Ambulatory Physician Care for Musculoskeletal Disorders in Canada

J. DENISE POWER, ANTHONY V. PERRUCCIO, MARIE DESMEULES, CLAUDIA LAGACÉ, and ELIZABETH M. BADLEY

ABSTRACT. ***Objective.*** To examine patterns of ambulatory physician visits for musculoskeletal disorders (MSD) in Canada.

Methods. Physician claims data from 7 provinces were analyzed for ambulatory visits made by adults age ≥ 15 years to primary care physicians and specialists (all medical specialists, rheumatologists, internists, all surgical specialists, orthopedic surgeons) for MSD (arthritis and related conditions, bone disorders, back disorders, ill defined symptoms) during fiscal year 1998-99. Person-visit rates and total and mean number of visits to all physicians for MSD were calculated by condition group. The percentages of patients with MSD seeing physicians of different specialties were also calculated. Provincial data were combined to calculate national estimates.

Results. Over 15.5 million physician visits were made for MSD during 1998-99. About 24% of Canadians made at least one physician visit for MSD: 16% for arthritis and related conditions, 2% for bone disorders, 7% for back disorders, and 6% for ill defined symptoms. Person-visit rates for MSD varied by province, were highest among older Canadians, and were greater for women than men. Primary care physicians were commonly seen, particularly for back disorders. Consultation with surgical and medical specialists was less common and varied by province and by condition.

Conclusion. MSD place a significant burden on Canada's ambulatory healthcare system. As the population ages, there will be an escalating demand for care. Careful planning will be required to ensure that those affected have access to the care they require. A limitation in using administrative data to examine health service utilization is that MSD diagnostic codes require validation. (J Rheumatol 2006;33:133–9)

Key Indexing Terms:
MUSCULOSKELETAL DISEASES ARTHRITIS
BONE DISEASES BACK AMBULATORY CARE

Musculoskeletal disorders (MSD) encompass a broad range of conditions affecting the bones, joints, and supporting structures and include conditions such as osteoarthritis (OA), rheumatoid arthritis (RA), osteoporosis, and spinal disorders. MSD are highly prevalent and rank among the most common medical conditions[1-4]. In the 1990 Ontario Health Survey, MSD were the most frequently reported type of chronic condition, reported by 22% of the population aged 16 years and older[1]. The prevalence of MSD increases markedly with age; American data from 2001 indicate that just under 60% of persons aged 65 years and older report arthritis or chronic joint symptoms[5].

MSD are leading causes of morbidity and disability, having a significant influence on quality of life and resulting in substantial economic and social costs[1,2,5-13]. The total economic burden of MSD in Canada was estimated at $16.4 billion dollars in 1998, ranking it the second most costly disease group after cardiovascular disease[8]. The indirect costs of MSD, for example due to wage losses, accounted for more than 5 times the direct costs. Medical expenditures in the United States in 1996 for MSD were equivalent to 2.5% of the gross domestic product that year at $193 billion dollars, with physician visits accounting for 23% of the costs[13].

The impact of MSD worldwide is vast and given the aging of the population, the burden associated with these

From the Arthritis Community Research and Evaluation Unit (ACREU), Toronto Western Research Institute, University Health Network, Toronto; Department of Public Health Sciences, University of Toronto, Toronto; and the Centre for Chronic Disease Prevention and Control, Health Canada, Ottawa, Ontario, Canada.

Supported by the Ontario Ministry of Health and Long-Term Care (grant to the Arthritis Community Research and Evaluation Unit) and funding through the Health Canada report Arthritis in Canada, with contributions from Health Canada, unrestricted grants from Merck Frosst Canada & Co., Pfizer Canada, Wyeth Canada, Amgen, Aventis Pharma Inc., and Sanofi-Synthelabo, and in-kind support from the Canadian Arthritis Network and The Arthritis Society.

