2010

Life *with* Arthritis *in* Canada

A personal and public health challenge

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A few words from the Chief Public Health Officer

Dear reader,

I urge everyone in reading this report, *Life with Arthritis in Canada: A personal and public health challenge*, to identify what can be done within your organization or personally to prevent and reduce the impact of arthritis among Canadians.

Although progress is being made on interventions to reduce the impact of arthritis on Canadians, arthritis remains common, costly, and disabling. More than 4.2 million Canadians live with one or more of the 100 conditions that comprise arthritis. It is one of the leading causes of pain and physical disability in Canada and a major public health challenge. Arthritis may affect one's daily activities, choice of career, social participation, relationships and family life, and economic status.

Life with Arthritis in Canada: A personal and public health challenge is designed to increase public awareness that arthritis is not simply a normal part of aging and the importance of prevention and timely management.

This report reflects the commitment of the Public Health Agency of Canada and the organizations and individuals which have collaborated on this report to provide the much needed information on arthritis to policy makers, health care providers, volunteers and the public. I would like to thank them for their ongoing commitment to the reduction of the burden of arthritis for all Canadians.

I encourage you to use this report within your areas of interest or expertise to improve the health of Canadians.

Dr. David Butler-Jones

Chief Public Health Officer of Canada

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Executive Summary

"Arthritis" is used to describe more than 100 rheumatic diseases and conditions that affect a joint or joints, causing pain, swelling and stiffness which often lead to disability. It is one of the most prevalent chronic health conditions in Canada and is a major cause of disability and health care utilization.

This report, *Life with Arthritis in Canada: A personal and public challenge* is the second national surveillance report on arthritis. Using the most recent data sources available, it provides an overview of arthritis in the Canadian population and its wide-ranging impact. It also suggests approaches for reducing the risk of developing some types of arthritis (osteoarthritis and gout) in addition to minimizing disability and improving the quality of life of those living with any type of arthritis.

In 2007-2008, over 4.2 million Canadians (16%) aged 15 years and older reported that they had arthritis. With the aging population, this number is expected to increase to approximately 7 million (20%) in 2031. Arthritis was the second and third most common chronic condition reported by women and men, respectively. Overall, nearly two-thirds (64%) of those affected with arthritis were women. Nearly three in five people with arthritis were aged under 65 years.

Arthritis can have a major impact on individuals and families, with many individuals reporting fair or poor general and mental health, needing help with daily activities in addition to limitations in work, community, social and civic life. On average, over a quarter of men and women with arthritis between 25 and 44 years of age were not in the labour force because of their arthritis.

Even though physical activity is very important in the prevention and management of arthritis, in 2007-2008 a higher proportion of individuals with arthritis were physically inactive during their leisure time compared to those without arthritis (59% and 49%, respectively). Furthermore, 63% of Canadians aged 18 years and over with arthritis were overweight or obese compared to 49% of those without arthritis.

While deaths from arthritis are uncommon, in 2005, 777 women and 296 men in Canada died from an arthritis condition: rheumatoid arthritis, systemic lupus erythematosus and other connective tissue diseases accounted for approximately 60% of all arthritis deaths. Two fifths (40%) of people who died from arthritis died prematurely (before the age of 75 years) which is similar to the percentage of Canadians who died prematurely of all causes (39%).

The economic burden of arthritis in Canada was estimated to be 6.4 billion dollars in 2000 — over one quarter (29%) of the total cost of musculoskeletal diseases. Of the total arthritis-related costs, the greatest impact is due to the indirect costs ($4.3 billion) which consists of the lost production attributable to long-term disability and premature death versus direct costs ($2.1 billion) which include hospital, drug, physician and additional health care expenditures. This indirect cost is underestimated as short term disability costs were not available. Nearly two thirds (65%) of the total arthritis-related costs were incurred by individuals aged 35–64 years ($4.1 billion) which emphasizes the important economic burden of arthritis in Canadians of work-force age.

In 2007, over 4 million non-steroidal anti-inflammatory drugs (NSAIDs), over 1 million disease modifying anti-rheumatic drugs (DMARDs), close to a million corticosteroids and approximately 150,000 biologic response modifier prescriptions were written in Canada for individuals with a diagnosis of arthritis. While there has been a decrease in the use of prescription NSAIDs and corticosteroids for arthritis, there has been an increase in the use of the newer DMARDs and biologic response modifiers.

Approximately 14% of people over the age of 15 years made at least one visit to a physician in 2005-2006 for any type of arthritis — an estimated total of 8.5 million visits in Canada (excluding the territories). In 2005-2006 most people (80%) who visited a physician for any type of arthritis saw a primary care physician at least once; approximately 19% saw a surgical specialist and fewer (14%) visited a medical specialist. Of all surgical specialists, orthopaedic surgeons were the most commonly consulted surgical specialists (85%).

In 2005-2006, there were 2.2 million hospitalizations in Canada of which 1.5 million were for medical care and 721,000 were for surgery. Arthritis was associated with over 6% (132,000) of the total hospitalizations — 3% of the 1.5 million medical hospitalization (45,000 hospitalizations annually) and 13% of the 721,000 surgical hospitalizations (93,730 hospitalizations annually).

Between 2001/02 and 2005/06, the total number of joint replacements increased by 54%. People aged 65 years and older had the largest number of hip and knee replacements. In 2005-2006, 74% of individuals who underwent hip replacement and 87% of those who received knee replacements were overweight or obese. Given the current prevalence of obesity in the population, it is expected that the number of individuals needing total joint replacements will continue to increase.

Maintaining a healthy body weight and avoiding joint injuries including occupational-related joint stress can help prevent osteoarthritis. Maintaining a healthy body weight, daily exercise and a reduced consumption of purine-rich foods such as red meat, seafood and alcohol will reduce the risk of gout. A balanced diet and maintaining or increasing physical activity are crucial components in the maintenance of a healthy weight.

Interventions exist to prevent disability and improve the quality of life of people living with arthritis (all types). These include: appropriate self-management behaviours such as maintaining a healthy weight, being physically active, avoiding joint injuries, participating in self-management programs, and getting an early diagnosis and treatment, particularly for inflammatory types of arthritis, to help reduce the risk of complications and disability.

Introduction

Moving, walking, lifting — all of these activities and more — involve the use of the body's muscles, bones and joints. They are integral to normal functioning of the human body, yet most of us spend very little time thinking about them. For more than 4 million Canadians living with arthritis, these activities cannot be taken for granted. Many have to carry on these activities through pain and fatigue or experience daily restrictions in performing them.

Arthritis makes up a large group of disorders affecting the joints, ligaments, tendons, bones and other components of the musculoskeletal system. It is one of Canada's most common chronic conditions affecting both individuals with the disease and inevitably their families. It is a leading cause of pain, physical disability and use of health care services. Arthritis has an impact on leisure and social activities, and on employment among individuals of all ages and is one of the most costly illnesses.

This is the second comprehensive report to document the impact of arthritis in Canada. Its purpose is to provide an overview of the impact of arthritis in Canada for researchers, health care professionals, policymakers and members of the interested public, particularly individuals with arthritis.

The goals of this report are to:

1. Provide an overview of the magnitude of the impact of arthritis on the Canadian population, including health and social outcomes and the use of health care services;
2. Describe approaches to reduce the risk of developing some forms of arthritis and to reduce adverse consequences of arthritis.

Documenting the impact of arthritis presents a number of challenges. First, the term "arthritis" covers a range of different conditions; the most commonly known are described in Chapter 1. While every effort has been made to be consistent in the types of arthritis included in the analyses, the use of a variety of data sources necessitated some variation in the range of arthritis conditions included. Second, arthritis is not always recorded as the underlying diagnosis in administrative databases such as those related to physician visits, hospital admissions or death, creating a challenge for surveillance.

Third, it is currently not possible to track and provide information for each type of arthritis due to a lack of data. Therefore, the information contained in this report focuses on arthritis as a group of diseases. Finally, while arthritis is more common in older age groups, children are also affected. Unfortunately, data on arthritis in children are currently not available at the national level and not included in this report. New data sources are being developed and this information will be provided as it becomes available.

Throughout the report, vignettes written by people with arthritis illustrate the personal challenge of living with the many different types of arthritis. Members of the Editorial Board, three not-for-profit organizations, Arthritis Consumer Experts (ACE), The Arthritis Society of Canada, and the Canadian Arthritis Patient Alliance (CAPA) were given the opportunity to reach out to their constituents inviting them to share their experiences of living with arthritis.

ACE and CAPA used their on-line and in-print publications, JointHealth™ express and Voices respectively, to send out a request to people living with arthritis to tell their own stories about life with the disease. The Arthritis Society sent an email through various Society channels asking a short list of questions to ensure that the full scope of arthritis' impact would be reflected: types of arthritis, life impact and the geographic diversity of Canada. From the responses, nine people were contacted for comprehensive interviews.

The response to the request for stories was overwhelming. Over 100 stories were received within one week and experiences shared ranged from personal triumph over arthritis to devastating loss — loss of health, mobility, marriage, career and more. Some responses were relatively brief, but the vast majority were detailed experiences of the daily realities of living with arthritis. The end result was a series of personal stories from which vignettes were chosen for the inclusion in this report.

Every person with arthritis has a different and personal story to tell. While the vignettes in this report are only a small reflection of the 4.2 million Canadians with arthritis and may reflect the experience of those with moderate or severe forms of arthritis, having the opportunity to tell and share stories in this forum provides a window on the scope and magnitude of this chronic condition.

Structure of the report

This report is the second in the series of comprehensive surveillance reports that began with Arthritis in Canada: an ongoing challenge, published by Health Canada in 2003.

The current report provides more in-depth information about prevention, treatment and management of these conditions, as well as providing insight into significant issues such as disability and economic burden. The report has been organised into nine chapters with a section on data sources and a glossary.

- **Chapter one** focuses on the prevalence of arthritis by demographic characteristics, geography and projections over time.
- **Chapter two** provides information on the modifiable and non-modifiable risk factors for arthritis and the existing prevention interventions.
- **Chapter three** presents available Canadian data on arthritis-related disability and the impact of the many forms of the disease on quality of life.
- **Chapter four** focuses on arthritis among Canada's First Nations, Inuit and Métis populations.
- **Chapter five** presents the most recent mortality data for arthritis.
- **Chapter six** presents the most recent cost estimates for musculoskeletal diseases and arthritis expenditures from the Economic Burden of Illness in Canada project.
- **Chapter seven** focuses on arthritis-related medication use.
- **Chapter eight** examines ambulatory care through an assessment of visits to primary care physicians and relevant specialists.
- **Chapter nine** presents data on hospital services utilization by people with arthritis — hospitalizations (medical and surgical) and day surgeries.
- The **data sources** section provides information on all the data sources used in the report.
- The **glossary** presents the definitions for several technical words used throughout the report.

This report will be useful to a wide range of audiences, including people with arthritis, health care professionals, policy makers and health planners, the general public, as well as community advocates.

Chapter One

What is arthritis and how common is it?

> *"I was quite concerned and depressed about the diagnosis as I had an aunt who at that time was already quite "deformed" by her rheumatoid arthritis. I was only about 27 at the time, with two young children and very active physically. I did not want to face this change in my lifestyle."*
>
> — Person living with rheumatoid arthritis

> *"I was only six and a half years old, just remember being scared to be in the hospital. I was in there for a month while they took daily blood and skin tests. My disease went into remission at age 11, so I enjoyed a normal life, enjoyed some school sports and got two jobs after school, took karate, played paintball. But at age 24, the disease came roaring back, affecting multiple joints—some of which were not touched before—causing complete and permanent disability. I have not worked since. Became a shut in. Medicine in those days was not very effective."*
>
> — Person living with rheumatoid arthritis

Introduction

This chapter addresses two key questions: "What is arthritis?" and "How common is it?" The first section describes arthritis in general and its different types. The second section presents the prevalence of arthritis in the Canadian population according to personal characteristics, place of residence and projects the prevalence of arthritis into the future.

What is arthritis?

Put simply, arthritis means "joint inflammation" and encompasses more than 100 rheumatic diseases and conditions that affect the joints, the tissues that surround the joint and other connective tissue. The most familiar types of arthritis are osteoarthritis (OA), rheumatoid arthritis (RA), systemic lupus erythematosus, childhood or juvenile idiopathic arthritis (JIA), and gout (Table 1-1). For further information about the different types of arthritis see the Glossary.

Table 1-1 *Major types of arthritis*

	Osteoarthritis (OA)	Rheumatoid Arthritis (RA)	Ankylosing Spondylitis (AS) and other spondyloarthropathies	Connective tissue disorders *	Juvenile Idiopathic Arthritis (JIA)	Gout
Background	OA results from deterioration of cartilage and thickening of the bones underneath, in one or more joints. This leads to joint damage, pain and stiffness. Typically affects hands, feet, knees, spine and hips.	RA is caused by the body's immune system attacking the body's joints (primarily hands, wrists and feet). This leads to pain, inflammation and joint damage. RA may also involve other organ systems such as eyes, heart and lungs.	Inflammatory arthritis of the spine. Causes pain and stiffness in the back and possibly a bent posture. Usually characterized by acute painful episodes and remissions. Disease severity varies widely among individuals. Other spondyloarthropathies include psoriatic arthritis and Reiter's disease.	Connective tissue disorder causing skin rashes, joint and muscle swelling, and pain. May also affect organs. Fluctuates over time, with flare-ups and periods of remission. Connective tissue disorders include systemic lupus erythematosus, scleroderma, polymyositis, dermatomyositis, and Sjögren's syndrome.	JIA is a rare chronic condition of children and adolescents. Although rarely fatal, the condition is long-term and associated with serious physical disability.	Gout is caused by too much uric acid in the body. Most often affects the big toe but can also affect the ankle, knee, foot, hand, wrist or elbow. Gout can be episodic, with long periods of remission followed by flare-ups for days to weeks, or it can become chronic.
Prevalence	Affects more than 10% Canadian adults.	Affects approximately 1% of Canadian adults (at least twice as many women as men).	Affects approximately 1% of Canadian adults (three times more men than women).	Affects approximately 0.05% of Canadian adults (up to ten times more women than men).	Affects approximately 5 to 10 per 10,000 children under the age of 16 years.	Affects up to 3% of Canadian adults (four times more men than women).
Possible risk factors	Age, heredity, obesity, previous joint injury.	Hormones, heredity, ethnicity.	Heredity and possibly, gastrointestinal or genitourinary infections and psoriasis (in the case of psoriatic arthritis).	Heredity, hormones and possibly a variety of environmental factors.	Onset may coincidentally follow a routine infection or injury, but such common events do not cause JIA. The immune system may be responsible for the inflammation.	Heredity, certain medications (e.g. diuretics), alcohol and certain foods (high intake of purine rich foods such as red meat and seafood).
Possible management strategies	Treatments can decrease pain and improve joint mobility, and include: • Medication (e.g. analgesics, anti-inflammatory drugs) • Exercise • Physiotherapy/ Occupational therapy • Weight loss/Healthy weight • Participation in self-management education programs In severe cases, the entire joint — particularly the hip or knee — may be replaced through surgery.	Early, aggressive treatment by a rheumatologist can prevent joint damage. • Medication (e.g. non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, disease-modifying anti-rheumatic drugs (DMARDs) and biologic response modifiers) • Exercise • Physiotherapy / Occupational therapy • Healthy weight • Participation in self-management education programs	Medications similar to those used for other types of arthritis are often prescribed to treat AS. • Exercise • Physiotherapy / Occupational therapy • Healthy weight • Participation in self-management education programs If damage is severe, surgery may be considered	Treatment goal is to control symptoms, reduce the number of flare-ups and prevent damage. • Medication (e.g. analgesics, anti-inflammatory drugs, cortisone and disease-modifying anti-rheumatic drugs (DMARDs)) • Exercise • Physiotherapy/ Occupational therapy • Healthy weight • Participation in self-management education programs • Balanced diet and avoiding excessive alcohol consumption	• Medication (e.g. non-steroidal anti-inflammatory drugs (NSAIDs) are often used to treat JIA to help reduce pain and swelling and decrease stiffness) • Exercise • Physiotherapy/ Occupational therapy: to minimize long-term damage to joints and muscles and to preserve function • Healthy weight • Participation in self-management education programs	• Medication (e.g. non-steroidal anti-inflammatory drugs (NSAIDs) and allopurinol can be used on a long-term basis to reduce uric acid levels and prevent future attacks. • Exercise • Physiotherapy/Occupational therapy • Healthy weight • Participation in self-management education programs

* Also known as Systemic Autoimmune Rheumatic Diseases (SARDS) in Canada.

Most types of arthritis are characterized by pain, aching, stiffness and swelling in and around joints or elsewhere in the musculoskeletal system.[1] They can affect the structure and functioning of the joints, leading to increased pain, disability and difficulty in performing everyday tasks and activities.[1-5]

Arthritis affects people of all ages. Although it is most prevalent among seniors, arthritis also affects babies, toddlers and people in the prime of their working lives, and can cause lifelong, permanent disability.

At the present time there is no known cure for arthritis, but appropriate treatment and management can prevent disability, maintain function and reduce pain.[1,3-5] While treatments vary according to the type of arthritis, general management and rehabilitation interventions are similar for all types. It includes pain management, self-management education, maintenance of healthy weight, medication and minimization of the impact of arthritis via rehabilitation interventions, such as adapted exercises and the use of assistive devices.

How common is arthritis?

Arthritis is one of the most common chronic health conditions in Canada and a major cause of morbidity, disability and health care utilization.[2,6,7]

Data from the Canadian Community Health Survey (CCHS) 2007-2008 were used for this chapter.* The CCHS asked respondents about the presence of chronic conditions with the question "Do you have any of the following long-term conditions that have been diagnosed by a health professional?" "Arthritis, excluding fibromyalgia" was one of the options from which respondents could choose. The CCHS defined a long-term condition as lasting or expected to last six months or longer. Data for people aged 15 years and over were included in this chapter.

Between 2005 and 2007-2008, the wording of the question on arthritis was changed. In 2001, 2003 and 2005, the question included the term "rheumatism", whereas in 2007-2008, this term was removed from the question. Consequently, the estimated prevalence of arthritis cannot be directly compared over time and the estimates presented in this chapter may appear lower than in the previous years. The change in the wording must be taken into account when interpreting and comparing current estimates to those of previous years.

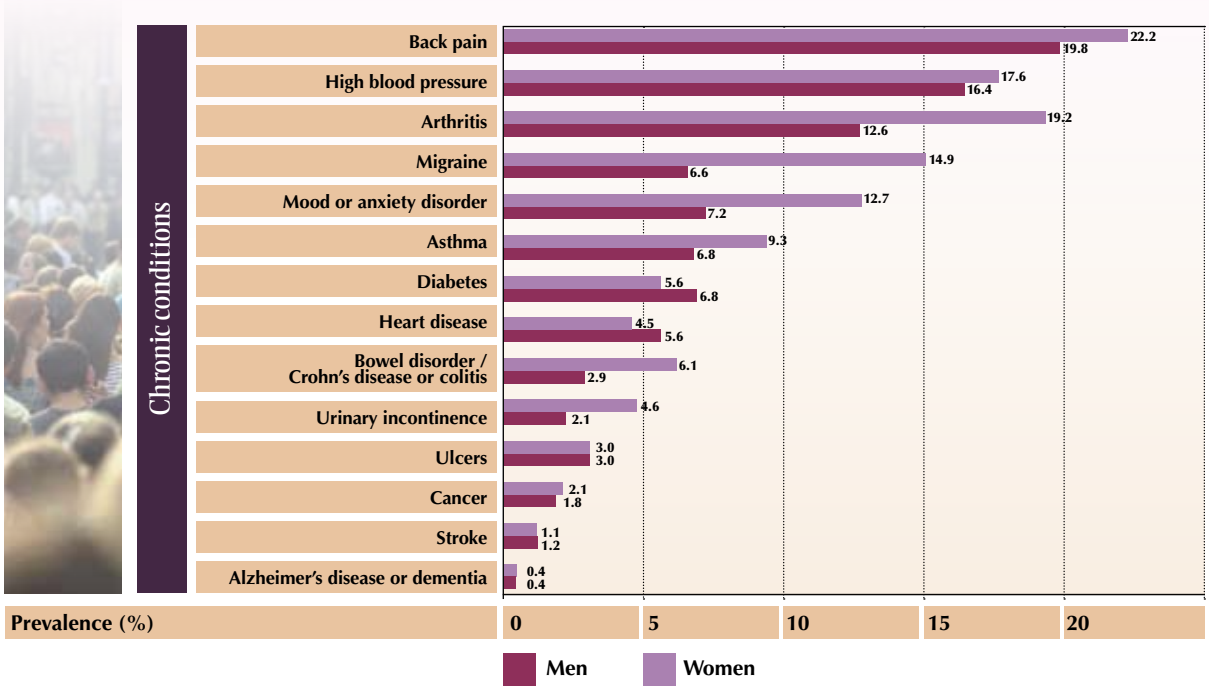
> ***"When I was first diagnosed, I thought, That's it. I'm 34 and life is finished."***
>
> — Person living with rheumatoid arthritis

* A more detailed description of the CCHS can be found under Data sources at the end of this report. The analyses for this chapter are based on Statistics Canada's CCHS, 2007-2008 share file (unless otherwise specified). All computations on these microdata were done by the Public Health Agency of Canada (PHAC), and the responsibility for the use and interpretation of these data in this report is entirely that of the author(s).

Prevalence by age and sex

In 2007-2008, arthritis as a long-term health condition affected more than 4.2 million Canadians aged 15 years and older — or 16% of this population. Arthritis was the second and third most common chronic condition reported by women and men, respectively (Figure 1-1).

Figure 1-1 *Self-reported prevalence of specific chronic conditions by sex, household population aged 15 years and older, Canada 2007-2008*

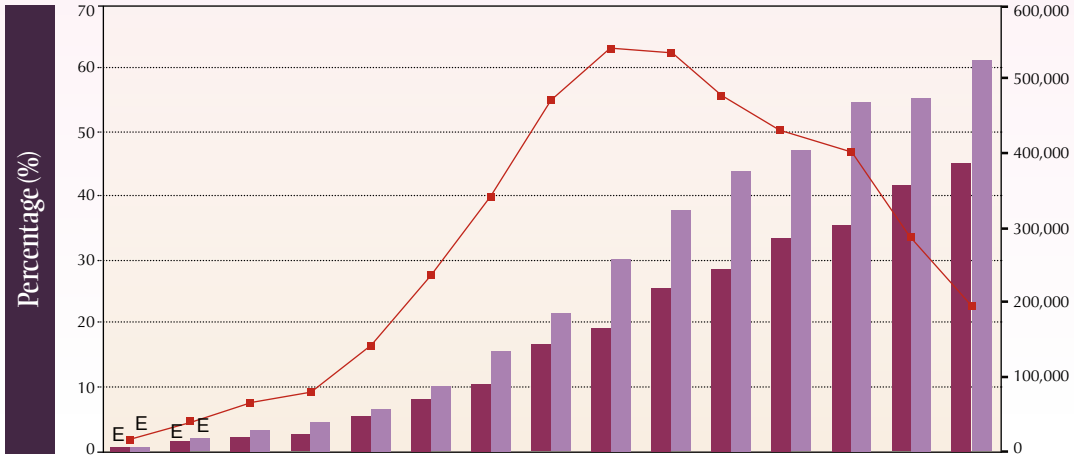


♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

The prevalence of arthritis increased with increasing age (Figure 1-2). In all age groups, prevalence of arthritis was higher among women than men. Overall, nearly two-thirds (64%) of those affected with arthritis were women, among whom the prevalence was 19%. Prevalence among men was 13%.

Several factors, such as longer life expectancy, hormones and lower socio-economic status, may explain the higher prevalence of arthritis among women.[8,9]

Figure 1-2 *Self-reported prevalence and number of individuals with arthritis by age and sex, household population aged 15 years and older, Canada, 2007-2008*

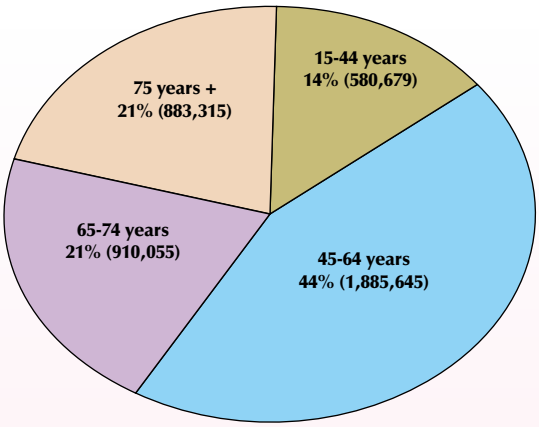


Age Group	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Men	0.7	1.7	2.4	2.7	5.6	8.4	10.5	16.8	19.5	25.4	28.6	33.2	35.4	41.6	45.2
Women	0.8	2.0	3.4	4.8	6.8	10.1	15.6	21.6	30.1	37.5	43.7	47.0	54.7	55.3	61.0
Number of men and women	15,476	40,301	65,772	81,570	141,762	235,798	341,549	471,367	537,992	534,737	478,442	431,613	401,337	287,528	194,450

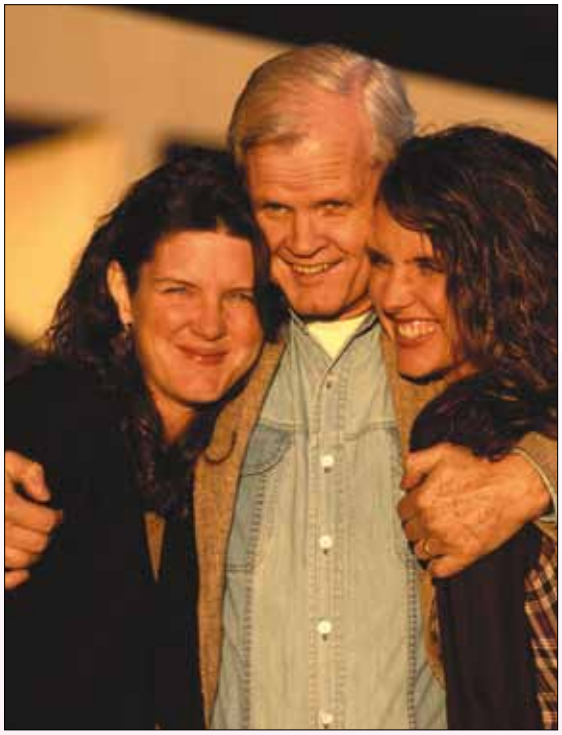
♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada. ♦ E – Interpret with caution.

Although arthritis is perceived as a disease of the elderly, nearly 3 in 5 people (58%) who reported having arthritis in 2007-2008 were younger than 65 years of age (Figure 1-3).

Figure 1-3 *Proportion of total number of individuals with arthritis, by age group, household population aged 15 years and older, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.



Geographic variations in prevalence

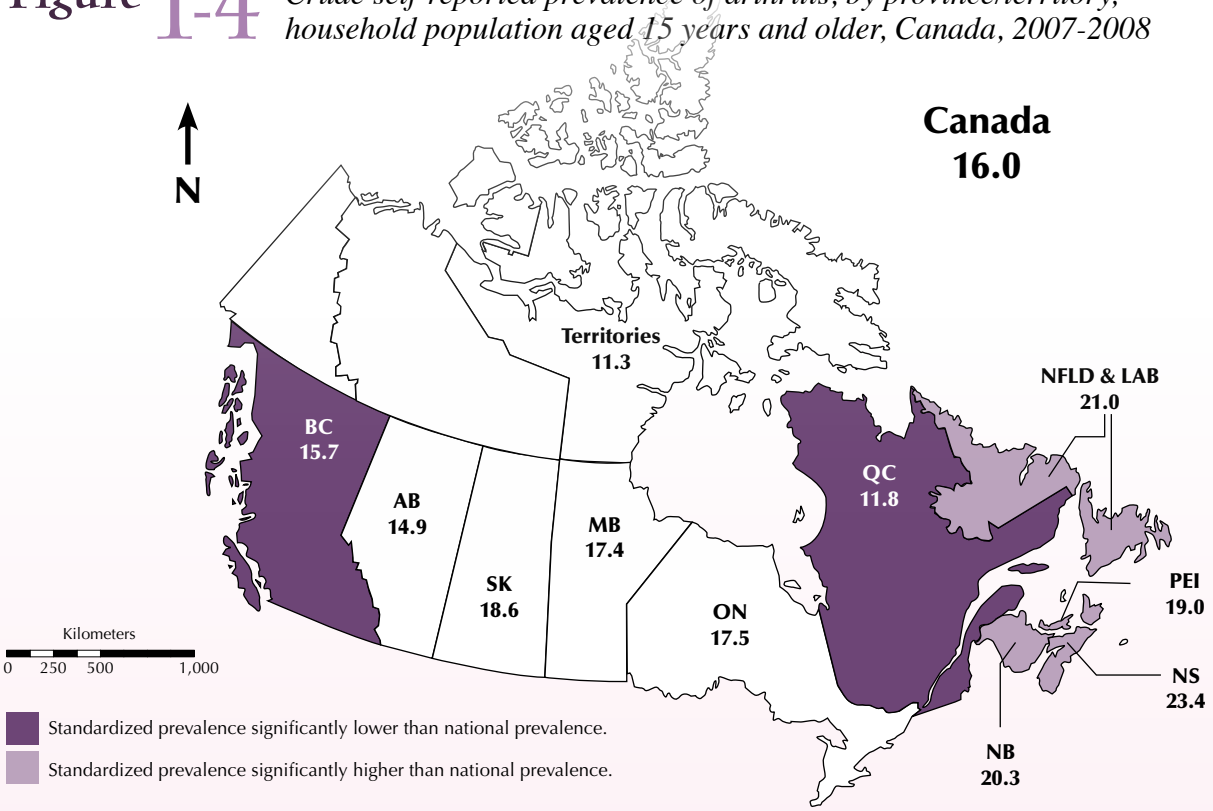
This section presents crude and age-standardized prevalence of arthritis by province/territory. It also shows age-standardized prevalence of arthritis by urban/rural areas and health regions. Crude prevalence is defined as the number of events (in this case, the number of people with arthritis) over a specified period of time, divided by the total population. Age – standardization serves to diminish the effect of differences in the age compositions of the various geographic areas and permit direct comparison with the overall Canadian prevalence.

Provinces and Territories

The crude prevalence of arthritis varied considerably across Canada in 2007-2008 (Figure 1-4 and Table 1-2). The highest percentage of individuals who reported having arthritis was found in Nova Scotia (23%), followed by Newfoundland and Labrador (21%), and New Brunswick and Prince Edward Island (20% and 19% respectively). The province of Quebec (12%) and the Territories (Yukon, Northwest Territories and Nunavut) (11%) had the lowest percentage of individuals who reported having arthritis.

Provinces and territories have different age compositions so age-standardized prevalence estimates were calculated to identify if the differences remained after adjusting for these age differences. Newfoundland and Labrador and Nova Scotia were significantly higher (1.1-1.3 times) than the national prevalence, whereas Quebec and British Columbia were significantly lower (0.6-0.9 times) (Table 1-2). This pattern has been consistently reported over time.[2,10] Differences in obesity rates and demographic and socio-economic factors (e.g. variations in ethnic composition, rural/urban, education, income levels, etc) might explain the provincial variations in the prevalence of self-reported arthritis.[10]

Figure 1-4 *Crude self-reported prevalence of arthritis, by province/territory, household population aged 15 years and older, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada and 1991 Census population for age-standardization.

Table 1-2 *Number of individuals, crude and age-standardized prevalence of self-reported arthritis, by province/territory, household population aged 15 years and older, Canada, 2007-2008*

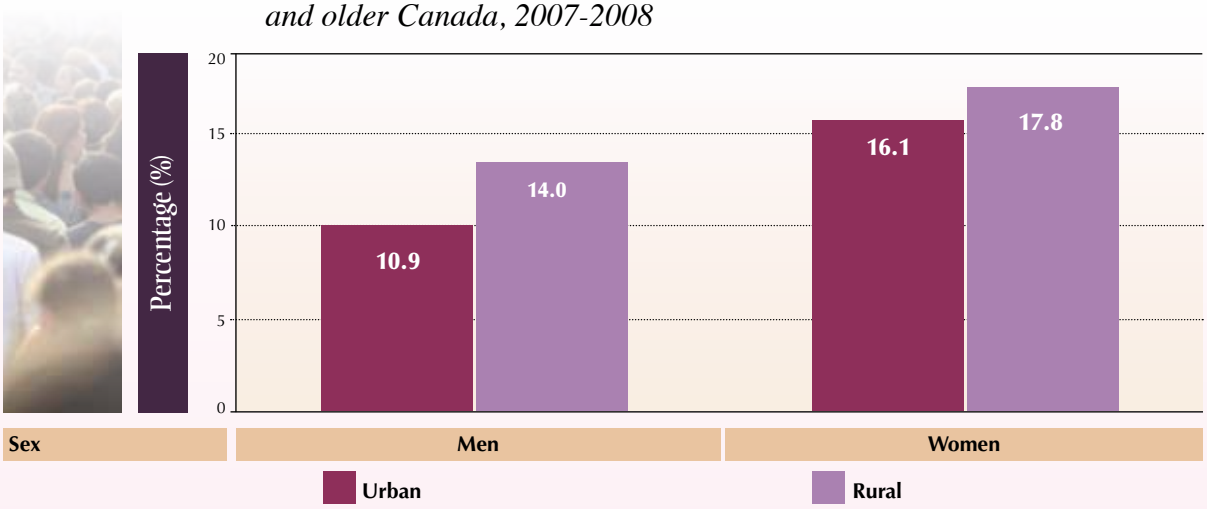
Province	Number	Crude rate (%)	Age – standardized rate per 100 population
British Columbia	560,925	15.7	13.5
Alberta	411,892	14.9	14.8
Saskatchewan	140,658	18.6	15.8
Manitoba	156,349	17.4	15.2
Ontario	1,825,011	17.5	15.7
Quebec	744,037	11.8	9.9
New Brunswick	124,712	20.3	17.0
Nova Scotia	177,515	23.4	19.6
Prince Edward Island	21,592	19.0	16.3
Newfoundland and Labrador	88,929	21.0	17.4
Territories	8,074	11.3	14.2
Canada	**4,259,694**	**16.0**	**15.3**

♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada and 1991 Census population for age-standardization.

