiropractic utilization and was inversely associated with psychosocial service use. The tendency, unmeasured in this report, of healthy individuals to seek chiropractors for maintenance, rather than for treatment of an immediate ailment, may explain this disparity, as would the tendency for those with low social support to seek psychosocial services to cope with their lack of social networks (as is sometimes mandated by financial assistance programs).

In the data set, area of residence was not identified as a factor affecting utilization of rehabilitation therapy and/or psychosocial services, but our findings do reveal a significant difference in chiropractic consultation between urban and rural areas: people living in rural areas are more likely to seek chiropractic services. This may be a result of the greater availability of chiropractors in rural areas. Previous statistics released by the Institute of Evaluative Sciences (1998) show the availability of chiropractors per 100,000 population by District Health Council in 1996. Of the areas considered, based on population density, Grey Bruce and East Muskoka-Parry Sound are among the group with the greatest number of chiropractors and Thunder Bay is also shown to have high availability of chiropractors. The high utilization in rural areas may be in part expained by these areas' abundance of care providers. Conversely, the greater availability of chiropractors in these areas may be a result of the perceived greater need for service. Once again, no causal relationship may be inferred from these associations, but speculation may prove useful.

Fair to poor self-rated health decreased the odds of chiropractic consultation, while increasing the odds for psychosocial service usage. Poorer, less healthy groups use rehabilitation services considerably less frequently than do higher SES groups. The opposite relationship was found for psychosocial services: those with poor self-rated health consulted social workers, counsellors and/or psychologists more than did their healthy counterparts. Consistent with previous literature on health care utilization, psychosocial services appear to follow a similar pattern to physician and acute hospital care utilization. In contrast, the predictors of chiropractic and rehabilitation therapist consultation are very different from other health care services. Further investigation of rehabilitation services, independent of other health care services, is necessary.

Based on our findings, the prevalence of disability is greatest among those with low education and low income, but rehabilitation service use is the least (specifically, use of chiropractors and rehabilitation therapists) among this same low SES group. Universally, those of low SES are less likely to utilize rehabilitation services than those of higher SES, suggesting a

potential focus for policy initiatives. Disability has been found to be more prevalent among those with low SES. And, of the two million people reporting musculoskeletal disorders, three quarters of them did not use or attribute their use of rehabilitation services to their condition. In short, our findings suggest that those with the greatest potential need for rehabilitation services are using the services the least. It remains to determine why.

Possible barriers to consultation among low SES groups may include less time to use services, difficulty manoeuvring through the health care system, an inability to afford time off from work, an inability to afford child care to attend consults, lack of transportation and/or a lack of supplementary insurance. Consultation with rehabilitation therapists particularly physical and occupational therapists and chiropractors are not universally covered by the Ontario Health Insurance Plan (OHIP), and often only to a limited degree by private supplementary insurance.

CONCLUSION

Socioeconomic status has a major impact on both the health of Ontarians and their patterns of rehabilitation service use. Socioeconomic status has been found to be related both to the prevalence of chronic health problems and disability, and to service utilization. Based upon our findings, the prevalence of disability is greatest among low SES groups. However, those of low SES are the least likely to utilize rehabilitation services, suggesting a barrier to access that might be addressed via policy initiatives. The identification of such barriers, and the development of eventual policy directions implemented to alleviate their impact, embody an important ethic for the long term maintenance and improvement of the health of Ontarians.

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APPENDIX 1

Figure 1: Estimated probability of consulting a chiropractor by the number of chronic conditions and by the presence of long-term disability

