
# ARTHRITIS COMMUNITY RESEARCH & EVALUATION UNIT (ACREU)

# Comparison of the patterns of health care utilization by the general population, and by people with arthritis or rheumatism, or other chronic conditions: an analysis of the 1996/97 Ontario Health Survey

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*Prepared by:*

Elizabeth M. Badley*
Naomi M. Kasman
Raywat Deonandan
Eleanor Boyle

*with contributions from*

Anne Marie Parkinson

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*Address for correspondence:

UHN/PMH
610 University Avenue
16th Floor, Room 16-706
Toronto, Ontario
M5G 2M9
Tel: (416) 946-2924
Fax: (416) 946-2291
badley@uhnres.utoronto.ca

University Health Network
Toronto General Hospital | Toronto Western Hospital | Princess Margaret Hospital

THE ARTHRITIS SOCIETY

*In partnership with*
*The Arthritis Society, Ontario Division*
*& in affiliation with*
*The University of Toronto*

*University of Toronto*

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**ACREU Working Paper 2001-01.** Comparison of the patterns of health care utilization by the general population, and by people with arthritis and rheumatism or other chronic conditions: an analysis of the 1996/97 Ontario Health Survey.

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# EXECUTIVE SUMMARY

- This is one of two reports prepared by the Arthritis Community Research and Evaluation Unit (ACREU) which begins to address the recommendation of the Ministry of Health and Long Term Care Arthritis Strategy Working Group related to the importance of identifying geographic, gender, age, and socioeconomic barriers to arthritis services and professionals across Ontario. Arthritis is a major cause of morbidity, disability and health care utilization in Ontario. With the aging of the baby boomer population, current estimates suggest that the number of people with arthritis will more than double by the year 2020.

- Data from the 1996/97 Ontario Health Survey (OHS) were analyzed with the following objectives in mind:
  1. To measure both the prevalence of arthritis or rheumatism and the rates of utilization of certain health care services by people reporting those conditions.
  2. To identify factors that are associated with the utilization of certain health care services by people reporting arthritis and rheumatism.
  3. To explore barriers to accessing health care services, as perceived by the residents of Ontario.

- Patterns of health care utilization with six types of provider were examined for the general population, individuals reporting arthritis or rheumatism, and individuals reporting other chronic conditions. The six types of providers were general practitioners, specialists, physical or occupational therapists (PT/OT), chiropractors, psychosocial service providers (psychologists or social workers), and alternative health care providers. Variations in utilization were explored in terms of predisposing factors (age, gender, smoking, region, and visiting an alternative health care provider), enabling factors (income, education), and need factors (chronic conditions, two-week disability, long-term disability, pain and self-rated health). Barriers to accessing health care services were addressed by the analysis of a survey question which asked respondents if there was ever a time when health care was not received when required, and, if yes, what the reason was for that lack of care.

- Prevalence and utilization rates were examined both universally across the province by District Health Council (DHC) region. Univariate and multiple logistic regression analyses were carried out to examine predictors of utilization.

- Overall, 15% of Ontarians aged 15 years and older reported that they had arthritis or rheumatism as a long term health condition diagnosed by a health professional; 45% of the population reported that they had at least one other chronic condition.

- The prevalence of arthritis increased steeply with age, whereas the overall prevalence of other chronic conditions did not vary much with age. More women than men reported experiencing arthritis; this was not the case for other chronic conditions. Both arthritis and other chronic conditions were reported less frequently with increasing levels of educational attainment and income.

- Independent predictors of reporting arthritis or rheumatism from multiple logistic regression were: increasing age, being overweight, being female, having low income, being a daily or former smoker, or having reported Native ancestry.

- The regional variation in self-reported arthritis prevalence ranged from 11.4% of the adult population in Peel/Halton to 20.4% in Niagara. The three regions which showed the highest rates of arthritis were Niagara, Lanark/Leeds/Grenville/Hastings/ Frontenac/Prince Edward/Lennox/Addington and Algoma/Cochrane/Manitoulin/Sudbury.

- There was a moderate negative correlation between the prevalence of arthritis and that of any other chronic condition across all sixteen regions.

**Utilization of Services**

- Over 90% of people with arthritis reported having seen a general practitioner (GP) in the past 12 months (compared to 78% of those with another chronic condition).

- More than 39% of the respondents with arthritis reported having seen a specialist in the past 12 months (compared to 20% of those with another chronic condition). Multiple logistic regression analyses showed a significant association with having seen a specialist with being aged 65 years of age or older, being female, having a high education, a high income, having arthritis, other chronic conditions, back pain, disability, poor self-rated health, not smoking, and having consulted alternative health care providers.

- 13% of people with arthritis (compared to 6% of people with any other chronic condition) saw a physical or occupational therapist (PT/OT) sometime in the past 12 months. The proportion of people with arthritis who saw a PT/OT increased with increasing levels of educational attainment. In the general population, having a high income, reporting disability or pain, having arthritis or other chronic conditions and having visited

alternative health care providers were associated with having visited a PT/OT

- 13% of people with arthritis saw a chiropractor (compared to 8% of those with another chronic condition). Visit patterns for chiropractic services were similar for people with arthritis and other chronic conditions. In the general population, having arthritis was not associated with an increased chance of visiting a chiropractor. The only factors which were associated with chiropractor visits for people with arthritis were whether the respondent had visited alternative health care providers and whether the respondent was experiencing pain.

- 5% of people with arthritis visited a psychosocial service provider in the past 12 months (compared to 3% of those with another chronic condition). With the exception of elderly men, people with arthritis in all age groups and both sexes reported a greater likelihood of visiting a psychologist or social worker than did people with other chronic conditions.

- 7% of people with arthritis visited an alternative health care provider in the past 12 months (compared to 5% of those with another chronic condition). A higher proportion of men and women aged 15-44 with arthritis sought alternative care than did people with other chronic conditions, while the overall proportion of visits was highest in this age group. Higher education, higher income and being female were associated with a greater probability of visiting an alternative provider; this was particularly marked for people with arthritis. Being 65 and over decreased the chance of visiting an alternative health care provider (but advanced age was generally associated with an increase in the rate of health care utilization of other types of practitioners).

- 10.3% of people with arthritis reported that health care was not received when required (compared to 6.9% of those with another chronic condition). In every region of the province, the proportion of "dissatisfied" people was higher for those with arthritis than for those with other chronic conditions. Residents of the regions of Thunder Bay/ Kenora/Rainy River, Brant/Haldimand/Norfolk and Algoma/Cochrane/Manitoulin/ Sudbury were the most likely to report that health care was not received when needed. People reporting that health care was not received when required were also more likely to be younger, of lower income and higher education. Having disability, pain and poor self-reported health were all independently associated with feeling that health care was not received when needed. People who felt that needed care was not received were more likely to have consulted an alternative health care provider. People with arthritis or rheumatism were more likely to select as reasons for health care not having been received, "Not available in area" and "Felt would be inadequate" than were people with other chronic conditions.

- From this report we find that people with arthritis or rheumatism use the services of all health care providers, including general practitioners and specialists, more frequently than do people with other chronic conditions. Having visited health care providers was generally associated with having disability and pain, and with higher socio-economic status, although there were no overall patterns across provider types with respect to age and gender. People with arthritis were are also more likely to feel that they had not received health care services when such were required. This was particularly true for those with disability, low education, low income, and for those living in rural regions.

# 1.0 INTRODUCTION

## 1.1 Background

This report is one of two reports based on research carried out as part of a partnership between the Arthritis Community Research and Evaluation Unit (ACREU) and the Ministry of Health and Long Term Care (MOHLTC) Population Health Unit with the goal of identifying variations in the use of care for arthritis and related conditions, what services are being accessed by whom, and factors that contribute to access and non-access.

Work on this theme builds upon the *ICES Practice Atlas, Patterns of Health Care in Ontario: Arthritis and Related Conditions*[1], which was published in September, 1998. The Atlas highlighted substantial variation in both the availability and use of services for people with arthritis in Ontario. As a result of the publication of the Atlas, the MOHLTC formed an Arthritis Strategy Working Group (ASAG). This group reported to the Minister in early 2000. Their first recommendation related to the importance of identifying geographic, gender, age and socio-economic barriers to arthritis services and professionals across Ontario. The present report and its companion document (ACREU Report 2001-02) provide further background information relevant to this recommendation. These reports are important because arthritis is currently one of the most prevalent chronic conditions in Canada. With the aging of the baby boomer population, large increases in the number of people with arthritis and related disability are expected, with a doubling of numbers by 2020[2]. According to the 1996 Ontario Health Survey (OHS), in this province approximately 860,000 women and 460,000 men reported arthritis as a long-term health problem that had been diagnosed by a health professional[2]. Arthritis is so common that it is often dismissed as a normal aspect of aging, even though interventions have proven to be effective in controlling the condition's progress and severity. The prevalence of arthritis increases markedly with age, and is higher in those of lower socio-economic status (SES)[2].

Although there is currently no cure for arthritis, there are numerous health care

interventions that have been shown to be effective in managing the condition, including prescription medications, surgery, and rehabilitation services, all of which require visits to a health care professional. Exploring the patterns of utilization of these services is therefore a pertinent exercise. In this context, it is also important to take note of the roles of demographic (e.g. SES, gender and ethnicity), behavioural and need-related variables such as pain and disability. Such variables have been implicated as factors that affect the use of health care services by both the population in general and by people with arthritis[2,3,4,5].

## 1.2 Factors affecting health care utilization

*Effect of Socio-economic status.*

American studies have shown that health care utilization by people with arthritis is strongly influenced by the individual's socio-economic characteristics[2]. While Canada's universal health care system may limit the relevance of this finding, socio-economic and related factors may influence Canadian patterns of utilization in more subtle ways. Indeed, although financial barriers may not directly impede access to health care services in Canada, differential use of physician services with respect to socio-economic status persists[2].

Socio-economic status is often estimated by measures of education and income. According to one Canadian study, individuals with higher levels of education are more likely to access both general practitioner (GP) and specialist services[4]. Since most visits to specialists require referral by a GP, the cited study suggests that higher education is likely also associated with an increased rate of referral.

Education may also be highly correlated with other socio-economic factors that confound its association with service utilization. For example, individuals with more years of education may have different types of jobs or higher incomes that allow them better access to health care services. Their jobs may be less physically demanding or have more flexible hours. As well, individuals who are more educated might be better able to negotiate for medical care and to seek out more information about their condition

and potential treatments. In short, higher education may allow an individual to take part in his or her treatment, possibly an important consideration for achieving optimal care.

Moreover, studies have confirmed that people with rheumatoid arthritis (RA) who have fewer years of formal education have higher rates of mortality and morbidity[6] than do their more educated counterparts. Therefore, one might expect that those with lower educational attainment would require more health services.

The role of the other primary determinant of SES, income, is equally important. The association between income and health status has long been recognized, with lower income associated with poorer health status and higher utilization rates of most kinds of health care services (including hospital admissions and contact with physicians); this relationship persists despite the implementation of a supposedly universal health care system in Canada[2,4].

Furthermore, lower household income has been found to be negatively associated with reporting a mobility/agility disability[2]. With the most common cause of mobility-agility disability being arthritis/rheumatism (according to both the 1991 and 1996 Health and Activity Limitation Surveys), income level can be shown to be related to a wide variety of characteristics of individuals with arthritis. Indeed, both low income and low education have been shown to be associated with an increased risk of arthritis disability[7].

Education and income, as dimensions of SES, occupy an interesting role in health services research. As predictors of morbidity and service usage, they are predisposing characteristics which are associated with –and may indeed influence– a variety of morbidity and service utilization outcomes. As well, since they relate to individuals' personal resources, they can be considered enabling factors which can modulate access to services. Hence, measures of SES are critical for assessing the extent and plasticity of barriers to needed care.

*Gender & Ethnicity*

The role of gender in health care utilization is certainly an important one. It has been consistently shown that women use more health care services than do men[8]. As

arthritis affects women almost twice as often as men[3], gender is a variable that cannot be overlooked in a study of health care service use by individuals with arthritis.

Equally complex is the relationship between ethnic and/or racial differences and both health status and health service utilization. Racial and ethnic groups that experience worse health generally also have lower socio-economic status. This may be the primary underlying cause of ethnic differences in health and, in particular, ethno-racial differences in functioning with a chronic condition[2].

*Location*

Whether people with arthritis are able to access health care services can also be affected by residential location[9]. Rural residents often have farther to travel and longer waiting times for health care than do their urban counterparts. Whether one lives in an urban or rural environment is further associated with other personal factors including education and income. Area of residence should not, therefore, be looked at independently of such factors. It is also possible that the prevalence of disease might vary by location. Therefore, an investigation of the role of geographic variation needs to take into account both estimates of disease prevalence (which are perhaps proxy measurements of service need) and estimates of service utilization rates by region. Such analyses have implications for policy, as the regional distribution of health resources continues to be a prime issue for health service planners.

A comprehensive investigation of factors associated with the use of health care services by individuals with arthritis is therefore required, as is a broad exploration of the degree of access to services reported by such people.

### 1.3 Specific study objectives

The three major objectives of the present study were:

A. To measure both the prevalence of arthritis and rheumatism and the rates of utilization of certain health care services by people reporting those conditions.

B. To identify factors that are associated with the utilization of certain health care services by people reporting arthritis and rheumatism.

C. To explore barriers to accessing health care services, as perceived by the residents of Ontario.

The objectives were addressed largely by the examination of patterns of health care service utilization by three user groups: the general population, individuals with chronic conditions that did not include arthritis or rheumatism, and individuals with arthritis or rheumatism.

Health service use was stratified by a variety of predisposing (e.g., age and gender), enabling (e.g., area of residence, education and income) and need factors (e.g., self-rated health, disability and pain) to identify the characteristics of those who used services and of those who felt that services were not available or accessible. This categorization is in line with the model developed by Andersen[10] which postulates that the use of medical care is postulated to be determined by factors categorized under the broad headings of predisposing, need, enabling, and illness response factors.

The six specific types of services whose utilization patterns were explored were: medical services, in terms of general practitioners (GPs) and specialists, and other health professional services which were categorized as physical or occupational therapists (PT/OT), chiropractors, or psychologists or social workers (hereafter called psychosocial services). The final category examined was that of alternative health care providers.

## 2.0 METHODS

### 2.1 Overview

Data from the 1996/97 Ontario Health Survey were analysed to determine trends in service utilization by individuals who reported having either arthritis and rheumatism or other chronic conditions.

Firstly, descriptive statistics were employed to explore prevalence rates of each examined condition and rates of service utilization with respect to major demographic, behavioural and other variables.

Secondly, visit rates for each of the six provider type were explored for selected district health council planning regions within the province, both crudely and adjusted for population densities. Our measure of "utilization" was therefore the rates of visiting for each provider type. Some regions were pooled because sample sizes for individual regions precluded the reporting of data.

Thirdly, logistic regression analyses were performed, modelling a host of demographic and other variables against the dichotomous outcomes of utilization of each service type, specifically whether the respondent had visited the provider in question at least once during the 12-month period immediately prior to being surveyed. Similar descriptive and multivariate methods were applied to address the question of whether health services received were thought to be inadequate when needed.

In addition, correlation statistics were employed to explore trends in service utilization and disease prevalence across regions in Ontario.

### 2.2 Data sources

The data for this report were obtained from the Ontario Health Survey (OHS) conducted in 1996/97. The survey targeted all household residents of Ontario using a stratified random sampling design to permit representation from all parts of the province. People without telephones, or those living on Indian Reserves, in Canadian Forces Bases, or in institutions or collective dwellings, were not included.

Population density values were calculated from the Statistical Profile of Canadian Communities, based on Statistics Canada's 1996 Census.

### 2.3 Sampling and data collection methods

The OHS 96/97 takes a cross-sectional look at Ontario residents who were interviewed between October 1996 and August 1997. The Ontario Ministry of Health commissioned Statistics Canada to interview an augmented sample of Ontario residents as part of the 1996/97 National Population Health Survey (NPHS).

The NPHS used a stratified two-stage cluster design. In stage one, separate geographic and/or socio-economic strata were formed in each province, and then six independent clusters were drawn from each stratum. In stage two, dwelling lists were prepared for each cluster, and dwellings were selected from those lists.