Urban and rural areas

Both men and women residing in rural areas reported statistically higher rates of arthritis compared to those residing in urban areas (Figure 1-5). In both rural and urban settings, prevalence of arthritis was higher among women than men. The highest prevalence of arthritis was among women living in rural settings (18%). Higher obesity rates and higher (paid or unpaid) work-related injury rates are consistent with the higher prevalence of arthritis among rural Canadians.[11-14] Agricultural occupations, such as farming, have been found to be associated with higher prevalence of musculoskeletal conditions, particularly osteoarthritis of the hip and knee.[12-14]

Figure 1-5 *Age-standardized self-reported prevalence of arthritis, by rural and urban place of residence and sex, household population aged 15 years and older Canada, 2007-2008*

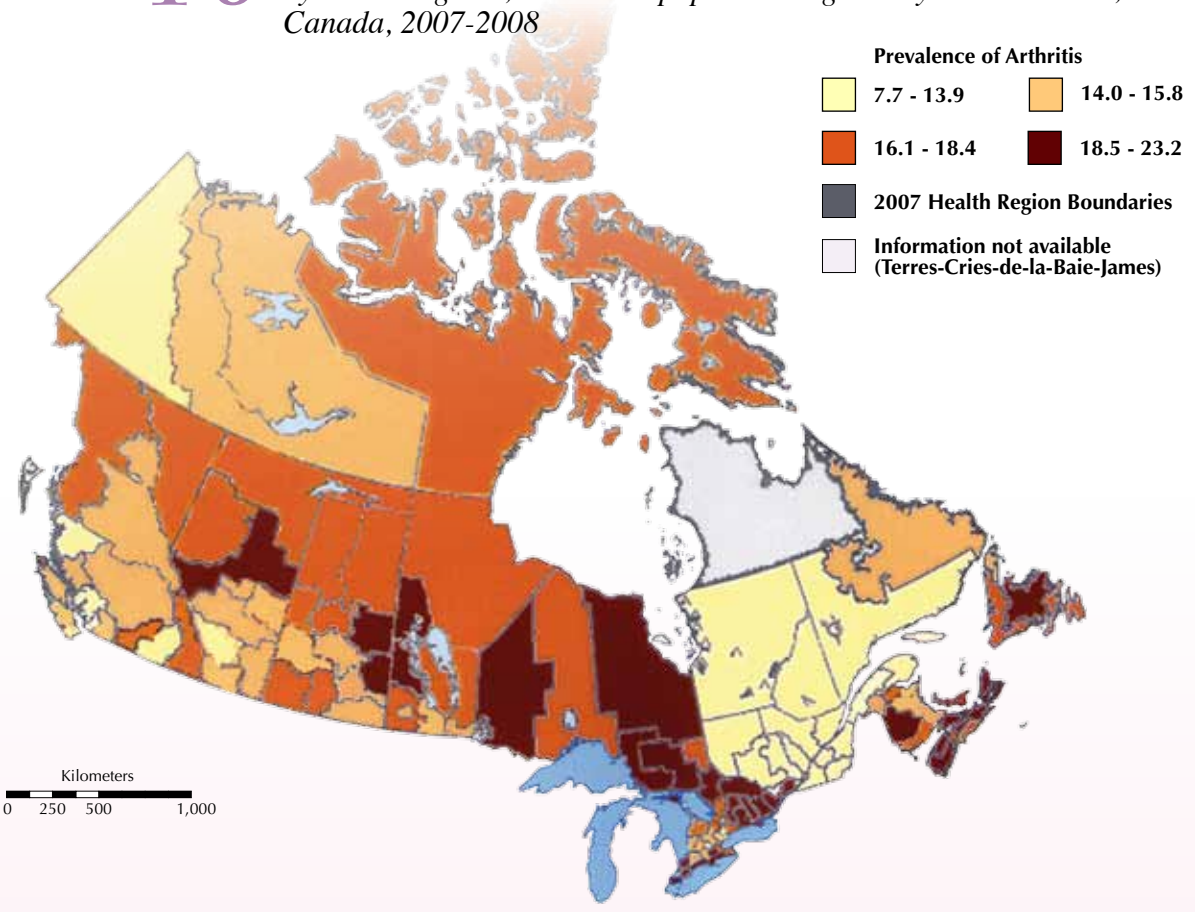


♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

Health regions

The age-standardized prevalence of arthritis varied considerably across Canadian health regions (Figure 1-6). The highest prevalence of arthritis in the country was reported in Ontario's Hastings and Prince Edward counties (27%) and the lowest was reported in Richmond, British Columbia (7%).* Regional variations in socio-economic status, body mass index and ethnic composition could contribute to the observed variations.[1]

Figure 1-6 *Age-standardized self-reported prevalence of arthritis (in quartiles), by health regions, household population aged 15 years and older, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

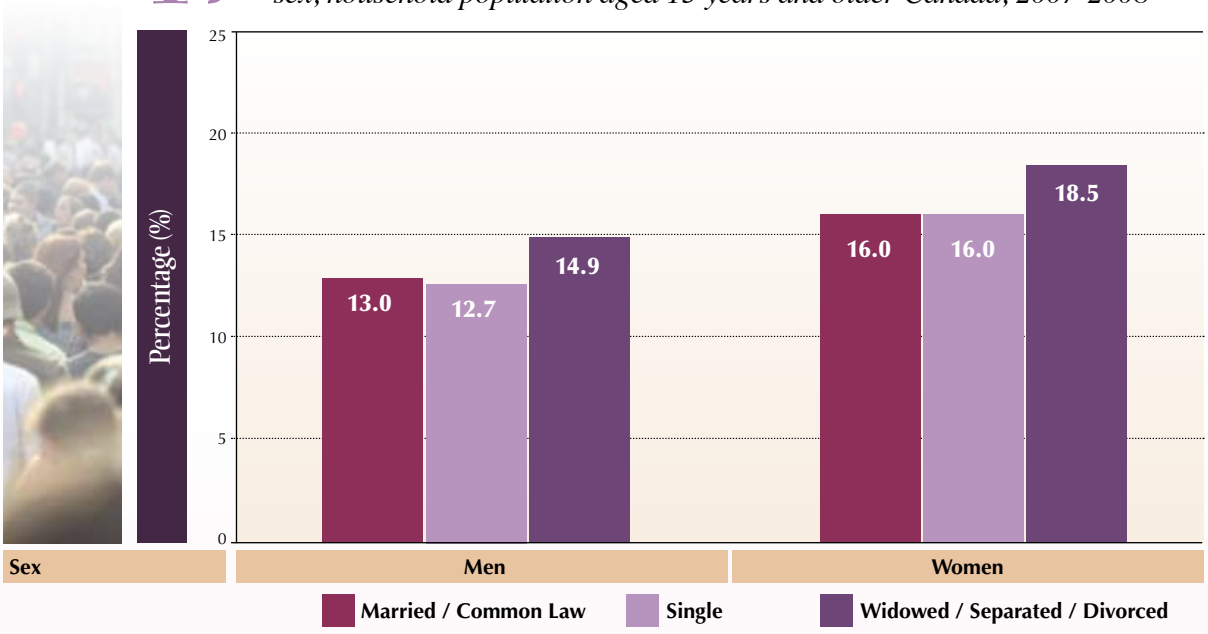
* More details can be found at: www12.statcan.gc.ca/health-sante/82-228/2009/06/index.cfm?Lang=E

Socio-demographic and socio-economic characteristics

Age-standardized prevalence rates are reported in this section. This was done to enable the comparison of rates between groups with different age structure.

The health benefits of relationships like marriage within society are well known.[15,16] For example, married adults are generally found to be healthier than single or divorced adults.[15-16] In keeping with this, the age-standardized prevalence of arthritis was significantly lower among men and women who were married/common law, compared to those who were widowed/separated/divorced (Figure 1-7). The higher rates of arthritis among separated and divorced people could result from the direct effect of arthritis on family dynamics or reduced family income, or from the higher rates of stress-related disability, job loss, and depression among those with arthritis, each of which could put stress on a marriage and lead to separation or divorce.

Figure 1-7 *Age-standardized self-reported prevalence of arthritis, by marital status and sex, household population aged 15 years and older Canada, 2007-2008*

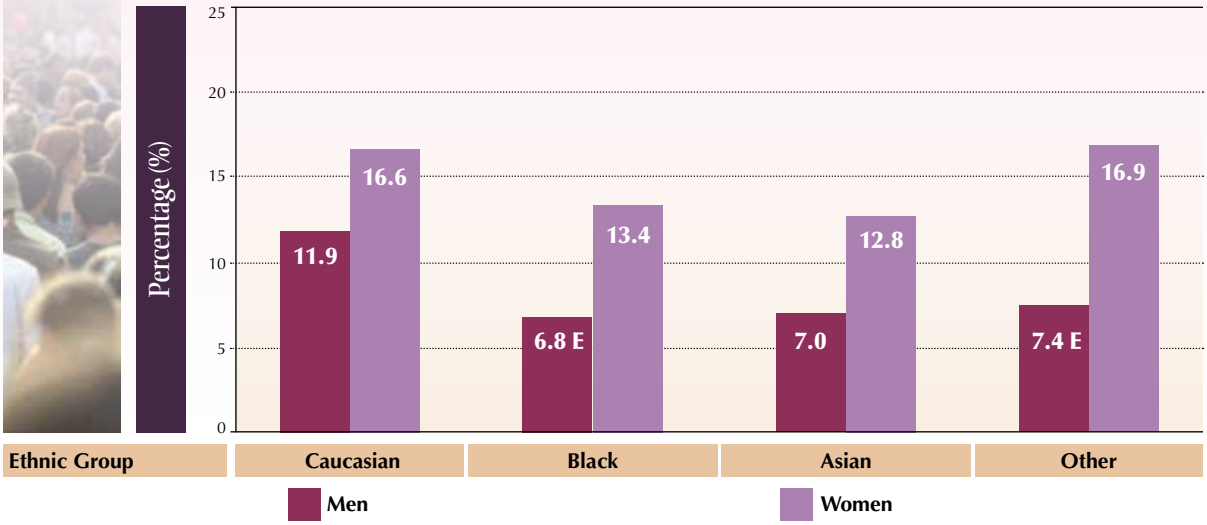


♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

Ethnicity has been identified as a factor associated with arthritis. The age-standardized prevalence of arthritis for Caucasian, Black, Asian and other ethnic groups is illustrated in Figure 1-8. The prevalence rates of arthritis among people from Asian origins were statistically lower than in people of Caucasian origin.

For information about arthritis among First Nations, Inuit and Métis populations, see Chapter 4.

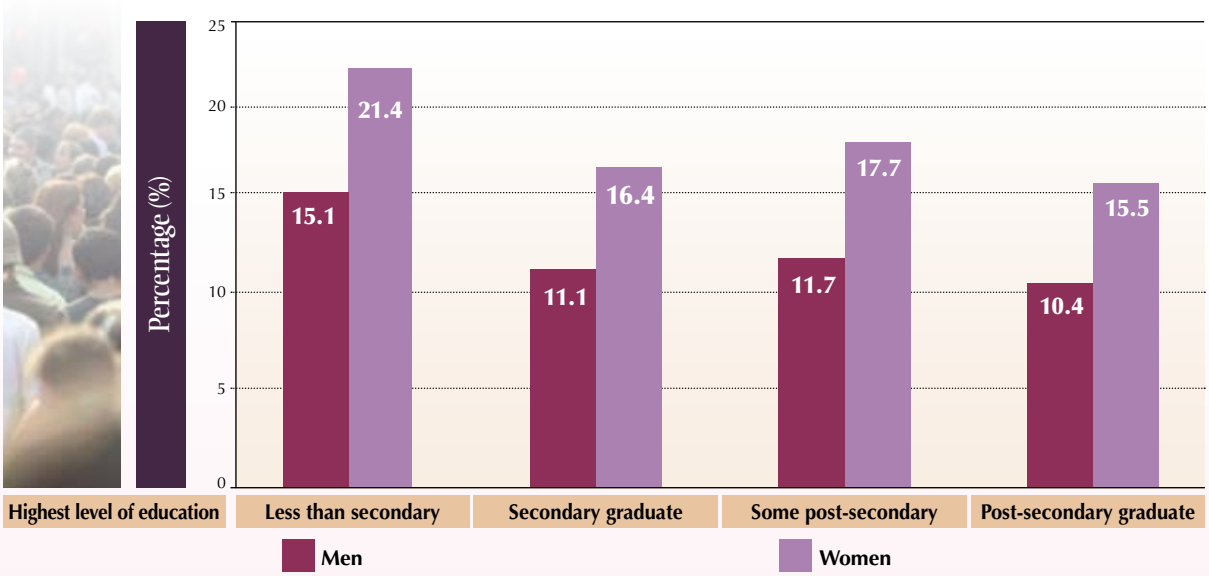
Figure 1-8 *Age-standardized self-reported prevalence of arthritis for Caucasian, Black, Asian and other ethnic groups by sex, household population aged 15 years and over, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada. ♦ E – Interpret with caution. ♦ 'Other' category excludes First Nations, Inuit and Métis populations.

Men and women with less than secondary school education were more likely to report having arthritis compared to all other levels of education (Figure 1-9).

Figure 1-9 *Age-standardized self-reported prevalence of arthritis, by level of education and sex, household population aged 15 years and over, Canada, 2007-2008*

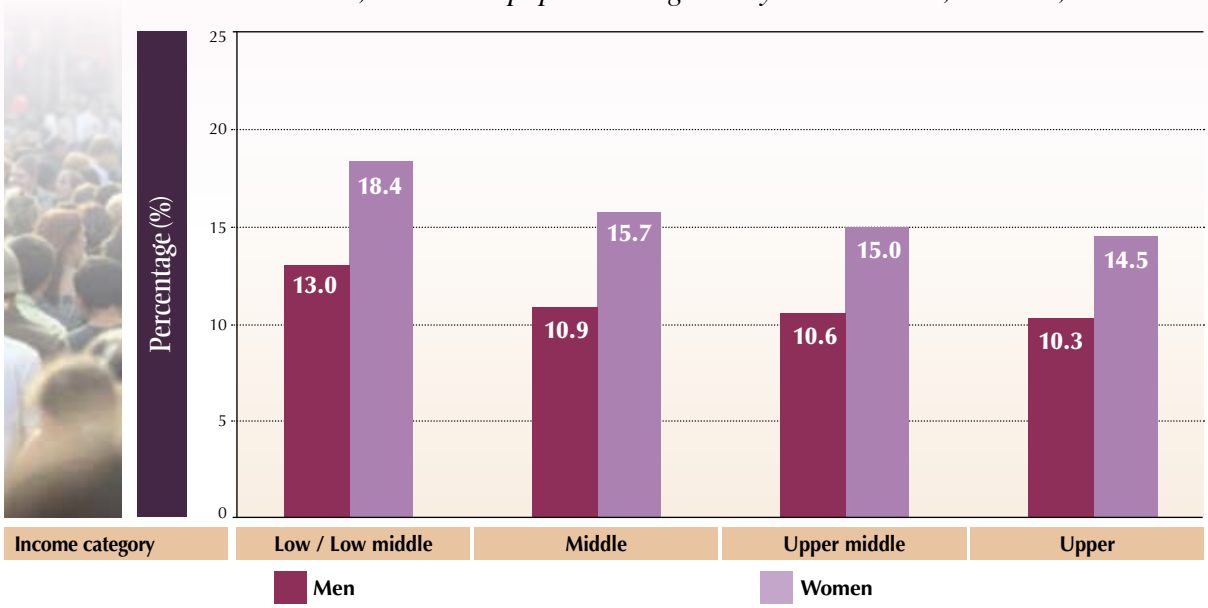


♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

The prevalence of arthritis was significantly higher among women and men with low / low middle income compared to all other income levels (Figure 1-10).

The association between self-reported arthritis and individual level of education and socio-economic status is well established. However, whether arthritis primarily affects those of low socio-economic status or leads to a lower socio-economic status is unknown.[9,17,18] These findings may result from differences in the prevalence of risk factors, as a lower socioeconomic status has been linked with inactivity and obesity, both established risk factors for certain types of arthritis. As well, disability associated with arthritis may reduce the opportunities for higher education and employment.

Figure 1-10 *Age-standardized self-reported prevalence of arthritis, by income and sex, household population aged 15 years and over, Canada, 2007-2008*



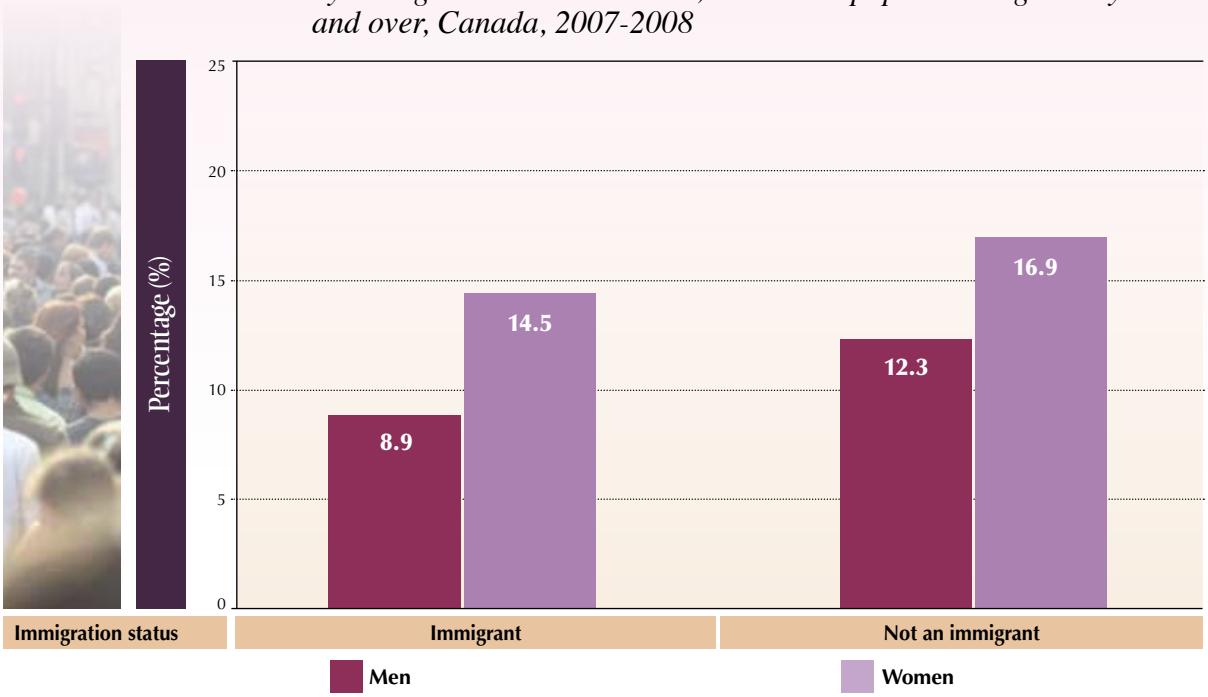
♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

The age-standardized prevalence of arthritis was significantly lower among immigrants than among people who were Canadian-born (Figure 1-11). This may be partly due to the healthy immigrant effect*. Women reported a higher prevalence than men in both immigrant (14% versus 9%) and non-immigrant populations (17% versus 12%).

Figure 1-12 illustrates the impact of time since immigration on the prevalence of arthritis among immigrants. The age-standardized prevalence of arthritis was much lower among recent immigrants (less than 15 years since immigration) than those who immigrated 15 years ago or more. The more time since immigration the more similar the prevalence rates of arthritis became to non-immigrant, particularly among women. These findings are consistent with results from the Canadian literature.[9] Studies reported a narrowing of the health status gap in Canada between individuals who are native born and immigrants as their years in Canada increase — a worsening of immigrant health over time. Some researchers hypothesize that convergence in health outcomes might arise from a process of acculturation, in which recent immigrants gradually take on the characteristics of their "new" society.[9]

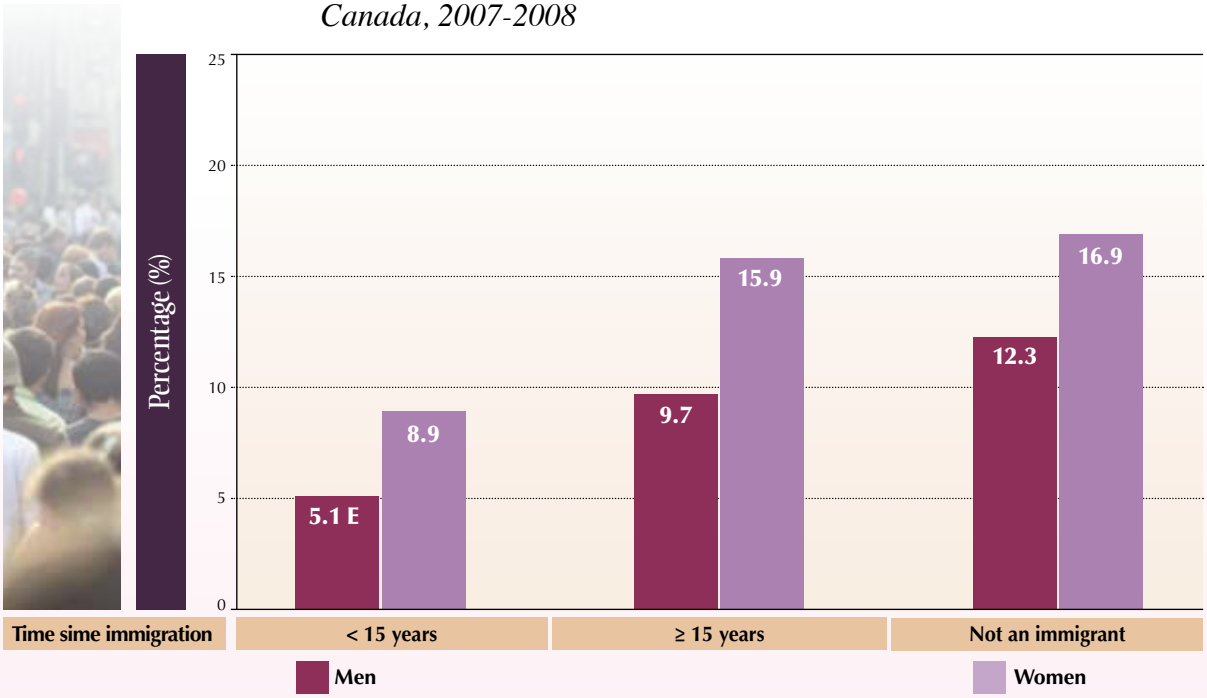
* The healthy immigrant effect refers to the observation that immigrants are often in superior health to the native-born population when they first arrive in a new country, due to direct or indirect selection effects.

Figure 1-11 *Age-standardized self-reported prevalence of arthritis, by immigration status and sex, household population aged 15 years and over, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey, 2007-2008, Statistics Canada.

Figure 1-12 *Age-standardized self-reported prevalence of arthritis, by time since immigration and sex, household population aged 15 years and over, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ E – Interpret with caution.

Projections of arthritis prevalence

As previously shown (Figure 1-2), the prevalence of arthritis in Canada increases with age. Given the aging of the Canadian population, this pattern has significant implications for the future impact of arthritis in Canada. Canada's population is aging so quickly that in approximately a decade senior citizens will outnumber children.[19]

The prevalence of arthritis is projected to increase by nearly one percentage point every five years over the next quarter century. By 2031, the prevalence of arthritis is projected to be 20% (Table 1-3), which would represent an increase of approximately 38% from 2007. It is estimated that by 2031, 6.7 million Canadians aged 15 years and older will have arthritis, with the largest increases in the older age groups, particularly among those aged 65 years and older due to an increasing number of older people (Figure 1-13). An increase is also noted in the working-age population (35-64 years of age), particularly among those aged 55-64 years.

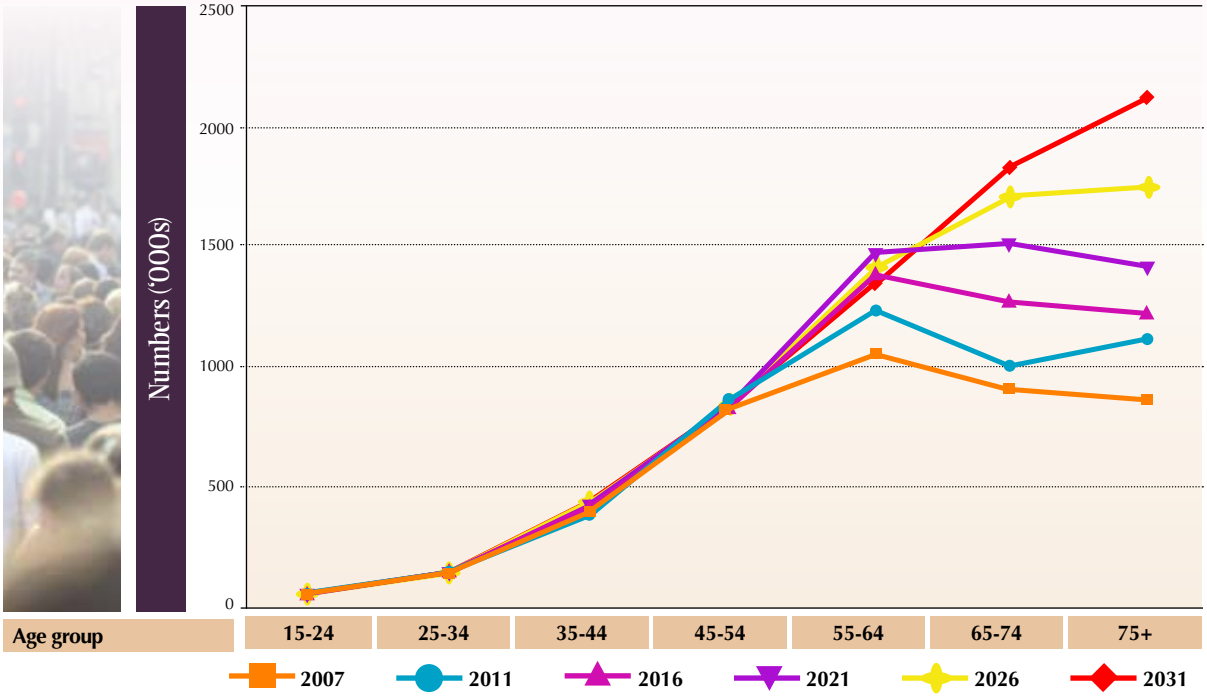
Table 1-3 *Projected* number of individuals aged 15 years and over with arthritis and prevalence of the condition, by sex, Canada, 2007-2031*

	Men		Women		Total	
Year	Number with Arthritis	Prevalence	Number with Arthritis	Prevalence	Number with Arthritis	Prevalence
2007	1,627,000	12.5%	2,564,000	19.0 %	4,191,000	15.8%
2011	1,838,000	13.1%	2,922,000	20.2 %	4,761,000	16.7%
2016	2,033,000	13.9%	3,218,000	21.2 %	5,251,000	17.6%
2021	2,232,000	14.6%	3,523,000	22.3 %	5,755,000	18.5%
2026	2,427,000	15.4%	3,827,000	23.3 %	6,254,000	19.4%
2031	2,607,000	16.0%	4,116,000	24.2 %	6,723,000	20.2%

♦ Source: Arthritis Community Research and Evaluation Unit using Canadian Community Health Survey 2007, Statistics Canada. ♦ * Based on medium population growth scenario.

While these prevalence projections show similar trends to previously published estimates, a change in the arthritis question in the 2007 CCHS, as compared to previous surveys, resulted in slightly lower overall estimates, as expected.[2] Furthermore, these projections may, in fact, be conservative due to the assumptions made regarding the stability of the age- and sex-specific prevalence estimates as well as of the prevalence of associated risk factors, such as obesity, over time.

Figure 1-13 *Number of people projected to have arthritis, by year and age group, Canada, 2007-2031*



♦ Source: Arthritis Community Research and Evaluation Unit using Canadian Community Health Survey 2007, Statistics Canada.

Summary

- The word "arthritis" is used to describe more than 100 rheumatic diseases and conditions that affect a joint or joints, causing pain, swelling and stiffness which often lead to disability.
- Common types of arthritis include osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus, gout, and childhood or juvenile idiopathic arthritis.
- In 2007-2008, over 4.2 million Canadians (16%) aged 15 years and older reported to have arthritis.
- On the basis of current projections, 1 million more Canadians will have arthritis within 10 years. In 20 years, the prevalence of arthritis may reach one in five Canadians.
- Close to three in five people (58%) with arthritis are under 65 years. Loss of both work and productivity are frequent and occur early, due to disability. This may impact participation in the labour force.
- The crude prevalence of arthritis varied considerably across Canada ranging from 23% in Nova Scotia to 12% in Quebec and 11% in the Territories (Yukon, Northwest Territories and Nunavut). Age-standardized prevalence estimates for Newfoundland and Labrador and Nova Scotia were significantly higher (1.1-1.3 times) than the national prevalence whereas, Quebec and British Columbia were significantly lower (0.6-0.9 times). Variations in socio-economic status, body mass index and ethnic composition could contribute to the observed differences between the provinces and territories.
- Prevalence of arthritis was higher among people who have lower formal education levels and report low income levels.
- The age-standardized prevalence of arthritis was significantly lower among immigrants compared to Canadian-born people. However, the age-standardized prevalence of arthritis was much lower among recent immigrants (less than 15 years since immigration) than those who immigrated 15 years ago or more. The more time since immigration the more similar the prevalence rates of arthritis became to non-immigrant, particularly among women.

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Chapter Two

Prevention and management

"I have been persistent in trying to maintain my lifestyle despite the restrictions that deformities, pain and decreased strength/grip have caused. Most people would probably be amazed that I manage to mountain bike, cross-country ski, swim and walk fairly aggressively, considering my condition. Although I am able to do these activities, I can't do them for as long (usually an hour to an hour and a half) on a daily basis, either because of pain or fatigue. I try to do some cardio activity every other day and on the off days do some weight training and exercises. I feel the benefits of the exercise outweigh the suffering that often occurs afterward. However, there have been lots of activities that I have had to give up."

— Person living with rheumatoid arthritis

Introduction

Arthritis is often mistaken as an inevitable part of aging— as a disease that affects only older individuals and for which there is no effective treatment or intervention. In reality, interventions can reduce the risk of developing certain types of arthritis, primarily osteoarthritis (OA) and gout, and improve the early detection and management of the disease, leading to improved health and quality of life of people living with arthritis.[1-5]

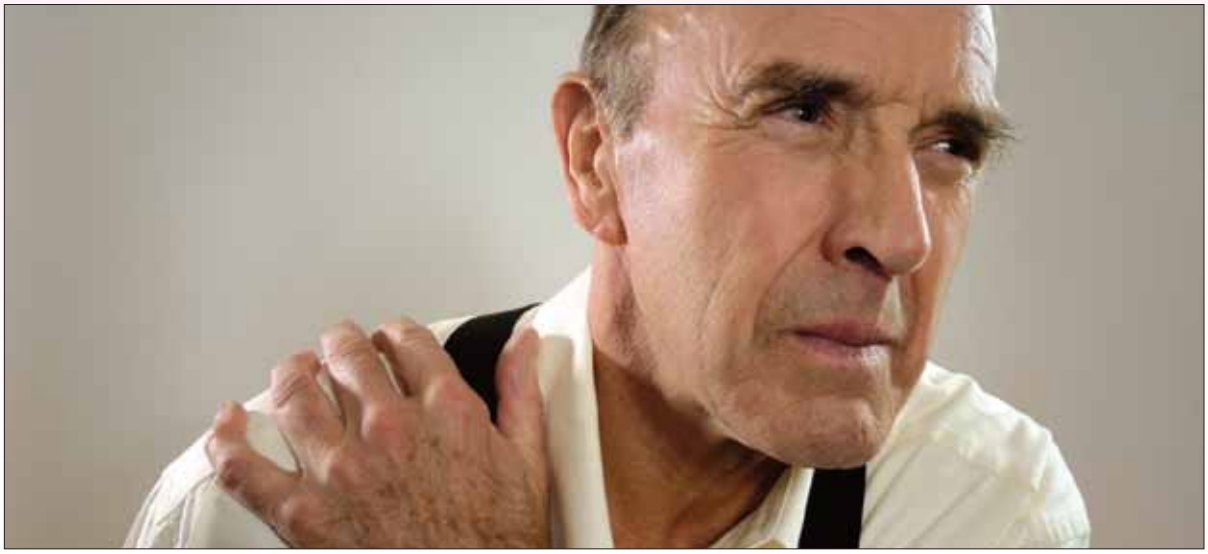
This chapter provides information on risk factors for arthritis and on existing prevention and management strategies. Risk factors are characteristics that are associated with an increased risk of developing a particular disease or condition, or with the progression and severity of that disease. Risk factors associated with arthritis can be modifiable or non-modifiable. Table 2-1 presents a summary of the available literature on the risk factors associated with arthritis. Data on risk factors from the Canadian Community Health Survey (CCHS) 2007-2008 are also presented and show the distribution of arthritis-related risk factors in the Canadian population. The interventions aimed at reducing the risk of developing some types of arthritis and the ways to reduce the progression and negative impacts of all types of arthritis are also discussed.

Table 2-1 *Summary of the evidence around risk factors for arthritis*

Risk factor	Evidence	Level of evidence
Non-modifiable		
Age	Incidence and prevalence of arthritis increases with age. Arthritis can develop at any age.	Accepted risk factor
Sex	Women are disproportionably affected by all forms of arthritis except gout and ankylosing spondylitis (AS). Being a woman has been reported as a risk factor for poorer outcomes.	Accepted risk factor
Female hormones	Possible hormonal link for rheumatoid arthritis (RA) and systemic lupus erythematosus (SLE). Evidence of disease changes occurring around menopause and pregnancy, particularly in RA. Associated with disease progression.	Under study
Genetic predisposition	Specific genes associated with increased risk of arthritis. Specific genes associated with severity of RA.	Under study
Modifiable		
Overweight and obesity	Associated with development of osteoarthritis (OA) of the hip, knee and hand. Associated with progression of hip OA. Associated with severity/progression of several types of arthritis.	Accepted risk factor for OA Accepted risk for severity/progression of several types of arthritis
Joint injury	Identified risk factor for the development of OA.	Accepted risk factor for OA
Physical inactivity	Associated with increased severity and progression of many types of arthritis.	Accepted risk factor
Smoking	Linked to progression and severity of RA and SLE. Inadequate evidence regarding its association with disease onset.	Under study
Diet	Important role in healthy weight maintenance, which is a key factor in the prevention/reduction of disease progression. Identified risk factor for gout development and management.	Accepted risk factor for gout
Certain occupations	Development of OA: knee, hip, hand.	Under study
Infections	Possible role in the initiation of RA.	Under study

♦ Levels of evidence: • Accepted risk factor: Evidence from meta-analysis of randomised controlled trials; Evidence from at least one randomised controlled trial; Evidence from at least one controlled study without randomisation; Evidence from at least one other type of quasi-experimental study; Evidence from descriptive studies i.e., comparative studies, correlation studies and case-control studies • Under study: Evidence from expert committee reports or opinion, or clinical experience of respective authority or both; Inconsistent findings from research.