J.D. Power, MHSc, Research Associate; A.V. Perruccio, MHSc, Research Associate, ACREU, Toronto Western Research Institute; M. DesMeules, MSc, Chief; C. Lagacé, MSc, Epidemiologist, Population Health Assessment Section, Surveillance and Risk Assessment Division, Centre for Chronic Disease Prevention and Control, Public Health Agency of Canada; E.M. Badley, DPhil, Professor, Department of Public Health Sciences, Faculty of Medicine, University of Toronto, Head, Division of Outcomes and Population Health, Director, ACREU, Toronto Western Research Institute.

Address reprint requests to Dr. E.M. Badley, Arthritis Community Research and Evaluation Unit, Toronto Western Research Institute, 399 Bathurst Street, MP10-316, Toronto, Ontario M5T 2S8.
E-mail: badley@uhnres.utoronto.ca

Accepted for publication August 8, 2005.

conditions is projected to increase greatly[2,14]. Despite this, the effects of MSD seem to be relatively unappreciated compared to diseases more commonly associated with increased mortality, such as cancer and heart disease.

The World Health Organization, the United Nations, and the governments of countries worldwide have officially endorsed 2000–2010 as the Bone and Joint Decade. Part of the goal of this initiative is to raise awareness of the growing burden of MSD on society. We examined one component of this burden in Canada — ambulatory healthcare utilization for visits to both primary care physicians and relevant specialists. Understanding the current burden of MSD on the healthcare system is important in terms of assessing the effect of these conditions and for planning and evaluating health services to meet the needs of the aging population.

MATERIALS AND METHODS

Data sources. Canada's publicly funded healthcare system is province and territory-based, consisting of 10 provincial and 3 territorial health insurance plans. These plans are designed to cover medically necessary hospital and physician services. The large majority of Canadian physicians operate on a fee-for-service basis such that in order to be paid, a physician must submit a claim form to their provincial health insurance plan for each patient encounter. As part of the collaboration between the Arthritis Community Research and Evaluation Unit and Health Canada to prepare the first-ever Canadian arthritis surveillance report, *Arthritis in Canada*[15], physician claims data on MSD were collected from 7 Canadian provinces (British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, Nova Scotia) for the fiscal year 1998-99 (April 1998–March 1999). The adult population aged ≥ 15 years in the participating provinces represents about 95% of the population in this age group residing in the 10 Canadian provinces. Data from each province were collected according to a common template. This collaboration marked the first time that data from provincial health services databases were aggregated at a national level.

In each province, all individuals aged ≥ 15 years with at least one ambulatory encounter during the fiscal year 1998-99 for which the physician claim contained a MSD diagnostic code (Table 1) were included in the analyses. These diagnostic codes are taken from the International Classification of Diseases, 9th Revision (ICD-9)[16]. Three of the provinces (Alberta, British Columbia, Quebec) use 4-digit ICD-9 codes, which were reduced to 3-digit codes in all analyses. In 2 provinces (Alberta, Nova Scotia), physicians are able to enter up to 3 codes per patient encounter. For comparability purposes with the other provinces, where only a single diagnostic code is entered on the physician claim, only the first code entered on these claims was considered.

A small minority of Canadian patients and physicians are enrolled in alternative payment plans (e.g., salaried physicians working in community health centers) and claims for care delivered under such plans are not usually included with fee-for-service claims. Data from "shadow bills" (claims submitted to the provincial health insurance plan for administrative purposes but not physician payment when ambulatory care is provided under alternative payment plans) were included in the data presented for Ontario, Saskatchewan, and Nova Scotia. Data missing from alternative payment plans are not likely to have a significant effect on data validity.

In addition to a diagnostic code, each physician claim also provides a unique patient identification number, doctor identification number, and fee codes based on the type of services/procedures received during the visit. These fee codes were used to identify ambulatory claims, while the patient identification numbers were used to convert the visit-oriented claims data to person-oriented data for the analyses described below.

Analyses. Person-visit rates for MSD and the subgroups of arthritis and related conditions, back disorders, bone disorders, and ill defined symptoms (Table 1) were defined as the number of persons with at least one visit for the condition grouping of interest per 1000 population. Person-visit rates were calculated for the 7 participating provinces combined, by sex/age group and by province. To estimate the total number of visits by condition grouping for the 10 Canadian provinces, the number of visits per 1000 population for the participating provinces was calculated and applied to the 1998 population of all 10 provinces. The ratio of women to men making at least one visit for each condition group was also determined, as was the mean number of visits per person.