The data were collected from respondents in two phases. The first phase was the household component where information about all household members was obtained from one knowledgeable member at the time of the home recruitment visit, or over the telephone if the person was unable to complete the interview at the time of the visit. The questions pertained to demographic factors, health status, chronic health problems, disability, and health care utilization for all members of the household. In the second phase, one selected respondent (a member of the household aged 12 or older) was randomly selected for a more detailed interview. Questions in this latter part pertained to health status, health behaviours, risk factors, life events, stress, and psychological concerns.

More detailed information of the methodology of the 1996/97 OHS can be found in its original documentation[11]. Additional methodological insight may be obtained from examining references[12] to the 1990 OHS whose methodology closely resembles that of the 1996/97 version.

The household response rate at the national level was 82.6%, and 78.8% at the Ontario level. The response rate for selected persons was 95.6% at the Canada level and 94.4% at the Ontario level. The analyses for this report focus on the 35,665 Ontario

respondents aged 15 or older.

Please see the Technical Appendix for information on the weighting methodology and sample size-based data release guidelines.

### 2.4 Variables used in these analyses

Table 1 describes the variables from the OHS that were used to address our objectives. Please note in Table 1 that, for convenience, lengthy names of DHC (District Health Council) regions have been shortened to single word abbreviations which are used throughout the remainder of this report. For clarity, and in accordance with the model proposed by Andersen[10], all of the examined variables have been categorized as "predisposing", "enabling", or as being related to "need".

Andersen's final category of "illness response" was not explored in this study due to data limitations. The categorization, titled "health service utilization", was used to describe the role of variables used as outcome measures. All of the former categories contribute to service utilization and serve as predictive factors with respect to the multivariate logistic regression analyses that were performed.

### 2.5 Statistical analyses

Data were analysed using the statistical package SAS, version 4.0.1381, release 7.00. Scalar weights were applied to the results for each respondent, as recommended by Statistics Canada, to give estimates representative of the total population. For an explanation of the estimation using weighting, please see the Technical Appendix.

It is important to note that due to the manner in which the questions were phrased in the OHS, the reporting of various outcomes, including the utilization of health services, cannot be attributed to any specific health condition(s). For example, subjects were asked the number of times they had visited a specialist in the past twelve months, but not the reason for these visits. The cross-sectional nature of the OHS dataset further prevents the drawing of explicit causal conclusions. However, associations between variables can be determined, measured, and examined, and comparisons made between

people with arthritis and those reporting other chronic health conditions.

Descriptive analyses were performed to explore the nature of the population, the population density, and the prevalence of chronic conditions (including for arthritis or rheumatism) for each of the 16 health regions across Ontario. The utilization rates for various health services were determined for all regions, for the general population for those with arthritis or rheumatism versus those with other chronic conditions.

Multiple logistic regression analyses were used to examine the associations between outcomes (health care utilization and perceptions about whether care was received when required) and possible predictive factors (predisposing, need and enabling variables); outcome variables that were ordinal or continuous were re-coded as dichotomous for modelling purposes. Odds ratios were calculated and represent the extent to which a predictor increases (or decreases) the chances of experiencing the outcome, independently of other predictors. An odds ratio of 1.0 indicates no relationship between the predictor and the outcome, an odds ratio significantly higher than 1.0 (i.e., when the 99% confidence interval does not include unity) indicates an increased chance of experiencing the outcome, and an odds ratio less than 1.0 indicates a decreased chance.

The question of whether care was not received when required was further investigated by considering respondents' reasons for lack of care. A simple distribution of responses was computed and presented graphically.

The variable coding for whether an alternative health care provider was visited was used as both an outcome for one analysis, and as a potential predictor for the remaining multivariate analyses. The same set of covariates were modelled for each outcome investigated, with variations in coding and categorization detailed in Table 1.

Lastly, correlation statistics were computed to compare utilization rates with disease prevalence rates and regional population sizes across various regions.

## 3.0 RESULTS

### 3.1 Prevalence of arthritis or rheumatism and other chronic conditions

Figures 1 (a-d) show the patterns of prevalence of arthritis or rheumatism and other chronic conditions, broken down sequentially by age, sex, income and education. Overall, 15% of Ontarians aged 15 years or older reported that they had arthritis or rheumatism as a long term health condition diagnosed by a health professional. In addition, a further 45% of the population reported that they had one other chronic condition.

The general trends found were:

a) The prevalence of arthritis increased steeply with age. The overall prevalence of other chronic conditions did not vary much with age

b) Women experienced arthritis more than did men; this was not the case for other chronic conditions.

c) Both arthritis and other chronic conditions were reported less frequently with increasing levels of educational attainment, though the gradient was steeper for arthritis.

d) Similar trends were seen for income: lower prevalences of both arthritis and other chronic conditions were associated with high income.

The 1996 OHS divides Ontario into 16 district health council (DHC) planning regions and, alternatively, into 22 public health regions; the former breakdown was used for the majority of analyses. (As mentioned, the single word abbreviations listed in Table 1 are used in place of full DHC names throughout this report). Figure 2 shows the prevalence of arthritis and of other chronic conditions in the 16 DHC regions. There was a considerable amount of regional variation. Previous work has found regional variation even after differences in the age and sex distributions of the populations were taken into consideration[13].

In the present study, the prevalence of self-reported arthritis or rheumatism ranged from 11.4% in Peel to 20.4% in Niagara. The three regions which show the highest rates of arthritis were Niagara, Lanark and Algoma. In comparison, prevalence rates for other chronic conditions were universally very high, ranging from 39.0% to 46.8% of the population of each region. Like arthritis, there was some variation in rates across the province.

There was a moderate though negative correlation between the prevalence of arthritis and that of any other chronic condition across all sixteen regions (Spearman's rho= -0.52, p=0.06).

Multiple logistic regression analyses were carried out to estimate the independent contribution of a variety of factors to prevalence of arthritis or rheumatism (Table 2). Increasing age and being of female gender were associated with a higher probability of reporting arthritis or rheumatism, as was being overweight (body mass index of >25). People who had low income were more likely to report arthritis. The odds ratio for the association between education level and reporting arthritis was not significant. Daily and former smokers were significantly more likely to report arthritis, although there was no such association with the consumption of alcohol.

Lastly, people who reported their ethnicity as black or Asian were significantly less likely to report arthritis, while people who reported that they were of Native origin were significantly more likely than whites to do so.

When region was added into the regression (using the data from the 22 public health units in the OHS data file), the overall sizes of the odds ratios were not much altered, indicating that variations in prevalence were not much affected by regional variations in demographic and behavioural variables (Table 2). Significant odds ratios were found for three regions --Niagara, Essex and Manitoulin-- although, for the former two, the lower bound of the confidence interval was only slightly higher than unity, implying that the observed statistical significance was marginal at best.

## 3.2 Utilization of health services

The following section summarizes patterns of utilization of health services and makes comparisons between those with arthritis or rheumatism and those with chronic conditions other than arthritis or rheumatism.

### 3.2.1 Visits to doctors

*GP Visits*

Over 90% of people with arthritis and 78% of people with other chronic conditions reported seeing a GP in the previous year. With respect to both men and women under age 65, a higher proportion of those with arthritis reported visiting a GP than did those with other chronic conditions (Figure 3a). Of those aged 65+ visiting a GP, the proportions were similar for those with and without arthritis. The proportion of respondents with arthritis aged 15-64 reporting visiting a GP was higher than for people with other chronic conditions in all education and income groups (Figures 3b and 3c).

Among the general population, controlling for the predisposing factors of age, gender and smoking, and the enabling factors of education attainment and income, people with arthritis were more likely to visit a general practitioner (OR=2.27) when compared to people with no reported health conditions, even more so than those with any other chronic condition (OR=1.84) (Table 3). The presence of back pain did not significantly affect the odds of visiting with a general practitioner. Other need factors in the general population which were independently related to having visited a GP or specialist in the previous year were reporting long term disability, two week disability, pain, and poor self-rated health. In a stratified analysis of respondents with arthritis, two-week disability was the only need factor found to be associated with visiting a GP.

*Specialist Visits*

Overall, more than 39% of the respondents with arthritis reported having seen a specialist in the previous year, compared with 20% of respondents with other chronic conditions. Similar to the pattern for GP visits, a higher proportion of respondents with

arthritis made visits to a specialist, particularly those under 65 (Figure 4a). Men with arthritis were more likely to see a specialist as they aged than were men with other chronic conditions. In contrast, women reporting arthritis were less likely to do so with advancing age. For women with other chronic conditions, there did not seem to be an age-related trend.

Overall, there was a tendency for a higher proportion of respondents with greater than secondary education to report visiting a specialist (Figure 4c). The pattern with income was opposite for those aged under and over 65 years, so the proportion visiting specialists increased with increasing income for those over 65, with the opposite trend for the younger respondents (Figure 4b).

Among the general population, being aged 65+, being female, having a high education, a high income, not smoking, and having consulted alternative health care providers were associated with visiting a specialist (Table 3). Positive associations with having seen a specialist were also found for having arthritis, other chronic conditions or back pain. The need factors of long-term and two-week disability and poor self-rated health were also associated, for those in the general population, with having visited a specialist. This was true as well as for respondents with arthritis and other chronic conditions, suggesting that it is indeed the more severely affected individuals who are referred to specialists.

### 3.2.2 Visits to other health professionals

*PT/OT Visits*

Overall, 13% of people with arthritis and 6% of people with other chronic conditions reported physiotherapy or occupational therapy visits. People who reported arthritis showed a dramatically greater proportion visiting a provider than did those reporting other chronic conditions (Figure 5a). This difference was greatest among younger adults and among women.

The proportion of people with arthritis who made physical or occupational therapy visits increased with increasing levels of educational attainment (Figure 5c). In

the youngest age group, there was a higher proportion of visits among those with low income (Figure 5b). The opposite was true for the oldest age group (65+).

In the general population, having a high income and having visited alternative health care providers were associated with having visited a PT/OT (Table 4). The odds of visiting were also significantly increased for respondents with arthritis and other chronic conditions. As might be expected, the need factors of reporting long- or short-term disability or pain were associated with having seen these providers. In addition, for people with arthritis, there was a significant association between having visited a PT/OT and having a high education.

*Chiropractor Visits*

Visits to a chiropractor in the previous year were reported by 13% of respondents with arthritis and 8% of respondents with other chronic conditions. Visit patterns for chiropractic services were similar for people with arthritis and those with other chronic conditions (Figures 6a-6c). The proportion of men reporting visiting a chiropractor declined with age, whereas the proportion was highest for women in the 45-64 year age groups. For those aged under 65, there was a relationship between having seen a chiropractor and both increasing educational attainment and increasing household income. There was no discernable pattern with SES for those aged 65 years and older.

Overall, the enabling factor of having a high household income was associated with increased odds of having visited a chiropractor (Table 4). For all respondents in the general population, having other chronic conditions or back pain was associated with seeing a chiropractor. In a stratified analysis, the only factors which were associated with chiropractor visits for people with arthritis were whether the respondent had visited alternative health care providers and whether the respondent was experiencing pain.

*Psychosocial Visits*

Overall, 5% of people with arthritis and 3% of people with other chronic conditions reported visiting a psychologist or social worker. The proportion decreased

with increasing age, and was highest for young women (Figure 7). With the exception of elderly men, people with arthritis in all age groups and both sexes report a greater likelihood of visiting a psychologist or social worker than did people with other chronic conditions. The survey sample was not large enough to permit reliable reporting of estimates broken down by age and SES.

### 3.2.3 Visits to alternative health care providers

Overall, 7% of people with arthritis and 5% of people with other chronic conditions reported seeing alternative care providers. A higher proportion of women 15-64 years of age reported visiting alternative health providers than comparably aged men, regardless of whether their health status was characterized as having arthritis or some other chronic condition (Figure 8a). A higher proportion of men and women aged 15-44 with arthritis sought alternative care than did people with other chronic conditions. A smaller proportion of people aged 65 years and older visited alternative care providers

Among adults younger than 65, the pattern of seeking of alternative therapies shows a similar SES relationship to that of seeking chiropractic care. Higher education and higher income were associated with a greater probability of visiting (Figure 8b, 8c). This was particularly marked for people with arthritis in the highest education and income groups.

Logistic regression analyses were carried out to identify the factors independently associated with visiting alternative health care providers. Many of the odds ratios for visiting an alternative health care provider differ from those of the other health care providers. As an example, being 65 and over decreased the chance of visiting an alternative health care worker, while advanced age was generally associated with an increase in the rate of health care utilization of other types of practitioners (Table 5). Females were consistently more likely to turn to alternative health care than men, as were people with high education and high income, while smoking generally decreased this likelihood.

Having arthritis or rheumatism increased the likelihood of using alternative health

care (OR=1.69), as did having another chronic condition, with a lower but still significant odds ratio of 1.58. Having back pain greatly increased the probability of having visited an alternative medicine provider. Experiencing pain was the only need factor which was positively associated with alternative health care utilization among those who reported arthritis or rheumatism.

### 3.2.4 Relationships Between Population, Population Density, and Disease Prevalence

There are a range of factors which potentially influence access to health care services. Geographical factors such as proximity to relevant services is one such factor. Our data on services for people with arthritis show that such services are mainly concentrated in urban centres[14]. We used size of regional populations and population density to represent proximity to services. According to these data, the adult populations (age 15 and over) of the health regions within Ontario range from 175,792 in Brant to 1,980,636 in Toronto. (A complete list of the regions is provided in Table 1.) Toronto also reports the highest population density across Ontario at 3785.8-people/$km^2$, while Thunder Bay has the lowest at only 0.39-people/$km^2$. The distribution of population size and density across the regions of Ontario is shown in Figure 9. Omitting Toronto, which has a population size and density several fold larger than other health regions, the correlation between population size and density was modest at r=0.56. Therefore, both population and density were included in several of our analyses since the modest correlation level implies that there may be different relationships between service use and each of these two variables.

*Visit Rates by Region*

There was considerable regional variation in the proportions both of respondents with arthritis and those with other chronic conditions who reported visiting health care providers. In each region of the province, a higher proportion people with arthritis or rheumatism reported visiting GPs, specialists and physical or occupation therapists than did people with other chronic conditions (Figures 10 to 13). The relative proportions

visiting chiropractors varied considerably by region (Figure 16). In some regions, the proportion was higher for arthritis, and for others (mainly in the west and north of the province) the proportion was higher for other chronic conditions. Similar variations were found for the proportion of people seeing alternative health care providers (Figure 14).

Overall correlations between the proportions of respondents with arthritis and with other chronic conditions visiting each type of provider by region are shown in Table 6. The correlations (measured via Spearman's Rho) for GP, specialists and PT or OT visits were generally only low (around 0.4) and were not statistically significant, implying that different regional patterns in the proportions visiting, i.e., regions with a high proportion of visits to GPs for arthritis are not necessarily those with a high proportions of visits to GPs for other chronic conditions. The correlations for chiropractor and alternative health care provider visits were statistically significant, suggesting that the underlying trends for visits were similar for both the arthritis group and the group reporting other chronic conditions.

The correlations for the percentage of people with arthritis or rheumatism visiting each type of provider and the prevalence of arthritis over the regions were generally low for GPs, specialists and PT/OT, suggesting that the highest visit rates were not found in the areas of highest prevalence, as might be expected based on need. There was a modest positive correlation (rho=0.59) for visits to chiropractors and prevalence, and a similar negative correlation (rho=-0.55) for alternative health care provider visits. The latter suggests that the highest rate of visits to alternative care providers occurred in areas with the lowest arthritis prevalence.

### 3.3. Health care not received when required

Overall, 10.3% of people with arthritis or rheumatism and 6.9% of people with other chronic conditions felt that health care was needed but not received. In some ways, this can be considered a measurement of dissatisfaction with the quality and/or accessibility of health care services. There was considerable regional variation in the proportion replying affirmatively to the question. In every region of the province, the

proportion of "dissatisfied" people was higher for those with arthritis than for those with other chronic conditions (Figure 15). The areas with the highest percentage in this category were Thunder Bay, Brant and Algoma (Figure 15). There was no significant correlation between the proportion of respondents with arthritis and those with other chronic conditions who answered affirmatively to the question (Spearman's rho -0.03, p=0.92), suggesting that different access and sufficiency factors are operating for people with arthritis than for those with other chronic conditions.