What we know about the risk factors of arthritis



Non-modifiable risk factors

> ***"I fatalistically viewed it as a bit of a family curse as rheumatoid arthritis was the ultimate killer of my mother a few years earlier."***
>
> — Person living with rheumatoid arthritis

Non-modifiable risk factors include age, sex, female hormones and genetic predisposition. Although their associated risk cannot be altered, understanding them is important for assessing overall risk and may provide an incentive for changing other modifiable risk factors.[2]

Age

Age is the strongest independent risk factor for arthritis.[6,7-9] While arthritis can affect people of any age, each form of arthritis has a unique peak of onset.[10,11] For example, the peak age of onset of rheumatoid arthritis (RA) is between 55-64 years in women and 65-75 years in men. On average, women develop RA ten years earlier than men.[11-13]

Age-related changes such as reduced muscle strength, loosening of ligaments within the joints and the thinning of cartilage cause changes to the joints, making them susceptible to developing arthritis, specifically OA.[14,15] This is especially evident in the knee, hip and hand joints—the joints that are most commonly affected.[9,15]

After the age of 75 years, the incidence of OA stabilizes.[14]

Age of onset may affect the severity of arthritis. For example, childhood-onset systemic lupus erythematosus (SLE) may be more severe than adult-onset SLE, while postmenopausal SLE may be milder than pre-menopausal SLE.[16]

Sex

Women are affected in greater proportions than men by all types of arthritis, with the exception of psoriatic arthritis (similar between men and women), gout and ankylosing spondylitis (AS) (both higher among men).[6,9,16-20] For example, 9 out of every 10 people with SLE are women with the peak age at onset occurring during childbearing years.[16] Women consistently report higher rates of both arthritis and arthritis-related physical disability.[7,12,15,17,18]

Being a women seems to amplify the age-related increase in the occurrence of OA in the hand, knee and in multiple joints. After the age of 50, the frequency of OA in these joints is significantly greater in women than in men while the frequency of hip OA increases at about the same rate with age in women and men.[15]

The reasons for these differences between men and women are not well understood.[7]

Hormones

The significant increase in some forms of inflammatory arthritis conditions including RA and SLE observed among women during their reproductive years or menopause suggests that female hormones may influence the development or the severity of these forms of arthritis.[19-23]

The most striking evidence is found during pregnancy in which estrogen and progesterone levels increase greatly during the third trimester. Many studies have documented the reduction or remission of RA symptoms during pregnancy and most profoundly during the third trimester.[17,22,24] This is followed by an increase in disease activity early in the postpartum period when estrogen and progesterone concentrations fall; the increase is greatest after a first pregnancy.[7,17,22,25] The return of symptoms during the postpartum period is hypothesized to be associated with the production of prolactin, a pro-inflammatory hormone, during breastfeeding.[17,22,24,25] Interestingly, men with RA have significantly lowered testosterone concentrations.[26] The influence of hormones in individuals with SLE appears to be different from those with RA. The signs and symptoms related to SLE appears to either worsen or remain unchanged during pregnancy.[27-29]

The possibility of a protective effect of past and current use of the oral contraceptive pill (OCP) on RA and SLE has been explored.[12,16,22,24] OCPs do not appear to prevent RA, but may postpone its development.[12,22,24] In general, use of OCPs provides a modest protective effect against RA.[22,24] To date, this protective effect has not been explained, in part due to the limited number of studies that have investigated this relationship in depth.[12,22,24] While some evidence supports the presence of the role of estrogen in reducing a woman's risk of RA, SLE and Sjögren's syndrome, no evidence supports the use of post-menopausal hormone therapy for risk-reduction purposes.[12,16,21,23,25]

Genetic predisposition

> ***"I was not surprised about it; both my parents and my paternal grandmother suffered from arthritis."***
>
> — Person living with osteoarthritis

The identification of the genes involved in arthritis will further the understanding of disease mechanisms and biology as well as, the interaction between genes and the environment.[30] However, the identification of genes for arthritis is complex. The genes involved may vary among different families or ethnic groups.[26] Moreover, even if the same genes were found to be involved, their expression may not be the same in all individuals.[22,24,30,31]

Specific genes are associated with a higher risk of developing certain types of arthritis. It has been observed that inflammatory types of arthritis tend to run in families and to some extent, most share a similar genetic make-up.[12,16,20,30,32,33] Most attention has been given to the group of genes called human leukocyte antigens (HLA). The many different HLA gene types are inherited and they are associated with certain autoimmune diseases. People with certain types of HLA genes are more likely to develop autoimmune diseases such as RA, AS, SLE and Sjögren's syndrome.[34] Significant evidence also supports the role of genetics in the development of OA.[8,14,15,35,36]

Genetics are influenced and affected by the individual's environment: the risk of developing OA following a knee injury increases if the individual has a family history of OA.[8,12,20,33,37-39] Such association confirms the importance of interactions between the environment and an individual's genetic makeup in the development of arthritis.

Modifiable risk factors

> ***"I began seeing a physiotherapist, who suggested I start getting active by pool walking because the buoyancy of the water would lessen the burden of my excess weight. The first time out I managed to take a few steps. The next day, I took a few more, and the day after that, more still. I thought that since I was already in the water, I may as well try swimming. I swam a length, then ten and eventually, a hundred at a time and I didn't want to stop. In order to become more active, I had to lose weight too, by following the basic rules of proper nutrition, I lost 100 pounds. Seven years after my diagnosis, I am a happy man again. I enjoy my new friends, swimming and planning hikes. Although I still experience arthritis pain on excessively humid days, and I don't know how the disease will progress, today, I would rather think about other things, like future goals. I feel strong, even euphoric."***
>
> — Person living with osteoarthritis

Some risk factors for arthritis are modifiable, such as physical inactivity, poor diet, excess body weight and joint injury. While they are mainly associated with the onset of OA and gout, they can be altered in populations who have any form of arthritis to reduce pain, improve function and quality of life.[2]

The level of evidence on how modifiable risk factors contribute to the occurrence of arthritis varies widely, depending on the type of arthritis (see Table 2-1 for more details). Established modifiable risk factors associated with disease occurrence apply predominately to OA and gout. All modifiable risk factors have also been associated with progression or severity of disease; hence their great potential for improving function and reducing disability.

Physical inactivity

Being physically active has the potential to both prevent the onset of some types of arthritis and ease the pain associated with many, if not all, types of arthritis.[9,14,15,40-42]

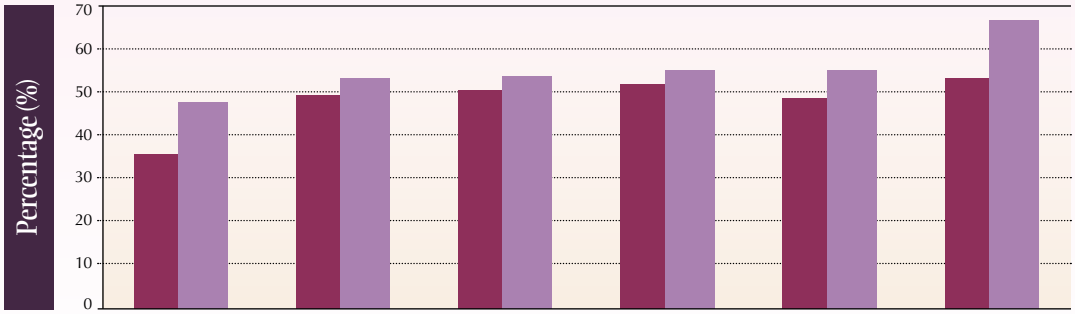
Canada's Physical Activity Guide to Healthy Living incorporates stronger bones and muscles as part of the messages on benefits of physical activity.[43]

Canada's Physical Activity Guide to Healthy Active Living for Older Adults also addresses individuals with arthritis, saying

> *…it is even more important that you make a commitment to doing gentle movements every day to keep your joints flexible. Small amounts of daily activity can make a huge difference and keep you mobile. Flexibility and strength activities are essential to keep your muscles and joints healthy so that you stay mobile. The more sedentary your lifestyle, the stiffer your joints will become. Seek professional help if you are unsure about what is safe for you.*[44]

Even though being physically active is beneficial for the health of all Canadians, in 2007-2008, half (50%) of the general Canadian population reported being physically inactive during their leisure time. The proportion of women who reported being physically inactive was significantly higher than men in the 15-39, and 60+ year age groups (Figure 2-1). The greatest difference occurred among individuals aged 70 years and over, where 66% of women reported being physically inactive compared to 53% of men.

Figure 2-1 *Proportion of individuals who reported being physically inactive during their leisure time, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



Age group	15-29	30-39	40-49	50-59	60-69	70+
Men	35.9	49.6	51.0	52.3	48.9	52.6
Women	47.4	52.8	53.4	54.8	54.9	66.5

♦ Source: Public Health Agency of Canada using data from the Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ Physical activity is defined according to the total daily Energy Expenditure values (kcal/kg/day) expended during leisure time activities. Energy Expenditure is calculated using the frequency and duration per session of the physical activity as well as the MET value of the activity. The MET is a value of metabolic energy cost expressed as a multiple of the resting metabolic rate. Respondents are categorized as being "active" (≥ 3 MET), "moderate" (1.5 to < 3 METS) or "inactive" (0 to < 1.5 METS) based on their total daily energy expenditure value. ♦ Differences between men and women statistically significant at $p<0.05$ except among those aged 40-49 and 50-59 years.

Physical activity is an important component in the maintenance of healthy weights in all individuals. For people with arthritis and a high body mass index (BMI), weight loss efforts could be beneficial to their overall health and quality of life.[45-47]

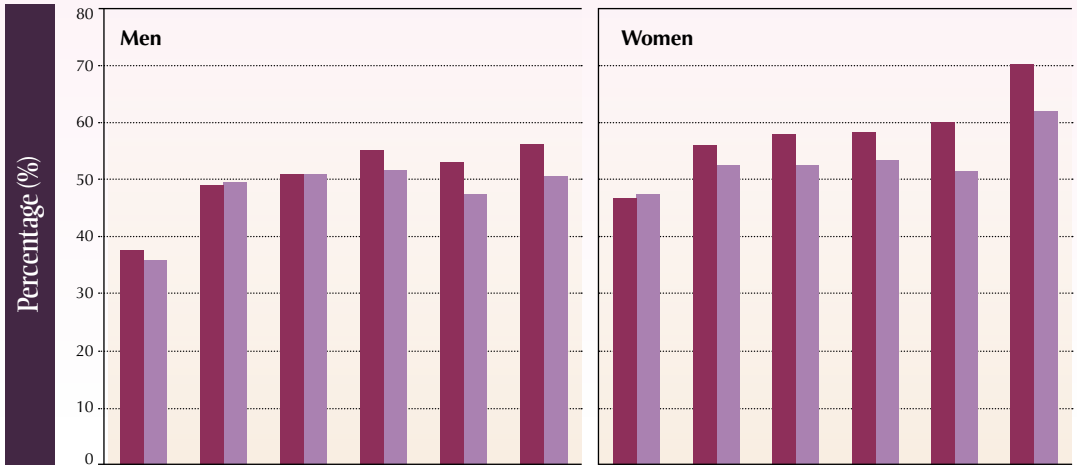
People with arthritis who participate in moderate to vigorous physical activity have been shown to improve their functional capacity without increasing disease activity or causing joint damage.[5,48-53] Regular moderate exercise can produce improvements in function, flexibility, muscle strength and endurance, cardiovascular fitness and psychological health.[3,54,55] Exercise appears to be the most consistently effective method to reducing arthritis-related pain.[3,55,56] Participation in recreational activities such as running, cycling, walking and dancing have been associated with a positive impact on function, pain and disability.[9,40,42,48-53,56-59] It is important, however, to address several factors — such as pain, fear of injury, joint or muscle stiffness, fatigue or lack of energy, and impaired balance — prior to beginning a regular exercise program.[55] The key issue is to develop a comfortable balance between rest and activity.

Inactivity can make arthritis worse as a result of reduced joint mobility, strength and fitness, increased fatigue and depression, low pain tolerance and increased risk for developing other chronic conditions such as heart disease and osteoporosis. Individuals with RA report low levels of physical activity, which is a concern since these individuals are at higher risk than the general population for other condition(s) such as heart disease and premature death. Inactivity can also exacerbate muscle wasting and joint stiffness, which further limit their physical function.[45,60] A similar trend is seen in individuals with OA, where inactivity can lead to joint instability.[60]

Even though physical activity is very important in the management of arthritis, a higher proportion of individuals with arthritis were physically inactive during their leisure time compared to those without arthritis (59% and 49%, respectively).

Physical inactivity among Canadians with and without arthritis increased with age (Figure 2-2). Of concern is the fact that up to 56% of people with and without arthritis between 15 and 39 years of age reported being inactive. Among men aged 60 years and older, those with arthritis were less physically active compared to those without arthritis. The same was true among women aged 40 years and older.

Figure 2-2 *Proportion of individuals with and without arthritis who reported being physically inactive, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



Age group	15-29	30-39	40-49	50-59	60-69	70+	15-29	30-39	40-49	50-59	60-69	70+
With arthritis	37.7	49.1	50.9	55.1	53.0	56.2	46.8	56.1	58.0	58.4	60.1	70.3
Without arthritis	35.8	49.6	50.9	51.6	47.4	50.6	47.5	52.5	52.6	53.5	51.4	62.1

♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey 2007-2008, Statistics Canada.

Diet

A healthy diet is a critical component of maintaining a healthy weight for individuals living with arthritis, since being overweight has been identified as a contributor to further progression of the disease.[49,58,61] A high intake of purine rich foods, such as red meat and seafood, and alcohol consumption are both linked to the development of gout.[6,62,63] Diet may also play a role in both the onset and the severity of RA, however, the specific diet composition has yet to reach scientific consensus.[17,22,35,63]

Excess weight and obesity

Being overweight or obese (defined according to the WHO International standards as a body mass index (BMI) of 25–29.9 (overweight) or ≥ 30 (obese)[64] increases the risk of developing OA and gout. The risk of developing OA and gout increases with increasing weight.[5-7,9, 46,47,65-67]

A strong association has been demonstrated between obesity and knee OA and a modest association has been shown between obesity and OA of the hip. Those who are obese are 2.5 to 3 times more likely to develop knee OA and 2 times more likely to develop hip OA compared to those with a normal BMI.[68-70]

The association between a high BMI and OA of the hand is less certain.[71]

Obese individuals who have arthritis are more likely to experience more severe arthritis symptoms and impaired quality of life compared to those with arthritis who maintain a healthy weight.[8,9,12,15,25,66,72] Furthermore, weight loss interventions decrease pain, improve function in older obese populations with OA of the knee.[73]

Overweight and obesity may precipitate or lead to progression of OA to the point at which joint replacement needs to be considered. Women and men who are overweight or obese are two times more likely to have a hip or knee replacement than those who have a healthy weight.[74] Functional recovery after joint replacement surgery is better among those with a healthy weight.[74]

In 2007-2008, approximately one in four boys and one in six girls 12–17 years of age in the general population were overweight or obese (Figure 2-3). Children and youth who are overweight or obese are more likely to be overweight or obese as an adult.

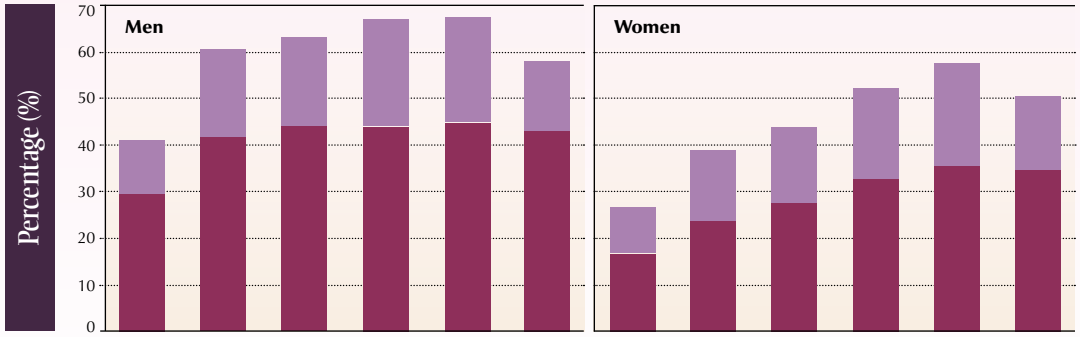
Figure 2-3 *Proportion of individuals aged 12-17 years who were overweight or obese (based on BMI), by sex, Canada, 2007-2008*

Sex	Boys	Girls
Overweight	17.55	11.38
Obese	6.27	2.83

♦ Source: Public Health Agency of Canada, using data from the Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ Differences between boys and girls statistically significant at $p<0.05$. ♦ BMI = Body mass index.

In 2007-2008, one in two adults aged 18 years of age and older (51%) reported a height and weight that put them in the overweight or obese category. The proportion of men who reported being overweight (BMI between 25 and 29.9) was significantly greater than among women in all age groups (Figure 2-4). The proportion of men in the obese category (BMI≥ 30) was significantly greater than women in all age groups except among those aged 60-69 and 70+ years. The largest proportion of men and women in the obese category was among men aged 50 to 59 years and women aged 60–69 years (23% and 22%, respectively). OA is also common in these age groups.

Figure 2-4 *Proportion of individuals aged 18 years and older who were overweight or obese (based on BMI), by age and sex, Canada, 2007-2008*

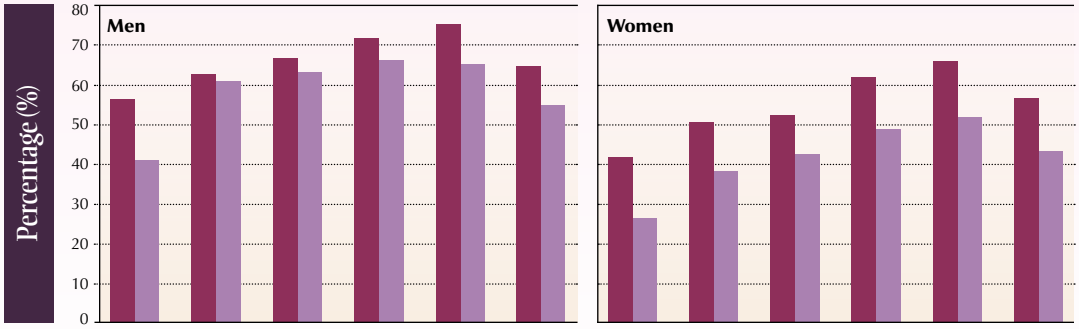


Age Group	18-29	30-39	40-49	50-59	60-69	70+	18-29	30-39	40-49	50-59	60-69	70+
Overweight	29.6	41.8	44.2	44.1	44.9	43.1	16.7	23.6	27.4	32.5	35.3	34.4
Obese	11.6	18.9	19.1	23.0	22.6	15.1	9.9	15.1	16.2	19.4	21.9	15.8

♦ Source: Public Health Agency of Canada using data from the Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ BMI = Body mass index.

In 2007-2008, 63% of Canadians aged 18 years and over with arthritis reported a height and weight that put them in the overweight or obese category, versus 49% of those without arthritis (Figure 2-5). This difference was more marked among women than men. For example, among women in the 50 to 59 age group, 62% with arthritis were overweight or obese compared to 49% among those without arthritis. Among men of the same age, there was a smaller difference between those with and without arthritis, with proportions of overweight or obese men being 72% among those with arthritis compared to 66% for those without arthritis. Also, a greater proportion of women with arthritis aged 18-29 years (42%) were overweight or obese compared to 26% of women without arthritis. Among men of the same age, there was less of a difference with proportions of overweight or obese men being 56% for those with arthritis versus 41% for those without arthritis.

Figure 2-5 *Proportion of individuals with and without arthritis aged 18 years and over who were overweight or obese (BMI ≥ 25) by age and sex, Canada, 2007-2008*



Age Group	18-29	30-39	40-49	50-59	60-69	70+	18-29	30-39	40-49	50-59	60-69	70+
With Arthritis	56.2	62.5	66.4	71.5	74.9	64.5	41.5	50.4	52.1	61.6	65.6	56.4
Without Arthritis	40.9	60.6	62.8	66.0	64.8	54.7	26.2	38.0	42.4	48.7	51.7	43.0

♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey, 2007-2008. ♦ Differences between individuals with and without arthritis significant at $p<0.05$, except men 30–49 years of age. ♦ BMI = Body mass index.

Joint injury

Injury is an important risk factor for the development of OA.[9,57] Meniscal and cruciate ligament tears increase the risk of the subsequent development of OA.[9,15,75] Factors such as having OA in another joint, increasing age, being a woman, or the continued stress of the injured joint might increase the risk of developing OA following a severe knee injury.[15] While joint injuries may be preventable, once they occur, their impact may not be reversible.

> ***"I began to experience pain in 1967 after a sport accident (missed hurdle and fell wrong way on foot). It was diagnosed as a bad sprain and left at that. However, the pain remained and never went away."***
>
> — Person living with osteoarthritis

Smoking

Smoking is associated with both the onset and development of inflammatory types of arthritis, namely RA and SLE.[16,17,24,33,76,77]

The risk of developing RA is higher among smokers, especially men and it also appears to cause a more active, possibly more aggressive, form of RA. [12,22,76,78] Smokers are more likely to have a positive rheumatoid factor (RF), even in individuals who do not yet have RA.[12,22,24,78-84] Smoking exacerbates the skin related features of SLE.

The mechanisms by which smoking affects inflammatory types of arthritis, and autoimmunity in general, are multiple and not yet well understood.[76,81] The interaction of smoking with genetic susceptibility further complicates the understanding of these mechanisms.[76]

Occupation

An occupational exposure to crystalline silica has been identified as a strong risk factor for inflammatory types of arthritis.[77] Mineral dust and vibration exposure have been suggested as possible risk factors for the development of RA, particularly among men.[11,82]

A strong association was found between occupational activities such as repeated knee bending, kneeling, squatting, or climbing and knee OA among men.[9,14] Also, a strong association was found between agriculture (including farm work, dairy, animal breeding and producing animal products) and hip OA; and more recently farming has been associated with OA of the knee.[9,57,83]

Infections

For many years, infection has been suggested as a possible initiator for inflammatory types of arthritis.[12,19,20,77] Certain viruses have been suggested as contributors to the development of RA and SLE. It is believed that viruses initiate the inflammatory process at the infected site, which in turn play a role in the initiation of RA.[22] Viruses may initiate this process by targeting the cells involved in immune function or by directly impacting joint tissues.[84] The most consistent evidence has been found with the Epstein-Barr virus (EBV) which has been implicated as a potential risk factor for RA for over 25 years, but it remains unknown as to whether it is a cause or a consequence of RA.[16,22]

Reducing the impacts of arthritis

> ***"I wasn't happy about the diagnosis, but understood why—my mother had been severely crippled with RA long before the latest generation of DMARDs (disease-modifying anti-rheumatic drugs) became available and was in great pain in her final years."***
>
> – Person living with rheumatoid arthritis

> ***"I know what to expect when one has a chronic illness. The world doesn't fall apart, you develop trust in your health care providers and research, and you make the most of the opportunities it provides, most of all, you focus on your abilities and the exciting things that the future holds."***
>
> — Person living with juvenile rheumatoid arthritis

The impacts of all types of arthritis can be minimized through:

- Education and awareness about arthritis;
- Early recognition of symptoms, early disease detection and diagnosis;
- Self-management including education, physical activity and weight control/exercise programs; and
- Appropriate treatment including medication, rehabilitation and surgery.

These interventions aim to stop or slow down the progression of the disease and reduce disability and other health complications from arthritis.

Education and awareness

Studies have shown that the general public is poorly informed about arthritis and that the public perception is permeated by many myths (see 'Common myths about arthritis').[85-88]

A recent study concluded that some of these beliefs endure and continue to exert an impact on the care-seeking behaviours and the uptake of treatment by individuals with arthritis symptoms or with diagnosed arthritis.[89]

Common myths about arthritis

"Arthritis is an old person's disease"

Although the risk for arthritis increases with age, nearly 3 out of 5 with arthritis are younger than age 65. People of all ages are affected, including children and teens. Juvenile rheumatoid arthritis is one of the most common chronic illnesses of childhood.

"Arthritis is just a normal part of aging"

If this were true, the majority of seniors and no children would have arthritis. In reality, 57% of seniors (> 65 years) don't have arthritis. In addition, two thirds of individuals with arthritis are under the age of 65 and arthritis affects children. Furthermore, some forms of arthritis (e.g. OA and gout) can be prevented.

"Arthritis isn't a serious condition; it's just minor aches and pains. It's best to ignore it"

Most of the joint damage associated with inflammatory arthritis occurs within the first few years after its onset; early and accurate diagnosis is crucial to minimizing its effects.

"There is nothing that can be done for arthritis. You just have to learn to live with it"

While there is currently no cure for arthritis, a person can do many things to relieve the pain, reduce disability and help maintain their ability to do the things that they enjoy. Early diagnosis and appropriate treatment strategies can help reduce the disability and quality of life impacts associated with many types of arthritis. Physical activity, healthy weight, self-management education, rehabilitative interventions, medication, and in severe cases, surgery, can make a difference.

"Joints with arthritis should be rested"

The assumption that an inflamed or painful joint requires rest is a common misunderstanding. Too little exercise can cause muscle weakness, pain and stiffness. People with arthritis should undertake some form of physical activity (as recommended by a physician or a physiotherapist/occupational therapist) such as:

- mobility exercises (e.g., stretching) to improve or maintain the joint's range of motion and flexibility;
- strength exercises, such as weight-bearing activities to build muscle strength, provide stability to the joint, and improve function; and
- aerobic exercises, such as walking or cycling, to improve cardiovascular fitness.

Early symptom recognition, early detection and diagnosis

> ***"I feel that the right amount of attention and education in the early stages of diagnosis would expedite treatment, which is what all the latest research is pointing towards. I would like to see a program set up where all newly diagnosed patients are seen by a team of specialists who can educate them and help them work through the denial that comes with such a diagnosis. Also to set them up on a program of lifestyle changes (exercise, diet, joint protection, massage, etc.) that will benefit them and reduce damages throughout their disease."***
>
> — Person living with rheumatoid arthritis

Early diagnosis of inflammatory types of arthritis, such as RA, is particularly important, since early, aggressive therapy may be associated with improved outcomes[56] Some forms of arthritis, such as lupus, may have a wide variety of clinical presentations that may or may not involve the joints. A complete medical history and physical examination will allow the physician to develop a differential diagnosis, order the appropriate laboratory tests and ultimately formulate a diagnosis and treatment plan.[56]

Public awareness of the value of early recognition of symptoms, diagnosis and treatment is important. Many people with arthritis do not consult with their physician for their symptoms, especially if they are generally in good health and have few activity or work limitations.[90]

Initiatives such as the "*Getting a Grip on Arthritis*" program have been applied successfully in Canada.[91] They increase the capacity of health providers and people with arthritis to work together to manage the disease by supporting the delivery of arthritis care and emphasizing prevention, early detection, comprehensive care, appropriate and timely access to specialty care, and self-management.

Self-management

> ***"My family tolerated my condition, but I was left home a lot due to pain and not being able to engage in several activities due to pain, discomfort, tiredness and moods. Had to learn to change my lifestyle considerably and do the things I was comfortable with doing. Took the Arthritis Self-Management Program course to help me better cope and later took training to teach others how to self help themselves. This is a most therapeutic and helpful course for those living with arthritis."***
>
> – Person living with osteoarthritis

Self-management refers to the tasks that a person must undertake in order to live well with one or more chronic conditions. These tasks include developing the confidence to deal with the medical management, life's roles and emotional management of their conditions.[92]

Self-management activities, such as participation in education programs and physical activity are central to the non-pharmacological management of arthritis. The American College of Rheumatology* practice guidelines for OA (knee and hip), RA and SLE include self-management programs and patient education as important components of non-pharmacological treatment for these conditions.[92-94]

Three self-management activities are discussed:

- self-management education, e.g. learning how to control symptoms, medication use, etc;
- maintaining regular, moderate intensity physical activity; and
- controlling weight.[2,4,54,90]

Self-management education is designed to build confidence and skills in managing arthritis on a daily basis. Self-management education programs differ from patient education or skills training in that they are designed to allow people with chronic conditions to take an active part in the management of their own condition.[95] Program participants learn to gain self-confidence in their ability to control symptoms, how to develop action plans to manage their arthritis, and make connections with others living with arthritis.

* Currently, there are no Canadian practice guidelines for specific types of arthritis.

Many self-management programs are available throughout Canada (for more information visit the Arthritis Society website (www.arthritis.ca) and the Arthritis Consumer Experts website (www.jointhealth.org). Benefits from participating in such programs include:

- reduced pain;
- increased self-care;
- improved functional ability;
- greater confidence in managing the disease;
- increased understanding of arthritis;
- increased coping skills; and
- greater participation in managing the disease.[96-98]

> ***"The best experience I have had because of my arthritis is that my rheumatologist convinced me to be a contact for the BC Lupus Society and eventually form a Lupus Support Group. I have done this for fifteen years now. I have a whole new circle of friends and have learned so much about SLE. It is a good feeling to be able to be called up to the hospital to talk with a newly diagnosed patient, and say, I have had SLE for over thirty years, and I am still here. You can beat this!"***
>
> — Person living with lupus

> ***"Things did eventually get better, I started browsing online and found testimonials from other people struggling with arthritis, on the Arthritis Society's website. This reassured and inspired me. It was such an eye-opening experience for me. I knew I wasn't alone in dealing with this disease in reading these stories, I understood that there was hope. There were steps I could take to relieve my pain and regain my life."***
>
> — Person living with osteoarthritis

Medication

For most types of arthritis, treatment often involves the use of medications aimed at reducing pain, maintaining joint function and limiting disease progression. These medications can be used alone or in combination as part of an individual's treatment plan. In recent years, the development of medications for arthritis has advanced and changed significantly. Currently, medications for treating arthritis include analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, disease-modifying anti-rheumatic drugs (DMARDs) and biologic response modifiers (also known as biologics). These medications and their use in the treatment of particular types of arthritis are discussed in more detail in Chapter 7.

Rehabilitation

All types of arthritis are commonly associated with limited function that can be improved using a wide variety of rehabilitation interventions aimed at the whole person and not just the affected structure. They differ depending on the person's condition, needs and health status.

Joint-specific exercises, physical fitness programs, the use of braces, aids and devices, as well as participation in self-management programs can improve activity and participation. They can help an individual develop a more active lifestyle and reduce the pain associated with arthritis, particularly OA and RA.[2,99]

Surgery

Surgery is normally considered for people with persistent pain despite optimal medicinal, physical and rehabilitative therapies. Several interventions can be performed, depending on the condition, severity, functional limitation or pain. The most well known interventions are arthroscopy, osteotomy and arthroplasty (or joint replacement). Surgery is recommended primarily for people with OA and RA who have end-stage joint damage that is causing unacceptable pain or limitation of function with significant alteration of joint anatomy.[92,93,99] It may also be indicated for spondyloarthropathies such as psoriatic arthritis and AS.[95,99] Further discussion about the utilization of surgical services can be found in Chapter 9.

Summary

- Maintaining a healthy body weight and avoiding joint injuries, including sports injuries and occupational-related joint stress, can help to prevent OA.
- Lifestyle changes recommended for the prevention of gout include maintaining a healthy body weight, daily exercise and a reduced consumption of purine-rich foods such as red meat, seafood and alcohol.
- Physical inactivity and obesity can aggravate the progression or severity of many forms of arthritis.
- 50% of the general Canadian population and 59% of Canadians with arthritis reported being physically inactive during their leisure time.
- 51% of the general Canadian population and 63% of Canadians with arthritis reported a height and weight that put them in the overweight or obese category.
- Infections, smoking and diet may play a role in the onset or severity of symptoms in some forms of inflammatory types of arthritis, such as RA or SLE.
- Appropriate management and early diagnosis can help reduce the impact of arthritis. A combination of strategies may be required, including:
  - education about self-management, pain management, and the disease itself;
  - counselling and support;
  - occupational and physical therapy;
  - physical activity;
  - weight reduction;
  - maintenance of a healthy diet;
  - joint protection;
  - prescription and/or over-the-counter medications; and/or
  - surgery.

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Chapter Three

Disability and quality of life

> ***"The days of covering up are over, as my condition is very visible and, naturally, people stare. I could wear the most expensive dress dripping with diamonds, but all they would see is my condition."***
>
> — Person living with ankylosing spondylitis

> ***"It has been a very difficult journey living with this disease for over twenty-five years. The biggest frustration has been the unknown— but also the progressive deterioration, not only physically but also emotionally as I struggle to live with the pain, the deformities, the frustrations and the embarrassment of a body that just won't cooperate and perform the way that I would like it to. It's difficult to stay enthusiastic about life and life's activities when 'life' is slowly draining from my body."***
>
> — Person living with rheumatoid arthritis

Introduction

Arthritis is a leading cause of pain and disability in North America.[1-4] Disability is a term that refers to difficulty in functioning at the body, person, or societal levels, in one or more life domains, as experienced by an individual with a health condition in interaction with contextual factors. Disability associated with all forms of arthritis results from:

- Impairments: problems in body function or structure such as reduced mobility of joints, pain and body stiffness;[5]
- Activity limitations: limitations or restrictions in carrying out activities of daily living including self-care (showering, toileting and dressing) or mobility (transferring from beds to chairs and walking around the house);[2,3,5-8]
- Participation restrictions: problems an individual may experience in their involvement in life situations such as working or participating in social activities.[5]

An individual's experience with impairments, activity limitations and participation restrictions may vary depending on a number of factors, including the type of arthritis and the number of joints that are affected.[5] These, in turn, affect an individual's perception of their own health and overall health state: perceived poor health in people with arthritis-related disability is strongly associated with limitations in performing regular daily activities.[5,9] In addition, studies have found that people living with arthritis are more likely than those without arthritis to experience depressive symptoms and have higher rates of mood and anxiety disorders than individuals of comparable age and sex without arthritis.[2,10] Depression can undermine motivation for self-care, such as compliance with medications, eating well and exercising.

Individuals with arthritis who have visible symptoms may face further stigmatization that negatively impact on their quality of life. The presence of other chronic conditions also contributes to poorer self-rated health and health status, potentially leading to more severe disability.[5,11]

Not everyone with arthritis is affected in the same way. The ability to function may diminish over time, depending on the nature and severity of the condition, the type of arthritis, and the number of joints involved.[5] The major impact of arthritis is on life — often over the course of many years and decades.[3]

This chapter presents Canadian data on arthritis-related disability and the impact of the disease on quality of life from two national population-based surveys: 2007-2008 Canadian Community Health Survey (CCHS), and the 2001 Participation and Activity Limitations Survey (PALS).

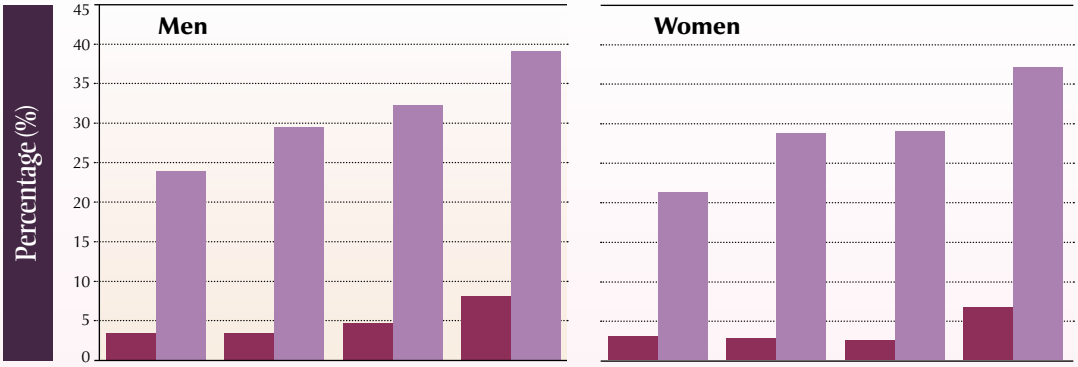
The CCHS provides data on disability as reported by people with arthritis but not necessarily attributed to arthritis specifically. It was used to provide a general overview of how people living with arthritis perceive their physical and mental health, stress, satisfaction with life, pain and activity limitations, and co-existing chronic conditions, compared to those who have no chronic conditions (where appropriate). Figures 3-1 to 3-9 are based on the analysis of the 2007-2008 CCHS data.

The 2001 PALS provides data on arthritis as the main cause of a respondent's disability. It was used to further examine the impact directly attributed to arthritis by the respondents on specific activity limitations and participation restrictions such as mobility, self-care, work, leisure activities and social participation. Figures 3-10 to 3-13 are based on data from the 2001 PALS.

General health

Self-rated health has been shown to be a reliable and valid measure of individual health.[12] The CCHS asked respondents to rate their health on a five-point scale: excellent, good, fair, poor or very poor. Overall, 30.4% of men and 29.1% of women living

Figure 3-1 *Proportion of individuals with arthritis and with no chronic conditions who rated their health as fair or poor, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



Age group	15-44	45-64	65-74	75+	15-44	45-64	65-74	75+
No chronic conditions	3.2	3.1	4.3 E	7.6 E	2.5	2.4 E	2.2 E	6.4 E
Arthritis	23.6	29.0	31.9	38.7	20.8	28.2	28.5	36.6

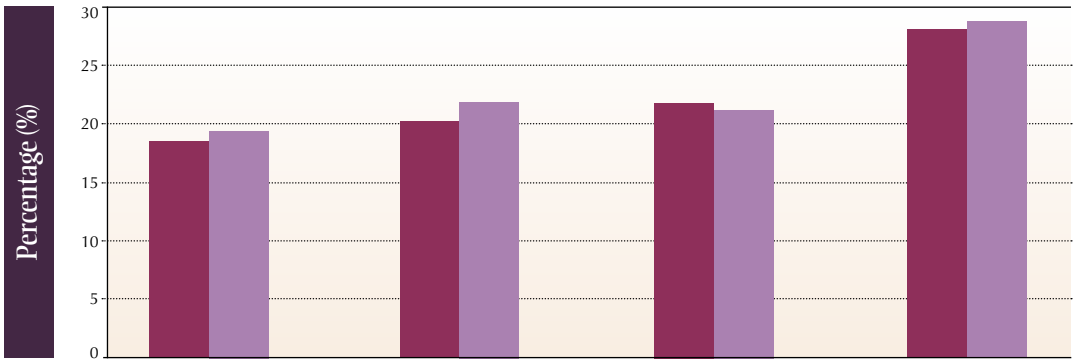
♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey 2007-2008, Statistics Canada ♦ E - interpret with caution.

arthritis reported their health as fair or poor (Figure 3-1). The proportion of individuals who rated their health as fair or poor was much higher among those living with arthritis than those with no chronic conditions. Men and women with arthritis aged 75 years and older were more likely to report fair to poor health than the other age groups (approximately 37% among 75 years and older versus between 21% and 32% for the other age groups).