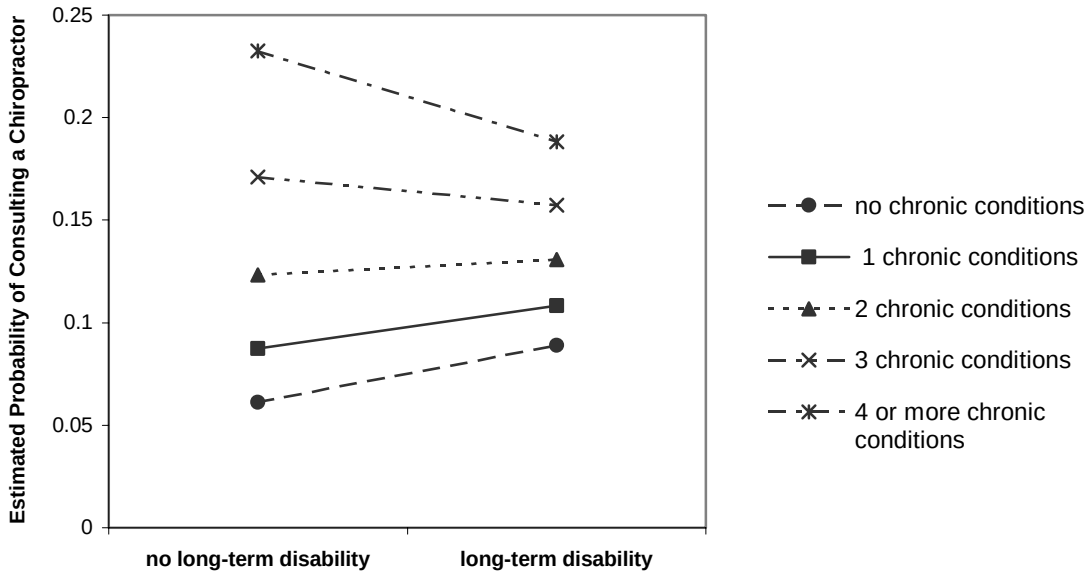


Figure 2: Estimated probability of consulting psychosocial services by the number of chronic conditions and by the presence of long-term disability

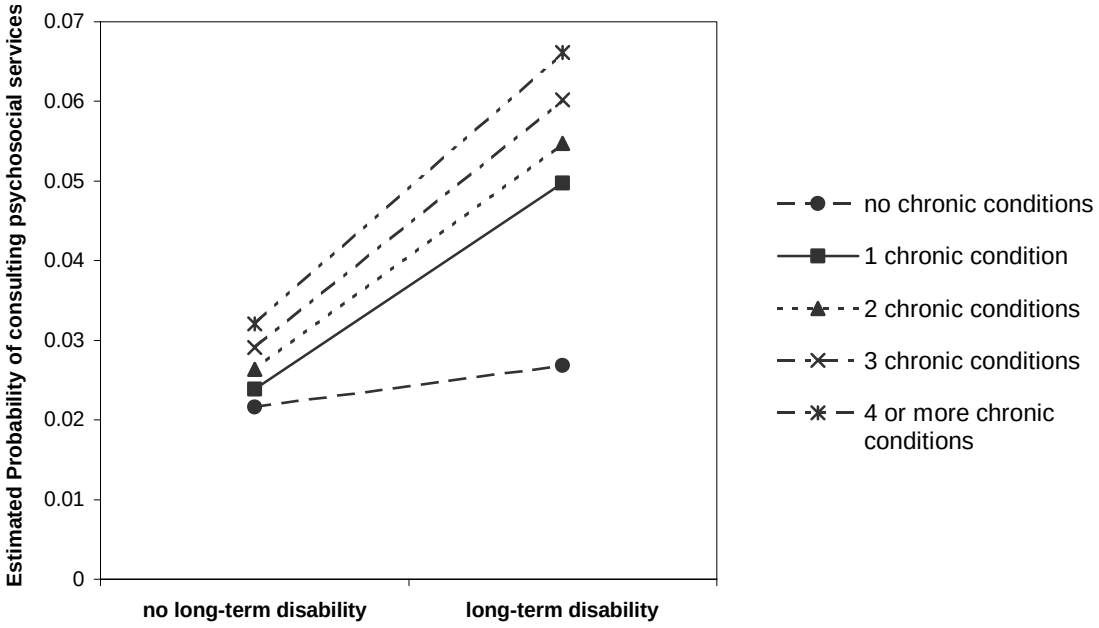


Figure 3: Estimated probability of consulting a rehabilitation therapist by age and education level