Moreover, differences in the proportions of people reporting having arthritis and other chronic conditions, who reported that health care services were not received when needed, were greatest among younger, lower income and more poorly educated individuals (Figure 16). Females were marginally more likely than males to report dissatisfaction while trends relating to education, age and income were the same for both sexes.

A variety of reasons were provided by respondents as to why health care services were not received when required (Figure 17). The percentage selecting each of the reasons was similar for the two groups of conditions, although people with arthritis or rheumatism were slightly more likely to select the reasons "Not available in area" and "Felt would be inadequate" than were people with other chronic conditions.

As above, a logistic regression analysis was performed for the outcome of whether people felt that health care was not provided when required. Results are available in Table 7. In the general population, people aged 16-44, compared with those 45 years and older, were more likely to feel that health care was not received when required. This variable was also positively associated with having higher education and lower income. People with arthritis were likely to feel that health care was not received when needed (OR=1.91), even more so than those with other chronic conditions (OR=1.63). Back pain did not play a role in this trend. Having long term disability, short term disability, pain and poor self-reported health were all independently associated with feeling that health care was not received when needed. People who felt this way were also more likely to have consulted an alternative health care provider.

Separate analyses for people with arthritis and with other chronic conditions showed generally similar results, although the contribution of having consulted an alternative health care provider was greater among people with other chronic conditions.

## 4.0 DISCUSSION

With an expected increase of 1.8 million cases of arthritis or rheumatism over the next two decades, to a total of almost 5 million people in Canada, there is an urgent need to determine where and to what extent health services for this group are most needed, what specific services are most used by this group and the degree of accessibility of these services.

### 4.1 Prevalence of arthritis and related chronic conditions

The reasons behind Ontario's varying regional rates of arthritis or rheumatism remain unknown. It is possible that regional variations in the distribution of factors known to be associated with arthritis, such as age, ethnicity, prevalence of obesity, etc., could be involved, although our analyses to explore this possibility suggest that this is likely to only be a minor part of the story.

The finding that the prevalence of arthritis and that of other chronic conditions were negatively correlated across the province is an interesting one. Also, the prevalence of arthritis was negatively correlated with population size. The implication is that arthritis is more common in rural areas, whereas other chronic conditions were more prevalent in urban areas. However, the other chronic condition group is very large; its broad definition may conceal a high degree of internal variation with respect to the prevalence of individual chronic conditions.

Prevalence rates examined in this study can be considered a measurement of service need; regions with a greater degree of arthritis morbidity could be expected to require proportionally more services. Our study shows that the prevalence of arthritis in

any region is variably associated with the region's degree of service utilization of doctors and PT/OT professionals.

Only visits to chiropractors were positively correlated with the prevalence of arthritis, although it is likely that this is reflective of chiropractic provision which is relatively higher in rural areas[14]. The variation in prevalence rates as detected in the OHS should be further examined via a more focussed study, ideally taking into account the findings of other studies to examine whether the variations are consistent across time and studies.

### 4.2 Use of health care services by people with arthritis

A goal of this study was to determine what services people with arthritis or rheumatism use across Ontario, and what factors may influence utilization. Rates of visiting specified service providers are a measure of the degree of service utilization. It appears that those with arthritis are more likely to visit a general practitioner or a specialist than are people with other chronic conditions, and twice as likely to do so as people without any chronic conditions. That the results for the two types of providers follow a similar pattern may be reflective of the fact that a referral from a general practitioner is usually required before visiting a specialist.

Just as people with arthritis appear to be more likely than people with other chronic conditions to use the services of a general practitioner or a specialist, they are also more likely to use the services of an occupational or physical therapist, and of an alternative health care provider, although this is not the case for the use of chiropractic services. Research points to the benefit of rehabilitation therapy for people with arthritis[15]. The use of alternative health care providers may point to the generally intractable and long term nature of these conditions.

As noted, the use of chiropractic services by those with arthritis is low. The areas with the highest percentage of chiropractor utilization were among the more rural regions, with the lowest percentage found in Metro Toronto. Chiropractors were also more likely to be seen by those with high income and who rate their health as good. Due

to the cross-sectional nature of the data, it is uncertain whether the higher visit rate is a result of greater chiropractor availability in pertinent regions, or whether such availability is a response to greater demand.

An interesting and unexpected finding from the various logistic regression analyses was the seeming universality of statistical significance of having sought care from an alternative health care provider, with respect to utilizing other health care services. This factor was pertinent for all service types except for GP visiting. One interpretation is that individuals who visit alternative therapists are actively involved in care-seeking behaviours, hence the strong association between having sought alternative therapy and having visited a chiropractor (Table 4). This was particularly true for people with arthritis (OR=4.22). This finding certainly deserves finer scrutiny, with an eye toward a better understanding of the ways in which people with arthritis seek care for their condition.

A major limitation of the data is that, because of the method of questioning used in the 1996 OHS, the reasons for these visits are not known; people with arthritis may make visits to care providers for reasons unrelated to arthritis. Even though causation cannot be shown, a strong association between the prevalence of arthritis or rheumatism and the higher use of specific services (general practitioner and specialists, and physical or occupational therapists) appears consistently, strongly suggesting at least partial causality. This relationship needs to be examined further in subsequent studies, ideally where the reason for the visit can be taken into account.

### 4.3 Factors associated with health care service use

It has already been discussed that the services most commonly used by those with arthritis are services provided by general practitioners and specialists. Hence, it is appropriate to focus on barriers to GP and specialist access when considering the needs of the arthritis population.

The socio-demographic variables that were looked at in this study included gender, age, education and income, and a variety of variables describing the impact of

chronic conditions (such as disability and the reporting of of pain). Just as previous studies have found, women are more likely to use health services than are men, particularly services provided by general practitioners, specialists, and alternative health care providers[17]. Yet, as discussed below, women are also more likely than their male counterparts to feel that health care was not received when required.

However, women with arthritis or rheumatism are no more likely than are men with the same condition to visit a specialist. This suggests a few possibilities. Firstly, once a person develops arthritis, he or she is equally likely, regardless of gender, to visit a specialist. Moreover, it is possible that women with arthritis are under-visiting for their condition, since, as established, women have higher rates of arthritis. It is also possible that, because of their age, many women are no longer visiting specialists for reproductive reasons, so that the gender difference in visit rates is narrowing. Again, this uncertainty can be clarified via further studies in which reasons for visiting can be specified and attributed.

For our analyses, we categorized having a high income and high education as enabling factors with respect to accessing health care services. High education is a factor affecting whether a person with arthritis or rheumatism visits a specialist, PT or OT, or alternative health care provider, although it is not associated with the frequency of GP visits. It may be that people with higher education are better able to identify and access services, or that they have access to more resources, such as jobs with health coverage or flexible work hours, that enable them to take advantages of such services.

The income of people with arthritis appears to only be a factor in the visiting of an alternative health care provider, a service that is often not covered fully by OHIP. Those of higher income tended to seek alternative therapies more than their lower income counterparts did.

The impact of arthritis or rheumatism on individuals is wide ranging and difficult to measure. The variables used in this study as a proxy for degree of disability (or impact) are: long-term disability, two-week disability, poor self-rated health, and severity of pain. It appears that people with severe arthritis or rheumatism, as shown by those

who have both long-term and two-week disability, are more likely to visit either a specialist or an occupational or physiotherapist.

Low socio-economic status can be viewed as predisposing in that the prevalence of arthritis is higher in people of low SES[3]. It can also be viewed as a factor enabling better health care access, as people with high SES have more resources to draw upon to negotiate the health care system. The role of SES and its influence on health care utilization need further exploration to disentangle the extent to which low SES can be viewed as a predisposing or enabling factor being associated with a higher risk of arthritis.

### 4.4 Health care not received when required

The final objective of this study was an exploration of the perceptions of barriers to existing health care services. This was done by examining responses to the question, "During the past 12 months, was there ever a time when you felt that you needed health care but you didn't receive it?".

Those with arthritis were more likely than those with another chronic condition to have answered this question affirmatively. While advanced age and high income decreased the likelihood of this feeling, being female and having high education increased it. This is important because females, particularly those of low income, are more likely to have arthritis.

Having higher income also decreased the chance that people with arthritis felt they weren't receiving needed services. Possible reasons that low-income individuals perceived that they are not receiving services include: difficulty manoeuvring through the health care system, an inability to afford time off work, an inability to afford child care, or lack of transportation. As with all studies based upon self-reported data, a further investigation would help to clarify these findings.

Higher degrees of disability were also associated with the feeling that health care was not received when needed. This suggests that those who are most disabled, and therefore need the most care, are not receiving that care, or at least perceive that they are

not receiving that care.

It appears that people who live in Northern Ontario are most likely to feel that health care services were not received when required, particularly residents of Thunder Bay and Algoma. This is consistent with previous findings in the ICES Practice Atlas for Arthritis and Related Conditions[14] in that these areas of Northern Ontario had some of the lowest levels of practitioner availability in the province. Both of these findings suggest that service provision in Northern Ontario would benefit from a more detailed examination. Regional stratification in this analysis reduced the available statistical power necessary for analyses of finer resolution. It would be useful to explore further the relationship between socio-economic and geographical variables contributing to access to services.

## 5.0 CONCLUSION

From this report we find that people with arthritis or rheumatism use the services of all health care providers, including general practitioners and specialists, more frequently than do people with other chronic conditions. Having visited health care providers was generally associated with having disability and pain, and with higher socio-economic status, although there were no overall patterns across provider types with respect to age and gender. People with arthritis were are also more likely to feel that they had not received health care services when such were required. This was particularly true for those with disability, low education, low income, and for those living in rural regions.

If we wish to be prepared for the expected increase in the number of individuals with arthritis or rheumatism, steps need to be taken now to ensure that services are available across all regions of Ontario, and that those who need such services are able to access them.

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# TABLES

**Table 1: Description of variables that were used in all analyses.**

| Category | Variable | Description | Categorization for Regression Analyses |
|---|---|---|---|
| **Health care utilization** | Health care utilization (per each of 6 provider types) | Visits to provider types were coded positively if the respondent consulted the provider at least once in the 12 month period prior to completing the survey. Provider types were:<br>a. General Practitioners (GPs)<br>b. Specialists<br>c. Occupational or Physical Therapists (OT/PT)<br>d. Chiropractor<br>e. Psychosocial<br>f. Alternative Health Care Provider (also used as covariate in some logistic regressions) | Each type was dichotomized for a logistic outcome |
| **Predisposing** | BMI | Body Mass Index (quotient of body mass over the square of body height) is a gross measure of obesity. | Dichotomized at BMI<25 or ≥25; used only in analyses of Table 2 |
| | Alcohol consumption | The degree of self-reported alcohol consumption | Three categories: presently a non-drinker, an occasional drinker or a regular drinker; used only in analyses of Table 2 |
| | Age | An age variable was created for using three groups: 15-44 years, 45-64 years, and 65 years and over. | Youngest category used as reference for most regression analyses; for Table 2, age treated as continuous and entered in decades |
| | Gender | Gender was a dichotomous variable of male or female. | Male category used as reference |
| | Smoker | The original variable in the survey was collapsed into three categories: never or former smoker, occasional smoker, or daily smoker. | Dichotomous: smoker vs. non-smoker |
| | Ethnicity | Categorical variable collapsed into four self-identified options: White, Black, Asian or Native | Only used in analyses in Table 2; White category used as reference |

**Table 1: Description of variables that were used in all analyses (continued).**

| Category | Variable | Description | Categorization for Regression Analyses |
|---|---|---|---|
| **Predisposing** (continued) | Region | With sample size limitations in mind, Ontario was divided into the following 16 regions based on the District Health Councils formed April 1, 1998 (bolded words are used in the report instead of full DHC names):<br><br><u>East</u><br>1. **Ottawa**/Carleton/Prescott/Russell/Stormont/ Dundas/ Glengarry/Renfrew<br>2. **Lanark**/Leeds/Grenville/Hastings/Frontenac /Prince Edward/Lennox/Addington<br><br><u>Central East</u><br>3. **Haliburton/**Peterborough/Victoria/ Haliburton/Durham/ Northumberland<br>4. **Peel**/Halton<br>5. Metro **Toronto**<br>6. **York**/Simcoe<br><br><u>Central West</u><br>7. **Niagara**<br>8. **Hamilton**/Wentworth<br>9. **Brant**/Haldimand/Norfolk<br>10. **Wellington**/Dufferin/Waterloo<br><br><u>Southwest</u><br>11. **Essex**/Lambton/Kent<br>12. **Elgin**/Middlesex/Oxford<br>13. Bruce/Grey/Perth/Huron (**Grey-Bruce**)<br><br><u>North</u><br>14. **Algoma**/Cochrane/Manitoulin/Sudbury<br>15. **Timiskaming**/Muskoka/Parry Sound/ Nipissing<br>16. **Thunder Bay**/Kenora/Rainy River | Not used in most regressions; 22 regions in Table 2 taken from OHS datafile |
| **Enabling** | Income | The income variable was collapsed into three categories: low income (0-$19,999 household income per year), middle income ($20,000-$49,999), or high income ($50,000 or more). | Treated as continuous for most regressions; in Table2, income is dichotomized with poor income as reference |

**Table 1: Description of variables that were used in all analyses (continued).**

| Category | Variable | Description | Categorization for Regression Analyses |
|---|---|---|---|
| **Enabling** (continued) | Education | The education variable was collapsed into three categories: less than high school, high school graduate, or some post-secondary education. | Treated as continuous for most regressions; in Table 2, education is dichotomized with high education as reference |
| **Need** | Other chronic condition | A positive value for this variable was coded if responses to *any* of twenty-one questions regarding chronic conditions listed in the OHS (not including arthritis or rheumatism) were affirmative. The conditions were: Food allergies, Other allergies, Asthma, Other back problems high blood pressure, migraine headaches, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of a stroke, urinary incontinence, bowel disorder, alzheimers/ dementia, cataracts, glaucoma, thyroid condition | Dichotomous |
| | Arthritis or Rheumatism | This variable refers to the question posed in the survey, "Do you have arthritis or rheumatism diagnosed by a health professional?" | Dichotomous |
| | Two-week disability | This variable refers to whether there were any days in the two-week period immediately prior to answering the survey during which the respondent stayed in bed or cut down in his/her activities because of illness or injury. | Dichotomous |
| | Long-term disability | Respondents were considered to have restricted their activity if they answered affirmatively 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. | Dichotomous |
| | Back Pain | This variable refers to the question in the survey, "Do you have back problems, excluding arthritis diagnosed by a health professional?" | Dichotomous |

**Table 1: Description of variables that were used in all analyses (continued).**

| Category | Variable | Description | Categorization for Regression Analyses |
|---|---|---|---|
| **Need** (continued) | Pain | Respondents rated their level of pain by choosing one response from four categories: none, mild, moderate, or severe pain. | Dichotomized as "pain" or "no pain", with the latter as reference |
| | Self-rated health | Respondents rated their health by choosing one response from five possible categories: poor, fair, good, very good, or excellent. | Dichotomized into "poor" or "not poor" health, with the latter as reference |
| **Health Care Not Received** | Health care not received | A dichotomous coding for this variable resulted from the survey question, "During the past twelve months, was there ever a time when felt that you needed health care but you didn't receive it?" | Dichotomized for a logistic outcome |
| | Reasons for health care not received | Six options for why health care was not received when needed were presented to respondents: appropriate health care was not available in the area, not available when required, the waiting time was too long, the respondent felt the care would not be adequate, the cost of care was too high, or other reason. | Categorical variable; respondents could choose just one of the six options |