The proportion of men and women with arthritis who rated their health as worse than a year earlier was 21.7% and 23.0% respectively (Figure 3-2). The greatest proportion of individuals with arthritis that rated their health worse than a year earlier was within the oldest age group (75+). A statistically significant difference between men and women was shown only among those aged 45–64 years: women with arthritis were more likely than men with arthritis to rate their health as worse than the previous year.

A study looking at the impact of seven chronic conditions in eight countries* (arthritis, diabetes, allergies, congestive heart failure, chronic lung disease, hypertension and ischemic heart disease) found that arthritis had the greatest impact on health-related quality of life.[1]

Figure 3-2 *Proportion of individuals with arthritis who rated their health as somewhat worse or much worse than a year earlier, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



Age group	15-44	45-64	65-74	75+
Men	18.6	20.3	21.9	28.2
Women	19.5	22.0	21.3	28.9

♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey 2007-2008, Statistics Canada.

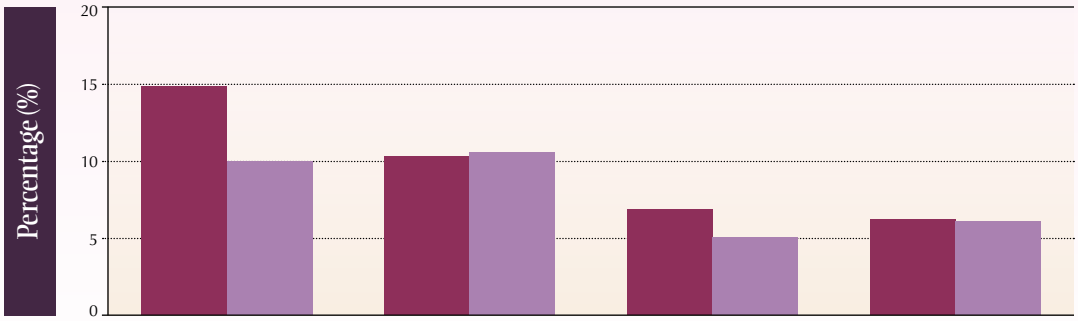
Psychological/mental health and stress

Many individuals with arthritis not only have to cope with the physical impacts of their condition but have to deal with its effect on their mental health. The overall proportion of men and women with arthritis that perceived their mental health as fair or poor was 9.6% and 8.2% respectively (Figure 3-3). Women less than 44 years of age were as likely as women in the 45-64 age group to report fair or poor mental health and men less than 44 years of age were more likely to report fair or poor mental health than all other age groups.

> *"I am often depressed as I look at a future of chronic pain and limited activity."*
>
> – Person living with osteoarthritis

* Denmark, France, Germany, Italy, Japan, the Netherlands, Norway and the United States.

Figure 3-3 *Proportion of individuals with arthritis who perceived their mental health as fair or poor, by age and sex, household population aged 15 years and over, Canada, 2007-2008*

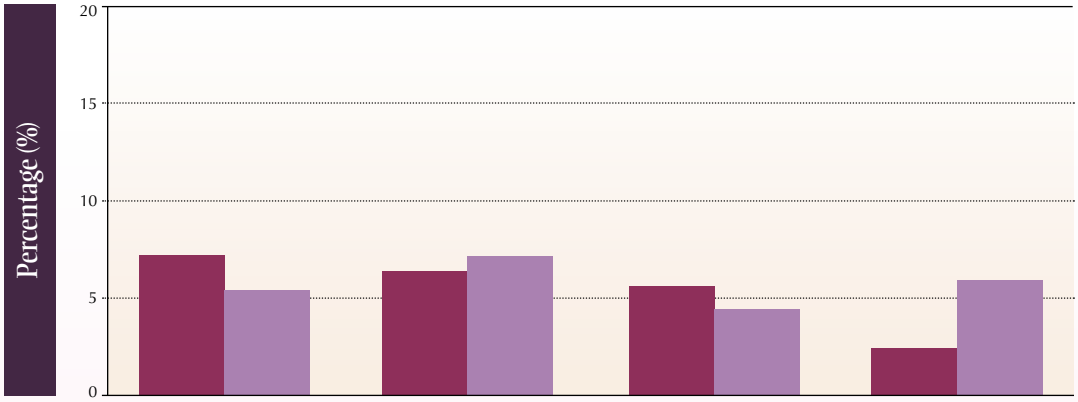


Age group	15-44	45-64	65-74	75+
Men	14.8 E	10.2	6.7	6.1
Women	9.9	10.5	4.9	6.0

♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ E - interpret with caution.

Overall, a small proportion of individuals with arthritis (5.7% and 6.0% of men and women, respectively) reported being dissatisfied with life (Figure 3-4). However, working age men and women with arthritis were as likely as those aged over 65 years to report being dissatisfied with life. A statistically significant difference between men and women was shown only among those aged 75 years and over: women with arthritis were more likely than men with arthritis to report being dissatisfied with life.

Figure 3-4 *Proportion of individuals with arthritis who reported being dissatisfied or very dissatisfied with life, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



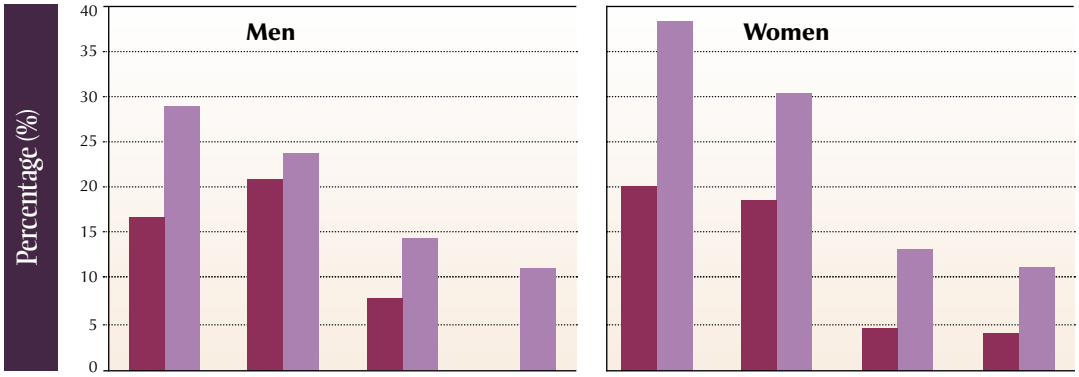
Age group	15-44	45-64	65-74	75+
Men	7.3 E	6.4	5.6	2.5 E
Women	5.5	7.2	4.4	5.9

♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ E - interpret with caution.

Overall, close to one quarter (22%) of individuals with arthritis reported life to be "quite a bit" or "extremely" stressful compared to approximately one fifth (18%) for those without chronic conditions (Figure 3-5). A higher proportion of women with arthritis of all ages reported life to be "quite a bit" or "extremely" stressful compared to women with no chronic conditions. The same was found for men aged 15-44 years and 65-74 years with arthritis. Men and women with arthritis between 15 and 44 years of age were more likely to find life a bit or extremely stressful compared to the other age groups.

The impact of arthritis on mental health and life appears to be greater in the youngest age group, as shown by the decrease in the proportions of people with arthritis reporting poor mental health and stress after the age of 44 years as well as by the higher proportions of people with arthritis of working age who reported being dissatisfied with life. Arthritis is generally not perceived as a young person's condition and as a result, young people with arthritis may need to make more adjustments to their life and come to terms with a greater sense of lost opportunity than their peers.

Figure 3-5 *Proportion of individuals with arthritis and with no chronic conditions who reported life to be quite a bit or extremely stressful, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



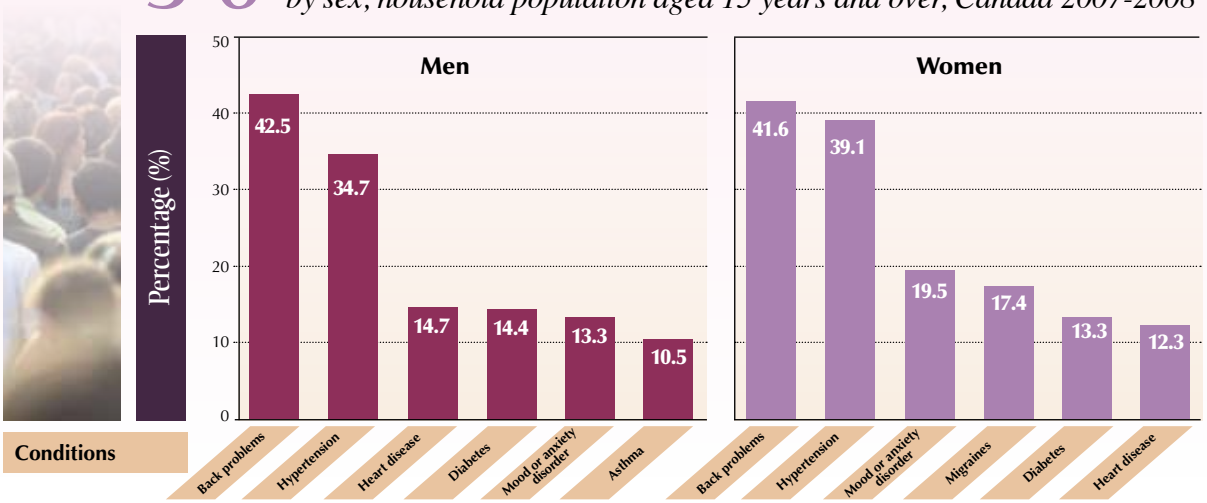
Age group	15-44	45-64	65-74	75+	15-44	45-64	65-74	75+
No chronic conditions	17.0	21.1	7.8 E		20.2	18.7	4.6 E	4.1 E
Arthritis	29.2	24.0	14.5	11.3	38.3	30.3	13.2	11.2

♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada.♦ E -interpret with caution. ♦ Value for "no chronic conditions" for men aged 75 years and over not reportable.

Co-existing chronic conditions

Many individuals with arthritis also have to cope with other chronic conditions. The co-existence of other chronic conditions may reduce their mobility and their ability to cope with the challenges posed by arthritis. The six chronic conditions most frequently reported among men with arthritis were back problems (42.5%), high blood pressure (34.7%), heart disease (14.7%), diabetes (14.4%), mood or anxiety disorder (13.3%) and asthma (10.5%) (Figure 3-6). Among women with arthritis, the most frequently reported conditions were back problems (41.6%), high blood pressure (39.1%), mood or anxiety disorder (19.5%), migraines (17.4%), diabetes (13.3%) and heart disease (12.3%). As stated above, arthritis does impact the quality of life of people beyond the physical aspects of the disease; it also impacts their mental health. Mood or anxiety disorders were 1.8 and 1.5 times more common among men and women with arthritis than in the population as a whole.

Figure 3-6 *Prevalence of top six chronic conditions among individuals with arthritis, by sex, household population aged 15 years and over, Canada 2007-2008*



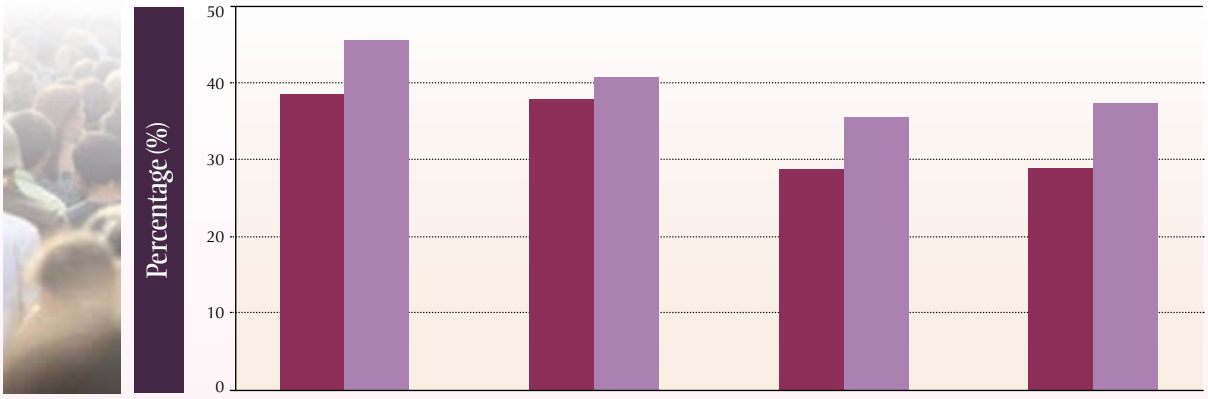
♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada.

Pain and activity limitations

> ***"I cannot lift up my small grandchildren any longer. I limp constantly. I'm almost always in pain."***
>
> — Person living with osteoarthritis

Arthritis can result in daily suffering and activity limitations. Overall, 34.4% of men and 39.4% of women with arthritis reported having pain that prevented activities (Figure 3-7). People aged 15-44 years were more likely than the other age groups to report having activities prevented by pain, particularly women. Men and women of working age (less than 65 years of age) were also more likely to report activities prevented by pain than those aged over 65 years.

Figure 3-7 *Proportion of individuals with arthritis for whom pain prevents a few, some or most activities, by age and sex, household population aged 15 years and over, Canada, 2007-2008*



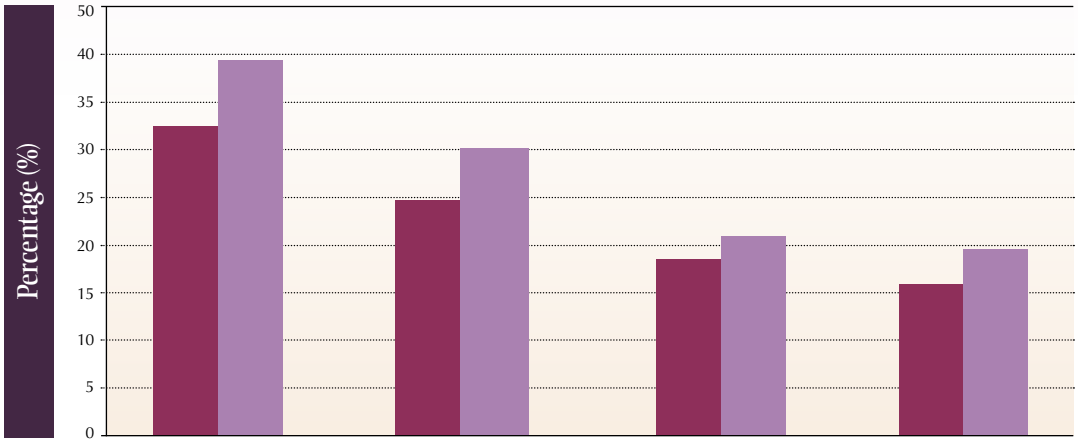
Age group	15-44	45-64	65-74	75+
Men	38.5	37.8	28.7	28.8
Women	45.5	40.7	35.5	37.3

♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada.

The CCHS asked respondents to report the number of disability days they had experienced for health-related reasons in the previous two weeks. Disability days are days on which people have to stay in bed all day or otherwise cut down on activities. Issues such as pain can prevent people with arthritis to go about their normal activities such as working.

The proportion of men and women with arthritis that reported disability days in the previous two weeks was greatest among those aged 15-44 years compared to the other age groups (Figure 3-8). Women were more likely than men in all age groups to report disability days. Again, people of working age (less than 65 years) were more likely than those aged 65 and over to report at least one disability day in the past 14 days.

Figure 3-8 *Proportion of individuals with arthritis reporting at least one disability day in the previous 14 days, by age and sex, household population aged 15 years and over, Canada, 2005*

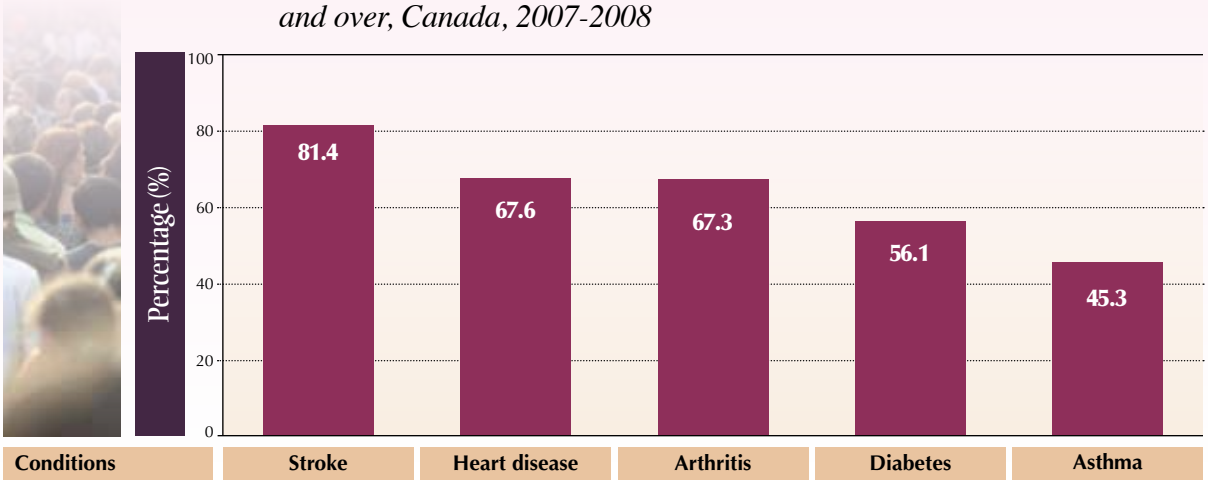


Age group	15-44	45-64	65-74	75+
Men	32.4	24.6	18.4	15.8
Women	39.3	30.1	20.8	19.5

♦ Source: Arthritis Community Research and Evaluation Unit, using data from the Canadian Community Health Survey (CCHS) 2005, Statistics Canada ♦ The 2005 CCHS was used for this figure as this variable was not available in the 2007-2008 CCHS.

Many individuals with arthritis have to cope with restrictions in their daily activities. The CCHS 2007-2008 asked the following question to respondents in order to assess activity limitations: "Do you have any difficulty hearing, seeing, communicating, walking, climbing stairs, bending, learning or doing any similar activities?". Over two thirds (67.3%) of individuals with arthritis aged 15 years and over reported activity limitations, a proportion similar to individuals with heart disease (67.6%) (Figure 3-9). A significantly greater proportion of individuals with stroke reported activity limitations (81.4%) compared to those with arthritis. In contrast, a significantly lower proportion of individuals with diabetes and asthma reported activity limitations compared to those with arthritis (56.1% and 45.3%, respectively).

Figure 3-9 *Proportion of individuals reporting activity limitations sometimes or often, by chronic condition, household population aged 15 years and over, Canada, 2007-2008*



♦ Source: Public Health Agency of Canada, using Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ Chronic condition categories are not mutually exclusive.

Disability due to arthritis

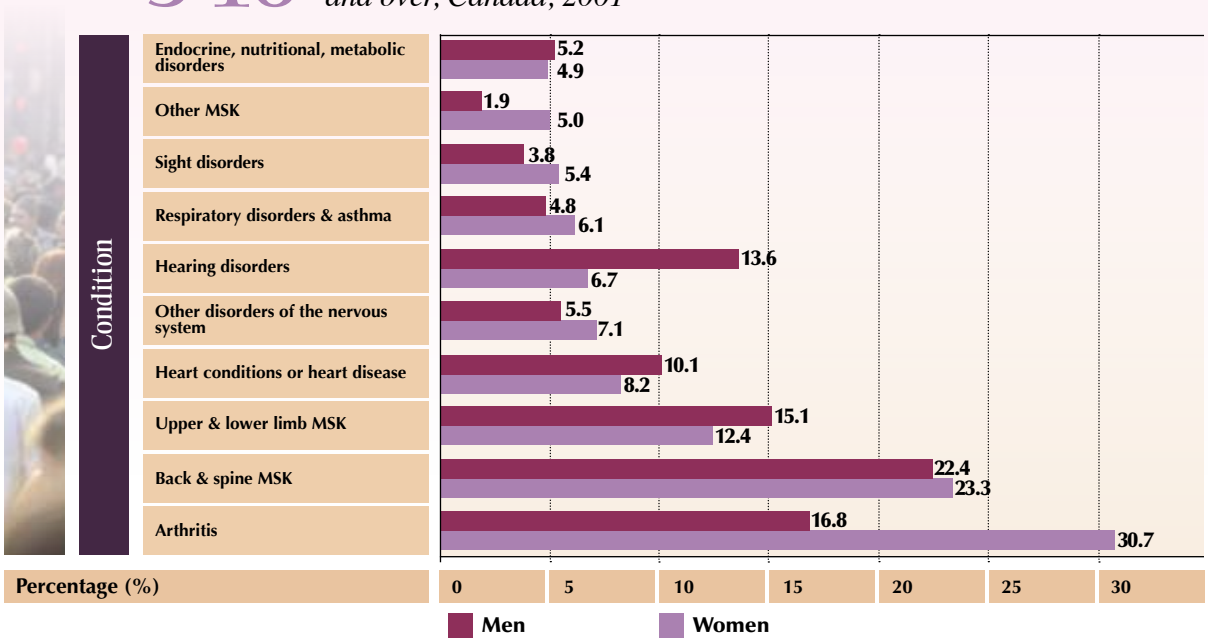
> ***"I am not sure that anybody can rise right above their disease, but instead you carry it with you, and let it lead you to places and people that otherwise would not be a part of your life. I always told myself that I would never let arthritis stand in the way of what I wanted to do and who I would become."***
>
> — Person living with juvenile rheumatoid arthritis

> ***I am truly looking forward to what the future holds for me. Yes, I do know that I will always have arthritis. But I will never let it define who I am or what I do as a person."***
>
> — Person living with juvenile rheumatoid arthritis

Arthritis is a major contributor to disability in Canada. In 2001, approximately one in six (15%) of Canadians reported having a disability in the Participation and Activity Limitation Survey (PALS). Approximately 25% attributed their disability to arthritis, while about 66% attributed it to other physical chronic conditions, and 9% to psychological chronic conditions.

Among the top ten causes of disability, arthritis was the most frequently reported cause of disability among women and second most frequently mentioned condition as a direct cause of disability among men (Figure 3-10).

Figure 3-10 *Top ten causes of disability among men and women aged 15 years and over, Canada, 2001*



♦ Source: Arthritis Community Research and Evaluation Unit, using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada. ♦ MSK = musculoskeletal diseases.

Overview of activity limitations due to arthritis

Figure 3-11 provides an overview of the activity limitations due to arthritis experienced by respondents in five daily life domains (which are based on the International Classification of Functioning, Disability and Health (ICF)).[16] The five domains are:

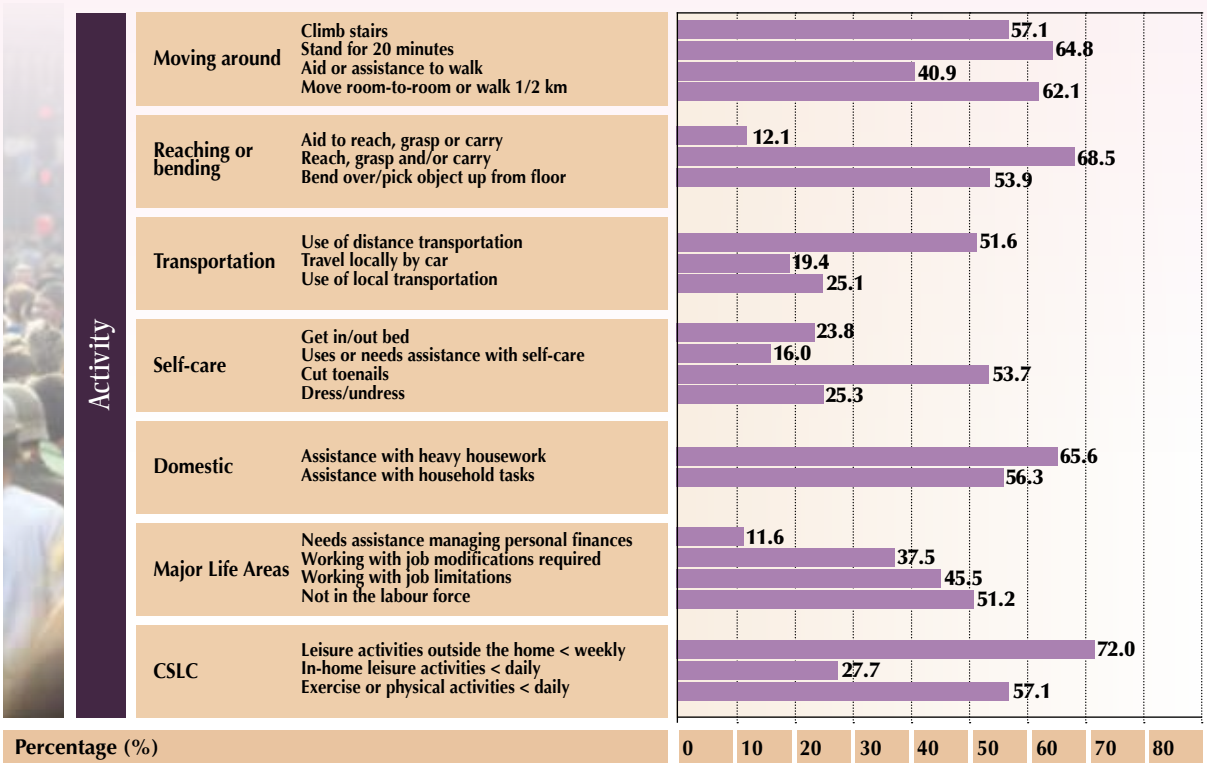
- mobility, which is further divided into:
  - ⇒ moving around;
  - ⇒ reaching and bending; and
  - ⇒ transportation;
- self-care;
- domestic life;
- participation in the labour force; and
- community, social and civic life (CSCL).

As shown in Figure 3-11, arthritis affects many dimensions of every day life for a large proportion of people living with the disease.

Over half of individuals with activity limitations due to arthritis faced difficulty with the following tasks:

- climbing stairs (57.1%);
- standing for 20 minutes (64.8%);
- moving room-to-room or walking ½ km (62.1%);
- reaching, grasping and/or carrying (68.5%);
- bending over and picking up an object from the floor (53.9%);
- use of distance transportation (51.6%);
- cutting toenails (53.7%);
- heavy housework (65.6%);
- household tasks (56.3%);
- leisure activities outside the home less than weekly (72.0%) and;
- exercise/physical activity less than daily (57.1%).

Figure 3-11 *Proportion of individuals aged 15 years and over with disability due to arthritis who reported limitations in specific life domains, Canada, 2001*



♦ Source: Arthritis Community Research and Evaluation Unit, using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada. ♦ CSCL is the abbreviation for Community, Social and Civic Life.

U.S.-based data suggest that people with arthritis find walking and mobility much more challenging than the non-arthritic population.[17] Data presented in this chapter suggest that activities as simple as cutting ones toenails or moving from room-to-room are particularly challenging tasks for respondents with activity limitations due to arthritis. These activity limitations may also vary according to the type of arthritis. Individuals with RA have been shown to be most limited in walking, climbing, gripping and handling.[18] Leisure activities, social activities, close relationships, community mobility, employment and heavy housework are the most frequently mentioned roles affected by osteoarthritis (OA).[19]

Activity limitations due to arthritis by sex and age

Mobility

Over 30% of men and women with activity limitations due to arthritis reported difficulty with or used assistance in moving around (Table 3-1). Women had significantly greater difficulty in climbing stairs, standing for twenty minutes, and moving room-to-room or walking than men whereas, similar proportions of women and men reported needing or using assistance in walking. People of working age (aged less than 65 years) had either similar or more difficulties with climbing stairs, standing for 20 minutes and moving room to room or walking compared to those aged over 65 years.

In all age groups, women with arthritis were more likely than men with arthritis to have difficulty reaching, grasping or carrying (68-76% versus 55-64%, respectively) (Table 3-1). They were also more likely than men to report the use of assistance with these tasks (12-26% versus 5-10%, respectively). These limitations due to arthritis were not restricted to the older age groups. Individuals of working age (15-64 years) were equally or more likely than individuals aged 65 years and over to report having difficulty reaching or bending due to their arthritis.

Use of transportation was problematic for young people with disability due to arthritis (Table 3-1). Men and women aged 15-44 years were more likely than the other age groups to report difficulties with transportation. The use of distance transportation was particularly challenging for young people, with close to 60% of them reporting difficulties in this area. Over a quarter of people of working age reported having difficulties traveling locally by car, which could impact their participation in the workforce or in social life. Similar proportions of men and women reported difficulty with the use of different transportation modes.

Table 3-1 *Proportion of individuals aged 15 years and over with disability due to arthritis who reported limitations in mobility, by age and sex, Canada, 2001*

Activity	Age Group	Men (%)	Women (%)
Moving around			
Move room-to-room or walk ½ km	15-44	50.3	52.7
	45-64	50.6	62.5
	65+	55.4	70.6
Aid or assistance to walk	15-44	33.8	37.2
	45-64	34.1	34.6
	65+	40.7	47.9
Stand for 20 minutes	15-44	54.9	62.0
	45-64	61.5	68.4
	65+	55.7	68.7
Climb stairs	15-44	38.4	47.8
	45-64	53.7	60.5
	65+	48.3	62.5
Moving around Reaching or bending			
Bend over/pick object up from floor	15-44	56.3	47.8
	45-64	60.4	57.0
	65+	49.8	52.4
Reach, grasp and/or carry	15-44	63.9	68.3
	45-64	55.5	73.6
	65+	54.6	75.9
Require use of aid to reach, grasp or carry	15-44	9.8	26.4
	45-64	9.0	15.1
	65+	5.0	12.2
Transportation			
Use of local transportation	15-44	32.7	38.1
	45-64	31.0	29.1
	65+	15.5	22.5
Travel locally by car	15-44	25.9	28.8
	45-64	29.5	23.1
	65+	10.2	16.4
Use of distance transportation	15-44	59.5	59.9
	45-64	57.5	55.2
	65+	42.8	49.5

♦ Source: Arthritis Community Research and Evaluation Unit using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada.

Self-care

> ***"My life as I knew it before ended. I was dependent on help from my husband, friends and family. Disability began with not being able to rise from the bed, dressing, walking and caring for myself. My role as head of the household ceased."***
>
> — Person living with rheumatoid arthritis and osteoarthritis

Overall, similar proportions of men and women reported difficulties with self-care activities (Table 3-2). Over 30% of men and women aged 15-44 years reported needing help to get in and out of bed and getting dressed, which is higher than among those aged 65 years and over (up to 23%).

Table 3-2 *Proportion of individuals aged 15 years and over with disability due to arthritis who reported limitations in self-care, by age and sex, Canada, 2001*

Activity	Age Group	Men (%)	Women (%)
Dress/undress	15-44	31.4	26.1
	45-64	28.9	30.3
	65+	19.4	23.1
Cut toenails	15-44	29.9	30.4
	45-64	50.6	50.2
	65+	52.4	62.4
Uses or needs assistance with self-care	15-44	8.4	14.7
	45-64	12.8	10.7
	65+	15.5	21.1
Get in/out bed	15-44	30.7	35.0
	45-64	31.8	31.0
	65+	15.6	18.8

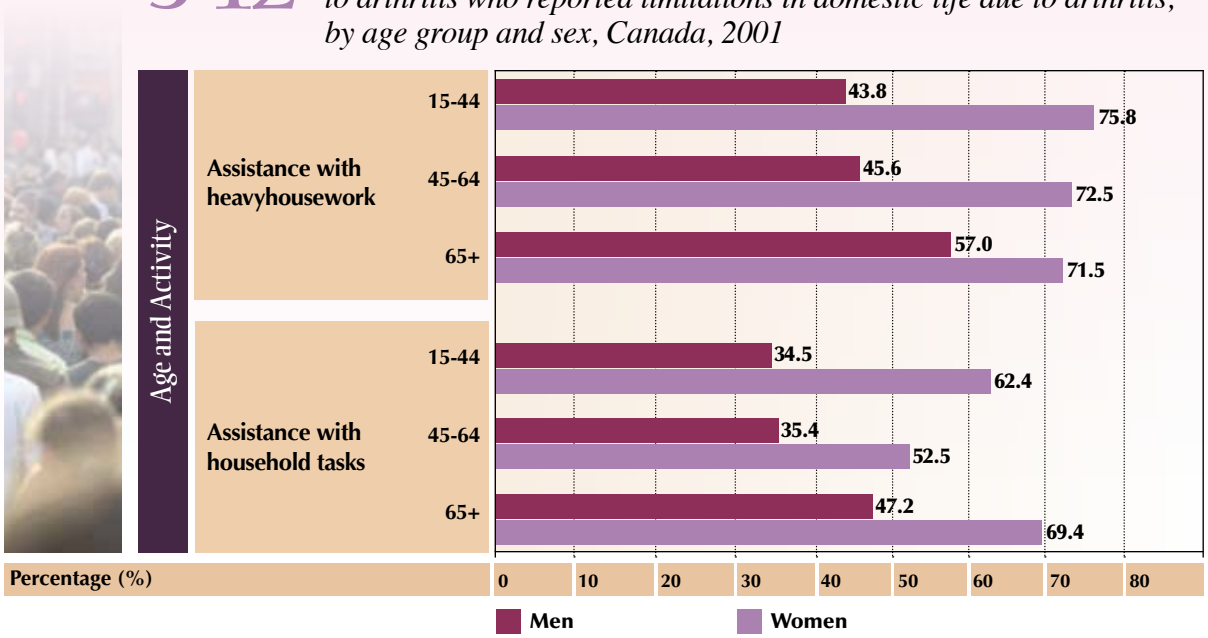
♦ Source: Arthritis Community Research and Evaluation Unit using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada.

Domestic life activities

Men and women, living with arthritis reported facing considerable difficulty in domestic life activities (Figure 3-12). Differences between men and women were evident, as the proportions of women who reported difficulties were up to 1.8 times higher than men.

High proportions of women aged 15-44 years with a disability related to arthritis reported difficulties in domestic life activities: 76% needed help with heavy housework and 62% needed assistance with household tasks. These proportions are similar to those reported by women aged 65 years and over (71% and 69%, respectively).

Figure 3-12 *Proportion of individuals aged 15 years and over with a disability due to arthritis who reported limitations in domestic life due to arthritis, by age group and sex, Canada, 2001*



♦ Source: Arthritis Community Research and Evaluation Unit using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada.