For each condition grouping, the percentage of individuals with at least one visit that saw physicians of different specialties was determined for the participating provinces combined. Physicians were grouped into the following specialties: primary care physicians, specialists, all medical specialists, rheumatologists, internists, all surgical specialists, and orthopedic surgeons. Primary care physicians were defined as those in general practice or family medicine. Specialists were defined as all medical specialists and all surgical specialists (i.e., all doctors who were not primary care physi-

Table 1. Diagnostic codes for musculoskeletal disorders*.

Condition Groupings		Diagnostic Categories	Diagnostic Codes
All musculoskeletal disorders	Arthritis and related conditions	Gout; polyarteritis nodosa, temporal arteritis; disseminated lupus erythematosus, generalized scleroderma; pyogenic arthritis; arthroplasty associated with other disorders classified elsewhere; rheumatoid arthritis; Still's disease; osteoarthritis; traumatic arthritis; internal derangement of the knee; joint derangement, recurrent dislocation, ankylosis; other and unspecified disorder of the joint; ankylosing spondylitis; polymyalgia rheumatica; peripheral enthesopathies and allied syndromes; synovitis, tenosynovitis, bursitis, bunion, ganglion; Dupuytren's contracture; fibrositis, myositis, muscular rheumatism; other diseases of the musculoskeletal system and connective tissue	274; 446; 710; 711; 713; 714; 715; 716; 717; 718; 719; 720; 725; 726; 727; 728; 729; 739
	Bone disorders	Osteomyelitis; osteitis deformans, Paget's disease of bone; osteochondritis, Legg-Perthes disease; osteoporosis, spontaneous fracture, other diseases of the bone and cartilage; flat foot, pes planus; hallux vagus, hallux varus, hammer toe	730; 731; 732; 733; 734; 735
	Back disorders	Spondylosis and allied disorders; invertebral disc disorders; spinal stenosis in cervical region; lumbar strain, lumbago, coccydynia, sciatica; scoliosis, kyphosis, lordosis	721; 722; 723; 724; 737
	Ill-defined symptoms	Symptoms such as: leg cramps, leg pain, muscle pain, joint pain	781

* Diagnostic codes taken from Chapter 13, Diseases of the Musculoskeletal System and Connective Tissue of the International Classification of Diseases, 9th revision[16]. Diagnostic codes not used: Ontario—713, 717, 719, 721, 723, 725, 726; Saskatchewan—713, 739.

cians). All medical specialists included rheumatologists, internists, and other medical specialists. All surgical specialists included orthopedic surgeons, as well as other surgical specialties. The percentage of individuals that saw a surgical or medical specialist was also calculated by sex and age group for the provinces combined.

Physician specialty was determined as the registered specialty in all of the provinces, with the exception of Ontario and Nova Scotia, where billing specialty was also considered. As registered specialties may not be accurate if physicians do not update the provincial health insurance plan once specialty and subspecialty training is completed, provincial variation in subtypes of medical and surgical specialists was not examined.

RESULTS

Roughly one-quarter of Canadians made at least one visit to a physician for a MSD during 1998-99. Just over 16% of the population made a visit for an arthritis and related condition, specifically. On average, individuals made 2.7 visits for MSD, for an estimated total of over 15.5 million visits (Table 2). Total numbers of visits for arthritis and related conditions, back disorders, and bone disorders were estimated at 8.8 million, 3.5 million, and 600,000, respectively. An additional 2.6 million visits were coded as being due to ill defined musculoskeletal symptoms rather than specific conditions. More women than men made visits for each of the condition groups studied, with the biggest sex difference occurring for bone disorders.

There was considerable variation in person-visit rates for MSD by province (Table 3), ranging from a low of 206 persons visiting per 1000 population in Quebec to a high of 316 persons visiting per 1000 population in British Columbia. The ill defined symptoms code was used quite commonly in British Columbia, Alberta, and Ontario, with rates ranging from 59 to 140 persons visiting per 1000 population, but was rarely used in the other provinces, with rates of 2 to 6 persons visiting per 1000 population.