**Table 2: Factors associated with variation in the prevalence of arthritis or rheumatism in Ontario: results of logistical regression analyses using data from the total adult population, aged 15+, overall and including region of residence (Odds ratios and 99% confidence intervals): 1996/97 Ontario Health Survey**

| Prevalence of Arthritis | | | | | | |
|---|---|---|---|---|---|---|
| Variables | Population | | | | | |
| | Overall | | | Including Region | | |
| | Odds ratio | 99% confidence interval | | Odds ratio | 99% confidence interval | |
| **Age group** | | | | | | |
| In decades | **1.98** | **1.88** | **2.08** | **1.99** | **1.89** | **2.09** |
| **Sex** | | | | | | |
| Female | **2.10** | **1.87** | **2.36** | **2.11** | **1.88** | **1.28** |
| **Low Education** | 1.06 | 0.94 | 1.19 | 1.04 | 0.92 | 1.16 |
| **BMI** | | | | | | |
| BMI <25 | **1.35** | **1.26** | **1.44** | **1.34** | **1.26** | **1.43** |
| **Income** | | | | | | |
| Non poor | **0.58** | **0.49** | **0.70** | **0.59** | **0.50** | **0.71** |
| Not stated | **0.53** | **0.44** | **0.65** | **0.54** | **0.44** | **0.66** |
| **Alcohol** | | | | | | |
| Non drinker now | 1.89 | 0.88 | 4.05 | 1.08 | 0.84 | 3.89 |
| Occasional drinker | 1.63 | 0.76 | 3.47 | 1.57 | 0.73 | 3.37 |
| Regular drinker | 1.29 | 0.61 | 2.75 | 1.27 | 0.60 | 2.71 |
| **Smoke** | | | | | | |
| Former smoker | **1.32** | **1.15** | **1.51** | **1.31** | **1.14** | **1.50** |
| Occasional smoker | 1.32 | 0.97 | 1.78 | 1.32 | 0.97 | 1.79 |
| Daily smoker | **1.47** | **1.27** | **1.70** | **1.43** | **1.24** | **1.66** |
| **Ethnicity** | | | | | | |
| Black | **0.62** | **0.42** | **0.92** | 0.70 | 0.47 | 1.04 |
| Asian | **0.64** | **0.51** | **0.82** | **0.72** | **0.57** | **0.93** |
| Native | **1.79** | **1.05** | **3.05** | 1.65 | 0.97 | 2.82 |
| **Region of residence** | | | | | | |
| Prescott | n/a | n/a | n/a | 0.86 | 0.58 | 1.29 |
| Lanark | n/a | n/a | n/a | 1.29 | 0.95 | 1.77 |
| Northumberland | n/a | n/a | n/a | 1.16 | 0.80 | 1.67 |
| Durham | n/a | n/a | n/a | 0.89 | 0.63 | 1.25 |
| Peel | n/a | n/a | n/a | 0.94 | 0.71 | 1.26 |
| Metro Toronto | n/a | n/a | n/a | 0.80 | 0.63 | 1.03 |
| York | n/a | n/a | n/a | 0.76 | 0.55 | 1.06 |
| Simcoe | n/a | n/a | n/a | 0.79 | 0.54 | 1.17 |
| Halton | n/a | n/a | n/a | 0.69 | 0.47 | 1.04 |
| Niagara | n/a | n/a | n/a | **1.40** | **1.01** | **1.94** |
| Hamilton-Wentworth | n/a | n/a | n/a | 0.92 | 0.66 | 1.29 |
| Brant | n/a | n/a | n/a | 1.11 | 0.73 | 1.69 |
| Wellington | n/a | n/a | n/a | 0.88 | 0.56 | 1.39 |
| Waterloo | n/a | n/a | n/a | 0.83 | 0.57 | 1.19 |
| Essex | n/a | n/a | n/a | **1.44** | **1.02** | **2.04** |
| Lambton, Kent | n/a | n/a | n/a | 1.19 | 0.80 | 1.78 |
| Elgin, Middlesex | n/a | n/a | n/a | 0.85 | 0.62 | 1.17 |
| Grey-Bruce | n/a | n/a | n/a | 1.12 | 0.77 | 1.64 |
| Algoma | n/a | n/a | n/a | 1.15 | 0.77 | 1.73 |
| Manitoulin | n/a | n/a | n/a | **1.66** | **1.13** | **2.45** |
| Timiskaming | n/a | n/a | n/a | 1.23 | 0.82 | 1.85 |
| Thunder Bay | n/a | n/a | n/a | 1.02 | 0.68 | 1.55 |

See Table 1 for description of categories and reference values
Values in bold are statistically significant at arthritis $p < 0.01$

**Table 3: Factors associated with visits to General Practitioners (GPs) and Specialists: results of logistic regression analyses using data from the total adult population, people reporting having arthritis or rheumatism, and those with other chronic conditions (Odds ratios and 99% confidence intervals): 1996/97 Ontario Health Survey**

| | Visiting GP | | | | | | Visiting Specialist | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Population | | | | | | Population | | | | | |
| | Total | | Arthritis | | Other chronic | | Total | | Arthritis | | Other chronic | |
| Variables | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval |
| **Predisposing factors** | | | | | | | | | | | | |
| Age | | | | | | | | | | | | |
| 45-64 | 1.03 | 0.90, 1.18 | 0.88 | 0.55, 1.38 | **1.32** | **1.06, 1.63** | 1.12 | 0.98, 1.27 | 1.05 | 0.79, 1.39 | **1.26** | **1.06, 1.48** |
| 65+ | **1.59** | **1.27, 2.00** | 1.26 | 0.75, 2.13 | **2.15** | **1.48, 3.11** | **1.25** | **1.05, 1.49** | 1.10 | 0.82, 1.49 | **1.44** | **1.14, 1.83** |
| Female | **2.12** | **1.88, 2.40** | **1.81** | **1.26, 2.6** | **2.03** | **1.68, 2.46** | **1.53** | **1.37, 1.71** | 1.08 | 0.88, 1.34 | **1.56** | **1.34, 1.81** |
| Smoke | **0.83** | **0.78, 0.88** | **0.76** | **0.62, 0.92** | **0.82** | **0.74, 0.91** | **0.86** | **0.81, 0.91** | **0.83** | **0.74, 0.94** | **0.89** | **0.82, 0.97** |
| Consulted alternative | 1.34 | 0.99, 1.82 | 1.23 | 0.56, 2.73 | 1.17 | 0.79, 1.72 | **1.37** | **1.11, 1.69** | 1.03 | 0.69, 1.53 | **1.43** | **1.09, 1.86** |
| **Enabling factors** | | | | | | | | | | | | |
| High Education | 0.99 | 0.92, 1.06 | 1.00 | 0.81, 1.23 | 0.96 | 0.85, 1.08 | **1.10** | **1.03, 1.18** | **1.18** | **1.04, 1.34** | 1.08 | 0.98, 1.18 |
| High Income | 1.07 | 0.98, 1.17 | 0.97 | 0.74, 1.27 | 1.00 | 0.87, 1.14 | **1.12** | **1.03, 1.21** | 1.14 | 0.98, 1.34 | 1.10 | 0.99, 1.23 |
| **Need factors** | | | | | | | | | | | | |
| Long term disability | **1.49** | **1.19, 1.88** | 1.20 | 0.78, 1.85 | **1.79** | **1.28, 2.50** | **2.08** | **1.79, 2.42** | **1.56** | **1.22, 1.98** | **2.15** | **1.76, 2.62** |
| Two week disability | **1.74** | **1.38, 2.21** | **2.60** | **1.34, 5.04** | **1.55** | **1.13, 2.11** | **1.54** | **1.32, 1.79** | **1.60** | **1.23, 2.09** | **1.37** | **1.12, 1.68** |
| Poor self-rated health | **1.13** | **1.06, 1.22** | 1.13 | 0.93, 1.38 | **1.20** | **1.08, 1.34** | **1.20** | **1.13, 1.28** | **1.27** | **1.14, 1.43** | **1.22** | **1.12, 1.32** |
| Pain | **1.22** | **1.07, 1.38** | 1.18 | 0.95, 1.47 | **1.29** | **1.06, 1.58** | **1.13** | **1.04, 1.22** | 1.09 | 0.97, 1.21 | **1.13** | **1.01, 1.26** |
| Arthritis | **2.25** | **1.77, 2.85** | n/a | n/a | n/a | n/a | **2.05** | **1.70, 2.48** | n/a | n/a | n/a | n/a |
| Chronic | **1.83** | **1.60, 2.09** | n/a | n/a | n/a | n/a | **2.06** | **1.80, 2.37** | n/a | n/a | n/a | n/a |
| Back Pain | 1.03 | 0.85, 1.25 | n/a | n/a | n/a | n/a | 0.94 | 0.82, 1.08 | n/a | n/a | n/a | n/a |

See Table 1 for description of categories and reference values

Values in bold are statistically significant at arthritis $p < 0.01$

**Table 4: Factors associated with visits to physical or occupational therapists (PT/OT) and chiropractors: results of logistic regression analyses using data from the total adult population, respondents with arthritis or rheumatism, and other chronic conditions (Odds ratios and 99% confidence intervals): 1996/97 Ontario Health Survey**

| | Visited PT/OT | | | | | | Visited chiropractor | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Population | | | | | | Population | | | | | |
| | Total | | Arthritis | | Other Chronic | | Total | | Arthritis | | Other Chronic | |
| Variables | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval |
| **Predisposing factors** | | | | | | | | | | | | |
| Age | | | | | | | | | | | | |
| 45-64 | 0.99 | 0.80, 1.23 | 1.04 | 0.72, 1.52 | 0.93 | 0.70, 1.25 | 1.05 | 0.88, 1.24 | 1.25 | 0.85, 1.83 | 1.11 | 0.90, 1.37 |
| 65+ | 0.93 | 0.69, 1.25 | 0.80 | 0.52, 1.23 | 0.88 | 0.56, 1.38 | 0.81 | 0.62, 1.06 | 0.79 | 0.51, 1.24 | **0.64** | **0.44, 0.94** |
| Female | 1.12 | 0.93, 1.34 | 1.16 | 0.86, 1.57 | 1.17 | 0.90, 1.52 | 1.02 | 0.88, 1.19 | 0.78 | 0.58, 1.06 | 0.96 | 0.80, 1.17 |
| Smoke | 0.93 | 0.84, 1.03 | 0.95 | 0.80, 1.12 | 0.91 | 0.79, 1.05 | **0.89** | **0.82, 0.97** | **0.83** | **0.70, 0.98** | 0.93 | 0.84, 1.03 |
| Consulted alternative | **2.47** | **1.89, 3.24** | **1.96** | **1.24, 3.10** | **2.55** | **1.77, 3.67** | **3.66** | **2.93, 4.58** | **4.22** | **2.76, 6.45** | **3.66** | **2.78, 4.81** |
| **Enabling factors** | | | | | | | | | | | | |
| High Education | 1.08 | 0.96, 1.21 | **1.23** | **1.03, 1.47** | 1.07 | 0.91, 1.26 | 1.00 | 0.90, 1.10 | 1.04 | 0.87, 1.24 | 1.02 | 0.90, 1.15 |
| High Income | **1.22** | **1.07, 1.40** | 1.08 | 0.87, 1.34 | **1.29** | **1.06, 1.56** | **1.32** | **1.18, 1.48** | 1.22 | 0.97, 1.52 | **1.25** | **1.08, 1.44** |
| **Need factors** | | | | | | | | | | | | |
| Long term disability | **2.56** | **2.03, 3.24** | **1.75** | **1.24, 2.49** | **3.13** | **2.30, 4.25** | 0.94 | 0.75, 1.17 | 1.07 | 0.75, 1.52 | 0.96 | 0.73, 1.27 |
| Two week disability | **1.45** | **1.15, 1.82** | **1.44** | **1.01, 2.03** | 1.19 | 0.87, 1.65 | 1.13 | 0.91, 1.40 | 1.07 | 0.72, 1.58 | 1.18 | 0.91, 1.53 |
| Poor self-rated health | 1.04 | 0.94, 1.15 | 1.06 | 0.91, 1.25 | 1.04 | 0.90, 1.20 | **0.88** | **0.80, 0.96** | 0.88 | 0.75, 1.04 | 0.92 | 0.83, 1.03 |
| Pain | **1.25** | **1.11, 1.40** | **1.18** | **1.01, 1.37** | **1.52** | **1.31, 1.78** | **1.13** | **1.02, 1.27** | **1.19** | **1.01, 1.40** | 1.43 | **1.25, 1.64** |
| Arthritis | **1.69** | **1.23, 2.33** | n/a | n/a | n/a | n/a | 1.25 | 0.95, 1.66 | n/a | n/a | n/a | n/a |
| Chronic | **1.33** | **1.03, 1.72** | n/a | n/a | n/a | n/a | **1.43** | **1.16, 1.75** | n/a | n/a | n/a | n/a |
| Back Pain | **1.64** | **1.33, 2.03** | n/a | n/a | n/a | n/a | **4.37** | **3.66, 5.22** | n/a | n/a | n/a | n/a |

See Table 1 for description of categories and reference values

Values in bold are statistically significant at arthritis $p < 0.01$

**Table 5: Factors associated with visits to Alternative Health Care Providers: results of logistic regression analyses using data from the total adult population, respondents with arthritis or rheumatism, and other chronic conditions. (Odds ratios and 99% confidence intervals): 1996/97 Ontario Health Survey**

| | Visited Alternative Health Care Providers | | | | | |
|---|---|---|---|---|---|---|
| | Population | | | | | |
| | Total | | Arthritis | | Other Chronic | |
| Variables | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval | Odds ratio | 99% confidence interval |
| **Predisposing factors** | | | | | | |
| Age | | | | | | |
| 45-64 | 0.86 | 0.67, 1.04 | 0.65 | 0.42, 1.03 | 0.89 | 0.68, 1.18 |
| 65+ | **0.45** | **0.30, 0.67** | **0.48** | **0.28, 0.84** | **0.30** | **0.15, 0.58** |
| Female | **1.98** | **1.63, 2.41** | **1.63** | **1.09, 2.45** | **1.88** | **1.46, 2.44** |
| Smoke | **0.81** | **0.72, 0.90** | 0.81 | 0.65, 1.01 | **0.81** | **0.70, 0.93** |
| Consulted alternative | n/a | n/a | n/a | n/a | n/a | n/a |
| **Enabling factors** | | | | | | |
| High Education | **1.66** | **1.43, 1.94** | **1.43** | **1.12, 1.85** | **1.66** | **1.36, 2.01** |
| High Income | **1.43** | **1.23, 1.66** | **1.79** | **1.34, 2.38** | **1.28** | **1.05, 1.54** |
| **Need factors** | | | | | | |
| Long term disability | 1.29 | 0.97, 1.70 | 1.35 | 0.86, 2.12 | 1.39 | 0.98, 1.97 |
| Two week disability | **1.68** | **1.31, 2.15** | 1.51 | 0.96, 2.37 | **1.72** | **1.26, 2.35** |
| Poor self-rated health | 0.97 | 0.87, 1.09 | 0.98 | 0.79, 1.21 | 0.98 | 0.85, 1.13 |
| Pain | **1.17** | **1.02, 1.34** | **1.30** | **1.06, 1.59** | **1.24** | **1.03, 1.49** |
| Arthritis | **1.69** | **1.19, 2.39** | n/a | n/a | n/a | n/a |
| Chronic | **1.58** | **1.22, 2.03** | n/a | n/a | n/a | n/a |
| Back Pain | **2.23** | **1.78, 2.81** | n/a | n/a | n/a | n/a |

See Table 1 for description of categories and reference values
Values in bold are statistically significant at arthritis $p < 0.01$

**Table 6: Correlation statistics comparing the "people with arthritis or rheumatism" group to "other chronic condition" group across 16 regions of Ontario: 1996/97 Ontario Health Survey**

| Health Care Provider Visited | Spearman's rho, p=value | |
|---|---|---|
| | correlation of percentage of people with arthritis or rheumatism, with percentage of those with another chronic condition, who visited each provider type | correlation of percentage of people with arthritis or rheumatism who visited each provider type with the prevalence of arthritis and rheumatism |
| GP | 0.43<br>p=0.099 | 0.21<br>p=0.451 |
| Specialist | 0.40<br>p=0.130 | -0.34<br>p=0.213 |
| PT or OT | 0.47<br>p=0.065 | -0.24<br>p=0.397 |
| Chiropractor | 0.60<br>p=0.013 | 0.59<br>p=0.022 |
| Alternative Health Care Provider | 0.71<br>p=0.002 | -0.55<br>p=0.035 |