Participation in the labour force

> ***"I haven't been able to work since the onset of my rheumatoid [arthritis], and that was initially very devastating. I loved my work and to have it snatched away really affected me emotionally."***
>
> *— Person living with rheumatoid arthritis*

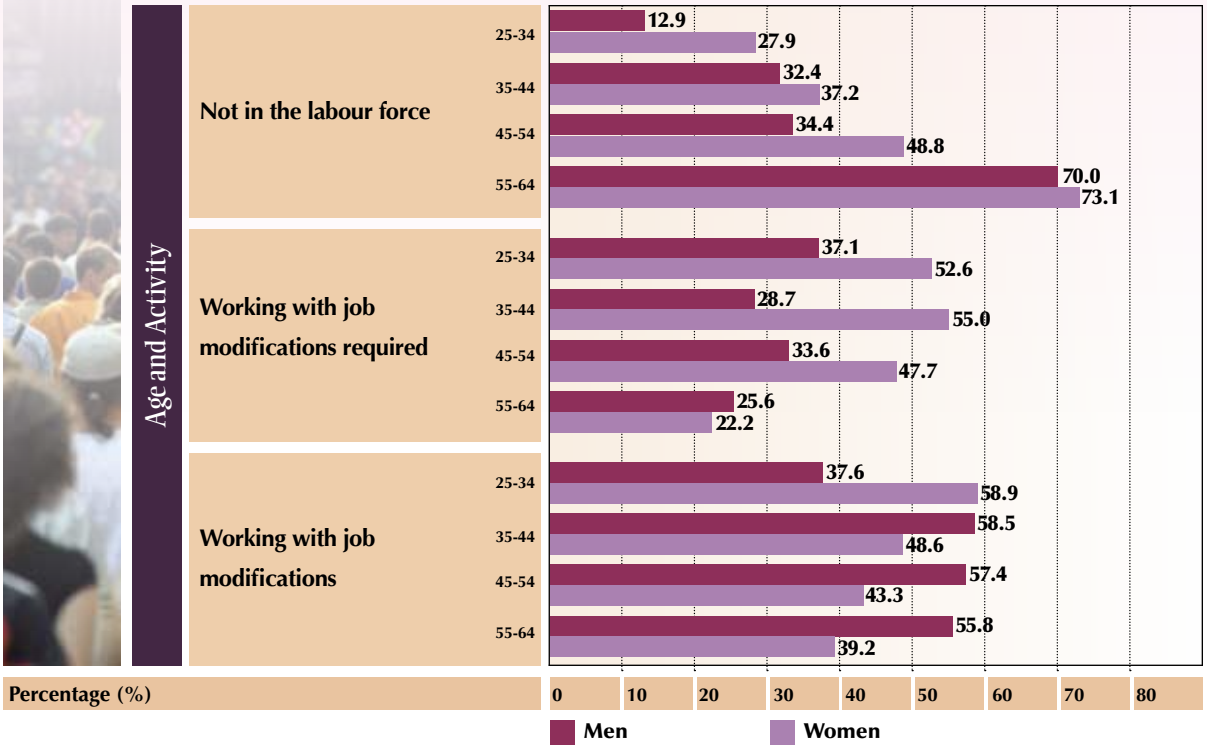
Arthritis conditions have a significant impact on work loss and the capacity to do work or gain employment.[5,8,20,21] Working age individuals may be unable to continue working at the same level as they would have if they had not developed arthritis, while others may need to adapt through workplace modifications.[5,6,22] Some workers may need to reduce the number of hours worked; others may be unable to work outside of the home; and others may need to change jobs.[5,8]

Figure 3-13 presents the proportion of people with activity limitations due to arthritis who are not in the labour force, who required job modifications, and have job limitations.

Many men and women with arthritis are still in the labour force however, 44% are working with job limitations and 33% required job modifications. Over 70% of those aged between 55-64 years reported not being in the labour force. Of concern is the proportion of young people with arthritis who report not being in the labour force. On average, over a quarter of men and women aged between 25 and 44 years with arthritis are not in the labour force because of their arthritis.

The data presented in this chapter do not capture loss of productivity, absenteeism, or the impact on the economic situation of the individuals and their family. Co-existing conditions such as mental illness or other physical conditions may also impact the ability of people living with arthritis to participate in the labour force.

Figure 3-13 *Proportion of individuals aged 25–64 years with disability due to arthritis who reported limitations in participation in the labour force, by age group and sex, Canada, 2001*



♦ Source: Arthritis Community Research and Evaluation Unit using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada.

Community, social and civic life (CSCL)

"When a person spends most of his time looking for places to sit down, he doesn't tend to be an avid sportsman. As a young person, I was very active physically and with the arthritis taking a firm hold in my 20s, I believe, I became much more oriented to intellectual pursuits—and thus was the first one of my family to attend university. My children later in life realized that I did not play and horse around with them to quite the extent that other fathers played with their children. Needless to say, our family did not make racing down the alpine slopes a family recreation. All in all, however, we were still an active family with summer trips on an annual basis to Victoria in the early years of my teaching career."

— Person living with non-specific polyarthritis

Participating in community, social and civic life can be challenging for many individuals with arthritis. Over 50% of those with activity limitations due to arthritis reported difficulties in participating in physical activities and in out-of-home leisure activities (Table 3-3). Over 65% of men and women aged 15-44 years reported a limitation in their participation in weekly leisure activities outside the home and up to 63% reported difficulties doing daily exercise or physical activity. The same pattern was observed among those aged 45-64 years of age.

Previous research has found that people with arthritis were more likely to report limitations in the amount of physical activity/exercise they could perform than those without arthritis.[23] This is cause for concern, since physical activity has been shown to be important in decreasing the degree of activity and participation limitations among individuals with arthritis.[24,25] Carrying out recommended levels of exercise has been associated with better quality of life and fewer physically and mentally unhealthy days.[26] These findings underline the importance of efforts to promote appropriate and adapted physical activity and exercise among people with arthritis, particularly in the younger age group and the working age population.

Table 3-3 *Proportion of individuals aged 15 years and over with disability due to arthritis who reported limitations in participating in community, social and civic life, by age and sex, Canada, 2001*

Activity	Age Group	Men (%)	Women (%)
Less than daily exercise or physical activity	15-44	63.0	59.3
	45-64	61.3	62.0
	65+	48.6	55.7
Less than daily in-home leisure activities*	15-44	32.4	22.8
	45-64	29.6	24.9
	65+	28.1	28.9
Less than weekly leisure activities outside the home	15-44	69.5	65.9
	45-64	73.2	73.7
	65+	74.9	70.5

♦ Source: Arthritis Community Research and Evaluation Unit using data from the Participation and Activity Limitation Survey 2001, Public Use File, Statistics Canada. ♦ * Exercise, stay in touch by email with family or friends, participate in electronic news groups or chat groups, surf the internet for information or e-commerce, do arts, crafts or hobbies, watch TV or videos, listen to the radio or CDs, read, talk on the telephone with family or friends.

> ***"I am scared sometimes for what the future holds. How will my husband cope when I can't do the things I do now? Will the meds stop working? What happens when my RA specialist retires, will I be able to find someone else? etc., etc."***
>
> – Person living with rheumatoid arthritis

Summary

- Arthritis seriously impacts the life of Canadians who live with the many forms of the condition. Individuals with arthritis not only have to live with the impairments, activity limitations and participation restrictions caused by their arthritis but also have to cope with other chronic conditions related to their arthritis including mental health problems and heart disease.
- Close to one third of individuals with arthritis reported their general health as fair or poor and the proportion of individuals with this general health standing increased with age. Up to one quarter of people with arthritis rated their health worse than a year earlier. Men and women with arthritis aged 75 years and older were more likely to report fair to poor health than the other age groups.
- Close to one tenth of individuals with arthritis perceived their mental health as fair or poor and close to one quarter reported life to be "quite a bit" or "extremely stressful". Overall, those aged 15-44 years of age were more likely to report poor mental health and a stressful life.
- The six chronic conditions most frequently reported among men with arthritis were back problems, high blood pressure, heart disease, diabetes, mood or anxiety disorder and asthma. Among women with arthritis, the most frequently reported conditions were back problems, high blood pressure, mood or anxiety disorder, migraines, diabetes and heart disease.
- Over a third of individuals with arthritis reported to have activities prevented by pain and the greatest proportions were observed in the youngest age group (15-44 years). Men and women of working age (less than 65 years of age) were also more likely to report activities prevented by pain than those aged over 65 years.
- Women with arthritis were more likely than men with arthritis to report disability days for health-related reasons. The greatest proportions were reported in the youngest age group (39% and 32% of women and men, respectively).
- The proportion of individuals with arthritis 15 years and over who reported activity limitations was similar to that of individuals with heart disease (67% and 68%).
- Arthritis was the second most frequently mentioned condition as a cause of disability among men and the first among women.
- Women were more likely to experience activity limitations due to arthritis compared to men. The proportions were higher in women of all age groups with the greatest difference observed between the ages of 55 and 74 years.
- Arthritis related disability includes limitations in mobility (i.e. moving around, reaching and bending and transportation), self-care, domestic life, major life areas, and community, social and civic life.
- Women with arthritis had significantly greater difficulty than men with climbing stairs, standing for twenty minutes, moving room-to-room or walking ½ km, reaching, grasping or carrying, and with domestic life activities.
- People of working age with arthritis had either similar or more difficulties with mobility activities, such as climbing stairs, standing for 20 minutes, reaching and bending, getting in and out of bed, getting dressed than the oldest age group with arthritis.
- Young women (15-44 years) with arthritis reported similar or greater difficulties with heavy housework and needing assistance with household tasks than those reported by women aged 65 years and over with arthritis.
- Use of transportation was also problematic for young people (15-44 years) with arthritis, particularly the use of distance transportation, with over 60% reporting difficulties in this area. Over a quarter of people of working-age reported having difficulties travelling locally by car.
- On average, one quarter of men and women with arthritis between the ages of 25 and 44 years were not in the labour force because of their arthritis.
- Over 65% of young people (15-44 years) with arthritis reported difficulties in participating in weekly leisure activities outside the home and up to 63% reported difficulties doing daily exercise or physical activity. A similar pattern was observed in those aged 45-64 years.

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Chapter Four

Arthritis among First Nations, Métis and Inuit

"Some valuable tools in overcoming my early struggles were my desire to discover everything I could about my disease and an open mind when it came to alternative therapies. As a child growing up in a First Nations community, I learned the traditional teachings, language and stories of my community at the feet of my Tama (grandmother) and my elders. Today, I live a full and active life. Through determination, education and with the support of my family and doctors, I am living proof that, while arthritis can strike anyone at any time, with early diagnosis, it can be treated. By sharing my story, I am helping to spread the message to the Aboriginal community that they don't have to suffer in silence.

— Person living with rheumatoid arthritis

Introduction

According to the 2006 census, over one million people in Canada identify themselves as First Nations (698,025 status and non-status), as Métis (389,780) or Inuit (50,480) which represents about 3.6% of the total Canadian population. This percentage, however, likely underestimates the true numbers due to the fact that enumeration was not completed on 22 reserves.[1]

Of the three Aboriginal populations, the Métis experienced the greatest increase in population (91%) between 1996 and 2006. This is more than three times the increase in the number of First Nations people (29%) and the Inuit (26%) population.[1] Several factors contributed to the large increases observed in the Aboriginal populations (particularly in the Métis population) including a high birth rate, an increase in the number of individuals self-identifying as Aboriginal (in response to political and social events) and an increase in the number of completely enumerated First Nations reserves.

First Nations

The majority of First Nations currently live in Ontario and the western provinces and approximately 60% live off-reserve. Half of the First Nations people living across Canada are under 25 years of age.[1]

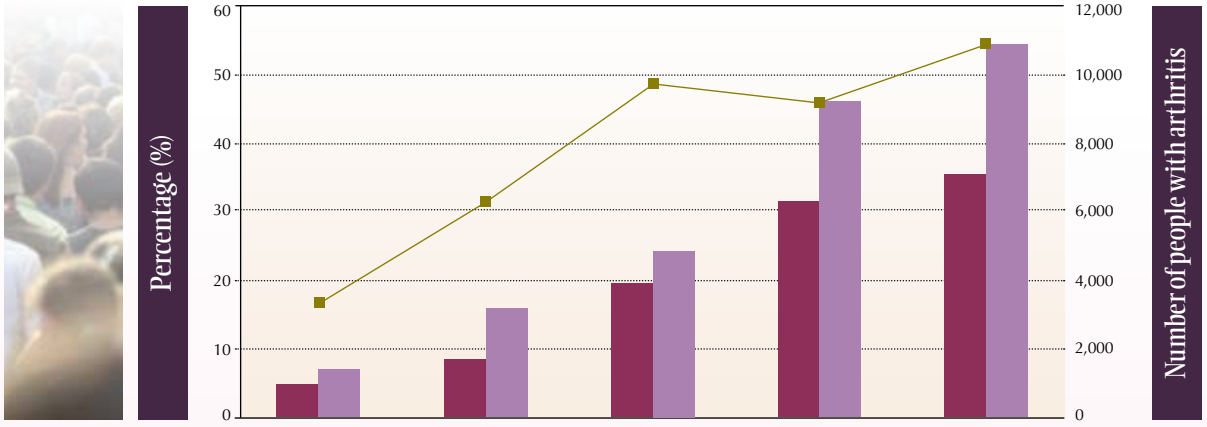
The two sources of data used to provide information on arthritis among First Nations in Canada are: the Canadian Community Health Survey (CCHS) for people who self-identified as being First Nations and who lived off-reserve; and the First Nations Regional Longitudinal Survey (RHS) for people living on-reserve.

First Nations People Living On-Reserve

According to the RHS, the top five most widely reported conditions among First Nations adults in 2002-2003 were arthritis/rheumatism, allergies, high blood pressure, diabetes and chronic back pain - conditions that are also very common in the non-Aboriginal adult population.[2]

In 2002-2003, 19% of First Nations adults aged 20 years and older living on-reserve (79,400 people) reported having been diagnosed with arthritis/rheumatism. The percentage of individuals with arthritis/rheumatism increased with increasing age and arthritis was more common among women than men in every age group (Figure 4-1). Close to two-thirds (64%) of First Nations adults living on-reserve who had arthritis/rheumatism were 30–59 years of age.

Figure 4-1 *Self-reported prevalence and number of individuals with arthritis/rheumatism, on-reserve First Nations population aged 20 years and older, by age group and sex, Canada, 2002-2003*



Age Group	20-29	30-39	40-49	50-59	60+	
Men	4.9	8.5	19.7	31.5	35.6	
Women	7.2	16.0	24.5	46.1	54.3	

Number of people with arthritis

♦ Source: First Nations Regional Longitudinal Health Survey (RHS) Phase 1 2002-2003, custom tabulations by the RHS National Team, Assembly of First Nations.

The 2002-2003 age-standardized (adjusted for differences in age distribution) prevalence estimate for arthritis/rheumatism in on-reserve First Nations adults aged 20 years and older was 1.3 times higher than the 2003 age-standardized estimate for arthritis in the Canadian population aged 20 years and older.

Among First Nations adults living on-reserve who had arthritis/rheumatism, 60% (55% men and 64% women) reported the need to limit either their amount or kind of activities as a result of their condition. Similar findings were reported by the Manitoba First Nations Regional Longitudinal Health Survey (MFN Survey) which also showed a high frequency of activity limitations among First Nations with arthritis living on-reserve (68% reported limitations due to any type of arthritis).[3]

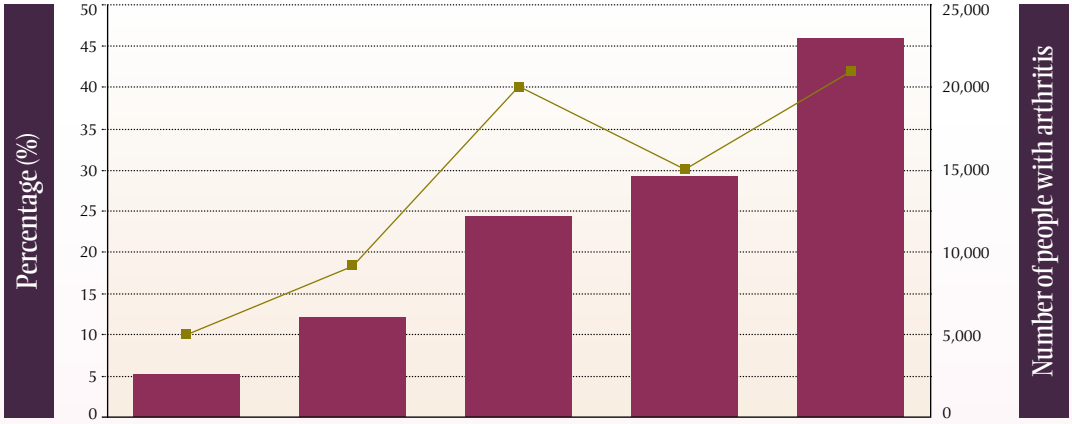
Fifty-three percent of First Nations adults living on-reserve who had arthritis/rheumatism (47% women and 57% men) stated that they were currently receiving treatment or taking medications for their condition. Health status and access to health care services are influenced by geography.[4] Since on-reserve health services may be provided in the form of a resident community health representative and a doctor who flies in on a semi-regular basis, not all services can be obtained in the communities in which people live.[2,4] First Nations populations living on-reserve, especially those who live in rural and remote communities, often face barriers in accessing medical care. These barriers can include high transportation costs, language issues and lack of available services.[2]

First Nations People Living Off-Reserve

In 2007-2008, 17.7% of First Nations adults aged 15 years and older living off-reserve (71,704 people) reported having been diagnosed with arthritis. The percentage of individuals with arthritis increased with increasing age (Figure 4-2) and overall arthritis was more commonly reported in women (19.9%) compared to men (15.3%). Close to two-thirds (61%) of First Nations adults living off-reserve who had arthritis were between 30 to 59 years of age.

The 2007-2008 age-standardized prevalence estimate for arthritis in off-reserve First Nations adults aged 15 years and older was 1.3 times higher than the 2007-2008 age-standardized estimate for arthritis in the Canadian population aged 15 years and older.

Figure 4-2 *Self-reported prevalence and number of individuals with arthritis, off-reserve First Nations population aged 20 years and older, by age group, Canada, 2007-2008*



Age Group	20-29	30-39	40-49	50-59	60+	
Men and women	5.2 E	12.2 E	24.3	29.0	45.9	

Number of people with arthritis

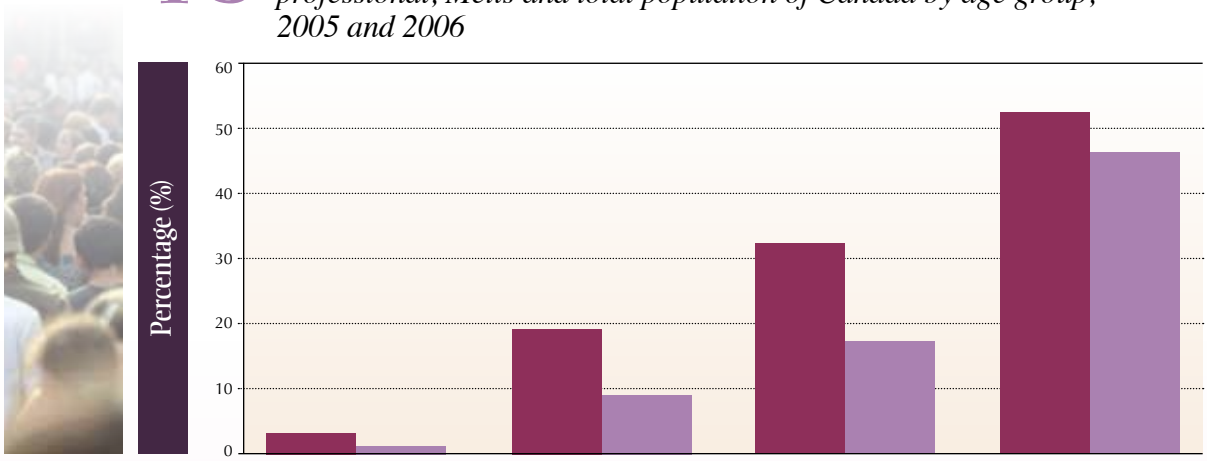
♦ Source: Public Health Agency of Canada, using the Canadian Community Health Survey 2007-2008, Statistics Canada. ♦ Age group 15 to 19 - not reportable. ♦ E - interpret with caution.

Métis

The Métis population was formed from the community of French fur traders and Cree women in the Prairies, and of English and Scottish traders and Dene women in the North. Currently, most individuals who self-identify as being Métis mainly live in urban centres in Ontario (73,605), Manitoba (71,805), Saskatchewan (48,120), Alberta (85,495) and British Columbia (59,445). Half of the Métis living in Canada are under 30 years of age.[1]

According to the 2006 Aboriginal Peoples Survey (APS) the most commonly reported chronic health conditions among Métis aged 15 years and older were arthritis/rheumatism (21%) followed by high blood pressure (16%) and asthma (14%). Métis women were more likely than men to report arthritis/rheumatism (24% and 18%, respectively). The prevalence of arthritis/rheumatism increased with increasing age (Figure 4-3).[5]

Figure 4-3 *Self-reported prevalence of arthritis/rheumatism diagnosed by a health professional, Métis and total population of Canada by age group, 2005 and 2006*



Age Group	15-19 E	35-44	45-54	65+
Métis	3	19	32	52
Total Canadian population	1	9	17	46

♦ Source: Statistics Canada. Aboriginal Peoples Survey, 2006: An Overview of the Health of the Métis Population. Ottawa: Statistics Canada, February 2009, Catalogue no. 89-637-X no. 004. ♦ E – interpret with caution.

The 2006 prevalence estimate for self-reported arthritis/rheumatism in Métis adults was 1.6 times higher than the 2005 CCHS estimate for arthritis/rheumatism in the total Canadian population after adjusting for the younger Métis population.[5]

Inuit

Most Inuit live in the northern regions of Canada — including Nunavut (24,635), Nunavik in northern Quebec (9,565), the Inuvialuit region in the Northwest Territories (3,115) and Nunatsiavut in northern Labrador (4,715). Approximately 17% (8,582) of all Inuit live in large urban centres in southern Canada. Half of the Inuit living in Canada are under 22 years of age.[1]

The 2006 APS collected information from Inuit people in the four Inuit regions across the north and from those in southern Canada and provides arthritis estimates at the national level.[6]

According to the 2006 APS, the most commonly reported diagnosed chronic conditions among Inuit adults aged 15 years and older were arthritis/rheumatism (13%) and high blood pressure (12%). These figures were similar to those of the total Canadian population after adjusting for differences in age. Arthritis/rheumatism were more common among Inuit women compared to men (16% and 10% respectively).[6]

The lower prevalence estimate for arthritis/rheumatism in the Inuit population compared to the other Aboriginal populations may be due to under diagnosis. The majority of Inuit live in the Canadian Arctic where there is less contact with health care professionals so many may go undiagnosed.[6,7] As well, the Inuit population is younger than the other Aboriginal populations and generally, those in younger age groups are less likely to report chronic conditions.[7] Furthermore, the Inuit's genetic predisposition as well as their high dietary intakes of fish (i.e., omega-3) may have a protective effect against inflammatory and autoimmune disorders.[8,9]

The true prevalence of arthritis for all three Aboriginal populations is likely underestimated, as those who do not see a health care professional for their symptoms and whose symptoms remain undiagnosed will not be included in these estimates.[7] Similar to the overall Canadian population, Aboriginal men are generally less likely than women to have contact with health care professionals.[10] Furthermore, it is possible that individuals may not realize that some health conditions such as gout or lupus are forms of arthritis and, consequently, not report that they have arthritis.

Summary

- Arthritis is one of the most prevalent chronic diseases in First Nations, on-and off-reserve (19% and 18% respectively), Inuit (13%) and Métis (21%).
- The arthritis prevalence estimate for First Nations adults living on-reserve, First Nations adults living off-reserve, and Métis adults was 1.3-1.6 times higher than the national estimate for arthritis in the Canadian adult population, after adjusting for differences in the age distribution in these populations.
- The prevalence estimate of arthritis/rheumatism in the Inuit population was similar to the total Canadian population after age standardization.
- The prevalence of arthritis was higher among women compared to men in all three Aboriginal populations.
- Close to two-thirds of First Nations living on- and off-reserve reporting arthritis were between 30–59 years of age (64% and 61%, respectively).
- Sixty percent of First Nations living on-reserve reported the need to limit either the amount or kind of activities as a result of arthritis/rheumatism.
- Fifty-three percent of First Nations living on-reserve stated that they were currently receiving treatment or taking medications for arthritis/rheumatism.
- All three Aboriginal populations have a young and growing population as a result, the prevalence of arthritis is expected to increase over time.

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Chapter Five

Mortality burden of arthritis

"My physician at the time told me that no one had ever died of arthritis. In the years to come, he apologized a number of times for that remark."

— Person living with rheumatoid arthritis

Introduction

While deaths from arthritis are rare, people with arthritis, specifically those with severe inflammatory forms, are at increased risk of premature mortality. The most severe inflammatory arthritis conditions including rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), scleroderma, and vasculitis have the highest mortality rates. Individuals with RA are at a higher risk of mortality than the general population, not only because of the disease itself, but because of its associated complications (e.g., cardiovascular disease, infections, renal disease and others).[1-10] They are also at increased risk of premature death, with a lifespan on average 5–10 years shorter than the general population.[1,2,11] The systemic nature of inflammatory forms of arthritis can lead to life-threatening complications of the cardiovascular and respiratory systems. In addition, some of the treatments can depress the immune system, leading to increased susceptibility to infection and the risk of immune system related diseases such as cancer.[8,10,12-16]

Mortality rates for this chapter were calculated using the Canadian annual mortality database based on death certificate information for the years of 1999–2005. The analysis included all deaths for which one of the types of arthritis was recorded as the underlying cause. Mortality rates were calculated for the following five arthritis categories:

- Osteoarthritis (OA);
- Rheumatoid arthritis (RA);
- Other inflammatory arthritis (e.g. gout, psoriatic arthritis, ankylosing spondylitis);
- Connective tissue diseases (e.g. lupus and scleroderma); and
- Other arthritis conditions (e.g. polymyalgia rheumatica, tendonitis, bursitis, synovitis, internal derangement of the knee, other unspecified arthropathies).

The cause of death in people with arthritis may not be recorded as arthritis, but rather as an acute condition or disease1 therefore, it is difficult to determine the true contribution of arthritis to overall mortality.[12-20] For instance, cardiovascular disease, infection or organ failure could have been listed as the underlying cause of death in individuals with inflammatory arthritis whereas, gastro-intestinal (GI) bleeding related to anti-inflammatory use or joint infections after joint replacement surgery could have been listed as the underlying cause of death in individuals with OA.[1,17,18]

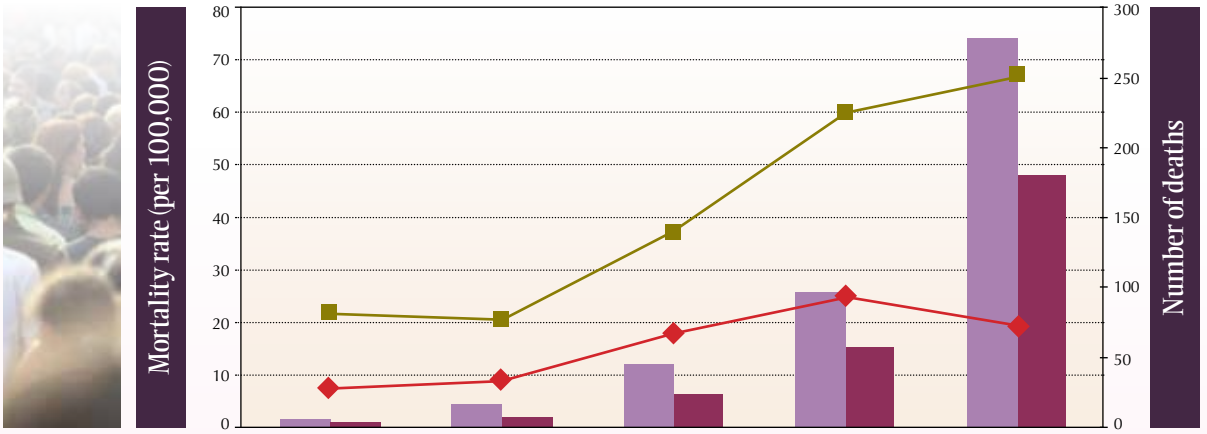
Gains in the understanding of mortality as an outcome of arthritis could be realized if the contributing causes of death were included in the Canadian annual mortality database. Such gains would also be important in the areas of diabetes, chronic respiratory diseases, injury and other chronic diseases.[19-20]

Mortality from arthritis among men and women

In 2005, 777 women and 296 men in Canada were recorded as having died from arthritis. Mortality rates among men ranged from 0.2 deaths for every 100,000 men aged 54 years or less to 48 deaths per 100,000 men aged 85 years and over (Figure 5-1). Among women in the same age groups, rates ranged between 0.7 deaths per 100,000 to 74 deaths per 100,000. Mortality rates were higher among women than men in every age group, with approximately 2.6 female deaths for every male death.

The number of deaths increased with age, except among men, where the number of deaths declined after the age of 84 years (Figure 5-1). Over one fifth (21%) of the deaths occurred in men and women of working age (0–64 years).

Figure 5-1 *Number of deaths and crude mortality rates (per 100,000) attributed to arthritis, by age and sex, Canada, 2005*



Age Group	0-54	55-64	65-74	75-84	85+	
Male Mortality Rate	0.2	1.9	6.3	15.2	48.0	
Female Mortality Rate	0.7	4.3	11.9	25.8	74.2	

Number of men Number of women

♦ Source: Public Health Agency of Canada, using 2005 Canadian annual mortality data, Statistics Canada.

Mortality for specific arthritis conditions

Of the five categories of arthritis conditions, two accounted for over 60% of the total arthritis deaths: connective tissue diseases such as lupus (34%), and RA (30%) (Table 5-1). Among deaths from connective tissue diseases, most were due to lupus or to systemic sclerosis/scleroderma which are two of the less common type of arthritis conditions.

Table 5-1 *Total arthritis deaths, by type of arthritis, Canada, 2005*

Type of arthritis	Number and proportion of total arthritis related deaths	
	Number	Proportion (%)
OA	208	19
RA	318	30
Other inflammatory arthritis	67	6
Connective tissue diseases (e.g. lupus)	361	34
Other arthritis conditions	119	11
All arthritis	**1,073**	**100**

♦ Source: Public Health Agency of Canada, using 2005 Canadian Annual Mortality data, Statistics Canada.

Premature mortality

Premature mortality is defined as death occurring before the age of 75 years. Forty percent of people who died from arthritis (430 deaths) died prematurely (before the age of 75) which is similar to the percentage of Canadians who died prematurely of all causes (39%). Over eighty percent of premature deaths related to arthritis were due to connective tissue diseases (57%) and RA (26%) (Table 5-2).

Premature mortality patterns differed between men and women, reflecting the higher prevalence of connective tissue diseases and RA in women. Among men, 49% of premature deaths were due to connective tissue diseases versus 61% among women, and 23% were due to RA in men compared to 27% for women (Table 5.2).

Table 5-2 *Number and proportion of arthritis premature deaths, by sex and type of arthritis, Canada, 2005*

Type of arthritis	Men		Women		Total	
	Number	Proportion (%)	Number	Proportion (%)	Number	Proportion (%)
OA	8	6	13	4	21	5
RA	30	23	81	27	111	26
Other inflammatory arthritis	13	10	8	3	21	5
Connective tissue diseases	64	49	182	61	246	57
Other arthritis conditions	15	12	16	5	31	7
All arthritis	**130**	**100**	**300**	**100**	**430**	**100**

♦ Source: Public Health Agency of Canada, using 2005 Canadian annual mortality data, Statistics Canada.

Several factors influence the risk of early death (premature mortality) including:[11,13-21]

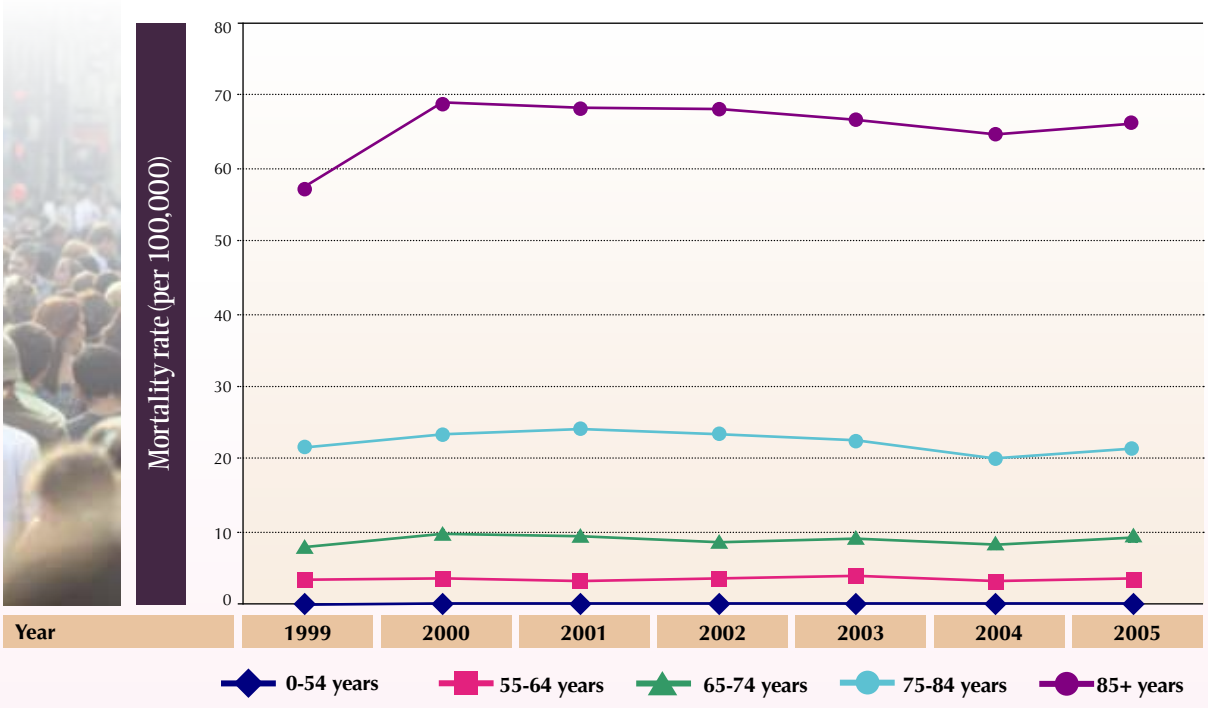
- physical limitations resulting from the disease;
- markers of disease severity including high number of joints involved, other organ involvement and positive rheumatoid factor in people with RA;
- the presence of other health problems such as cardiovascular diseases, infections, cancer, renal disease, respiratory diseases, gastrointestinal diseases;
- sex (being female); and
- increasing age.

Most of these predictors are associated with premature mortality in the majority of the arthritis types. Preventing premature arthritis deaths involves early diagnosis and recognition, appropriate management and compliance with treatment.[11-12,17]

Mortality over time

Age-specific mortality rates due to arthritis remained relatively stable from 1999–2005 (Figure 5-2). For those 65 years of age and over, there was a noticeable peak in the year 2000, which could likely be explained by the fact that most provinces and territories in Canada changed their coding classification from ICD-9 to ICD-10 during that year. It may also indicate that ICD-9 and its coding rules could have underestimated the arthritis-related mortality compared to ICD-10. However, no comparability studies have examined the extent to which the change in classification would impact the ascertainment of the causes of death.

Figure 5-2 *Age-specific mortality rates (per 100,000) for arthritis, by year, Canada, 1999–2005*



♦ Source: Public Health Agency of Canada, using 2005 Canadian annual mortality data, Statistics Canada.

Summary

- While deaths from arthritis are rare, in 2005, 777 women and 296 men in Canada died from an arthritis condition: rheumatoid arthritis, systemic lupus erythematosus and other connective tissue diseases accounted for more than 60% of all arthritis deaths.
- Arthritis mortality rates were higher among women than men in every age group, with approximately 2.6 female deaths for every male death in part because these conditions are more common among women.
- Forty percent of people who died from arthritis died prematurely (before the age of 75 years) which is similar to the percentage of Canadians who died prematurely of all causes (39%).
- Age-specific mortality rates due to arthritis remained relatively stable over time (1999–2005).