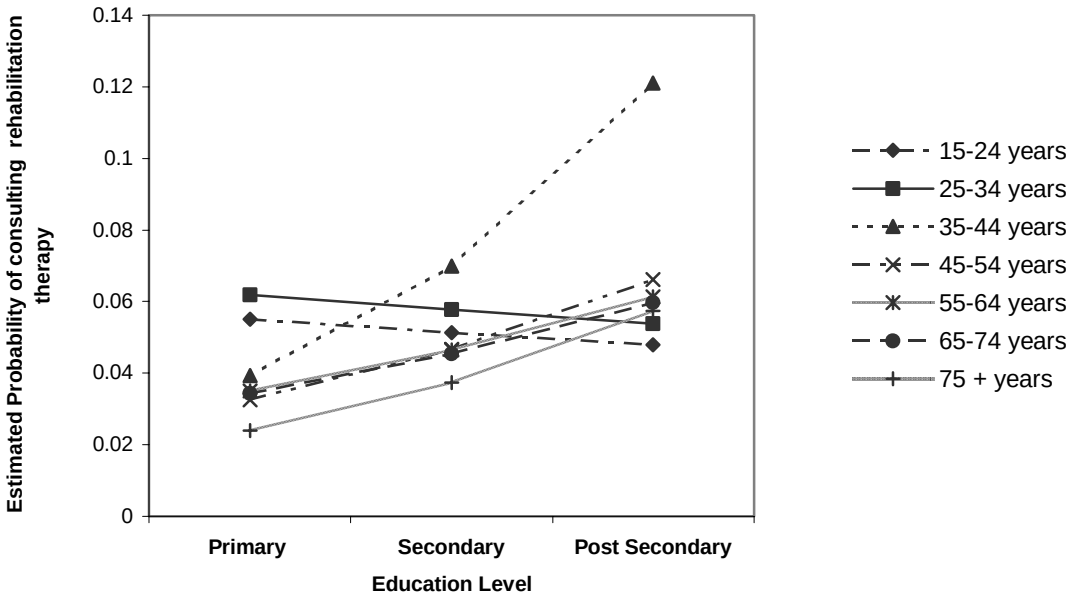


Figure 4: Estimated probability of consulting a chiropractor by the number of chronic conditions and by the presence of two-week disability

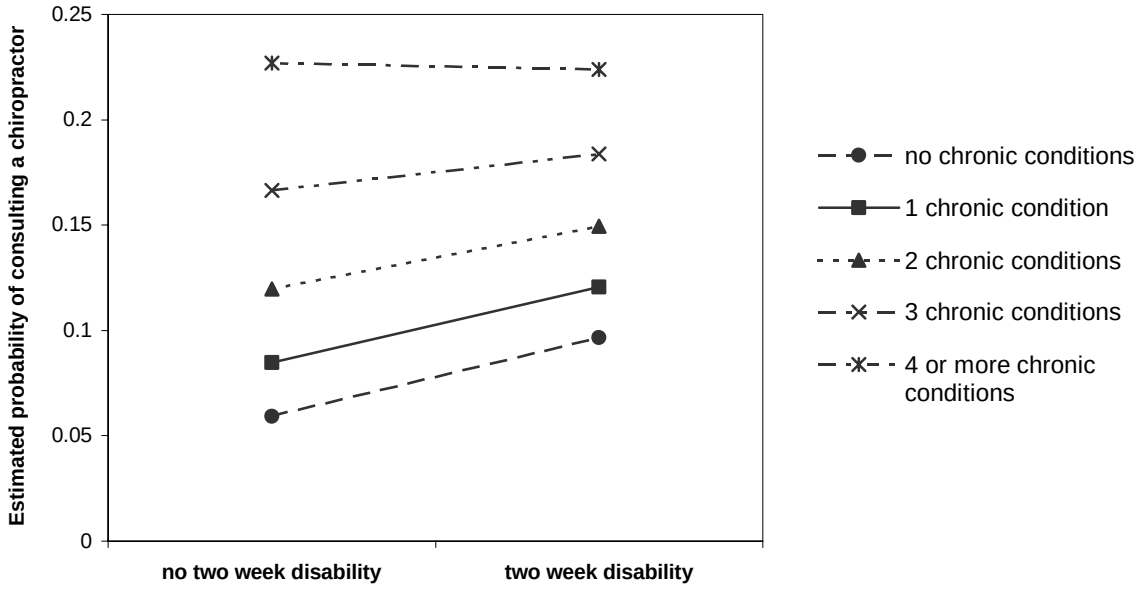
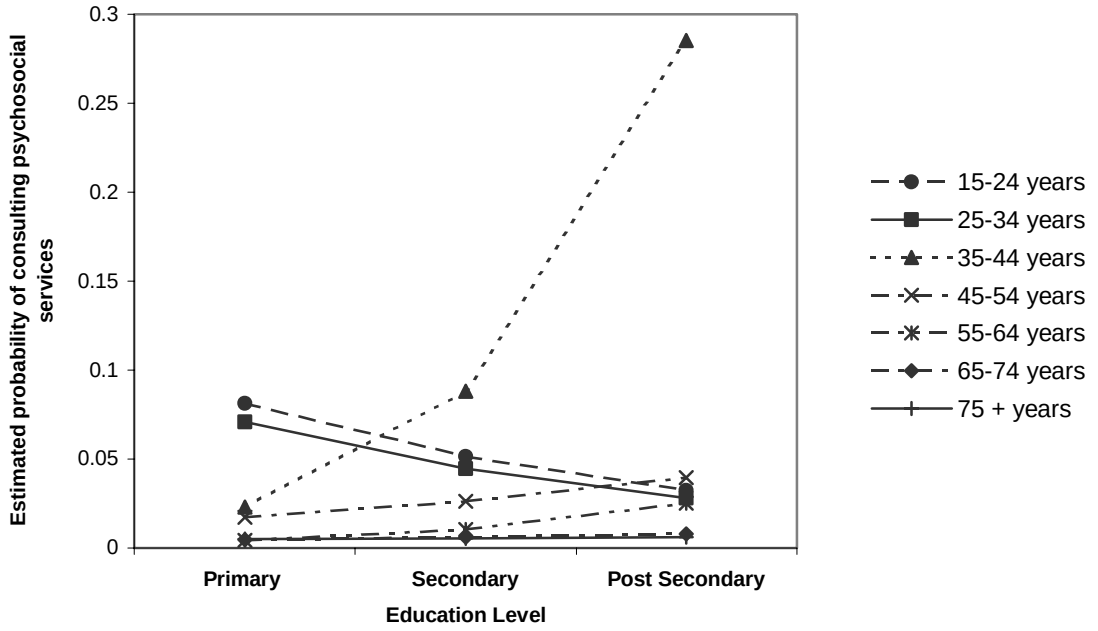