Metropolitan Toronto omitted

**Table 7: Factors associated with reporting that health care was not received when needed: results of logistic regression analyses using data from the general population (Odds ratios and 95% confidence intervals)**

| Variables | Population | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Arthritis | | Other chronic conditions | |
| | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval | Odds ratio | 95% confidence interval |
| **Predisposing factors** | | | | | | |
| Age | | | | | | |
| 45-64 | **0.50** | **0.39, 0.63** | **0.47** | **0.31, 0.70** | **0.54** | **0.40, 0.75** |
| 65+ | **0.31** | **0.22, 0.45** | **0.34** | **0.21, 0.54** | **0.25** | **0.13, 0.47** |
| Female | **1.42** | **1.17, 1.72** | 1.18 | 0.83, 1.67 | **1.41** | **1.09, 1.83** |
| Smoke | 1.10 | 0.99, 1.22 | 0.96 | 0.80, 1.16 | 1.11 | 0.97, 1.28 |
| Consulted alternative | **2.06** | **1.54, 2.76** | 1.44 | 0.83, 2.49 | **2.23** | **1.55, 3.21** |
| **Enabling factors** | | | | | | |
| High education | **1.32** | **1.17, 1.50** | 1.20 | 0.98, 1.46 | **1.43** | **1.20, 1.70** |
| High income | **0.76** | **0.66, 0.87** | **0.76** | **0.59, 0.97** | **0.76** | **0.63, 0.91** |
| **Need factors** | | | | | | |
| Long term disability | **2.35** | **1.84, 3.01** | **1.96** | **1.30, 2.96** | **2.10** | **1.52, 2.89** |
| Two week disability | **1.76** | **1.40, 2.21** | **1.66** | **1.15, 2.41** | **1.96** | **1.46, 2.64** |
| Poor self-rated health | **1.14** | **1.03, 1.27** | 1.16 | 0.97, 1.28 | **1.16** | **1.01, 1.34** |
| Pain | **1.20** | **1.07, 1.36** | **1.31** | **1.11, 1.54** | **1.20** | **1.02, 1.42** |
| Arthritis | **1.91** | **1.36, 2.67** | n/a | n/a | n/a | n/a |
| Chronic | **1.63** | **1.26, 2.11** | n/a | n/a | n/a | n/a |
| Back pain | 1.13 | 0.90, 1.42 | n/a | n/a | n/a | n/a |

See Table 1 for description of categories and reference values
Values in bold are statistically significant at arthritis $p < 0.01$

# FIGURES

**Figure 1: Prevalence of arthritis or rheumatism and other chronic conditions in the Ontario population aged 15+**

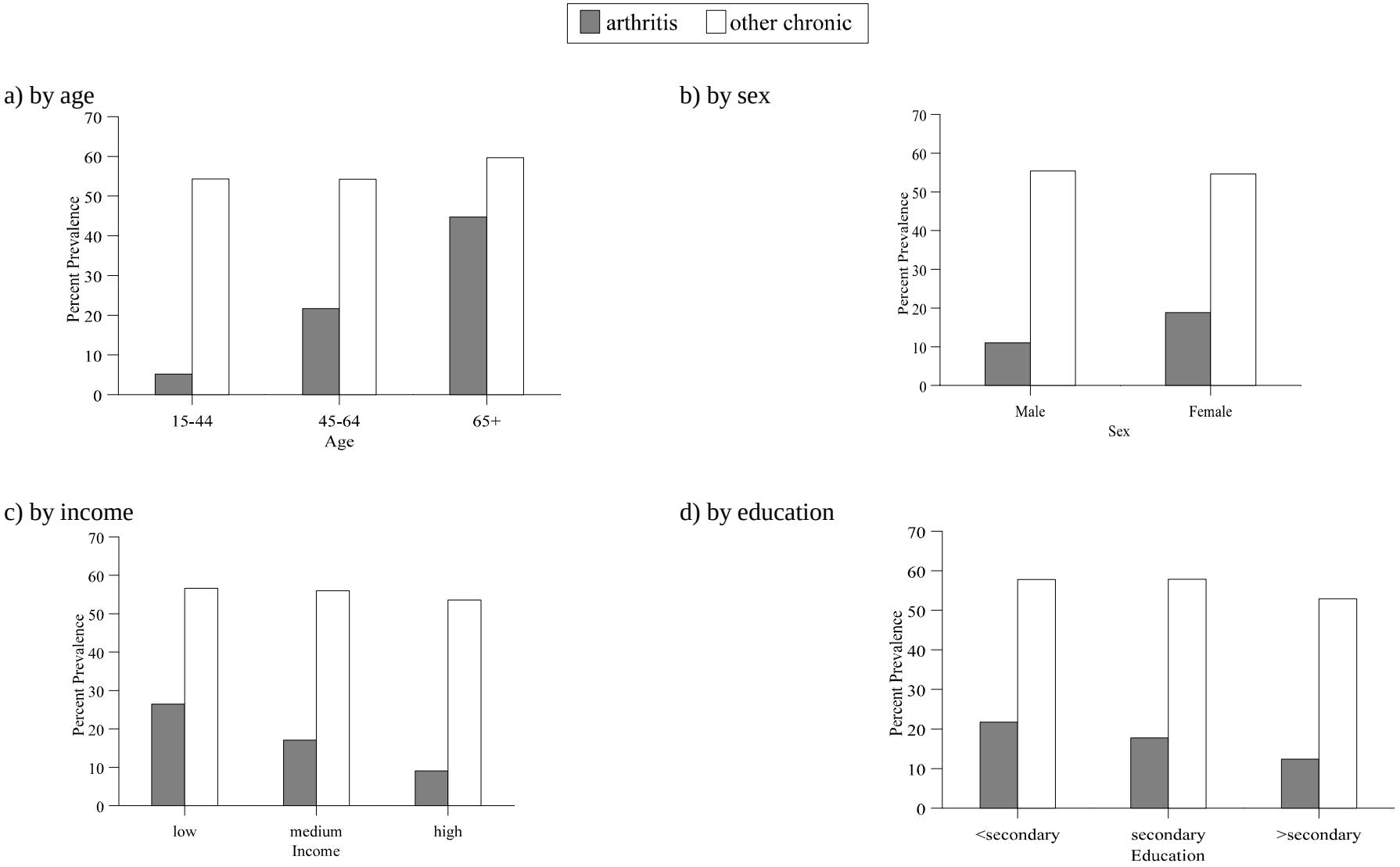


**Figure 2:** **Prevalence of arthritis or rheumatism and other chronic conditions among the Ontario population aged 15+ across District Health Councils**

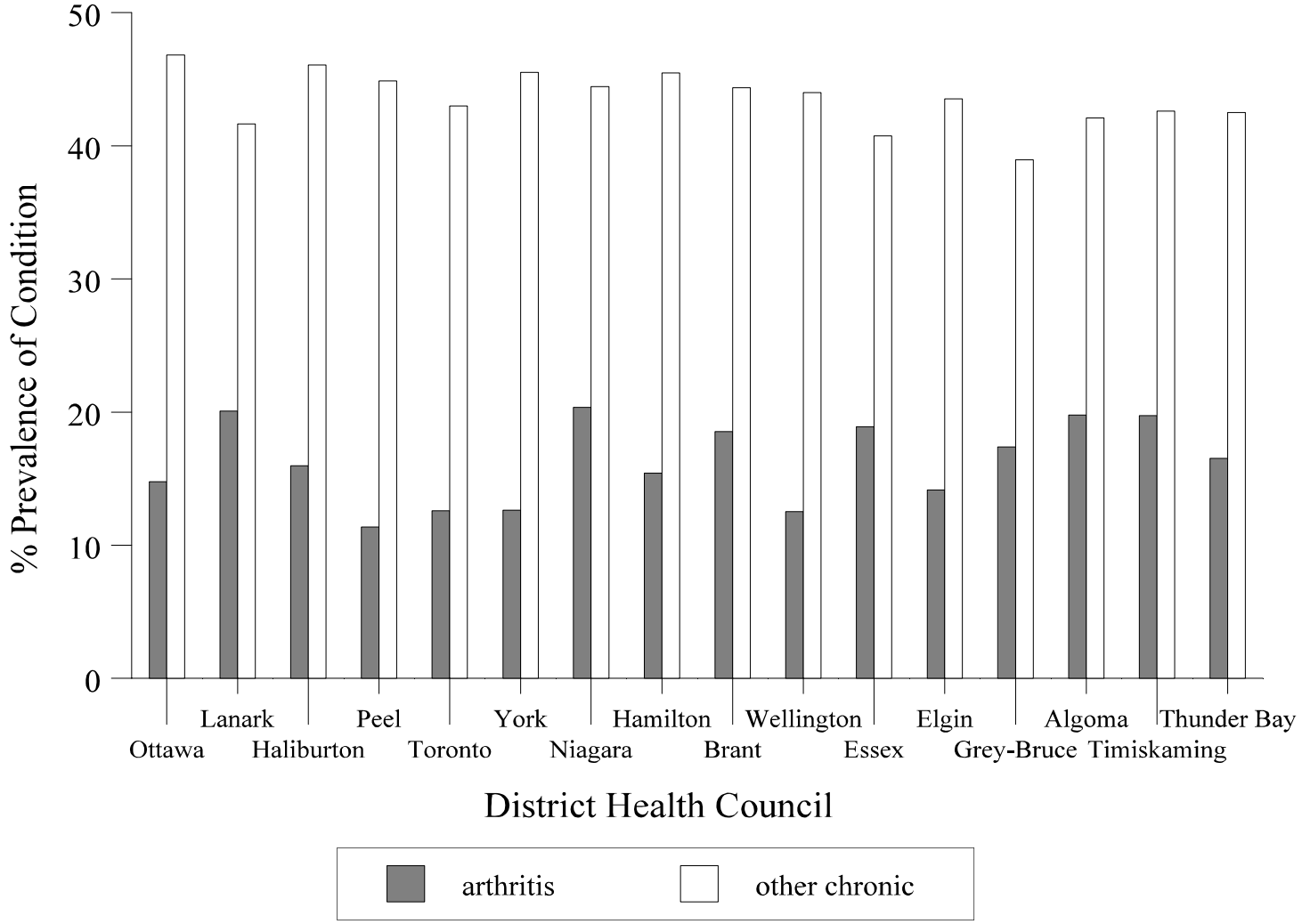
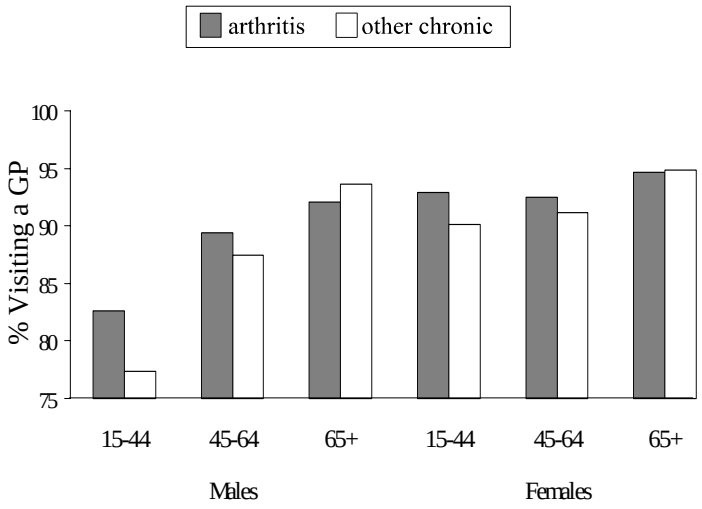
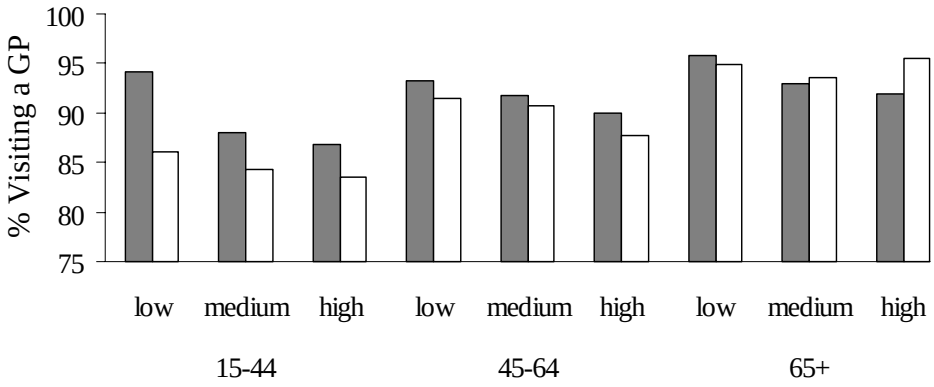


**Figure 3: General Practitioner (GP) visits: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age, sex, income and education**

a) by age and sex




b) by age and income




c) by age and education

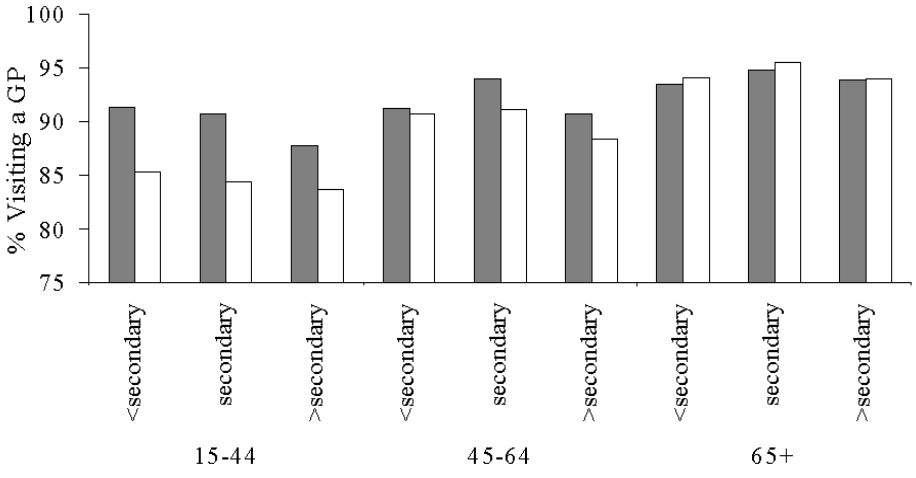
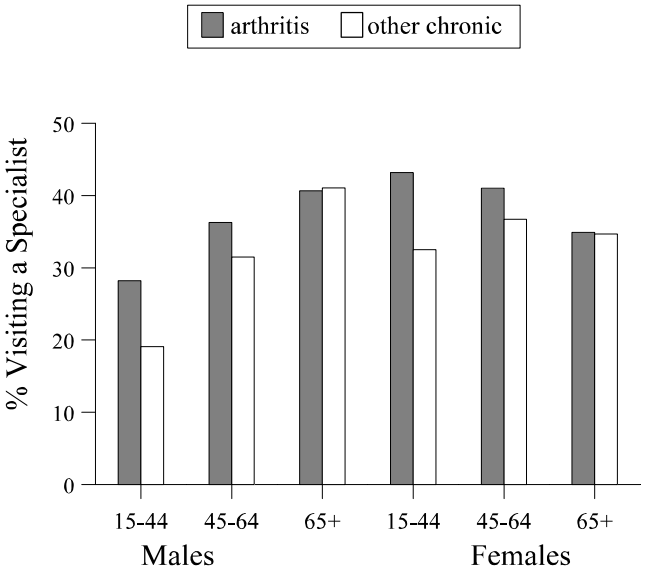
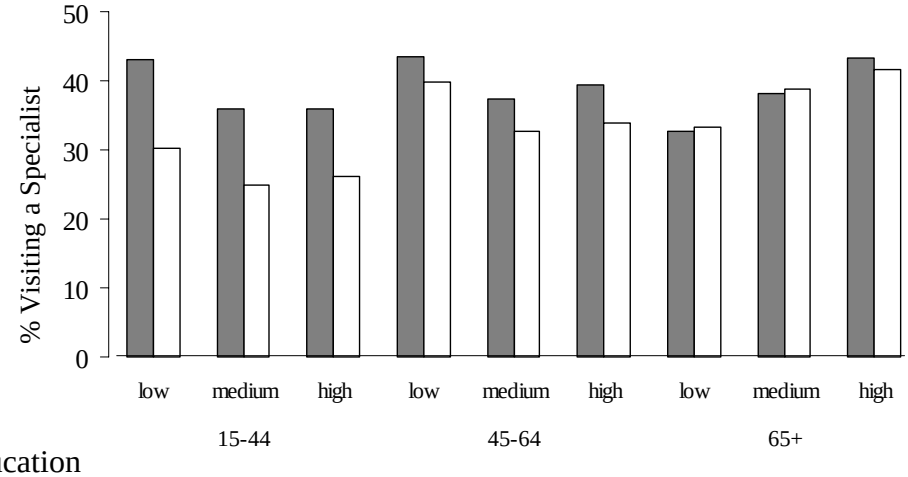