Person-visit rates were highest for arthritis and related conditions in all age groups for both sexes (Figure 1). For each of the condition groups, rates were consistently higher for women than men across all ages. Visits for arthritis and related conditions and bone disorders increased with age. Person-visit rates for back disorders peaked slightly in middle age and closely mirrored rates for ill defined symptoms.

Overall, 88% of individuals who visited any type of physician for MSD saw a primary care physician at least once and 27% saw a specialist (Table 4). Orthopedic surgeons were the most common type of specialist consulted, followed by internists. The proportion of individuals seen by primary care physicians varied by condition, being highest for ill defined symptoms and back disorders and lowest for bone disorders. There was also substantial variation in proportions seeing different kinds of specialists by condition (Table 4), as well as provincial variation in medical and surgical specialist consultation for MSD (Table 5).

Although the differences were small, women generally

Table 2. Visits to all physicians for musculoskeletal disorders by adults aged ≥ 15 years, Canada, 1998–99.

Condition	Persons Visiting per 1,000 Population*	Sex Ratio (women:men)	Estimated Total No. of Visits**	Average No. of Visits per Person
Arthritis and related conditions	162.7	1.3:1	8,800,000	2.3
Bone disorders	14.9	3.9:1	600,000	1.7
Back disorders	66.3	1.2:1	3,540,000	2.2
Ill defined symptoms	60.3	1.3:1	2,630,000	1.8
All musculoskeletal disorders	242.8	1.3:1	15,570,000	2.7

* Person visit rates for arthritis and related conditions, bone disorders, back disorders, and ill defined symptoms do not sum to the rate for all musculoskeletal disorders, as an individual may see a physician for more than one of these conditions in a year. ** A rate was calculated using data from the 7 participating provinces, and visits for the 3 nonparticipating provinces were estimated by applying this rate to their respective 1998 provincial populations. All other data are from the 7 participating provinces only.

Table 3. Person-visit rates to all physicians for musculoskeletal disorders among adults aged ≥ 15 years by Canadian province, 1998–99.

	Persons Visiting per 1,000 Population*						
Condition	BC	AB	SK	MB	ON	QC	NS
Arthritis and related conditions	162.8	167.7	170.3	207.3	145.5	152.2	181.4
Bone disorders	8.7	17.1	12.3	11.2	15.5	18.1	7.1
Back disorders	84.4	58.8	69.6	67.3	60.5	65.1	89.2
Ill defined symptoms	140.3	58.7	2.4	2.0	85.0	5.7	3.8
All musculoskeletal disorders	316.0	246.1	221.4	287.8	238.5	206.2	243.3

* Person-visit rates for arthritis and related conditions, bone disorders, back disorders, and ill defined symptoms do not sum to the rate for all musculoskeletal disorders, as an individual may see a physician for more than one of these conditions in a year. BC: British Columbia; AB: Alberta; SK: Saskatchewan; MB: Manitoba; ON: Ontario; QC: Quebec, NS: Nova Scotia.