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Chapter Six

Economic burden of arthritis

6

Introduction

Arthritis affects a substantial proportion (16%) of the Canadian population and is a leading cause of illness and disability (Chapter 1 and 3). People living with arthritis suffer pain, impaired physical function and a reduced quality of life, particularly with respect to their social, psychological and financial well-being.

This chapter presents the most recent (2000) costs attributed specifically to arthritis from the Economic Burden of Illness in Canada (EBIC) project of the Public Health Agency of Canada.

The total costs associated with arthritis reported in this chapter include both direct and indirect costs. Direct costs include hospital care expenditures (public and private), drug expenditures (publicly and privately prescribed and non-prescribed products), physician carwe expenditures (all fee-for-service and alternative payment plans), and additional health care expenditures. Indirect costs refer to the dollar value of lost production due to illness, injury or premature death and consist of the lost production attributable to short and long-term disability (morbidity costs) and the lost production associated with premature death (mortality costs).

Short-term disability costs could not be calculated specifically for arthritis. As a result, the indirect and total costs attributed to arthritis are underestimated. Costs are reported in 2000 dollars and in 2008 dollars (Table 6-1). Costs figures were converted to 2008 dollars using the Bank of Canada inflation calculator.[1]

Costs Attributed to Arthritis

In 2000, the total cost of musculoskeletal* diseases (which includes arthritis) was $22.3 billion and the most costly group of diseases. The economic burden of arthritis† in Canada was estimated to be $6.4 billion (Table 6-1), representing almost one third of the total cost of musculoskeletal diseases.

Indirect costs associated with arthritis accounted for twice the direct costs ($4.3 billion and $2.1 billion, respectively). With respect to direct costs, arthritis accounted for over one half of hospital care expenditures for all musculoskeletal diseases, nearly three fifths of drug expenditures, and approximately one half of physician care expenditures. For indirect costs, arthritis accounted for more than 80% of all musculoskeletal mortality costs and over one quarter of morbidity costs due to long-term disability.

Table 6-1 *Economic burden of arthritis, by cost components, Canada 2000 (2008) dollars*

Type of cost	Component	Arthritis costs ($ million)	Proportion of musculoskeletal disease expenditures (%)
Direct costs			
	Hospital care	$987.3 ($1,185.8)	54.0%
	Drug	$524.6 ($630.1)	57.8%
	Physician care	$589.4 ($707.9)	49.0%
	Total direct	$2,101.3 ($2,523.8)	53.4%
Indirect costs			
	Mortality	$177.9 ($213.6)	81.4%
	Long term disability	$4,136.8 ($4,968.5)	26.4%
	Short term disability	n/a	n/a
	Total indirect	$4,314.7 ($5,182.1)	23.5%
Total costs		**$6,415.9 ($7,705.9)**	**28.9%**

♦ Source: Public Health Agency of Canada, Economic Burden of Illness in Canada 2000 custom tabulations. ♦ Short term disability costs not available for arthritis but included in musculoskeletal disease.

* ICD-9 710-739, 274.

† ICD-9 99.3, 274, 696.0, 446, 710.0-710.4, 710.9, 711-720, 725-729.

Morbidity costs ($4.1 billion) due to long-term disability accounted for nearly two thirds of total arthritis costs in 2000, by far the largest cost component of the arthritis burden. The largest direct cost components were hospital care expenditures ($987 million) and physician care expenditures ($589 million).

Total costs attributed to arthritis were greater in women than men ($4.1 billion and $2.3 billion, respectively). This reflects the greater prevalence of arthritis among women than men. Nearly two thirds (65%) of the total arthritis costs were incurred by individuals aged 35–64 years ($4.1 billion), followed by individuals aged 65 years and over ($1.7 billion) and those aged 15–34 years ($493.8 million). This emphasizes the important economic burden of arthritis in Canadian individuals of work-force age as well as seniors. Costs incurred by the youngest age group (0–14 years) were $49.3 million.

In the future, people aged 55 years of age and older will account for the greatest increase in the number of people affected with arthritis (see Chapter 1) and a high proportion of these people may face reduced participation in the labour force (see Chapter 3), so morbidity costs due to arthritis are expected to increase substantially in the future. This can be mitigated by focusing on prevention, improving health and reducing disability in order to minimize short and long disability costs and help people with arthritis to participate actively in society, including staying in the labour force.

Summary

- In 2000, the total cost associated with arthritis was $6.4 billion which represents almost one third of the total costs attributed to musculoskeletal diseases, the most costly group of diseases in Canada.
- The greatest economic burden associated with arthritis is attributed to long-term disability.
- Indirect costs associated with long-term disability accounted for twice the direct costs of arthritis.
- Total arthritis costs were greater in women ($4.1 billion) than men ($2.3 billion) because of the higher prevalence of arthritis among women.
- Total costs incurred by individuals within the labour force (35-64 years) were over two times higher than those incurred by the elderly (65 years and over) ($4.1 billion and $1.7 billion, respectively).

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Chapter Seven

Arthritis-related prescription medication use

> ***"I have not had success with two biologics and a host of other drugs, but now am on one that is working very well for me. Most people would not even know I have a disease. I have had one hand surgery and was in line for a knee replacement until I started a medication that had basically put me into a remission."***
>
> — Person living with Still's disease

Introduction

Arthritis encompasses a group of complex diseases for which there is currently no known cure. Medication is a key component of the management of arthritis in the effort to reduce pain, maintain joint function and limit disease progression.[1]

For some types of arthritis, particularly inflammatory conditions, early diagnosis and timely treatment is vital in order to reduce pain and inflammation, prevent or reduce disability, and to improve overall quality of life.[2-9] Without effective treatment, the course of many forms of arthritis such as rheumatoid arthritis (RA) and ankylosing spondylitis (AS) leads to functional disability.[4,8]

Currently, medications used for treating arthritis include: analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, disease modifying anti-rheumatic drugs (DMARDs) and biologic response modifiers (also known as biologics). In recent years, the introduction of new drugs such as biologics, have greatly improved the efficacy of pharmacological treatment for arthritis. Furthermore, innovative drugs for osteoarthritis (OA) are on the horizon, including drugs to prevent the progression in the early stages of the disease and disease-modifying drugs for established OA (DMOADs).[10]

This chapter examines the use of arthritis-related medications by type of arthritis, age, sex, year and drug classes, using IMS Health Canada (IMS) data. The specific types of arthritis were grouped into five categories:

- Osteoarthritis (OA);
- Rheumatoid arthritis (RA);
- Other inflammatory arthritis (e.g. gout, psoriatic arthritis (PsA), ankylosing arthritis (AS));
- Connective tissue diseases (e.g. systemic lupus erythematosus, scleroderma); and

- Other arthritis conditions (e.g. polymyalgia rheumatica, tendonitis, bursitis, synovitis, internal derangement of the knee, other unspecified arthropathies).

Analgesics (pain medication)

Simple Analgesics include medications such as acetaminophen. While they are considered the first-line therapy for arthritis pain (predominately used in OA), they have no effect on inflammation.[1,2,11] This form of pain medication does not require a prescription; as a result, it is difficult to track its usage.[1,11]

Non-steroidal anti-inflammatory drugs (NSAIDs)

NSAIDs are one of the most widely used medications in the treatment of arthritis because of their pain-killing (especially acute pain) and anti-inflammatory properties.[1,3,12] They are used in the treatment of most forms of arthritis, including OA, RA, gout, AS, PsA and connective tissue disorders.[2,7,11-18] Some NSAIDs are available over-the-counter and some require a prescription from a physician.

Gastrointestinal (GI) protective agents

Best practice guidelines recommend that GI protective agents be prescribed to treat or prevent the GI complications (e.g. GI bleeding) associated with the use of NSAIDs among those who present with risk factors for GI problems, such as advanced age, multiple NSAIDs use or prior ulcer. GI protective agents are also prescribed for other conditions, such as Gastroesophageal Reflux Disease (GERD), primary gastro-duodenal ulcers and many stomach and bowel symptoms unrelated to the use of NSAIDs.[19]

Corticosteroids

Corticosteroids have successfully been used to reduce joint inflammation and disease activity in inflammatory forms of arthritis.[20] There are two forms of corticosteroids: oral and injectable. Both forms are effective in relieving pain and swelling for many types of arthritis.[1-6,11-14,16,18,21-23]

Disease-modifying anti-rheumatic drugs (DMARDs)

DMARDs are medications that suppress inflammation and prevent damage to the joint.[1,4,11,20,24] Currently, clinical treatment guidelines for RA recommend the initiation of DMARDs as soon as the diagnosis is confirmed. DMARDs do not have an immediate effect — relief is usually delayed. As a result, NSAIDs and corticosteroids are often used when initiating therapy with DMARDs.[4] DMARDs are also used in the treatment of AS, PsA, and connective tissue disorders.[2,5,7,16,18,21]

Biologic response modifiers

Biologic response modifiers are the newest class of arthritis medication. Similar to DMARDs, biologic response modifiers suppress inflammation and help to prevent joint damage.[20] Biologic response modifiers provide symptomatic control and functional improvement in patients for whom treatment with one or more DMARDS has failed, and they are often used in combination with DMARDS.[11,20]

> ***"I live with a great deal of fear that this drug will stop working and others may not work or be available to me."***
>
> — Person living with rheumatoid arthritis

Arthritis-related prescriptions dispensed to people with arthritis

Prescriptions by arthritis type

In 2007, over 4 million prescriptions for NSAIDs were written in Canada for individuals with a diagnosis of arthritis—the largest number among all categories of arthritis-related prescriptions. Nearly one third (30%) of NSAID prescriptions for arthritis were written for people diagnosed with OA, 9% were written for those diagnosed with RA, connective tissues diseases and other inflammatory arthritis and the remaining 61% were written for other types of arthritis such as, joint derangements, polymyalgia rheumatica, synovitis, bursitis, and unspecified arthropathies.

NSAIDs can irritate the lining of the stomach and GI system. Protective drugs are prescribed to reduce the risk of irritation. Most of the GI protective agent prescriptions were either written for people with OA or for people with any of the other arthritis conditions (40% and 53%, respectively).

DMARDs are also commonly used among individuals with arthritis with over 1 million prescriptions written for people with arthritis in 2007. The majority (over 70%) of the 1 million DMARDs prescriptions were written for individuals with a diagnosis of RA.

Corticosteroids prescriptions (62%) were most commonly written for those with a diagnosis that fell in the other arthritis conditions category.

Over 90% of biologic response modifier prescriptions were written for individuals diagnosed with RA.

Table 7-1 *Number and percentage of NSAID, DMARD, corticosteroid, biologic response modifier and GI protective agent prescriptions written for individuals aged 15 years and over with arthritis, Canada, 2007*

	Number of prescriptions written for individuals with a diagnosis of arthritis	Percentage of prescriptions written for individuals with specific arthritis conditions				
		OA	RA	Connective tissue disorders	Other inflammatory arthritis	Other arthritis conditions
NSAIDs	4,165,700	30.0	4.5	0.6	3.9	61.3
DMARDs	1,101,230	0.9	72.2	9.9	5.7	8.0
Corticosteroids	908,230	13.1	12.6	8.2	2.0	61.8
Biologic response modifiers	149,610	-	90.1	-	2.5	-
GI protective agents	283,650	40.0	6.1	0.1	10.3	52.8

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada.

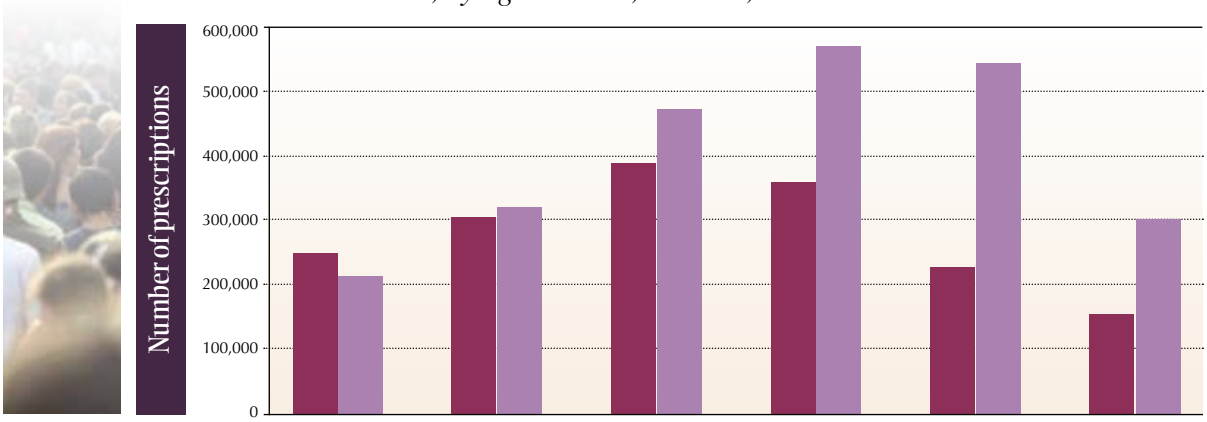
> ***"If any of the new biologics had been available when I was in my twenties, I believe I would have been in much better shape. What these drugs do for people in the early stages of arthritis is just remarkable. The key is an early diagnosis and aggressive treatment".***
>
> — Person living with rheumatoid arthritis

Prescriptions by age and sex and over time

NSAIDs and GI protective agents

In 2007, more NSAID prescriptions were written for women than men with arthritis for all age groups with the exception of those between the ages of 15 and 34 years (Figure 7-1). The number of NSAID prescriptions peaked among men 45–54 years of age and among women aged 55–64 years, and then declined. These findings are in keeping with the fact that arthritis is more common among women and that the majority of individuals with arthritis are of working age.

Figure 7-1 *Estimated total number of NSAID* prescriptions written for individuals with arthritis, by age and sex, Canada, 2007*



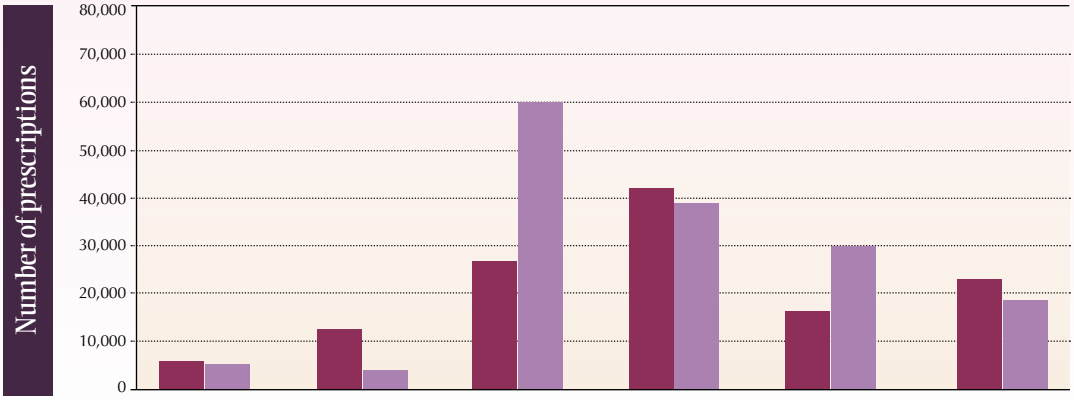
Age Group	15-34	35-44	45-54	55-64	65-74	75+
Men	249,730	304,210	388,990	358,850	227,920	154,360
Women	213,780	320,180	473,150	571,060	543,790	301,490

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * NSAID = Non-steroidal anti-inflammatory drug.

More GI protective agent prescriptions were written for men than women with arthritis, with the exception of those aged 45–54 years and 65–74 years (Figure 7-2). There was an increase in the number of prescriptions for GI protective agents for men up to age 64 years. Whereas, there was a sharp increase in GI protective agent prescriptions among women between the ages of 35 and 54 years, followed by a steady decline thereafter.

Best practice guidelines recommend that GI protective agents be prescribed to treat or prevent the complications associated with NSAIDs use among those who present with risk factors for GI problems (e.g. advanced age, multiple NSAIDs use or prior ulcer). While a lower number of GI prescriptions were written for people with arthritis compared to the number of NSAIDs prescriptions, it is not possible to assess the potential gap between guidelines and clinical practice without knowing the proportion of individuals that presented with risk factors for GI problems.

Figure 7-2 *Estimated total number of GI* protective agent prescriptions written for people with arthritis, by age group and sex, Canada, 2007*

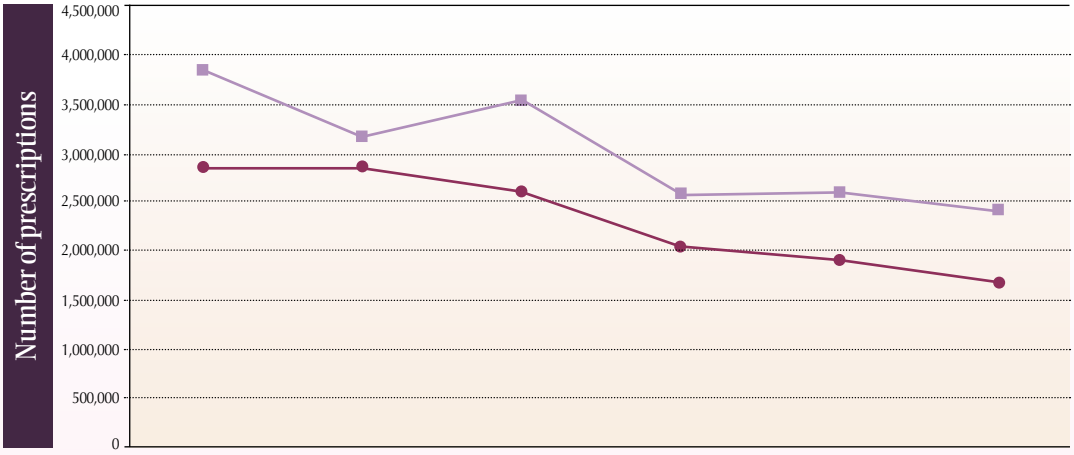


Age Group	15-34	35-44	45-54	55-64	65-74	75+
Men	5,860	12,620	26,810	42,010	16,380	23,000
Women	5,220	3,960	60,150	38,920	30,040	18,680

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * GI = Gastrointestinal.

The number of prescriptions written for NSAIDs declined over time among women and men (Figure 7-3). For women, the number of prescriptions written peaked in 2004, followed by a steep decline. The decline may have resulted from the withdrawal of Rofecoxib (a COX-2 selective NSAID) from the Canadian market in September 2004. COX-2 selective NSAIDs were specifically developed to help reduce GI complications and while successfully decreasing the risk of GI events, these agents have been associated with an increase in cardiovascular risks.[12] The decline may have been a result of the shift from prescription to over-the-counter use of NSAIDs.[25]

Figure 7-3 *Estimated total number of NSAID* prescriptions written for people with arthritis, by sex and year, Canada, 2002–2007*



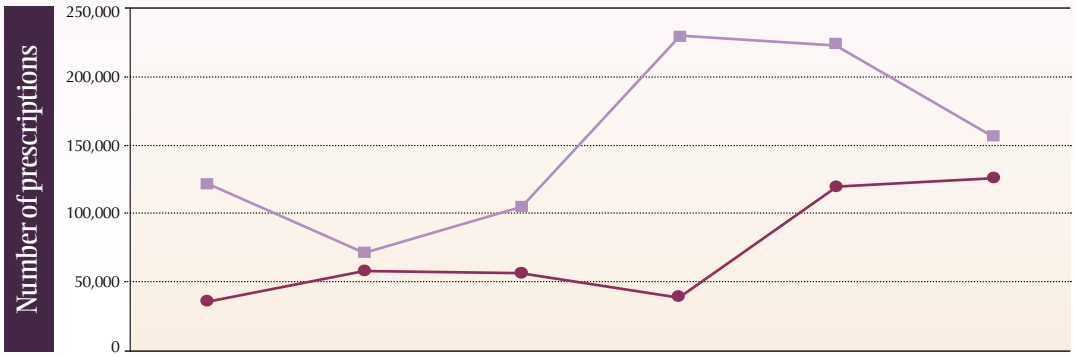
Year	2002	2003	2004	2005	2006	2007

Men Women

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * NSAID = Non-steroidal anti-inflammatory drug.

The number of GI protective agent prescriptions written for women and men increased greatly between 2004 and 2005, and 2005 and 2006, respectively (Figure 7-4). The sharp decrease among women between 2006 and 2007 is concerning because the number of NSAIDs prescriptions did not as sharply decrease during this time.

Figure 7-4 *Estimated total number of GI* protective agent prescriptions for arthritis, by sex and year, Canada, 2002–2007*

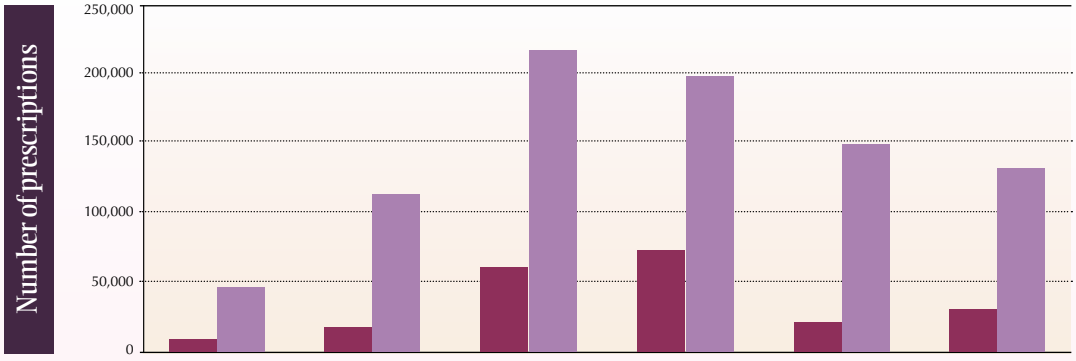


♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * GI = Gastrointestinal.

DMARDs

DMARDs are the primary therapy recommended for RA. The number of DMARD prescriptions written for women with arthritis was higher than for men in all age groups (Figure 7-5). This finding reflects the fact that the forms of arthritis that require treatment with a DMARD (including RA) are more common among women than men. The peak number of DMARD prescriptions was among women aged 45–64 years, after which the number began to decline; men's prescriptions peaked between 55 and 64 years of age which is consistent with the fact that the majority of individuals with arthritis are of working age.

Figure 7-5 *Estimated total number of DMARD* prescriptions written for individuals with arthritis, by age group and sex, Canada, 2007*

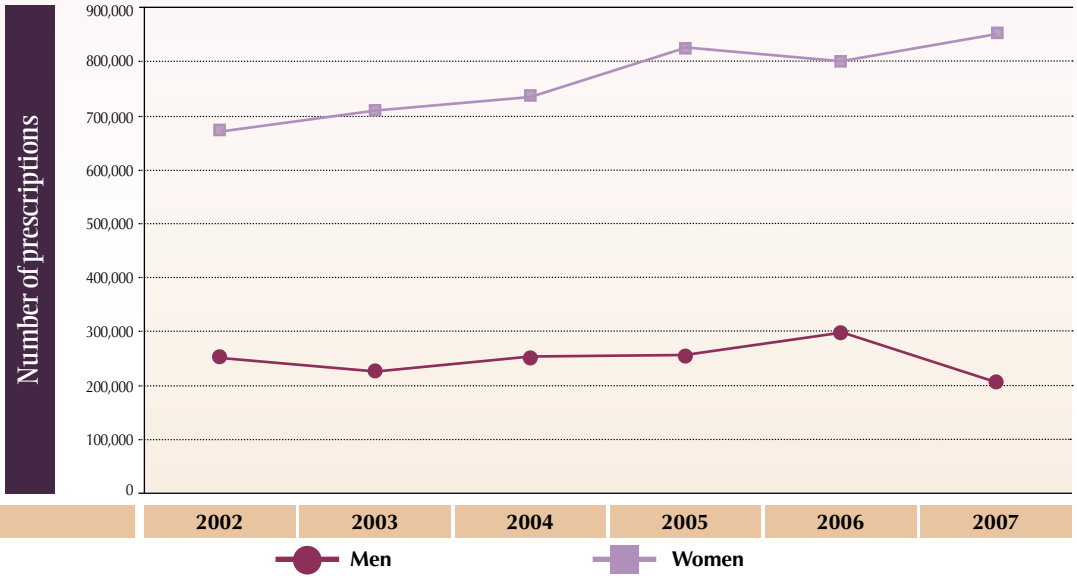


Age Group	15-34	35-44	45-54	55-64	65-74	75+
Men	8,620	17,190	60,500	72,920	20,780	30,420
Women	45,930	113,050	216,010	197,650	148,820	131,620

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * DMARD = Disease modifying anti-rheumatic drug.

The time trends for DMARDs prescriptions varied according to sex. The number of prescriptions written for women with arthritis increased between 2002 and 2007 while the number for men remained stable until 2006, followed by a decrease in 2007 (Figure 7-6). It is not clear why the pattern for men and women is so different.

Figure 7-6 *Estimated total number of DMARD* prescriptions written for people with arthritis, by sex and year, Canada, 2002–2007*

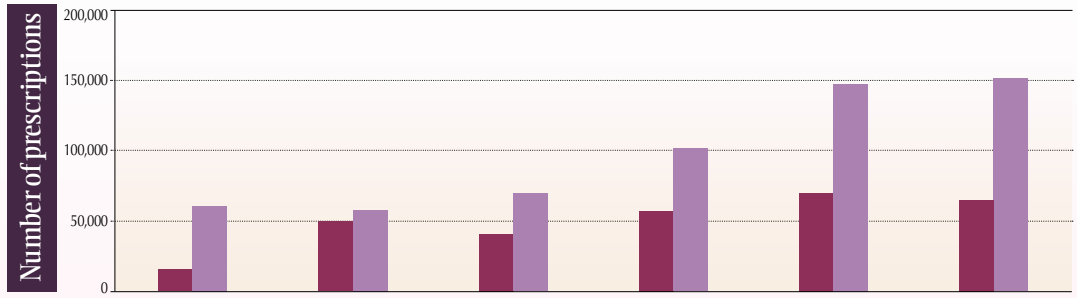


♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ * DMARD = Disease-modifying anti-rheumatic drug.

Corticosteroids

In every age group, the number of corticosteroid prescriptions (oral and injected combined) written for women with arthritis was greater than that for men (Figure 7-7) which is in keeping with the fact that arthritis is more common among women. The number of prescriptions written for women with arthritis increased with age.

Figure 7-7 *Estimated total number of corticosteroid prescriptions written for individuals with arthritis, by age group and sex, Canada, 2007*

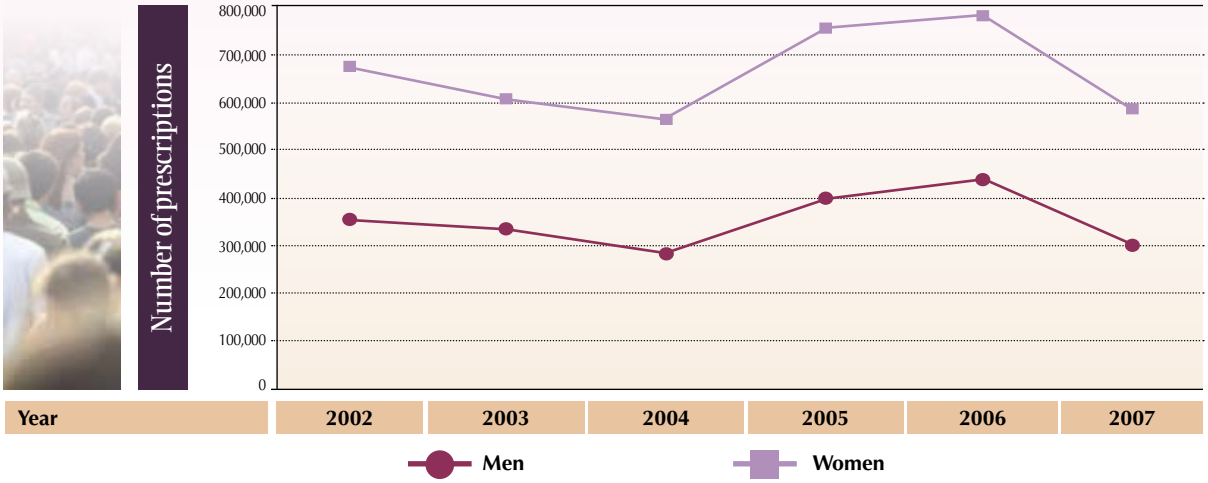


Age group	15-34	35-44	45-54	55-64	65-74	75+
Men	15,550	49,580	40,770	56,920	69,770	64,810
Women	60,660	57,580	69,550	101,570	147,070	151,110

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada.

A similar trend in the number of corticosteroid prescriptions (oral and injected combined) was found among women and men: the number prescriptions written decreased between 2002 and 2004, followed by an increase from 2004 to 2006, and a subsequent decrease in 2007 (Figure 7-8).

Figure 7-8 *Estimated total number of corticosteroid prescriptions written for people with arthritis, by sex and year, Canada, 2002–2007*

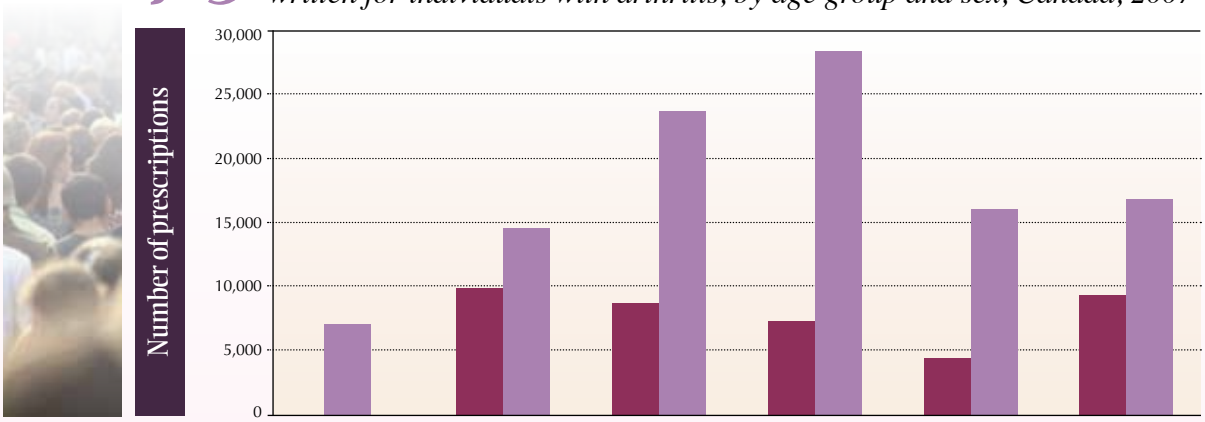


♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada.

Biologic response modifiers

Women received a higher number of written prescriptions for biologic response modifiers than men (Figure 7-9). This is in keeping with the higher prevalence of inflammatory arthritis conditions (such as RA) among women. The number of prescriptions written for women increased with age until 64 years whereas the number decreased among men within the same age groups.

Figure 7-9 *Estimated total number of biologic response modifier prescriptions written for individuals with arthritis, by age group and sex, Canada, 2007*

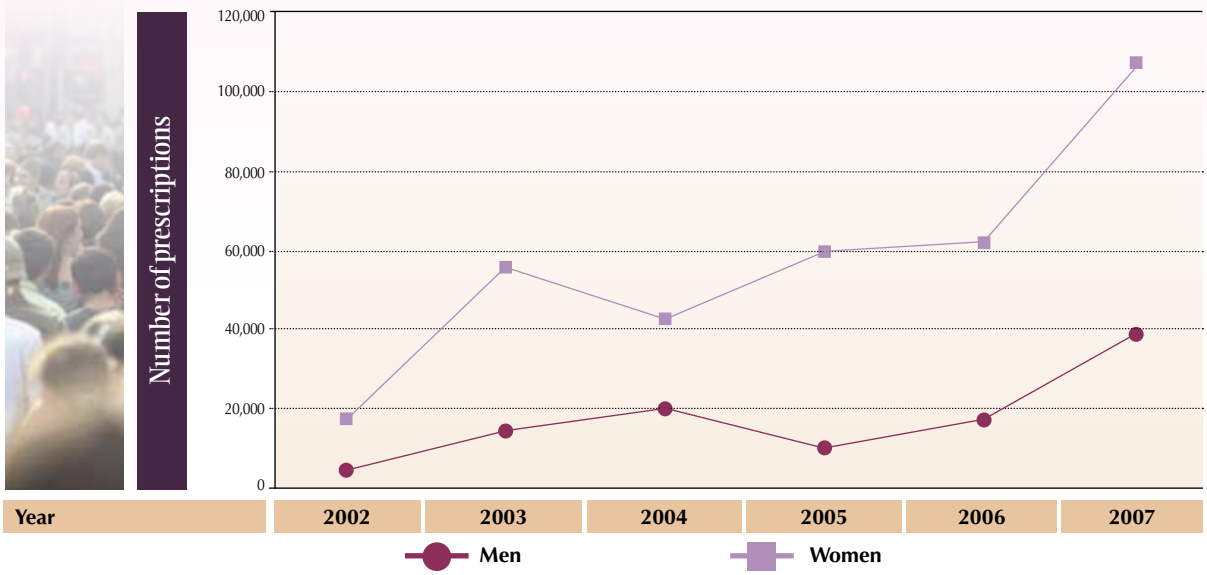


Age Group	15-34	35-44	45-54	55-64	65-74	75+
Men		9,920	8,540	7,320	4,320	8,960
Women	7,010	14,630	23,880	28,440	16,100	16,910

♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada. ♦ Note: There were no prescriptions reported by surveyed physicians for men aged 15–34 years in 2007.

The number of biologic response modifier prescriptions written for women increased sharply between both 2002 and 2003, and 2006 and 2007 (Figure 7-10). There was a sharp increase in biologic response modifier prescriptions between 2006 and 2007 for both men and women. These increases may in part be the result of changes to provincial formularies, which have increased their coverage of biologics response modifiers.

Figure 7-10 *Estimated total number of biologic response modifier prescriptions written for people with arthritis, by sex and year, Canada, 2002–2007*



♦ Source: Public Health Agency of Canada, using data from the Canadian Disease and Therapeutic Index (CDTI), IMS Health Canada.

Summary

- Five main types of drugs are used to treat arthritis: analgesics, non-steroidal anti-inflammatory drugs, corticosteroids, disease modifying anti-rheumatic drugs and biologic response modifiers.
- While there has been a decrease in the use of non-steroidal anti-inflammatory drugs and corticosteroids, there has been an increase in the use of the newer drugs i.e., disease modifying anti-rheumatic drugs and biologics.
- In 2007, over 4 million prescriptions for non-steroidal anti-inflammatory drugs were written in Canada for individuals with a diagnosis of arthritis, 30% were written for people with osteoarthritis, 9% were for rheumatoid arthritis, connective tissue diseases and other inflammatory conditions and 61% were for other arthritis conditions.
- Over 1 million disease modifying anti-rheumatic drugs prescriptions were written for people with arthritis in 2007 and the majority (over 70%) were written for individuals with a diagnosis of rheumatoid arthritis.
- Close to a million corticosteroids prescriptions were written in 2007 and they were most commonly written for those with a diagnosis in the 'other arthritis' category (62%).
- In 2007, approximately 150,000 biologic response modifier prescriptions were written of which, 90% were for individuals diagnosed with rheumatoid arthritis.
- With the exception of corticosteroids, more arthritis-related drugs prescriptions were written for women than men and for those of working age than the other age groups.