**Figure 4: Specialist visits: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age, sex, income and education**

a) by age and sex




b) by age and income




c) by age and education

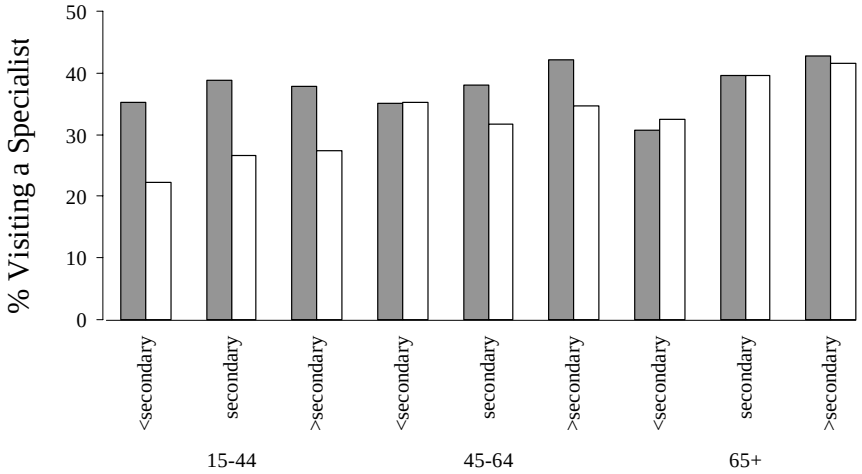
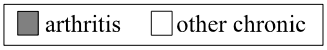
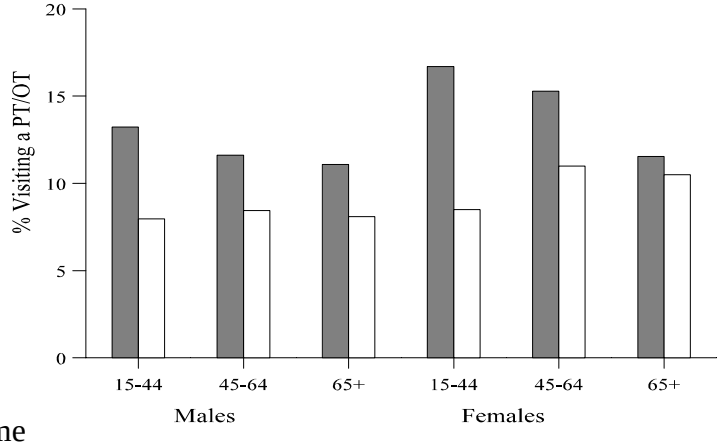


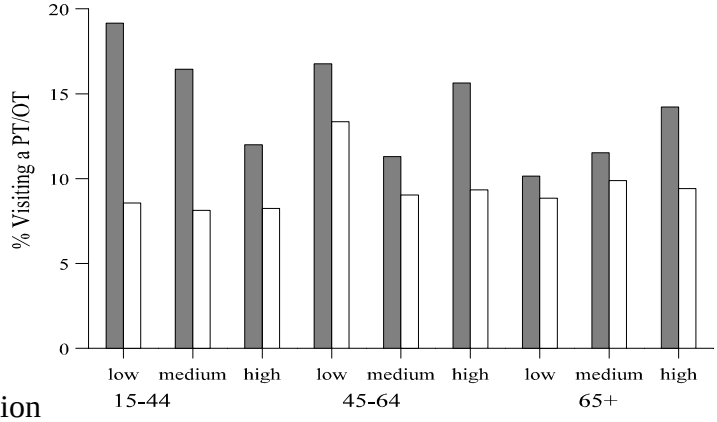
**Figure 5: Physical or occupational therapist (PT/OT) visits: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age, sex, income and education**




a) by age and sex




b) by age and income




c) by age and education

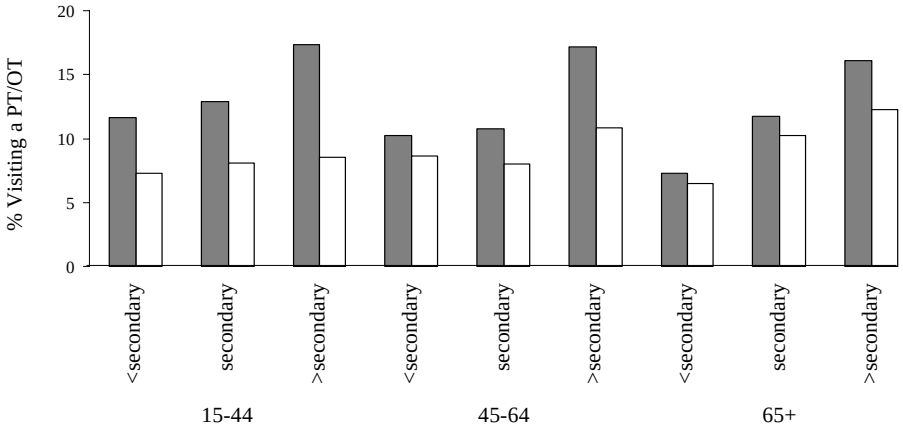
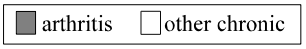
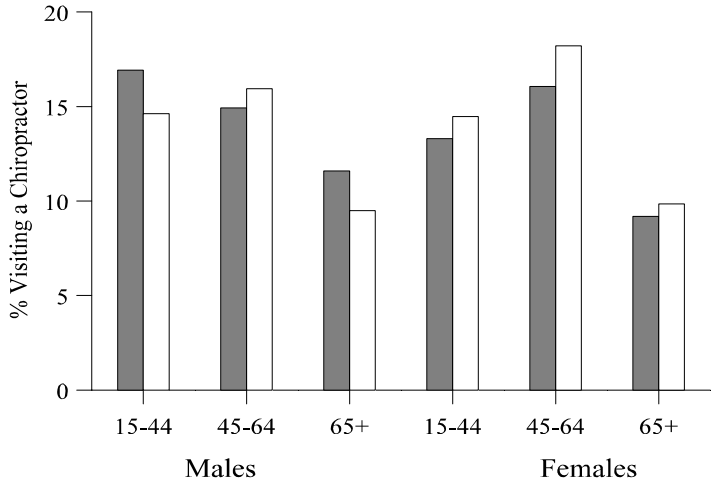


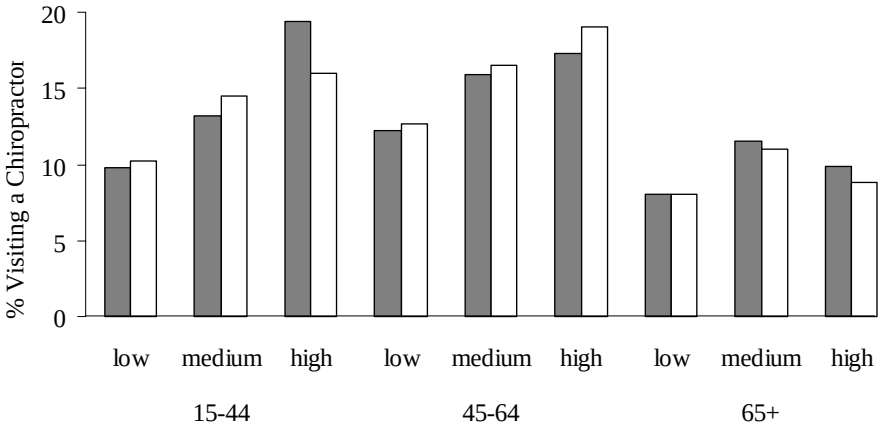
**Figure 6: Chiropractor visits: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age, sex, income and education**




a) by age and sex




b) by age and income




c) by age and education

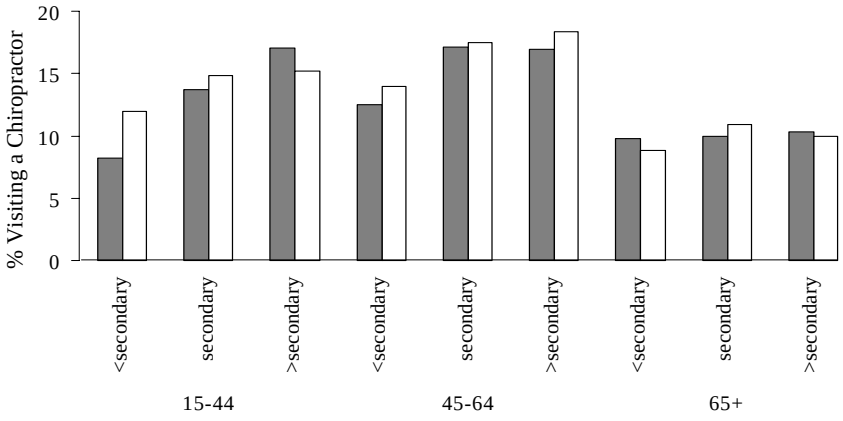


**Figure 7:** **Psychosocial visits: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age and sex**

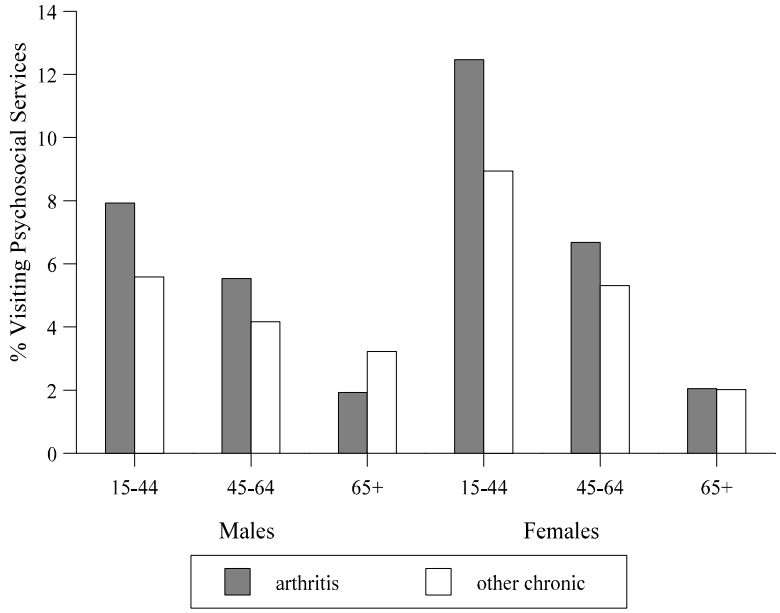
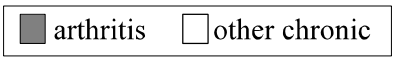
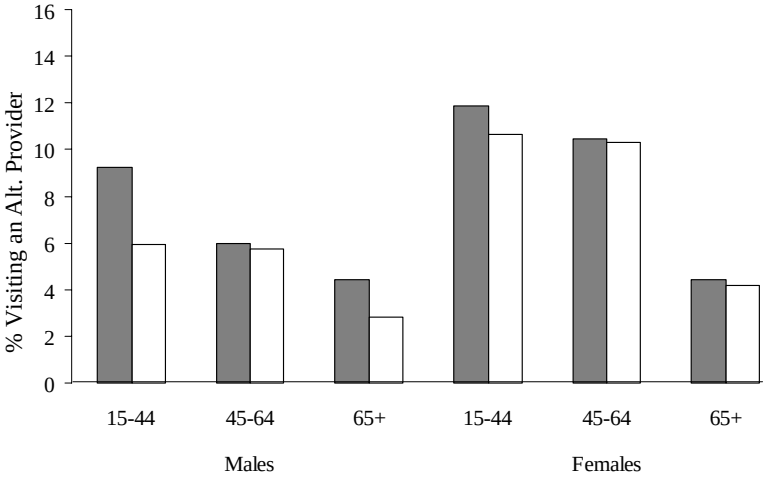


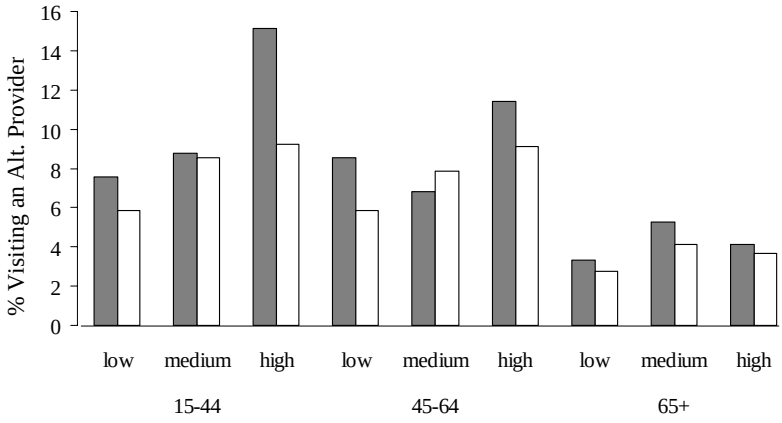
**Figure 8: Alternative health care provider: percentage of the Ontario population aged 15+ with arthritis or rheumatism and other chronic conditions, reporting visits within the past 12 months by age, sex, income and education**




a) by age and sex




b) by age and income




c) by age and education

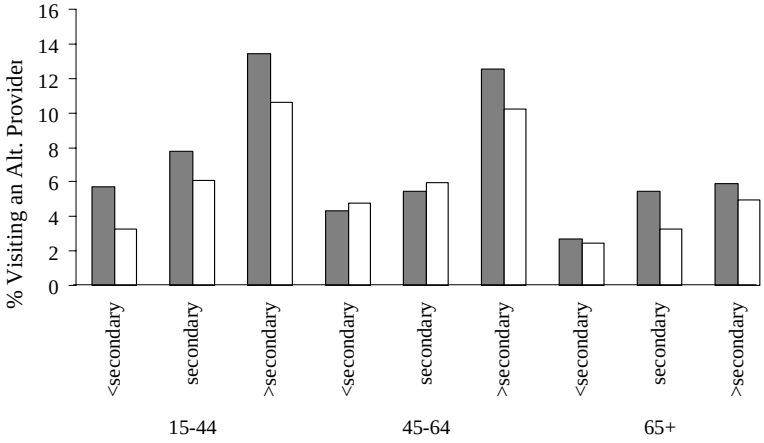


**Figure 9:** **Populations and population densities, pertaining to people aged 15+, of each of sixteen Ontario District Health Councils**

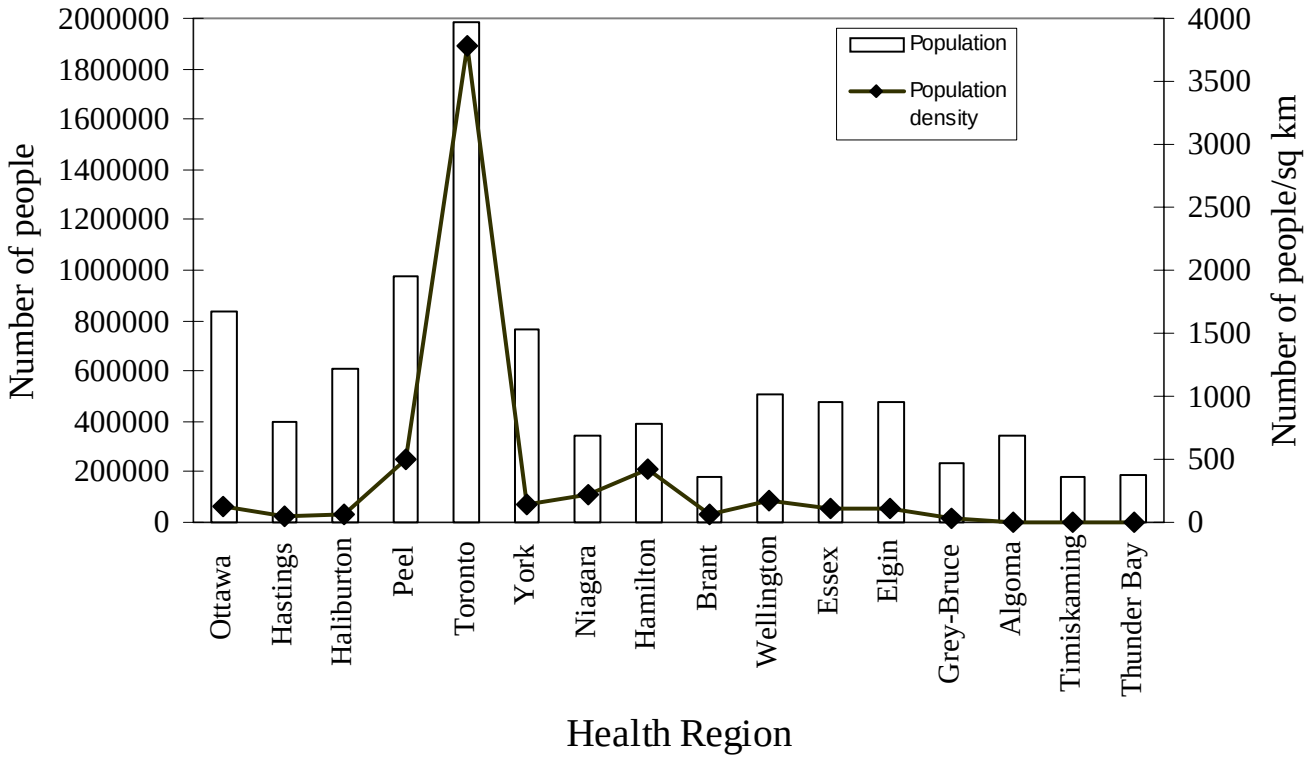


**Figure 10: General Practitioner (GP) visits: percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils reporting visits within the past 12 months**