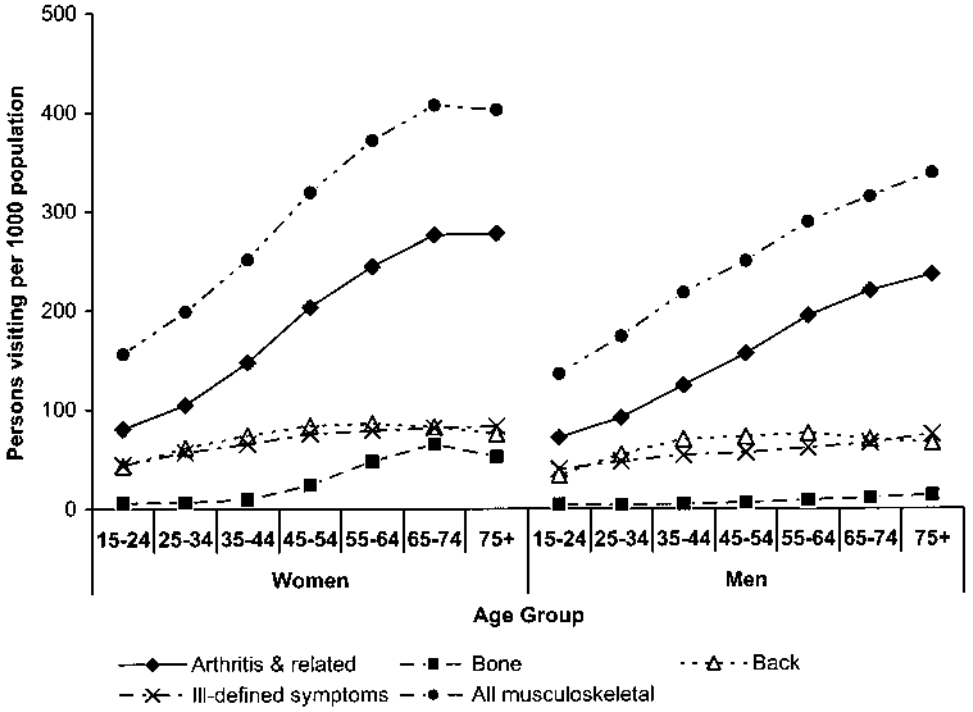

Figure 1. Person-visit rates to all physicians for musculoskeletal disorders among adults age ≥ 15 years, by sex and age group, in participating Canadian provinces, 1998-99.

Table 4. Distribution of type of physician seen by adults aged ≥ 15 years for musculoskeletal disorders, participating Canadian provinces, 1998–99.

	Type of Physician*, %						
				Medical Specialists		Surgical Specialists	
Condition	Primary Care	All Specialists	All	Rheumatologists	Internists	All	Orthopedic Surgeons
Arthritis and related conditions	82.0	30.3	13.7	5.5	4.8	18.5	15.1
Bone disorders	65.6	37.3	23.5	4.9	8.8	14.4	12.8
Back disorders	89.4	18.3	9.1	1.5	1.9	10.6	6.9
Ill defined symptoms	91.1	11.7	7.9	1.0	2.2	4.0	2.8
All musculoskeletal disorders	88.3	26.6	13.2	4.2	4.4	15.7	12.4

* Row percentages do not sum to 100% as an individual can visit more than one type of physician in a year.

Table 5. Percentage of patients aged ≥ 15 years who saw a medical specialist or a surgical specialist at least once for musculoskeletal disorders, by Canadian province*, 1998–99.

	Percentage Saw a Medical Specialist/Percentage Saw a Surgical Specialist						
Condition	BC	AB	SK	MB	ON	QC	NS
Arthritis and related conditions	8.5/15.4	14.8/19.9	8.1/10.6	10.2/14.7	14.2/19.4	15.8/23.3	7.7/17.7
Bone disorders	8.9/19.0	24.8/9.4	20.3/5.7	17.4/20.6	27.3/13.2	23.1/16.6	14.5/20.0
Back disorders	4.2/8.8	5.8/11.2	5.4/9.7	7.9/7.9	9.2/9.4	14.7/14.2	4.4/7.4
Ill defined symptoms	2.4/1.5	7.4/0.6	38.0/2.4	43.8/6.0	10.1/5.9	27.9/4.5	19.3/3.0
All musculoskeletal disorders	6.5/11.1	13.8/13.1	8.8/11.2	10.2/13.3	15.1/15.6	17.2/21.9	7.8/16.2

BC: British Columbia; AB: Alberta; SK: Saskatchewan; MB: Manitoba; ON: Ontario; QC: Quebec, NS: Nova Scotia.

saw medical specialists for MSD in higher proportions than men across age groups, while men saw surgical specialists in slightly higher proportions. In general, the proportions of patients who saw a medical or surgical specialist for MSD at least once tended to increase with age, peaking for those in the 55–64 or 65+ age groups and decreasing for those age 75 and older. The pattern for women who saw a surgical specialist for bone disorders was distinct, with a sharp decline occurring for those age 45–54 with a continued decline into the older age groups. Trends with age for men were less pronounced.