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Chapter Eight

Ambulatory care services utilization

> ***"This journey of meds, surgeries and other treatments has been exhausting, time consuming and discouraging to say the least. However, I continue to be able to look for the positives in the situations and focus on them so that I don't spiral down into the abyss of despair. My health care team has made all the difference. Their diligent work and compassion go a long way in helping me cope with a very challenging situation."***
>
> — Person living with ankylosing spondylitis

Introduction

Arthritis is a major cause of long-term disability and pain, resulting in significant demands on the health care system.[1,2] In Canada, arthritis care is provided mainly in ambulatory or outpatient settings. Primary care physicians play a central role in establishing early diagnosis, co-ordinating the ongoing management and monitoring of the individual's condition, and facilitating access to other services, such as consultations with specialists and rehabilitation professionals.[2-4]

Best practice recommendations for the management of rheumatoid arthritis (RA), and other types of arthritis with the potential for serious consequences, stress the importance of early referral to a rheumatologist.[4] A rheumatologist can ensure the definitive diagnosis, initiate early treatment and can evaluate an individual's response to treatment and review the treatment plan on an ongoing basis.[5,6] General internists are also involved in arthritis management, especially in settings where rheumatologists are not available or in cases where they have developed expertise in arthritis care.[4]

Interventions such as joint replacement are widely recognized as cost-effective procedures for the treatment of advanced osteoarthritis (OA) and RA thus, orthopaedic surgeons are often involved when arthritis is unresponsive to first-line therapy over time.[4,7,8]

This chapter presents ambulatory healthcare utilization through an examination of visits to both primary care physicians and relevant specialists. Physician claims data on arthritis were collected from five Canadian provinces (Alberta, Manitoba, Nova Scotia, Ontario and Quebec) for the fiscal year 2005-2006*. All individuals aged 15 years or

more with at least one ambulatory encounter during the fiscal year 2005-2006 for which the physician claim contained an arthritis diagnostic code were included in the analyses.

The following categories were used for this chapter:

- Rheumatoid arthritis (RA);
- Osteoarthritis (OA);
- Other inflammatory arthritis (e.g. systemic lupus erythematosus, scleroderma, gout, psoriatic arthritis, ankylosing spondylitis);
- Other arthritis conditions (e.g. polymyalgia rheumatica, tendonitis, bursitis, synovitis, internal derangement of the knee, other unspecified arthropathies); and
- All arthritis conditions listed above combined.

A Canadian rate (excluding territories) to estimate the total number of arthritis related visits was calculated. The territories were excluded from this estimate due to differences between the territories and provinces with respect to ambulatory care services utilization.

*These provinces participated in a feasibility study on the use of administrative data for arthritis surveillance. Portions of data were made available by the Nova Scotia Department of Health and the Population Health Research Unit (PHRU), Dalhousie University as well as, the Institute for Clinical Evaluation Sciences (ICES) which is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC). Although this research is based on this data, the observations and opinions expressed are those of the author(s) and do not represent those of the Nova Scotia Department of Health, PHRU, ICES or the Ontario MOHLTC.

All physician visits

In 2005-2006, the total number of arthritis-related visits in Canada, excluding the territories, was estimated to be 8.5 million (Table 8-1). Approximately 14% of Canadians 15 years and older made at least one visit to a physician with a diagnosis of arthritis. On average, 2.3 arthritis-related visits per person were made during 2005-2006 and more women than men consulted a physician for arthritis (women to men ratio 1.4:1).

Approximately 5% of the Canadian population made at least one physician visit with a recorded diagnosis of OA (30% of all arthritis visits). This is less than the proportion of the population who reported they had arthritis, reflecting that many people with OA do not visit their physician each year or if they did, another reason for their visit may have been recorded.

Less than one percent of Canadians (0.6%) visited a physician for RA, which is in keeping with published epidemiological estimates (0.6%–0.76% in an adult population).[11,12] RA is a serious form of arthritis and it is likely that people will visit their physician at least once a year for this condition.

On average, 2.0 visits per person were made for OA and 3.2 visits per person were made for RA during 2005-2006 (Table 8-1). Women visited a physician 1.7 times more often than men for OA and 2.5 times more often than men for RA, which is in line with the higher prevalence of OA and RA among women.

Table 8-1 *Visits to all physicians for arthritis and related conditions among adults aged 15 years and older, in Canada, excluding territories (range of results from participating provinces)*, 2005-2006*

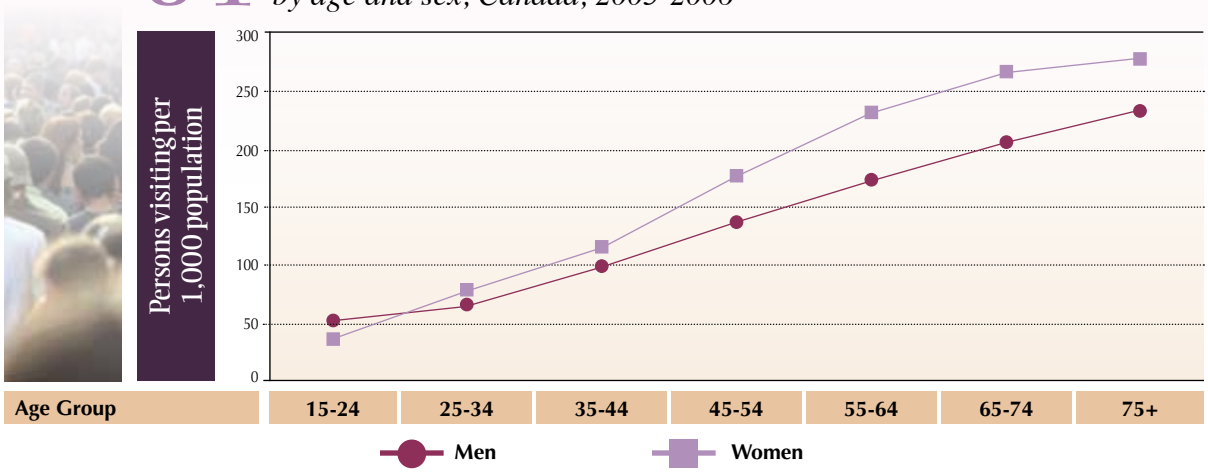
	Persons visiting per 1,000 population	Women: men	Average number of visits per person	Estimated total number of visits**
All types of arthritis conditions	**136.7 (112.5 - 205.5)**	**1.4:1 (1.4:1 - 1.5:1)**	**2.3 (2.1 - 2.7)**	**8,548,588**
Osteoarthritis	45.6 (32.1 - 53.8)	1.7:1 (1.5:1 - 1.9:1)	2.0 (1.8 - 2.3)	2,503,078
Rheumatoid arthritis	6.4 (5.2 - 7.8)	2.5:1 (2.3: 1 - 2.9:1)	3.2 (2.5 - 4.6)	564,644
Other inflammatory conditions	8.8 (5.9 - 13.6)	0.8:1 (0.7:1 - 0.9:1)	1.8 (1.7 - 2.2)	441,740
Other arthritis conditions	94.4 (57.2 - 171.8)	1.3:1 (1.3:1 - 1.5:1)	1.9 (1.6 - 2.3)	5,041,705

♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS). ♦ * At least one visit to a physician. ♦ ** Canadian rate was calculated using data from the participating provinces, and visits for non-participating provinces were estimated by applying this rate to the respective 2005 provincial populations.

Physicians visits by age, sex and type of arthritis

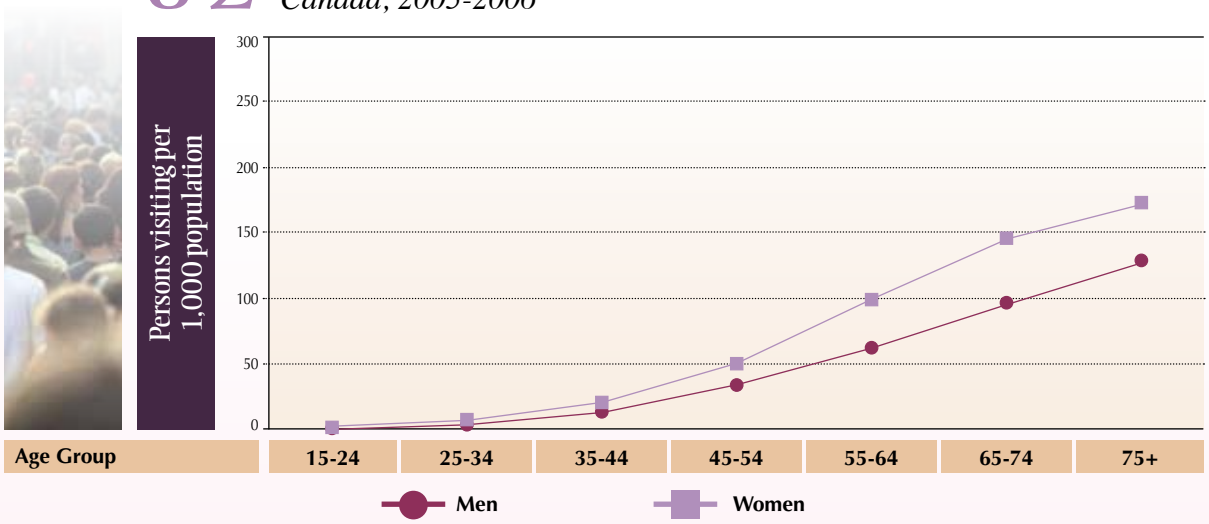
Overall, person-visit rates i.e., persons visiting per 1,000 of the Canadian population, for all types of arthritis and for OA increased with age (Figures 8-1 and 8-2). Rates among women were greater than among men within all age groups except the youngest age group (i.e. 15-24 years). Person-visit rates for RA increased with age, and then declined in women 75 years and older (Figure 8-3). This may in part be due to the fact that as people age, they are more likely to have co-existing chronic conditions. The physician may have recorded a condition other than arthritis on the billing form as the primary reason for the visit.

Figure 8-1 *Person-visit rates to all physicians for all types of arthritis conditions, by age and sex, Canada, 2005-2006*



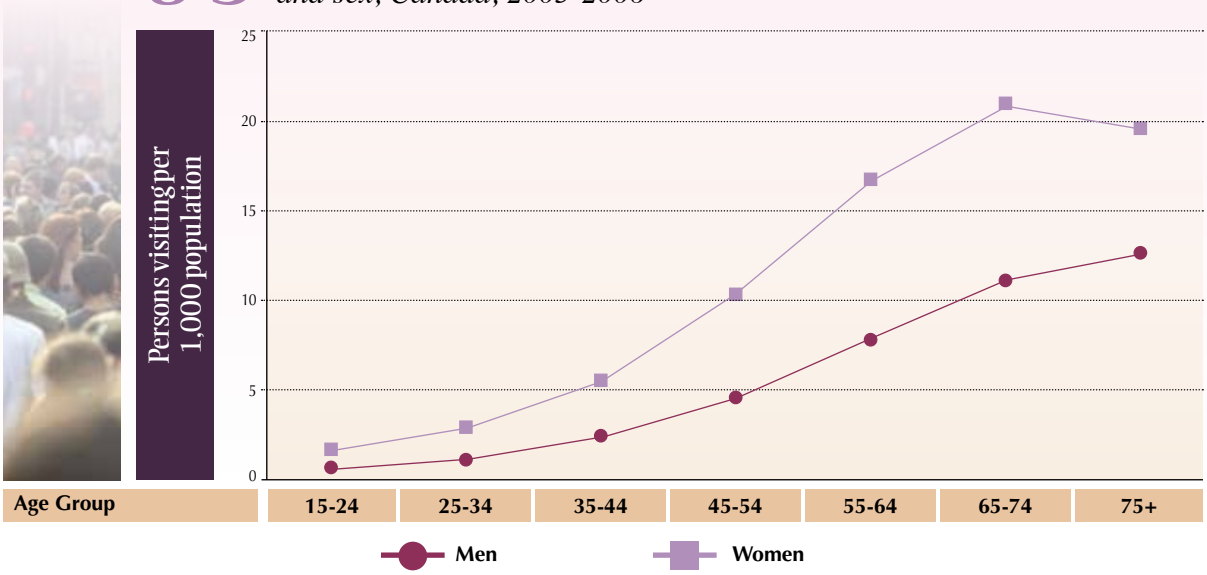
♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS).

Figure 8-2 *Person-visit rates to all physicians for osteoarthritis, by age and sex, Canada, 2005-2006*



♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS).

Figure 8-3 *Person-visit rates to all physicians for rheumatoid arthritis, by age and sex, Canada, 2005-2006*

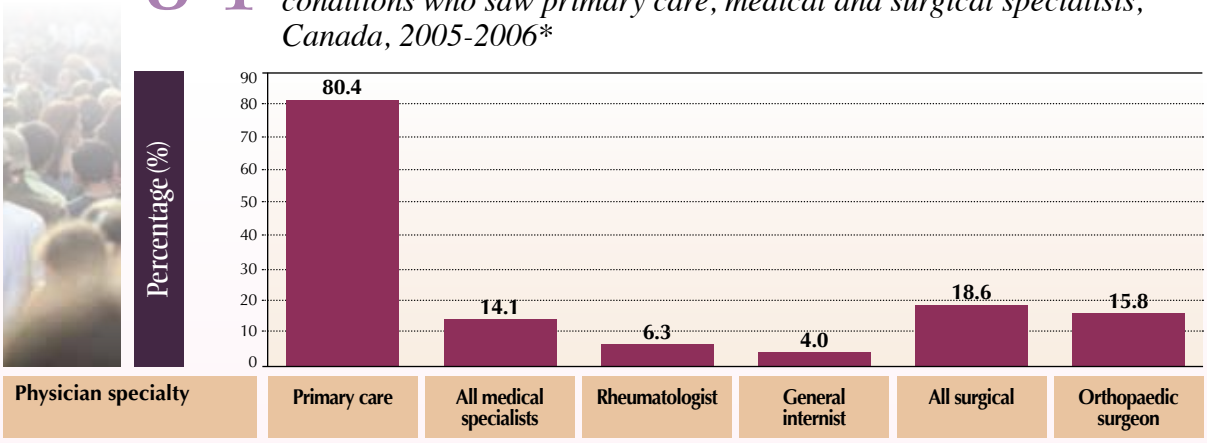


♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS).

Type of physician visits

In 2005-2006, 80% of the individuals who visited a physician with arthritis was listed as the reason for the visit, saw a primary care physician (Figure 8-4). Approximately 19% saw a surgical specialist and fewer (14%) visited a medical specialist. Of all the surgical specialists, orthopaedic surgeons (85%) were the most commonly consulted. This highlights the important role of the primary care physician in the management of arthritis in collaboration with specialists as needed.

Figure 8-4 *Percentage of adults aged 15 years and older with all types of arthritis conditions who saw primary care, medical and surgical specialists, Canada, 2005-2006**

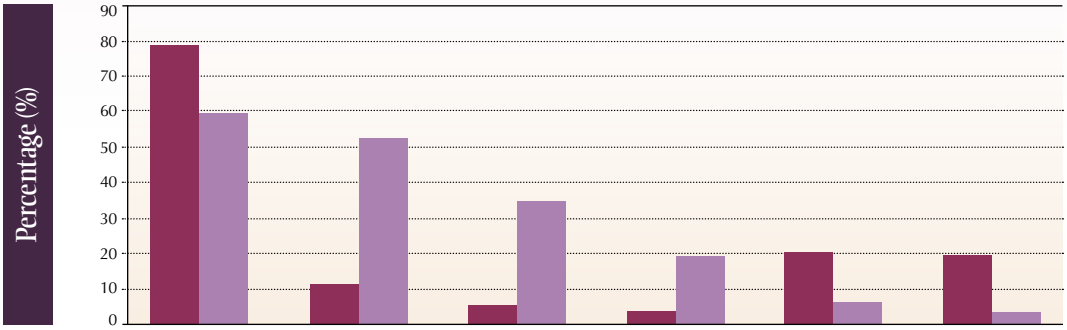


♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS). ♦ * Percentages do not add to 100% because an individual can visit more than one type of physician in a year.

Of those who visited a physician for OA, 79% saw a primary care physician (Figure 8-5). A greater percentage of people with OA visited a surgical specialist (20.5%) compared to a medical specialist (11.5 %). Of all the surgical specialists, orthopaedic surgeons were the most commonly consulted (97%).

While over half of individuals who visited a physician for RA visited a primary care physician (60%), a large proportion also visited a medical specialist (53%). Of all the medical specialists consulted, rheumatologists were the most commonly consulted (67%), followed by general internists (37%). Fewer individuals with RA visited a surgical specialist (7%) and of those who did, over half consulted an orthopaedic surgeon.

Figure 8-5 *Percentage of adults aged 15 years and older with osteoarthritis and rheumatoid arthritis who saw primary care, medical and surgical specialists, Canada, 2005-2006**



Physician specialty	Primary care	All medical specialists	Rheumatologist	General internist	All surgical specialists	Orthopaedic surgeon
Osteoarthritis	79.3	11.5	5.5	3.5	20.5	19.8
Rheumatoid Arthritis	59.8	53.0	35.0	19.2	7.0	3.8

♦ Source: Public Health Agency of Canada using provincial physician billing data (AB, MB, ON, QC, NS). ♦ * Percentages do not add to 100% because an individual can visit more than one type of physician in a year.

Summary

- Approximately 14% of Canadians over the age of 15 years made at least one visit to a physician in 2005-2006 for any type of arthritis - an estimated total of 8.5 million visits in Canada (excluding the territories).
- About 5% of the Canadian population 15 years and older made at least one physician visit in 2005-2006 with a recorded diagnosis of OA.
- Less than one percent visited a physician for RA (0.6%) and other inflammatory arthritis (0.9%).
- More women than men made arthritis-related visits and the rate of consultation was highest among older people of both sexes.
- Primary care physicians play a prominent role in arthritis management - 80% who visited a physician for any type of arthritis saw a primary care physician.
- Nineteen percent of individuals with at least one visit for arthritis during the year saw a surgical specialist and 14% saw a medical specialist. Of the surgical specialists, orthopaedic surgeons were the most commonly consulted (85%).
- For those with rheumatoid arthritis, many (60%) visited a primary care physician and a large portion also visited a medical specialist (53%). Rheumatologists were more commonly consulted (35%) than a general internist (19%) and few visited a surgical specialist (7%).

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Chapter Nine

Hospital services for arthritis

Introduction

While the majority of individuals with arthritis receive care in ambulatory settings, many require diagnostic or therapeutic services in hospital and have same-day surgical procedures.[1,2] Admissions to hospital can be for either medical or surgical management of the disease.

Medical hospitalizations may be required to manage the non-joint related consequences of arthritis, arthritis-related pain and disability, or the side effects of drugs used to treat arthritis, such as gastrointestinal (GI) complications.

Orthopaedic surgery is the most common type of surgical intervention for individuals experiencing severe pain and joint damage when non-surgical treatments have had their maximum impact.[3-5] Surgical procedures for arthritis range from joint fusions to joint replacements. Joint replacement surgery has been shown to be a cost-effective procedure for reducing pain and improving physical function in individuals with advanced arthritis.[3] Joint replacements have been developed for various joints, however, the most frequently replaced joints are the hip and knee, followed by the shoulder.

This chapter focuses on hospital care provided to Canadian residents 15 years of age and older with arthritis, including hospitalizations (medical and surgical) and day surgeries. Data are also presented on total joint replacement surgeries. Information regarding wait times as well as readmissions and complications for total joint replacement are not included in this chapter however, have been published by the Canadian Institute for Health Information (CIHI).[6,7] Data for this chapter were obtained from several national databases maintained by CIHI for the fiscal years 2001/02 to 2005/06.

Hospitalizations with an arthritis diagnostic code were classified into five groups:

- inflammatory arthritis (e.g., rheumatoid arthritis (RA));
- osteoarthritis (OA);
- systemic connective tissue disorders (e.g., lupus);
- soft tissue disorders (e.g., rotator cuff syndromes, synovitis); and
- 'other arthritis' (e.g., spondylosis and allied disorders, internal joint derangement).

For comparative purposes, data on hospitalizations are also presented for non-arthritis diagnoses.

Hospitalizations and day surgeries for arthritis

"When I was 24, if it had not been for that hospitalization, I would have surely landed in a wheelchair. They were able to treat multiple joints at a time. I had shoulders, hands, knees, and elbows flaring up badly, and if that had happened today, I would be asked which joint do I want to be treated as they are only allowed one per session. Which joint would you pick to save??"

— Person living with rheumatoid arthritis

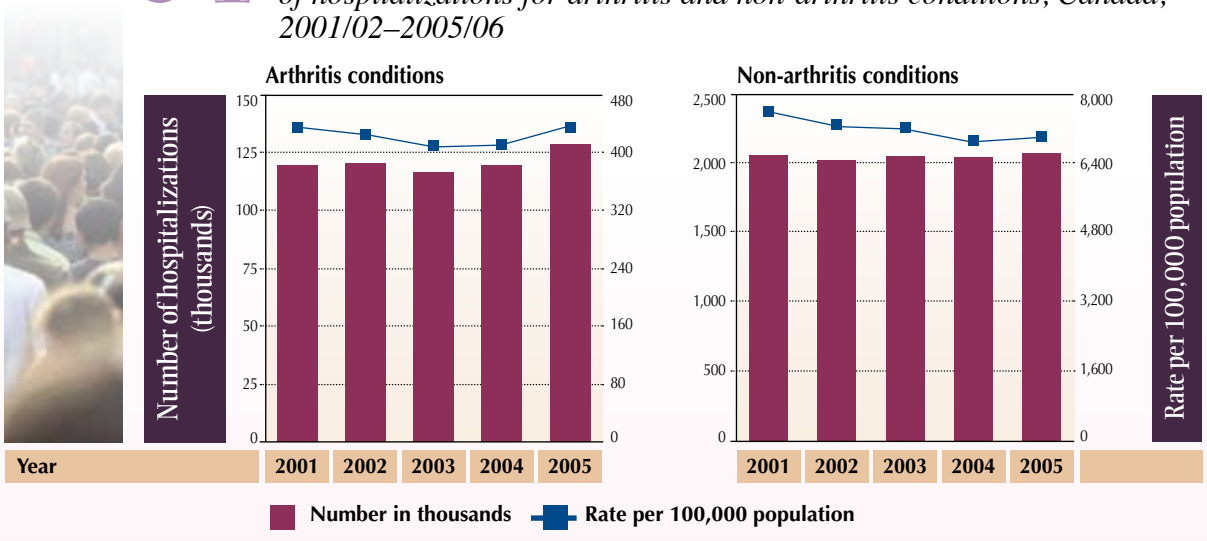
In 2005-2006, there were 2.2 million hospitalizations for individuals aged 15 years and older in Canada, of which 1.5 million were for medical care and 721,000 were for surgery. Arthritis was associated with over 5.9% (129,205) of the total hospitalizations, but accounted for more of the surgical hospitalizations – 91,556 or 12.7% of the surgical hospitalizations. Medical hospitalizations included 37,649 (2.6%) with arthritis as the most responsible diagnosis. Of all arthritis hospitalizations, surgical hospitalizations (71%) were more common than medical ones. This is in contrast to non-arthritis conditions where surgical hospitalizations were less common (32% of all non-arthritis hospitalizations).

The number of hospitalizations for arthritis conditions were relatively stable between 2001/02 and 2004/05 with a minor increase in 2005/06, while non-arthritis conditions remained relatively stable during this time period (Figure 9-1). While the age- and sex-standardized rate of hospitalizations for arthritis conditions decreased between 2001/02 and 2004/05 and increased slightly between 2004/05 and 2005/06, the rate of hospitalizations for non-arthritis conditions decreased during this period of time.

The number of hospitalizations can remain stable while rates go down, as the two populations (those with arthritis and those without) have different age and sex compositions. Therefore standardized rates were calculated to identify if the differences remained after adjusting for these differences.

Figure 9-1

Number and age- and sex-standardized rates (per 100,000 population) of hospitalizations for arthritis and non-arthritis conditions, Canada, 2001/02–2005/06



♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB)/CIHI.

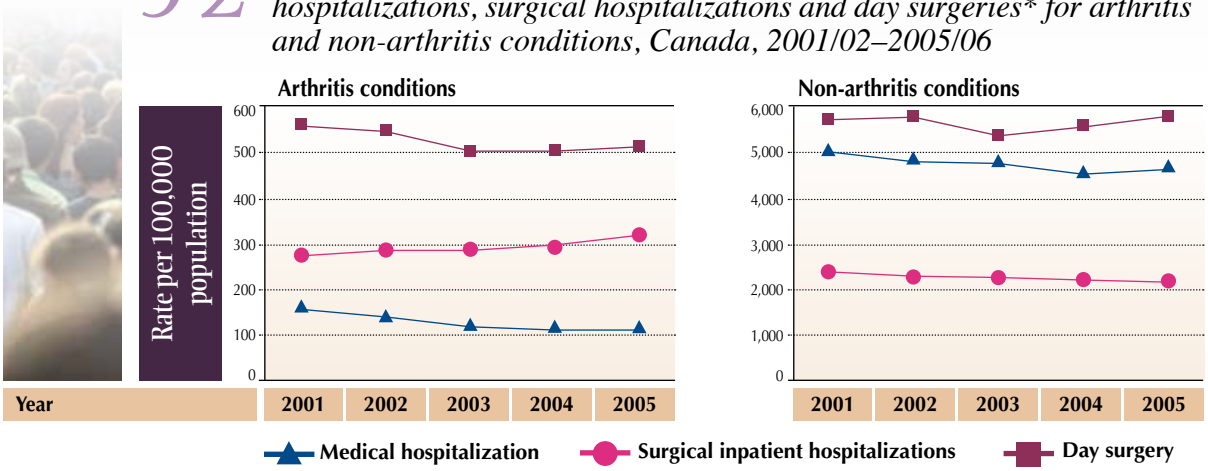
Between 2001/02 and 2005/06, the age-standardized rates for medical and day surgery hospitalizations for arthritis decreased (Figure 9-2).

The rates of surgical in-patient hospitalizations for arthritis increased during the same time period. This increase, particularly in 2005/06, may be related to initiatives to decrease wait times for procedures in priority areas such as hip and knee replacement surgeries.[2-4]

Among the five types of arthritis, medical hospitalizations rates were higher for the more common soft tissue disorders (e.g., synovitis and bursitis), inflammatory arthritis and 'other arthritis' (e.g., internal joint derangements) than for OA or systemic connective tissue disorders (e.g., lupus) (Figure 9-3). Medical hospitalization rates decreased after 2001/02, with the exception of the soft tissue disorders, which showed a slight increase in 2005/06.

Between 2001/02 and 2005/06, surgical hospitalizations for all types of arthritis remained stable with the exception of OA whose rate increased particularly between 2004/05 and 2005/06 (Figure 9-3). As noted above, this is likely related to the implementation of several initiatives to decrease wait times for total hip and knee replacements used to treat OA in late 2004/05.

Figure 9-2 *Age- and sex-standardized rates (per 100,000 population) of medical hospitalizations, surgical hospitalizations and day surgeries* for arthritis and non-arthritis conditions, Canada, 2001/02–2005/06*

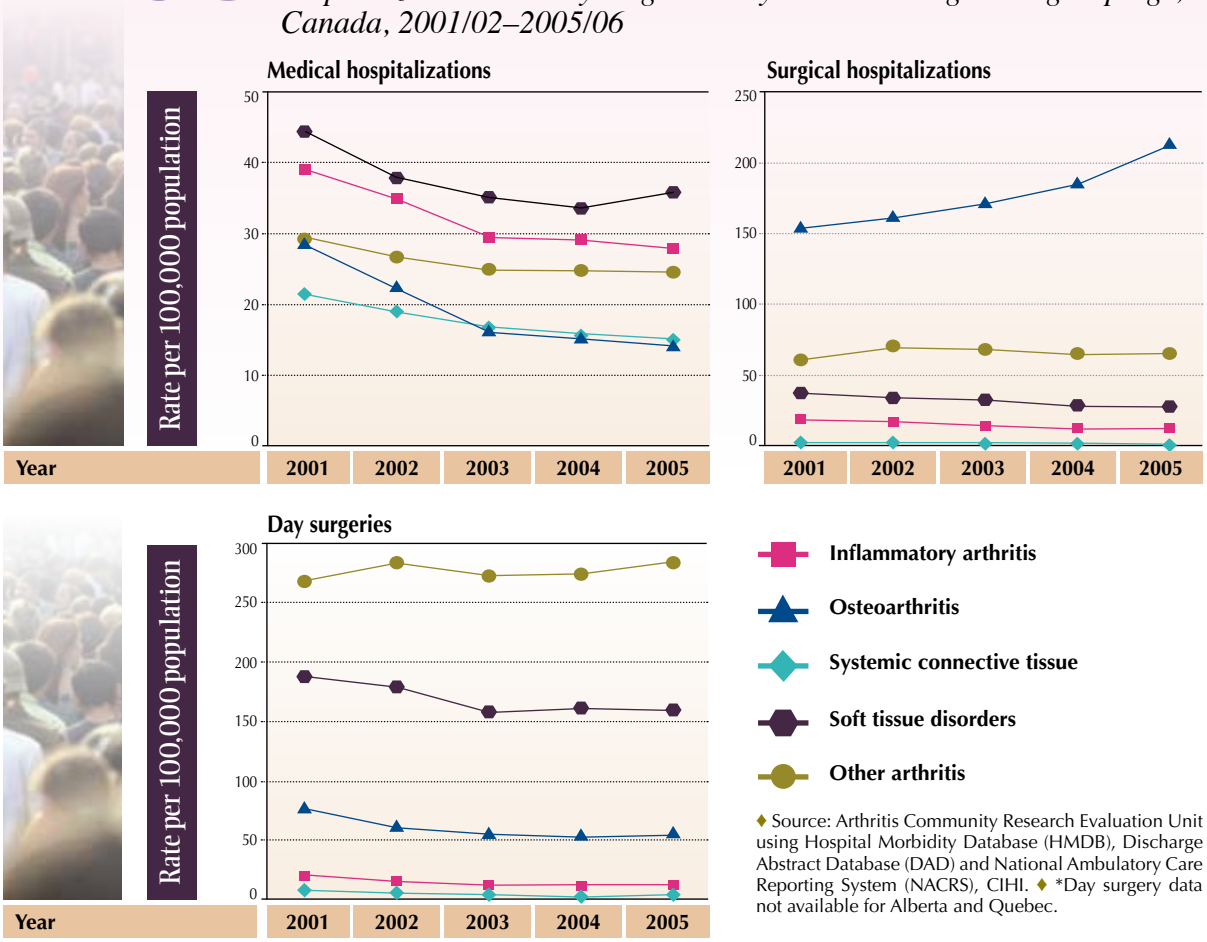


♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS), CIHI. ♦ *Day surgery data not available for Alberta and Quebec.

Day surgeries, most often arthroscopic surgical procedures, were more common for individuals with 'other arthritis', likely related to injury of the joint (e.g., joint derangement of the knee), soft tissue disorders and OA (Figure 9-3).[8] The rate of day surgeries decreased between 2001/02 and 2003/04 for most of the diagnostic groups and then levelled off thereafter.

Overall, OA accounted for most of the hospitalizations related to arthritis, particularly surgical hospitalizations. Consistent with the high frequency of OA, knee and hip replacement surgeries were also common, accounting for over 60% of surgical hospitalizations related to arthritis. Similar findings have been reported in the United States.[2,9] Inflammatory types of arthritis accounted for about one in four of all arthritis-related medical hospitalizations, likely due to complications of the disease.

Figure 9-3 *Age- and sex-standardized rates of medical hospitalizations, surgical hospitalizations and day surgeries* by arthritis- diagnostic groupings, Canada, 2001/02–2005/06*



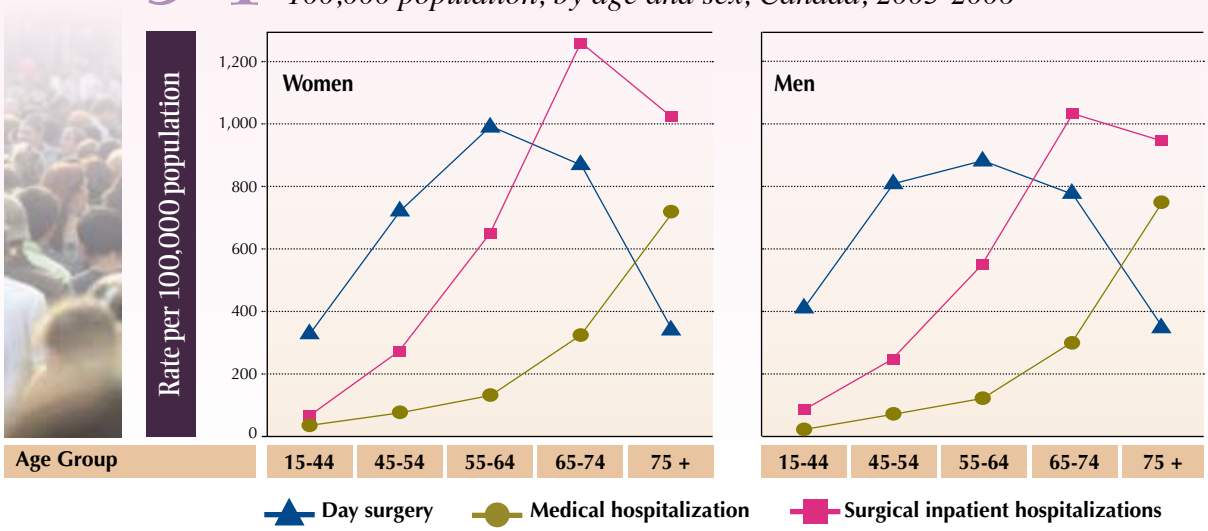
♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS), CIHI. ♦ *Day surgery data not available for Alberta and Quebec.

Hospitalizations for men and women

The rate of medical hospitalization increased with age and was more than twice as high in the 75 and over age group than in the 65 to 74 year old age group (Figure 9-4). The rate of surgical hospitalizations increased to age 65 to 74 then decreased for both men and women. The rate of day surgeries peaked in the 55 to 64 year old age group for both men and women and then declined. These findings could indicate that other management approaches are used in the oldest age group due to the increased risk of complications associated with surgery in this age group.

The rate of surgical hospitalizations was higher than the rate of medical hospitalizations for men and women in every age group (Figure 9-4). In general, the rate of hospitalizations was slightly higher for women than men, with the exception of day surgeries. Young men (aged 15-44 years) had higher day surgery rates than young women. This may be related to higher rates of joint injury among young men.