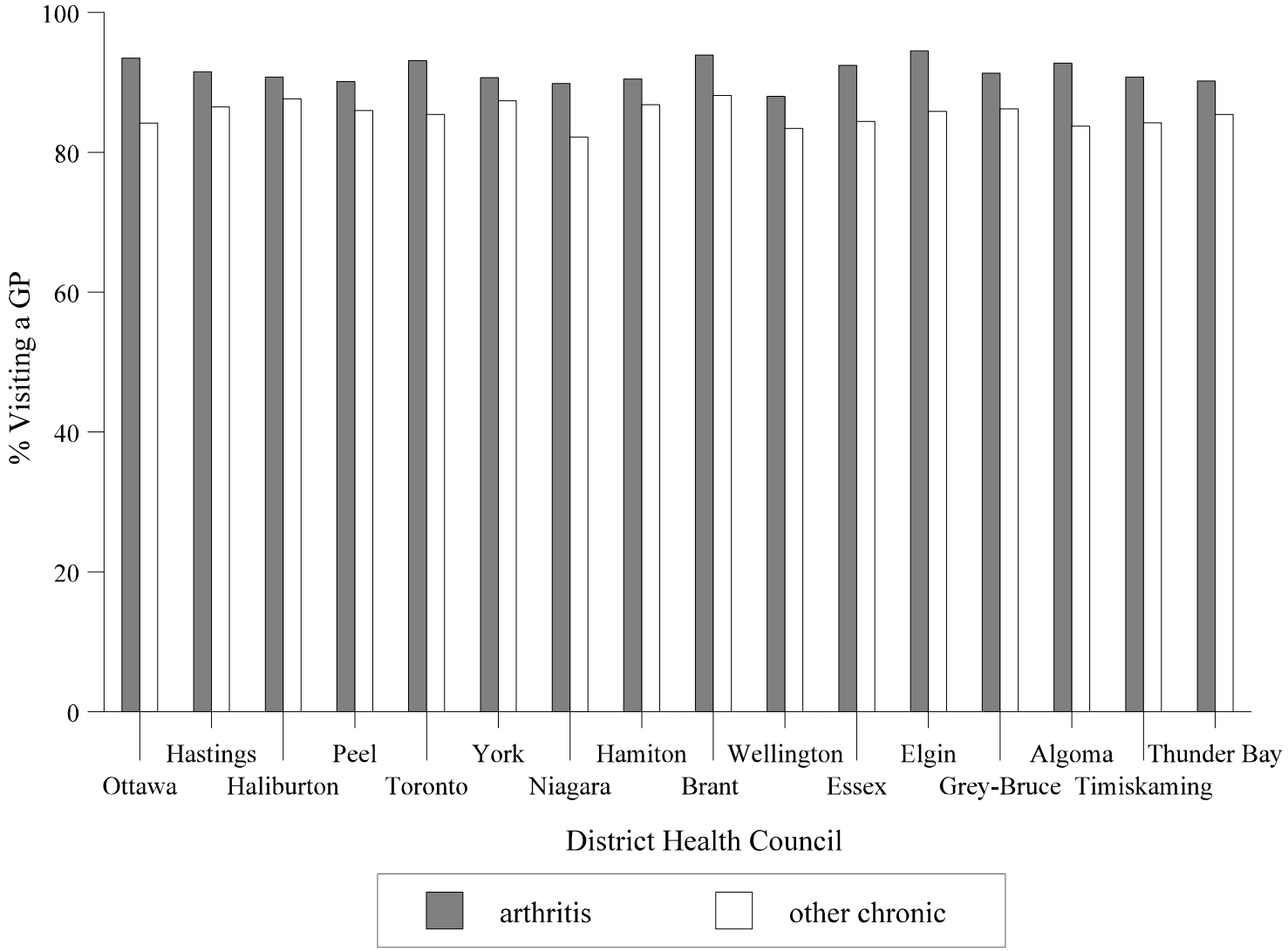


**Figure 11: Specialist visits: percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils reporting visits within the past 12 months**

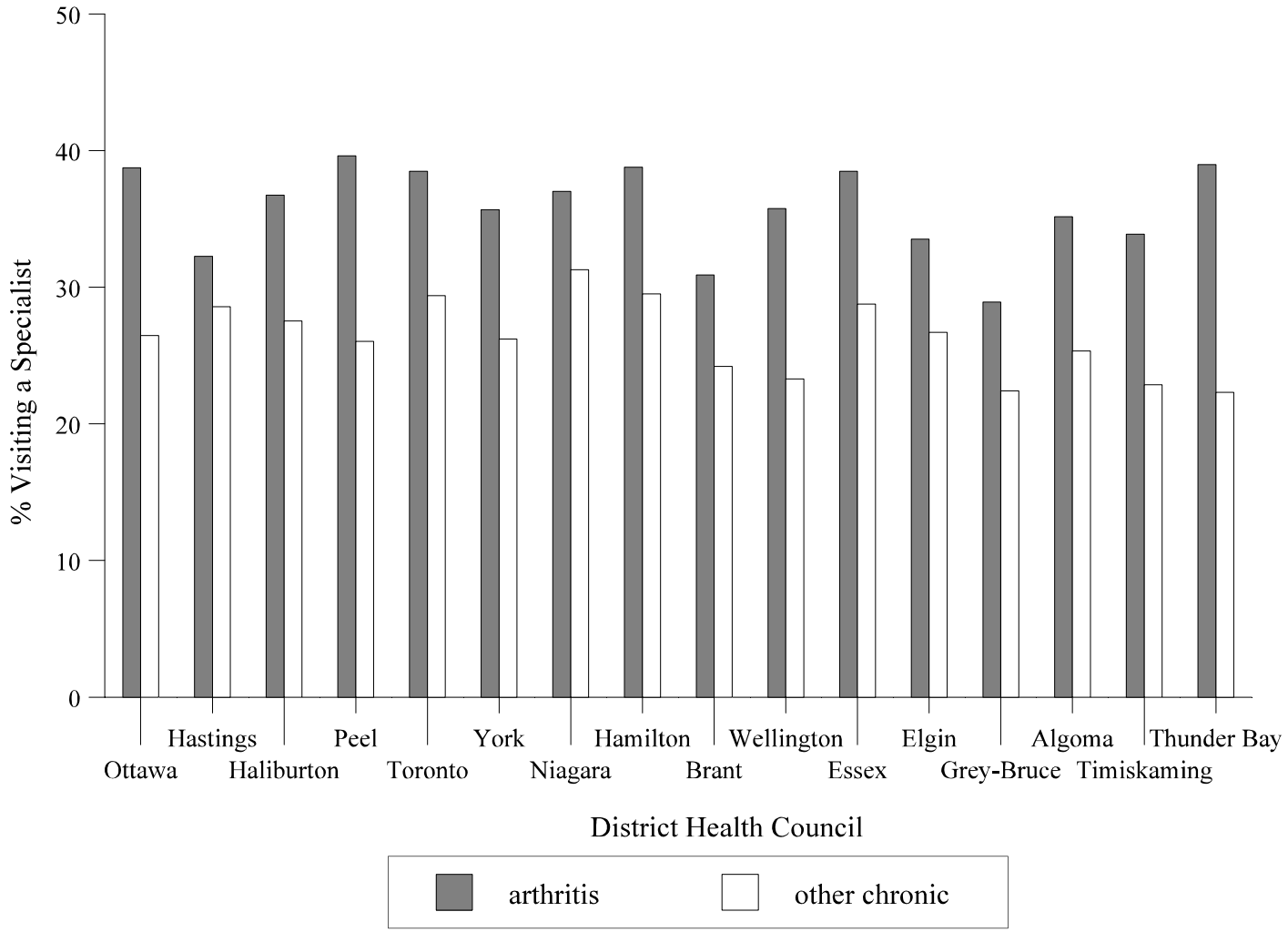
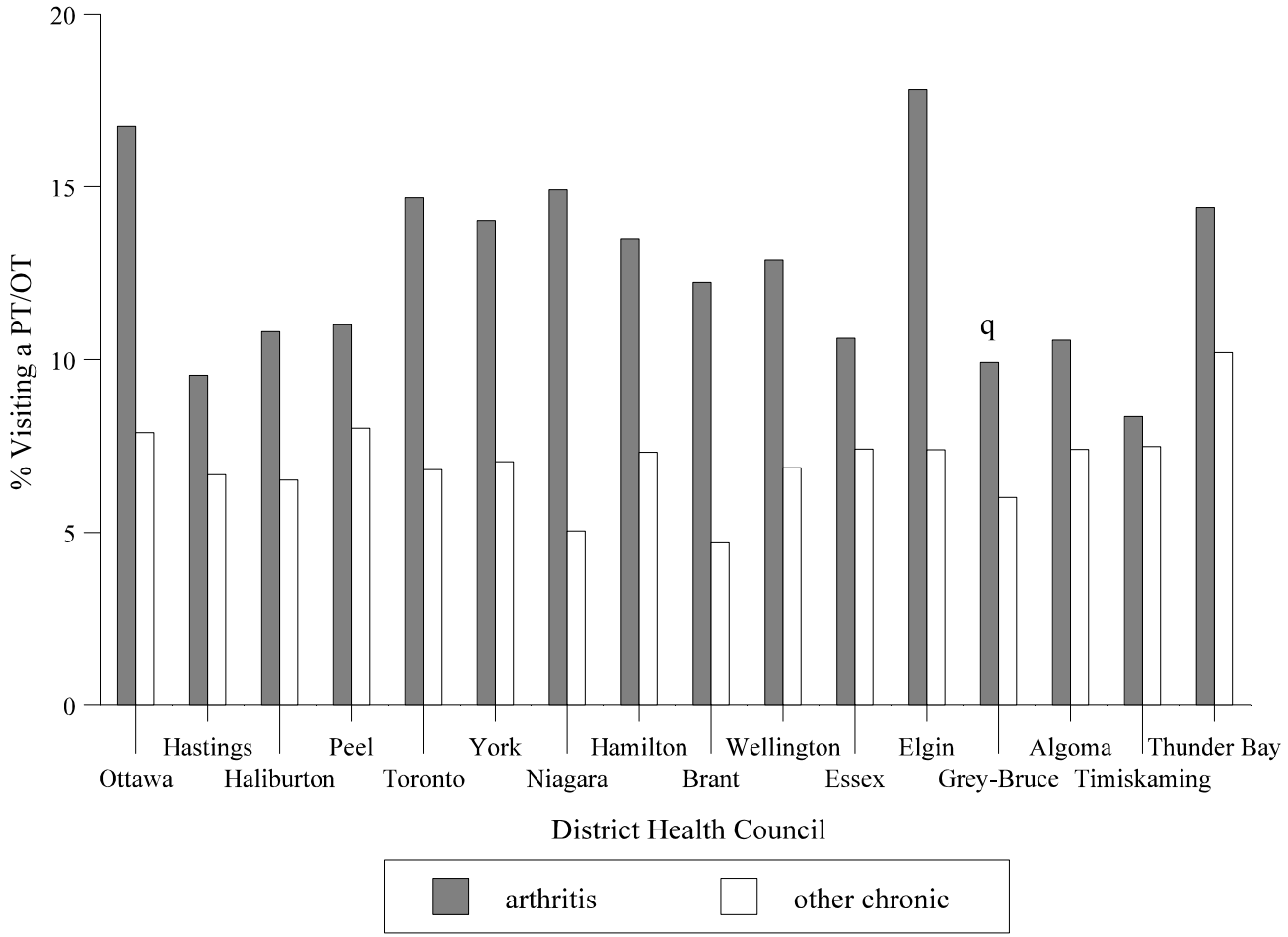
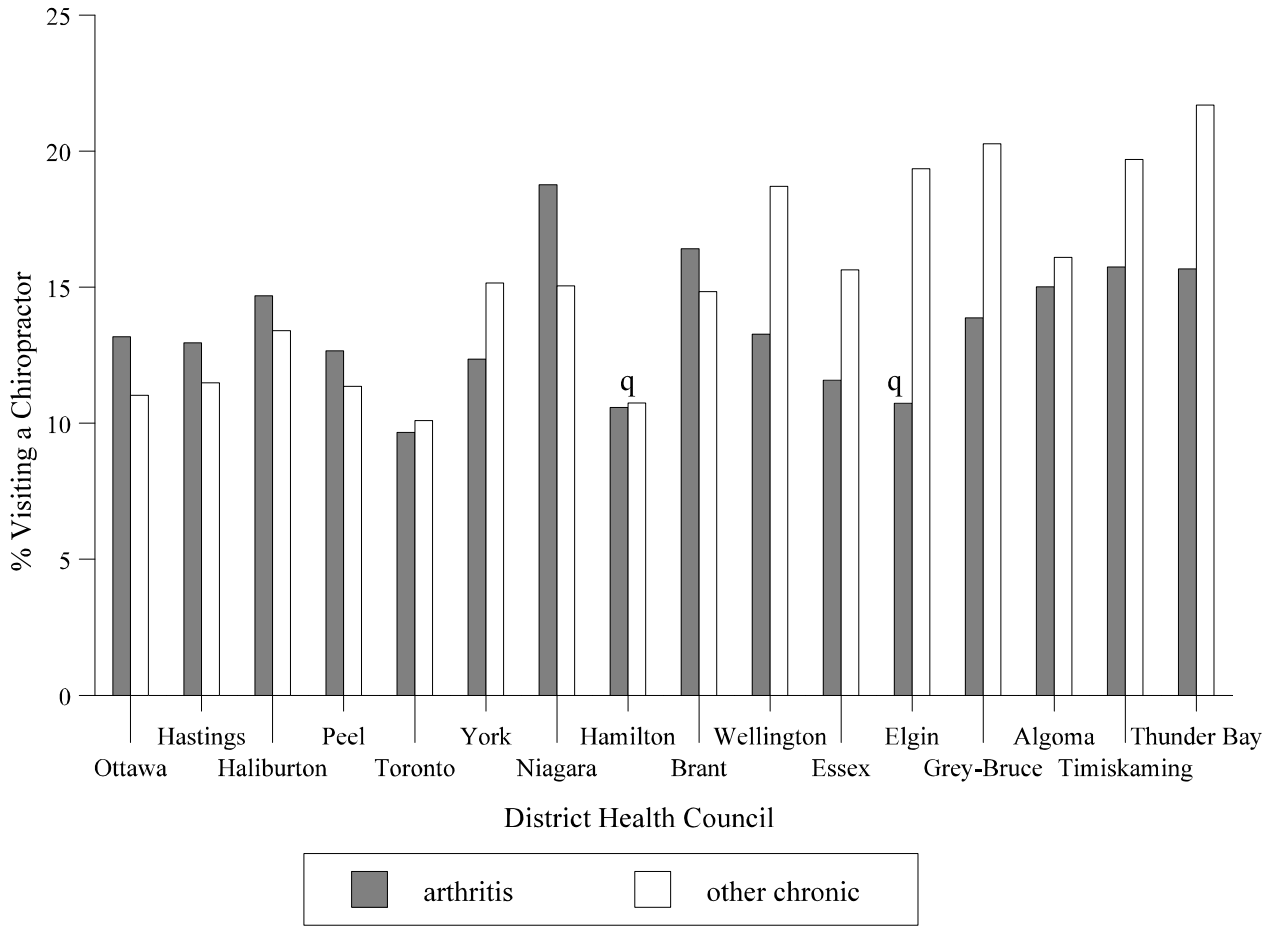