DISCUSSION

This is the first study to examine ambulatory physician visits for musculoskeletal disorders (MSD) in Canada on a national level. These conditions account for over 15.5 million annual visits to physician made by roughly one in 4 Canadians. Person-visit rates to physicians for these conditions vary by province, are highest among older Canadians, and are greater for women than men. Primary care physicians play a substantial role in the care of MSD, particularly for back disorders. Surgical and medical specialists also play important roles in the treatment of MSD, especially for arthritis and related conditions and for bone disorders.

The Canadian person-visit rate for MSD at 243 per 1000 population is in reasonable agreement with the prevalence of self-reported health professional-diagnosed MSD (fibromyalgia, arthritis and rheumatism, back problems) in the 2000 Canadian Community Health Survey (CCHS) at 28.9% (unpublished data). The overall visit rate for arthritis and related conditions is also similar to the CCHS estimated prevalence of these conditions[2]. Further, provincial prevalence estimates for arthritis range from 12.0% to 23.3% in the CCHS[2], while 15% to 21% of the provincial populations made at least one physician visit for these conditions. The findings are also consistent with data from the 1990 Ontario Health Survey indicating that almost 20% of people reporting they consulted with a health professional in the last 2 weeks did so due to MSD, making it the most common reason for consultation[1]. Further, 1996-97 Ontario physician claims data indicated that 21% of Ontarians made visits to primary care physicians for MSD, and the total number of visits made for this purpose was exceeded only by those made for diseases of the respiratory system[17]. Data from other countries indicate that MSD account for 15%–20% of all primary care consultations[18].

The 2000 National Ambulatory Medical Care Survey indicated that in the United States 59,270,000 visits, or 7.2% of all visits to physician offices, were for MSD (ICD-9 codes 710–739)[19]. Although this is not the exact set of diagnostic codes we considered in our analyses, it is in close agreement with the proportion of ambulatory visits attributed to MSD in the provinces of Ontario and Alberta, the only 2 provinces for which we were able to obtain data on all visits, at 9.7% and 7.3%, respectively (unpublished data).

Despite the limitations inherent in claims data, our findings do have face validity. The observed age/sex pattern of consultation was in general agreement with epidemiological data. For example, the increase in person-visit rates for bone disorders in women beginning at 45–54 years of age coincides with the expected onset of menopause and the increased incidence of osteoporosis[20]. The observed age pattern of consultation for back disorders agrees with data collected from surveys[21]. However, the overall person-visit rate for these disorders at 7% is much lower than the prevalence of back problems in the CCHS at 18%[2], although it is in reasonable accord with the 8.4% of adults in the United Kingdom who consult in general practice[22]. The lower person-visit rate relative to the population prevalence is probably due, in part, to the fact that many people with new or mild back problems do not seek medical care, and because we did not collect data on strains and sprains, as will be discussed later.

It is not possible to determine the appropriateness of age/sex patterns of specialist consultation from the administrative data we collected. In general, older individuals with MSD saw specialists in higher proportions than younger people, except for those seeing surgical specialists for bone disorders. For these individuals, there was a decrease in the proportion seeing a surgical specialist with increasing age. It is difficult to ascertain why this occurred, as our bone disorders grouping contained a range of conditions. It may be that younger people are more likely to have corrective surgery than older people.

Overall, we found that women were more likely to see medical specialists for MSD, while men were more likely to see surgical specialists. This may be a function of the types of conditions each sex has a propensity to develop, disease severity, or personal preference. However, this may also reflect barriers to care. Research conducted in Ontario has found that women are less likely than men to receive joint replacement surgery for hip and knee arthritis, even after adjusting for need and willingness[23].

Access to specialist care for MSD in Canada requires further study in terms of provincial variation. It is unknown to what extent provincial differences are due to the availability of specialists or differences in primary care referral patterns. Rheumatologists and orthopedic surgeons play large roles in MSD care, and shortages of both of these types of specialists in Canada are a concern[24,25]. Further, the role of internists may require further study, as a significant proportion of MSD patients consulted these physicians. Problems with primary care referral, specifically to rheumatologists for early RA, have been identified in Ontario[26]. Further, consultation patterns with rheumatologists in Ontario have been found to vary such that in regions with high proportions of RA patients being treated by primary care physicians, there is lower utilization of rheumatology services[27].