Figure 5: Estimated probability of consulting a psychosocial services by age and education level



APPENDIX 2: TECHNICAL REPORT

Weighting in the 1996-97 OHS

To control for the geographical clustering of respondents, numerical weights were assigned to each case within the 1996-97 OHS. Weights were not identical for all persons in the sample. The variable WT66_S, computed by Statistics Canada, contains a weighting factor that represents the reciprocal of the individual's probability of being selected for surveying. A person from a dense urban centre is thus weighted more heavily than one from a sparse rural environment, allowing the former to proportionately represent more persons in the reference population. By applying weights when performing statistical analyses, the extreme variability in population densities across the province is somewhat accounted for, and a more accurate rendering of the provincial profile rendered.

For multivariate analyses, the scalar weights were further scaled by dividing through by the arithmetic mean of all the weights in the total sample. This allowed for a degree of improved variance without which all findings would appear to be extremely statistically significant. This approach was pursued because of its recommendation by Statistics Canada in the OHS documentation.

Moreover, due to issues relating to the independence of cases within each sampling frame, it is advised by Statistics Canada that a "boot-strapping" procedure be implemented to impute greater variance within the sample, and hence provide a more statistically conservative interpretation of putatively significant effects. Since the "boot-strapping" procedure was not applied to the calculations presented in this report, confidence intervals were widened to 99% rather than the traditional 95%. It is generally agreed that this allows for a degree of statistical conservatism comparable to that provided by the "boot-strapping" procedure.

Interpretation of Odds Ratios

In classical epidemiology, the odds ratio compares odds of exposure in diseased individuals with odds of exposure in disease-free individuals. The odds ratio is roughly equivalent to the risk ratio used in cohort studies for rare diseases. Some authors use the alternate term, "estimated relative risk". Although it is not a true measure of risk, the odds ratio will approximate relative risk as disease incidence approaches zero. An odds ratio for a predictor is a measure of the relative effect of that predictor on a binary outcome. An advantage of the odds ratio is that it is relatively constant across different types of patients. The same is not true of risk ratios or risk differences; these depend on the level of risk in the reference group.

It is generally held that an odds ratio of 2.0 or greater is an important finding, implying that the presence of the predictor doubles an individual's chances of the outcome (compared to the absence of the same predictor). "Adjusted" odds ratios in multivariate analyses, such as logistic regressions, imply that the presence of competing influences, confounders and predictors have been controlled or held constant so that the variable of interest may be examined in isolation.

If the odds ratio equals unity, or if its associated confidence interval includes unity, the interpretation is that the presence or absence of the predictor variable has no effect on the outcome of interest.