**Figure 12: Physical or occupational therapist (PT/OT) visits: percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils reporting visits within the past 12 months**



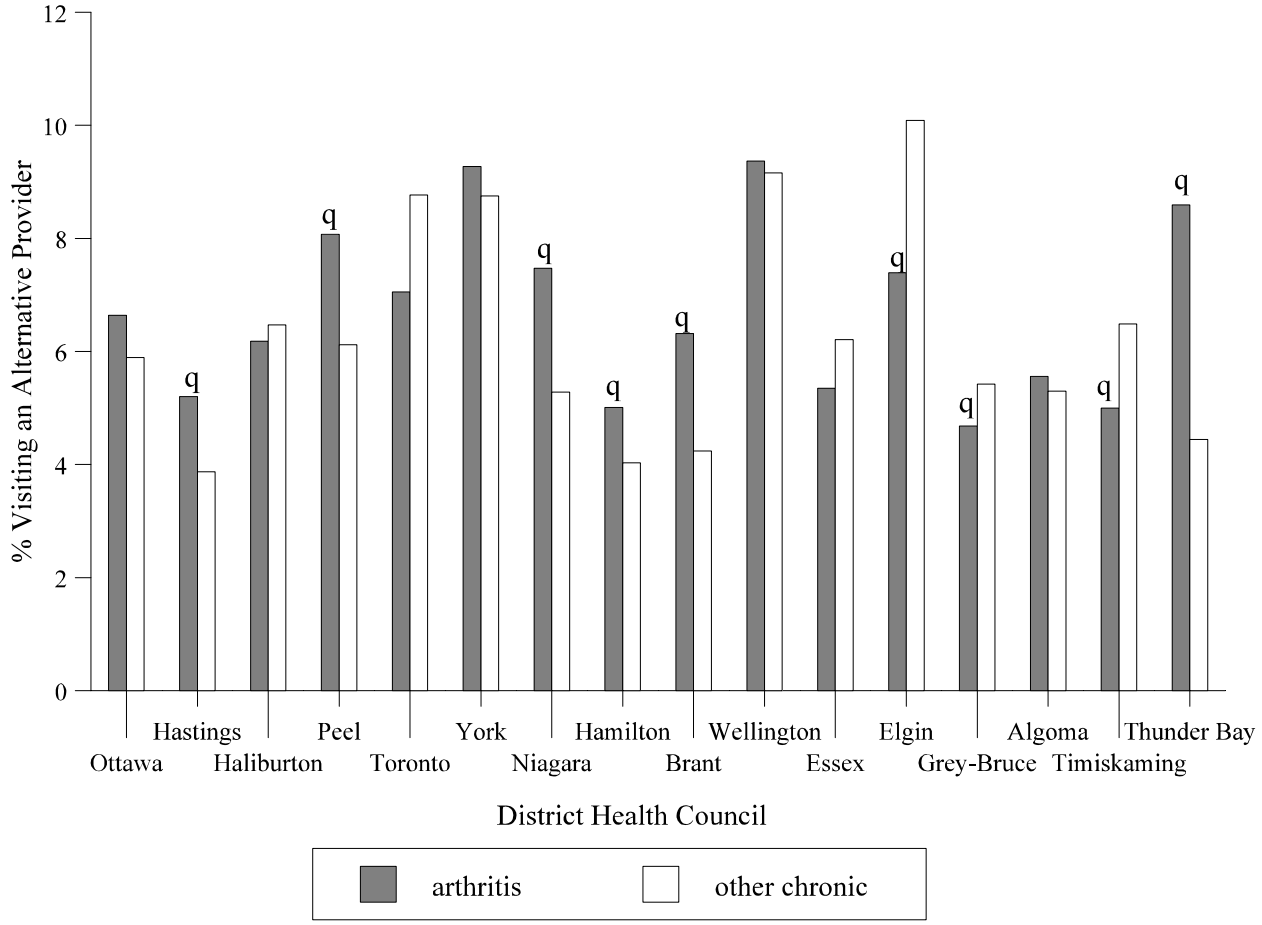

q = qualified datum; insufficient number of respondents to publish with confidence

**Figure 13: Chiropractor visits: percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils reporting visits within the past 12 months**



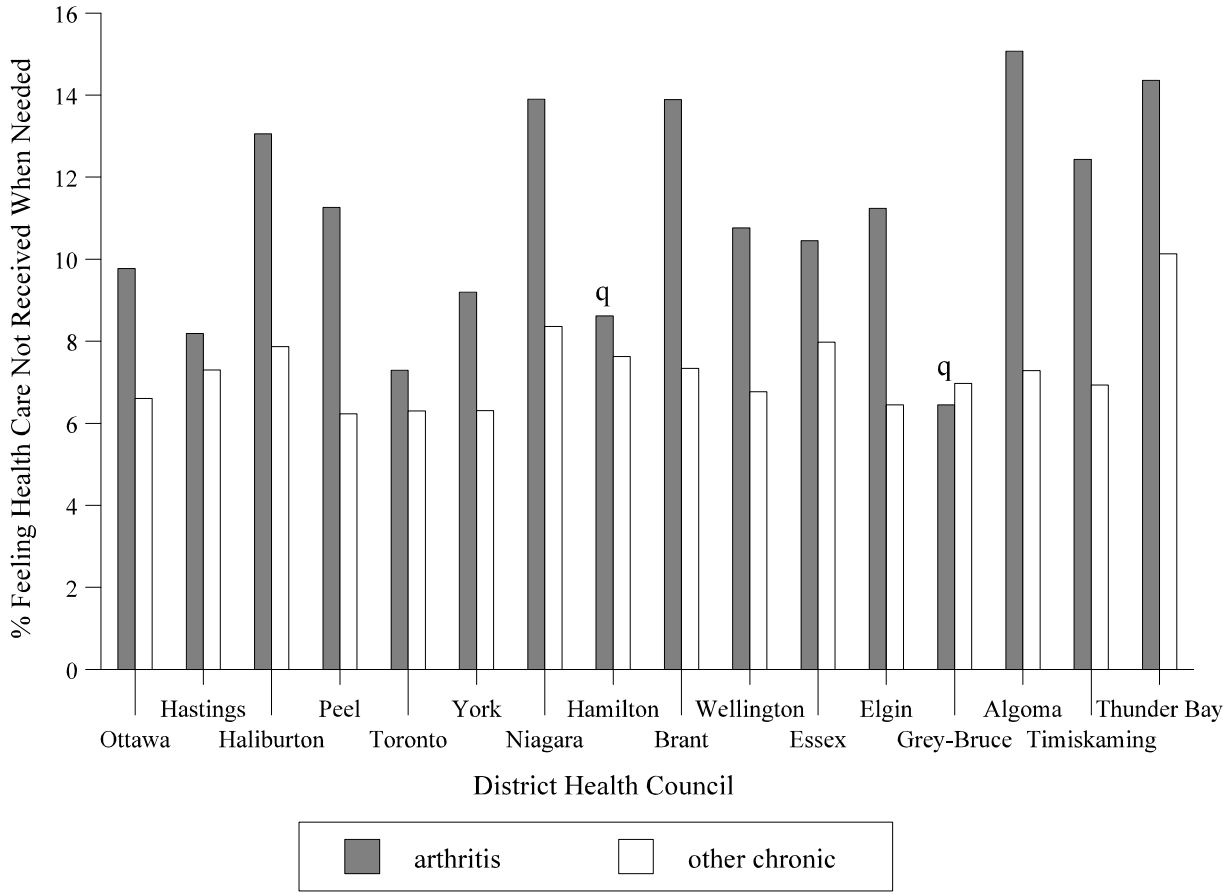

q = qualified datum; insufficient number of respondents to publish with confidence

**Figure 14: Alternative health care provider visits: percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils reporting visits within the past 12 months**



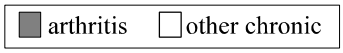

q = qualified datum; insufficient number of respondents to publish with confidence

**Figure 15: Percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, in each of sixteen Ontario District Health Councils, reporting that health care was not received when needed within the past 12 months**

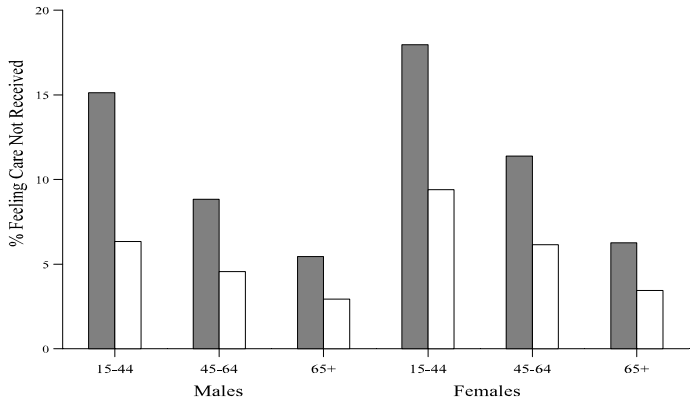



q = qualified datum; insufficient number of respondents to publish with confidence

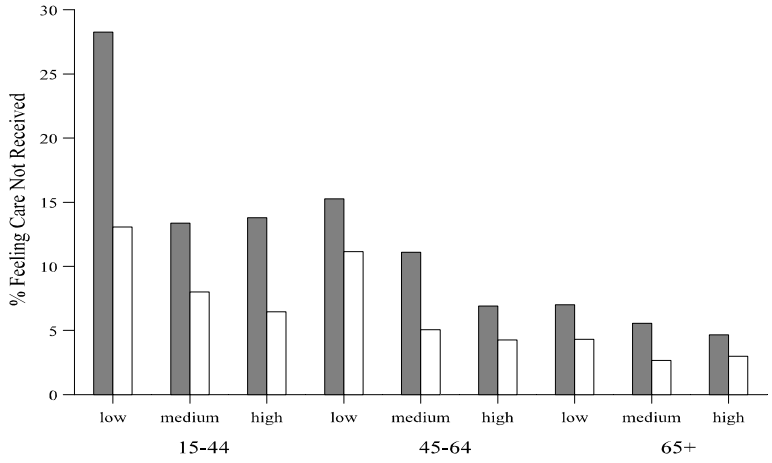
**Figure 16: Percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions, reporting that health care was not received when needed within the past 12 months by age, sex, income and education**




a) by age and sex




b) by age and income




c) by age and education

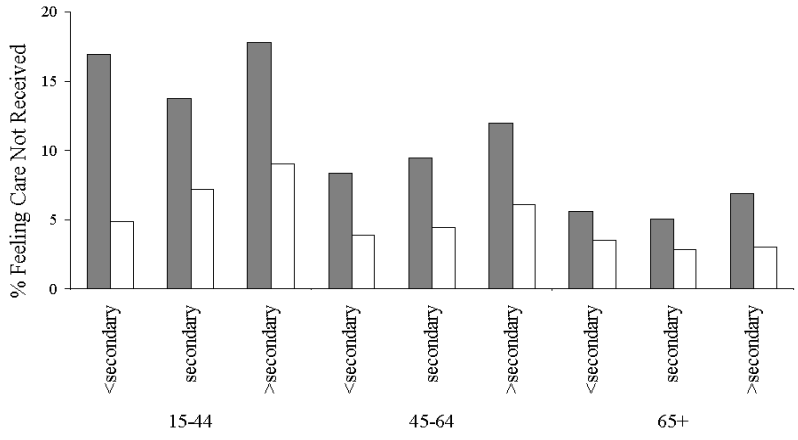
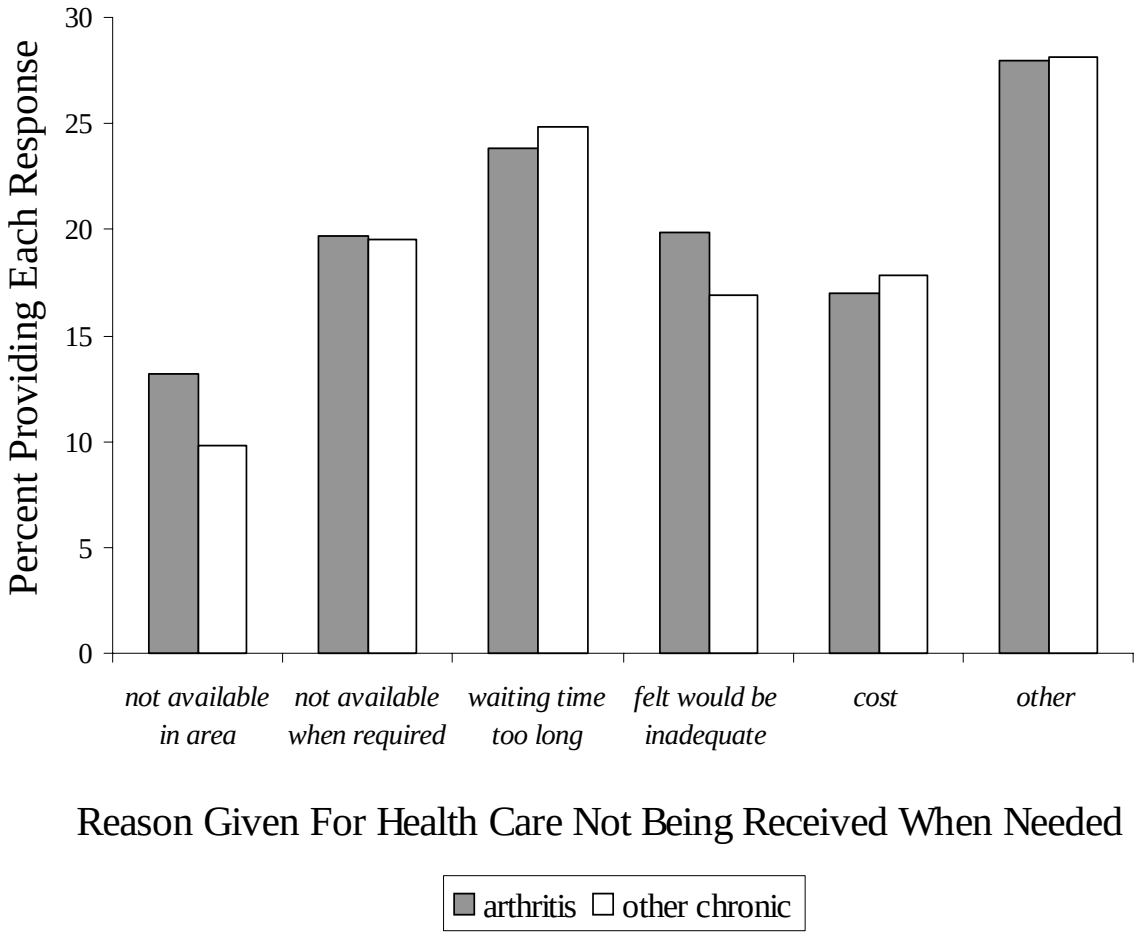


**Figure 17: Percentage of people aged 15+ with arthritis or rheumatism and other chronic conditions: distribution of reasons provided for feeling that health care was not received when needed**



## TECHNICAL APPENDIX

The 1996/97 Ontario Health Survey was conducted in a representative sample of the population of the regions of Ontario. In order to provide estimates for the total population, a numerical weighting factor was applied to the data from each individual interviewed. The variable WT66_S, computed by Statistics Canada, contains that weighting factor. It represents the reciprocal of the individual's probability of being selected for survey. As well as adjusting for the sampling fraction, this weighting factor also adjusts for other aspects such as differential non-response in particular groups in the population. For the calculation of statistical significance, the weighting factor was re-scaled by dividing the weight by the mean weight for the total sample, so that the average weight is equal to unity. This allows for variance estimates to be more conservative and to be in line with the estimates that would be expected from the total number of people interviewed, rather than the total number of people in the population.

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 potentially 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.

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. For estimated 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 noted by the letter 'q'.