This is an important finding, as lack of access to rheumatology services has been associated with underuse of disease modifying antirheumatic drugs[27].

Access to orthopedic services and the associated wait times has been identified as an important first stage in access to total joint replacement, a cost-effective procedure for endstage arthritis[28-30]. We found provincial variation in consultation with surgical specialists. Further, considerable provincial variations in joint replacement rates and in waiting times have also been identified in Canada[31]. The relationship between variations in joint replacement rates, waiting times, and ambulatory visit rates to orthopedic surgeons requires study.

Our person-visit rates underestimate physician care for all MSD, as we did not collect data on sprains and strains (ICD codes 840–848). Additionally, some of the codes we did include may be used interchangeably with the sprain/strain codes. Buchbinder, *et al*[32] conducted a chart review to examine the ICD-9 coding of soft tissue disorders of the neck and upper limb in a Canadian steel company medical department, and found that 31% of visits for inflammation were coded as sprain/strain, as were 42% of visits for pain. They also noted that many of the same specific diagnoses were coded by multiple ICD-9 codes. This variation in coding is most likely to influence our findings for arthritis and related conditions and back disorders, such that we may have missed some relevant visits.

Some of the provincial variation we found in person-visit rates for MSD may be due to differences in provincial claims databases. For example, physicians in Ontario do not use 5 of the 18 arthritis diagnostic codes considered, and the person-visit rate for arthritis was lowest in Ontario. Some of the provinces provide physicians with a list of which conditions are associated with each diagnostic code and these lists vary to some degree.

A major limitation of examining claims data in Canada is that only one diagnostic code is provided per patient encounter in most provinces. It is possible that MSD are seen as secondary rather than primary diagnoses and are therefore coded less often than warranted by the frequency of their presentation. Conversely, because we included individuals in our analyses for a particular condition if they made at least one visit to any type of physician for that diagnosis, we may have included patients with only tentative diagnoses. However, the effect of this is likely diminished by the fact that we looked at relatively large groupings of conditions, such as bone disorders, in contrast to specific conditions, such as osteoporosis.

There is a definite need to validate the MSD diagnostic codes used in Canadian physician claims. A study from the province of Quebec[33] compared claims diagnoses with medical charts and found a sensitivity of only 23.9% for gout, the only MSD studied. However, the positive predictive value of using ICD codes from Medicare claims made by rheumatologists in the United States has been reported to be at least 0.90 for RA and systemic lupus erythematosus, and 0.83 for OA and fibromyalgia[34]. Other studies have suggested a lower positive predictive value for OA at approximately 0.6, when diagnoses recorded by a physician of any specialty were considered[35,36].

A major strength of our study is its high coverage of the Canadian population. Due to the design of Canada's publicly funded healthcare system and the participation of 7 provinces, our findings are highly representative of the Canadian adult population. Further, we were able to examine data on visits to specialists in addition to primary care physicians, and we considered an extensive list of MSD diagnoses, including nonspecific diagnoses likely to be used in primary care.

Our findings clearly show that MSD place a significant burden on Canada's ambulatory healthcare system. As the baby boom generation ages and the number of people affected by these conditions increases, there will be an escalating demand for care. Service providers and funding agencies will have to plan carefully to ensure that those affected have access to the primary and specialist care they require. The research community has an important role to play in assessing quality of care and barriers to access and evaluating alternative methods of care delivery.

ACKNOWLEDGMENT

The authors thank the following organizations and individuals for providing the data for this project: Alberta Health, Larry Svenson; Arthritis Research Centre of Canada, Jacek Kopec; Cancer Care Manitoba, Erich Kliewer and Wendy Fonsecaholt; The Institute for Clinical and Evaluative Studies, Jun Guan; Montreal General Hospital, McGill University, Elham Rhame and Martin Ladouceur; Population Health Research Unit, Dalhousie University, George Kephart and Alison James; and Saskatchewan Health, Winanne Downey.

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