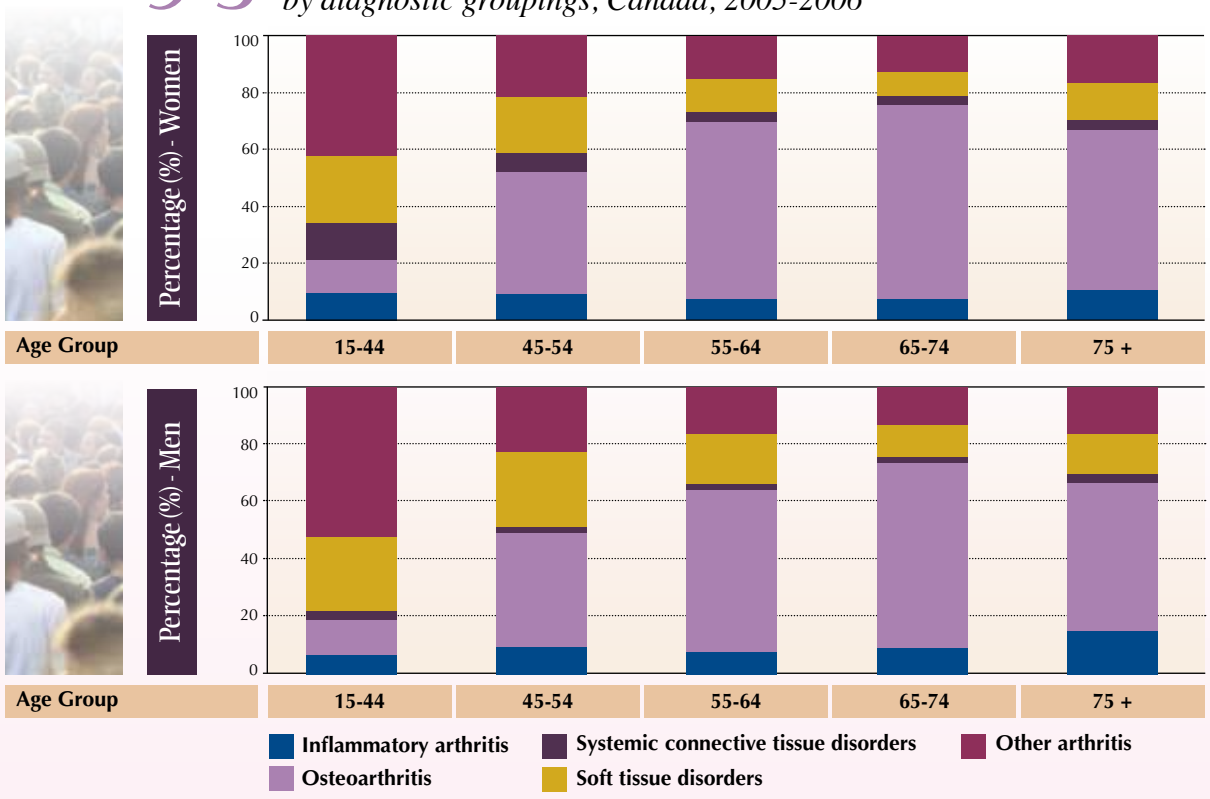
Figure 9-4 *Rates of arthritis-related hospitalizations and day surgeries* per 100,000 population, by age and sex, Canada, 2005-2006*



♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), Discharge Abstract Database (DAD) and National Ambulatory Care Reporting System (NACRS), CIHI. ♦ *Day surgery data not available for Alberta and Quebec.

The highest proportion of all arthritis-related hospitalizations was attributed to OA for men and women in all age groups, with the exception of those between 15 and 44 years of age (Figure 9-5). In contrast, the proportion attributed to soft tissue disorders or 'other arthritis' was higher in men and women under 45 years of age.

Figure 9-5 *Age and sex distribution of arthritis-related hospitalizations, by diagnostic groupings, Canada, 2005-2006*

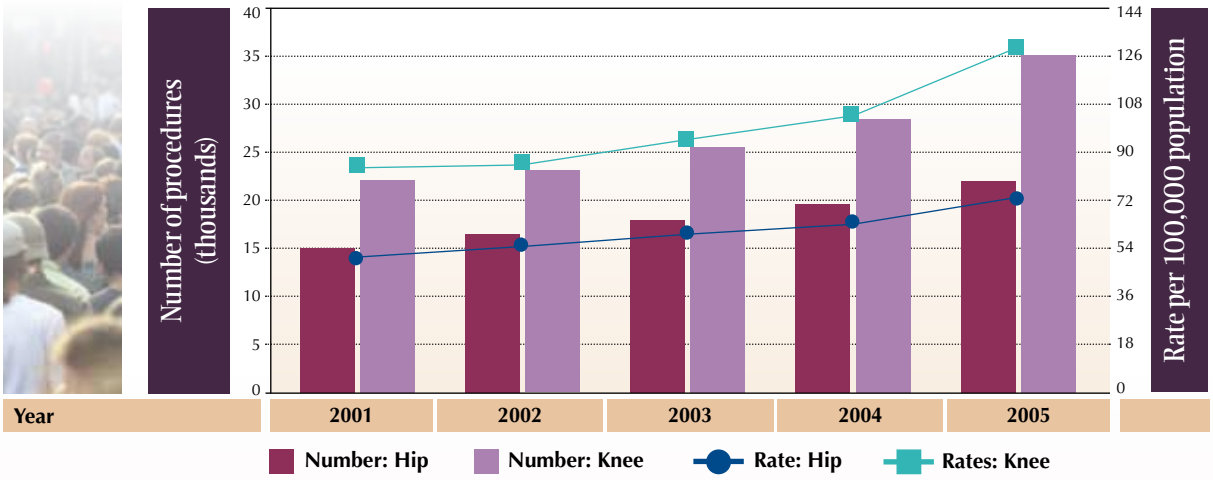


♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI.

Hip and knee replacements

In 2005-2006, 59,200 joint replacements for arthritis were performed in Canada. Nearly all of these (57,300) were hip or knee replacements (Figure 9-6). In each year between 2001/02 and 2005/06, the number of knee replacements exceeded the number of hip replacements, and this gap widened over time (Figure 9-6). The number of knee replacements increased by 59% and the number of hip replacements increased by 47%. After adjusting for the older age group who have hip replacements and the aging of the population over that time period, knee replacements still increased 1.3 times more than hip replacements. The observed increases may be explained by the investments in *Patient Wait Time Guarantees* towards reducing the wait times for hip and knee replacements together with an increasing number of people with arthritis.

Figure 9-6 *Number and age- and sex-standardized rates per 100,000 population of arthritis-related hip and knee replacements, Canada, 2001/02–2005/06*

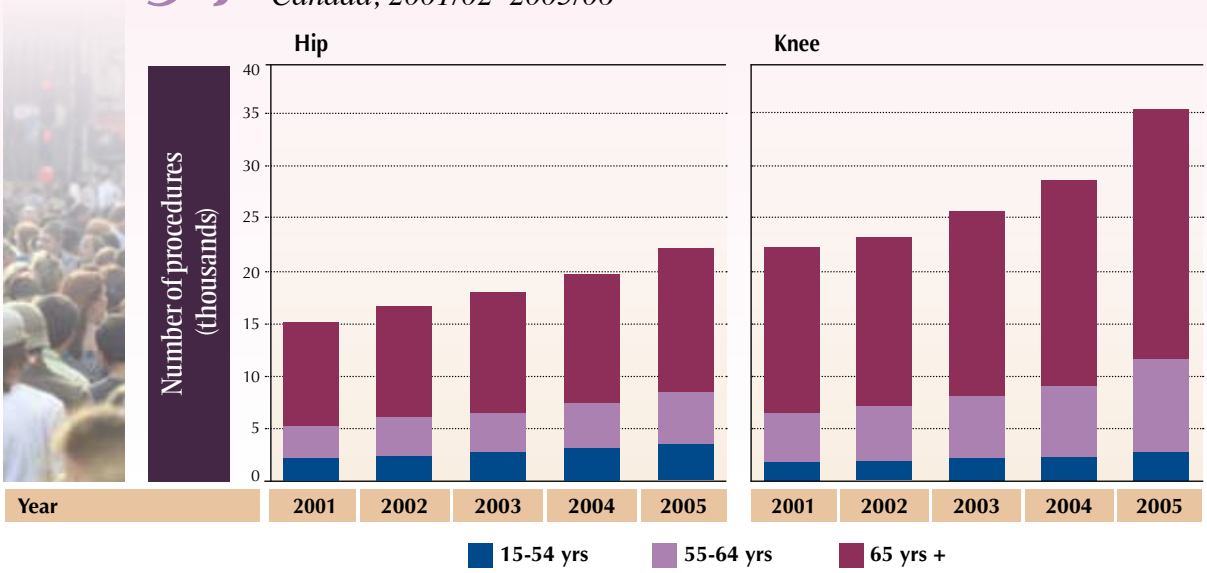


♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI.

Men and women

The number of joint replacement procedures increased in every age group between 2001/02 and 2005/06 (Figure 9-7). This finding highlights the fact that more Canadians are getting joint replacements even within the younger age groups. A similar situation has been recently reported in the US.[10] This may put additional pressure on the healthcare system, since younger individuals are likely going to require a revision surgery (i.e., a procedure to replace a worn out hip or knee implant) in the future.

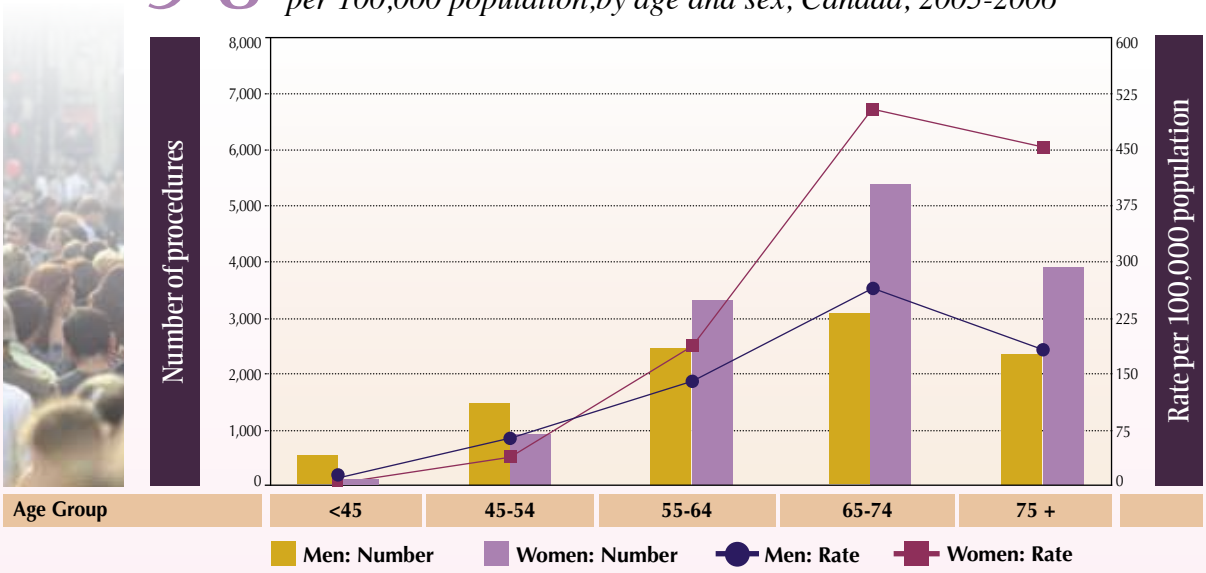
Figure 9-7 *Number of arthritis-related hip and knee replacements, by age, Canada, 2001/02–2005/06*



♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI.

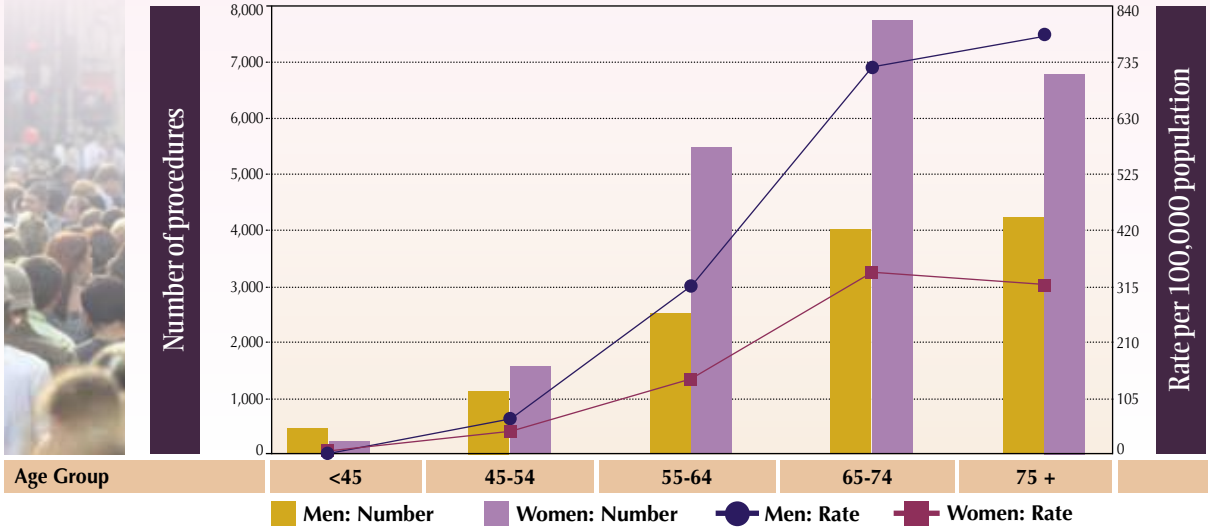
The rate of hip replacements in Canada increased with age in 2005-2006, peaking among both men and women aged 65–74 years (Figure 9-8). Similarly, the rate of knee replacements increased with age in 2005-2006, peaking among women aged 65–74 years and among men over 75 years of age (Figure 9-9). The majority of these surgeries were for the management of OA. The Canadian Joint Replacement Registry (CJRR) demonstrated that OA accounted for over 83% of hip replacements and over 93% of knee replacements in Canada in 2005/06.[6] Adults aged 65 years and older had the largest number of hip and knee replacements, reflecting the aging of the Canadian population.

Figure 9-8 *Number and rates of arthritis-related hip replacements per 100,000 population,by age and sex, Canada, 2005-2006*



♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI.

Figure 9-9 *Number and rates of arthritis-related knee replacements per 100,000 population, by age and sex, Canada, 2005-2006*



♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI.

Joint replacement and obesity

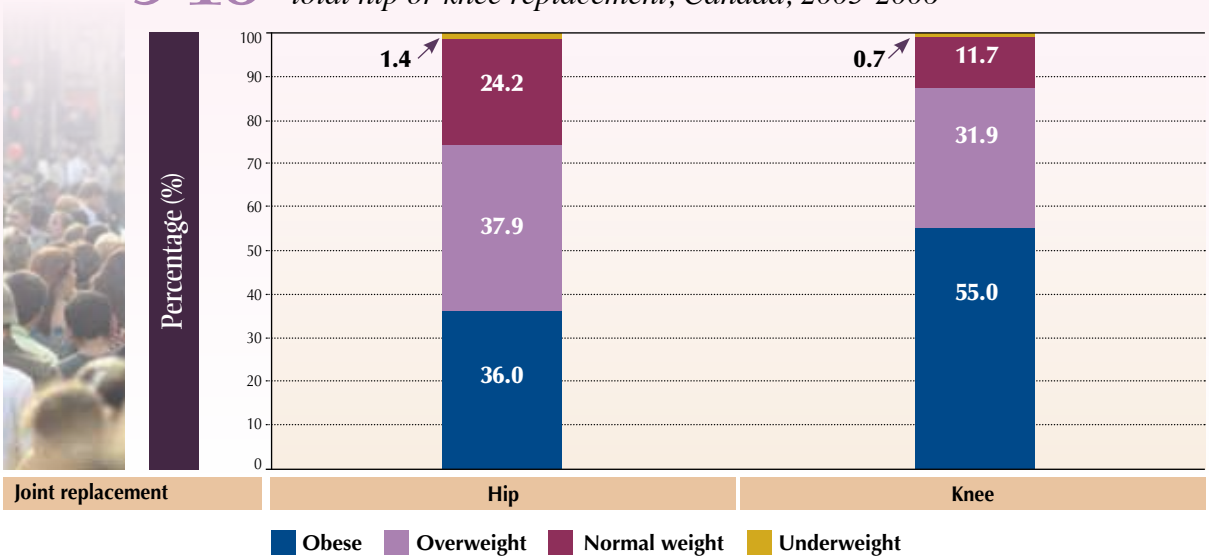
Obesity is an important factor in the development of OA, particularly OA of the knee, and for individuals who are obese in early adulthood.[3,11-14] Obesity has also been found to be associated with the need for total hip and knee replacements.[14]

The Canadian Joint Replacement Registry (CJRR) contains information from surgeons on weight and height of individuals undergoing hip and knee replacement. Data in this section are taken from the 2007 CJRR report.[6]

In 2005-2006, 74% of those who underwent hip replacement and 87% of those who underwent knee replacement were overweight or obese (Figure 9-10).

Given that the prevalence of obesity has increased in Canada in recent decades, it is anticipated that the number of overweight/obese individuals needing total joint replacements will continue to increase.[15] Health promotion programs for reducing overweight and obesity in the population are critical to counter this trend.

Figure 9-10 *Distribution of BMI* categories among individuals who underwent total hip or knee replacement, Canada, 2005-2006*

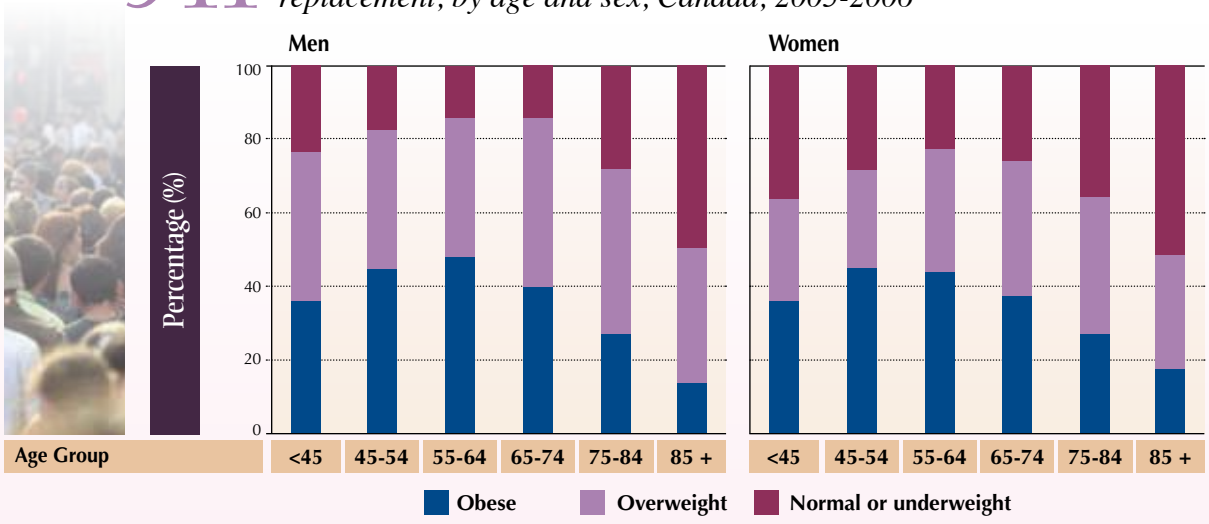


♦ Source: Canadian Joint Replacement Registry (CJRR), CIHI. ♦ *BMI = Body mass index.

More men than women who had a hip or knee replacement were overweight or obese (85% and 80%, respectively). The proportion of individuals that were obese was higher among those undergoing knee replacement compared to those having a hip replacement among men and women, in all age groups (Figures 9-11 and 9-12).

A large proportion of individuals who were obese and who had either knee or hip replacements were of working age i.e., less than 65 years old (66% and 44%, respectively). Knee and hip replacements occurred at an earlier age for those individuals who were overweight or obese whereas, they occurred at an older age for those of normal or underweight. These results suggest that obesity is likely to contribute to an earlier need for joint replacement.

Figure 9-11 *Distribution of BMI* categories among individuals undergoing hip replacement, by age and sex, Canada, 2005-2006*



♦ Source: Canadian Joint Replacement Registry (CJRR), CIHI. ♦ *BMI = Body mass index.

Figure 9-12 *Distribution of BMI* categories among individuals undergoing knee replacement, by age and sex, Canada, 2005-2006*

♦ Source: Canadian Joint Replacement Registry (CJRR), CIHI. ♦ *BMI = Body mass index.

Provincial/territorial variation

Rates of hip and knee replacements varied considerably by province in 2001/02 and 2005/06 (Table 9-1). Rates in Quebec and Newfoundland and Labrador were the lowest among all jurisdictions. With the exception of the Territories, the hip and knee replacement rates increased in all provinces between 2001/02 and 2005/06.

Table 9-1 *Age-and sex-standardized rate of joint replacement per 100,000 population, by province of residence, Canada, 2001/02 and 2005/06*

Province	Hip replacements		Knee replacements		Other joint replacements	
	2001/02	2005/06	2001/02	2005/06	2001/02	2005/06
British Columbia	55.6	82.4	70.0	112.4	4.9	6.8
Alberta	74.7	94.7	107.3	146.0	8.1	10.0
Saskatchewan	67.0	93.2	97.0	132.0	6.5	11.3
Manitoba	61.2	88.3	108.7	143.4	7.9	5.9
Ontario	66.4	85.9	107.4	151.2	6.8	8.6
Quebec	34.8	45.7	49.3	76.8	1.7	2.3
New Brunswick	54.1	66.5	91.6	119.2	8.8	6.9
Nova Scotia	52.2	76.7	91.4	117.8	9.5	8.4
Prince Edward Island	68.4	85.6	84.7	148.2	4.4	4.5
Newfoundland and Labrador	34.3	55.3	53.1	96.1	5.4	3.1
Territories	67.1	56.7	173.3	123.1	-	-
Canada	**56.2**	**75.0**	**85.5**	**122.9**	**5.5**	**6.7**

♦ Source: Arthritis Community Research Evaluation Unit using Hospital Morbidity Database (HMDB), CIHI. ♦ - = Data not reportable due to small numbers.

Length of stay in hospital

The average length of stay for individuals with hip replacements was slightly longer than for those with knee replacements. For hip replacements in 2005-2006, the average length of stay for women was higher than for men; no sex difference was observed for knee replacements (Figure 9-13) Between 2000/01 and 2005/06, the average length of stay for hip replacements declined from 10 to 8 days and from 8 to 6 days for knee replacements (Figure 9-14). These findings may partially reflect the inclusion of emergency surgery for hip fractures (approximately 5% of all total hip replacement) in this analysis.[6]

Figure 9-13 *Average length of stay for hip and knee replacements, by sex, Canada, 2005-2006*

♦ Source: Arthritis Community Research Evaluation Unit using Canadian Joint Replacement Registry (CJRR), CIHI.

Figure 9-14 *Average length of stay for hip and knee replacements, Canada, 2000/01-2005/06*

♦ Source: Arthritis Community Research Evaluation Unit using Canadian Joint Replacement Registry (CJRR), CIHI.

Summary

- In 2005-2006, there were 2.2 million hospitalizations in Canada; of these, 132,000 (6%) were associated with arthritis.
- Arthritis accounted for 3% of the 1.5 million medical hospitalizations (45,000 hospitalizations annually) and 13% of the 721,000 surgical hospitalizations (93,730 hospitalizations annually).
- Osteoarthritis accounted for most of the hospitalizations related to arthritis, particularly surgical hospitalizations related to joint replacements.
- The rate of hospitalizations for arthritis in Canada increased between 2001/02 and 2005/06, while hospitalization rates for non-arthritis conditions decreased. This was due in part to an increase in surgical hospitalizations for joint replacements.
- The total number of joint replacements increased by 54% between 2001/02 and 2005/06. Adults aged 65 years and older had the largest number of hip and knee replacements.
- In 2005-2006, 74% of individuals who underwent hip replacement and 87% of those who received knee replacements were overweight or obese.
- A large proportion of individuals who were obese and who had either hip or knee replacements (66% and 44% respectively) were of working age i.e., less than 65 years old.
- Given the current high and increasing prevalence of overweight and obesity in the population, it is expected that the number of individuals needing total joint replacements will continue to increase.

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Data sources

Aboriginal Peoples Survey (APS), 2006

The Aboriginal Peoples Survey (APS) is a national survey of Aboriginal peoples living in Canada (First Nations peoples, Métis and Inuit) aged 6-14 years and 15 years and older, living in urban, rural and northern locations. It excludes people living in Indian settlements or on-reserves (although all Aboriginal people living in the territories were included) as well as those living in institutions. The survey provides data on Aboriginal identity and ancestry, education, language, labour activity, income, health, communication technology, mobility, housing and family background.

The APS is a post-censal sample survey with a cross sectional design. The sample was selected from people living in households whose response on their 2006 Census questionnaire indicated that they:

- Had Aboriginal ancestors, and/or
- Identified as First Nations and/or Métis and/or Inuit, and/or
- Had treaty or registered Indian status, and/or
- Had Indian Band membership.

The sample size was comprised of 61,041 individuals. Data for people aged 15 years and over are collected directly from survey respondents.

The APS asked respondents about long-term health conditions that have lasted or are expected to last six months or more. With respect to arthritis/rheumatism, the APS asked:

- Have you been told by a doctor, nurse or other health care professional that you have arthritis or rheumatism?

Canadian Community Health Survey (CCHS), 2007-2008

The Canadian Community Health Survey (CCHS) is a cross-sectional general population health survey that collects information related to health status, health care utilization and health determinants for the Canadian population. The CCHS 2007-2008 has a large sample and was designed to provide reliable estimates down to the health region level. A brief description of the survey is presented below, and a more detailed version is available from Statistics Canada.[1]

The target population of the CCHS was people aged 12 years or older who were living in private dwellings in the 10 provinces and three territories. People living on Indian Reserves or Crown lands, living in institutions, full-time members of the Canadian Armed Forces and residents of certain remote regions were excluded. The overall response rate was 76%; 124,844 individuals participated. Data for people aged 15 years and over were included in the analysis for the report.

Starting in 2007, the wording of the question on arthritis was changed. In 2001, 2003 and 2005, the question included the term "rheumatism". The term was removed from the question in 2007-2008.

- Question in 2001–2005: Do you have arthritis/ rheumatism, excluding fibromyalgia?
- Question in 2007-2008: Do you have arthritis, excluding fibromyalgia?

All analyses performed on the CCHS data were weighted to ensure that derived estimates would be representative of the entire targeted Canadian population 15 years of age and older. If high sampling variability (coefficient of variation between 16.6% and 33.3%) was associated with any of the reported estimates, the symbol "E" was used to indicate that the estimate must be interpreted with caution. If cell sizes were less than 30, estimates were not released, in accordance with Statistics Canada release guidelines. To minimize sample size problems, the Northwest Territories, Yukon and Nunavut were combined under the category "Territories". In order to determine the statistical significance of differences between ratios (e.g. differences in proportions between men and women) the bootstrap method recommended by Statistics Canada was employed.[1-3]

Canadian Joint Replacement Registry (CJRR)

The Canadian Joint Replacement Registry (CJRR) is a national registry that collects information on primary and revision hip and knee replacement surgeries performed in Canada. Data are submitted to the CJRR on a voluntary basis by participating surgeons from across Canada. The overall participation of surgeons was 70% in 2006. The database contains demographic information, the type of replacement, surgical approach, fixation modes and implant types. It also contains information on weight and height. CJRR was

used to supplement analyses on hip and knee replacements for Canada in 2005-2006 (see Table 4 for Canadian Classification of Health Interventions (CCI) and Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures codes (CPP) for joint replacement surgery used). For more information on the CJRR: www.cihi.ca

Canadian Mortality Database

Mortality rates were calculated using the Canadian mortality database for the years of 1999–2005. The analysis included all deaths for which one of the types of arthritis was recorded as the underlying cause. The cause of death variable in the death database is classified according to the World Health Organization (WHO) "International Statistical Classification of Diseases and Related Health Problems" (ICD). ICD-9 was used from 1979 to 1999 and ICD-10 has been in use since 2000. ICD codes were used to identify death from specific arthritis types and then grouped into five categories (see Table 1 for arthritis ICD-9/10 codes).

The medical death certificate

When someone dies, the authority (usually a physician) who certifies the death is required to record all conditions considered to have caused or contributed to it on the death certificate. To comply with international administrative conventions, each death is classified by identifying a single, underlying cause. The underlying cause of death is defined as:

- the disease or injury that initiated the chain of events leading directly to death, or
- the circumstances of the accident or violence that produced the fatal injury.[4]

The certifier is also expected to list the causes so that the immediate, antecedent, underlying and any contributing causes are in an order that reflects the sequence of events that caused the death. In reality, people are often afflicted with several co-morbid conditions and death may result from a combination rather than a clear sequence of causes. Thus, it may be difficult to accurately certify the order of causes of a death.[4]

In recognition of this difficulty and to standardize the procedure of single-cause attribution when more than one condition contributes to a death, the WHO rules govern the selection of the underlying cause from information entered on the death certificate.[4]

In general, the cause entered alone on the lowest used line of Part I of the Medical Certificate of Death is selected as the underlying cause, if it reasonably could have brought about the conditions entered above it. Although the underlying cause should be entered alone on the lowest used line of Part I, frequently, several conditions are entered on this and the other lines. When the order in which causes of death have been entered on the certificate does not follow the standard, the underlying cause is derived using additional WHO coding rules.[4]

Discharge Abstract Database (DAD)

The Discharge Abstract Database (DAD) contains demographic, administrative and clinical data for hospital discharges (inpatient acute, chronic, rehabilitation) and day surgeries of hospitals in every province and territory except Quebec. It contains clinical, demographic and administrative data for hospital discharges. DAD was used to derive estimates of utilisation of day surgeries for all provinces except Quebec and Alberta from 2001-2002 to 2005-2006, and Ontario and some of Nova Scotia's facilities from 2003-2004 onward (see Table 3 for arthritis ICD-9/10 codes). For more information about the DAD: www.cihi.ca

First Nations Regional Health Survey (RHS), 2002-2003

The First Nations Regional Health Survey (RHS) is a national longitudinal survey that gathers information about health, wellness and health determinants of First Nations living on-reserve/on crown land in First Nations communities across Canada.[5]

RHS Phase 1 (2002-2003) collected the baseline data of this longitudinal survey. It included three questionnaires designed for adults (18 years and older), youth (12–17 years) and children (0–11 years). Data collection took place between 2002 and 2003. In total, 22,602 questionnaires were completed from 238 First Nations communities in ten regions.

The sampling frame included all communities except the James Bay Cree and Innu. The communities were defined by their sub-region and community size (small, medium, large). All large communities were invited to participate, and small/medium communities were randomly selected. Communities with populations under 75 people were deemed 'too small'. The samples were devised by age/sex groups. Individuals were randomly selected from the local Band Membership lists. Weights were created for the final dataset thereby permitting population estimates.[6]

The First Nations Information Governance Committee (a standing committee appointed by the Assembly of First Nations Chiefs Committee on Health) oversees and governs the survey.

The RHS asked First Nations adults about health-related conditions that had lasted at least six months, or were expected to last at least six months, and that had been diagnosed by a health care professional. With respect to arthritis/rheumatism, the RHS asked respondents three specific questions:

- Have you been told that you have arthritis or rheumatism?
- Are you currently undergoing treatment or taking medication for this condition?
- Has this limited the kinds or amount of activity that you do?

In order to enable comparisons to other populations and take into account the difference in age distribution between the First Nations people and the overall Canadian population, age-standardized prevalence estimates were calculated using the 1991 Canadian census population.

Hospital Morbidity Database (HMDB)

The Hospital Morbidity Database (HMDB) is a national data holding that captures administrative, clinical and demographic information on hospital inpatient events. It provides national discharge statistics from Canadian health care facilities by diagnoses and procedures. HMDB was used to estimate hospitalization rates in Canada and the provinces and territories from 2001-2002 to 2005-2006 (see Table 3 for arthritis ICD-9/10 codes). For more information about HMDB: www.cihi.ca

IMS Health Canada (IMS) Canadian Disease and Therapeutic Index (CDTI)

The Canadian Disease and Therapeutic Index (CDTI) is an ongoing survey designed to provide information about disease and treatment patterns of office-based physicians in Canada. CDTI is used to understand prescription drug utilization at a national level in Canada. CDTI data help assist in describing current and long-term trends in drug therapy/utilization, as well as the medical conditions for which they are used.

A sample of 652 physicians is selected from 45,800 office-based physicians in Canada, stratified by region and specialty. These physicians fill out diaries (verbatim) for two consecutive days out of every quarter detailing information on each patient contact. This information is projected to the universe of approximately 45,000 physicians in Canada. The sample of physicians used on the CDTI panel is kept as consistent as possible from quarter to quarter.

Patient demographics (such as age and sex) and information about patient diagnosis and concomitant diagnosis and drug therapy (such as product name, strength, and form) are captured in CDTI. Data from CDTI were extracted by medication type, age, sex and arthritis type. CDTI permits the examination of prescriptions written for people with arthritis.

Medication categories:

Health Canada's Therapeutic Products Directorate assigns a unique Drug Identification Number (DIN) to every drug product that it approves for sale in Canada. Using Health Canada's Drug Product Database (DPD), the DINs for all arthritis-related prescription medications were determined.

The DINs were organized into five drug categories:

- non-steroidal anti-inflammatory drugs (NSAIDs);
- corticosteroids;
- disease-modifying anti-rheumatic drugs (DMARDs);
- biologic response modifiers; and
- gastrointestinal (GI) protective agents.

Definition of arthritis:

Arthritis diagnoses are classified according to the International Statistical Classification of Diseases and Related Health Problems (ICD). ICD-9 codes were used to identify individuals with specific arthritis types and then grouped into five categories (see Table 1 for ICD-9/10 codes used).

Participation and Activity Limitation Survey (PALS), 2001

The Participation and Activity Limitation Survey (PALS) in 2001 is based on the 2001 Canadian census and is designed to collect information on adults and children with disabilities—that is, those whose everyday activities are limited because of a health condition. The PALS provides detailed information on the prevalence of various disabilities, support or aid for

persons with disabilities, their labour force profile, and their income and participation in society.

The PALS included people who reported arthritis as the main reason for their limitations. To be considered part of the "disabled" population for the PALS, respondents had to have indicated a disability on both the census and at least one of the filter or screening questions in the PALS.

The population covered by the survey was persons living in private and some collective households in the 10 provinces. The population living in the Aboriginal communities, including all First Nations reserves, were excluded, as well as the population living in the three northern territories and the residents of institutional collectives. In addition, individuals living on military bases, Canadian Armed Forces vessels, merchant vessels and coast guard vessels, as well as campgrounds and parks were excluded for operational reasons.

The total size of the PALS 2001 sample is around 43,276 individuals, including 35,424 adults (over the age of 15 years) and 7,853 children (under the age of 15 years), living in private households and collective dwellings. An overall response rate of 82.5% was obtained. The analyses based on the PALS focused on the population aged 15 years and over with arthritis as the main cause of disability.

Provincial physician claims data

Canada's publicly funded healthcare system is province- and territory-based, consisting of 10 provincial and three territorial health insurance plans that cover medically necessary hospital and physician services. The large majority of Canadian physicians operate on a fee-for-service basis: in order to be paid, a physician must submit a claim form to their provincial/territorial health insurance plan for each individual encounter.

Each physician claim includes a diagnostic code specifying the reason for the visit, and each province uses a classification scheme of diagnoses based on the International Statistical Classification of Diseases and Related Health Problems (ICD). ICD codes were used to identify individuals with specific arthritis types and then grouped into five categories (see Table 2 for ICD-9/10 codes used).

Physicians and individuals enrolled in alternative payment plans are not usually included. However, some physicians submit "shadow bills" to the provincial health insurance plan with diagnostic information. Shadow billing was included in the data where available.

Table 1 *Arthritis ICD-9/10 codes used in Chapters 5 and 7*

Category	Conditions	ICD-9 codes	ICD-10 codes
Lupus and other connective tissue diseases	Systemic lupus erythematosus	710.0	M32.1, M32.8, M32.9
	Vasculitis	446.x	M30.x, M31.x
	Inflammatory myopathies; dermatomyositis	710.3, 710.4	M33.x
	Systemic sclerosis/Scleroderma	710.1	M34.x
	Sicca syndrome/Sjögren	710.2	M35.0
	Overlap syndrome	n/a	M35.1
	Undifferentiated connective tissue disease	710.9	M35.8, M35.9
Rheumatoid arthritis	Rheumatoid Arthritis	714.x	M05.x-M06.x
Osteoarthritis	Osteoarthritis	715.x	M15.x-M19.x
Other inflammatory arthritis	Reiter's Disease	99.3	M02.3
	Gout	274.x	M10.x
	Psoriatic Arthritis	696.0	M07.0-M07.3
	Infectious arthropathies	711.x	M00-M03.x excluding M02.3
	Crystal arthropathies	712.x	M11.x
	Arthopathy associated with other disorders classified elsewhere	713.x	M14.x
	Ankylosing spondylitis	720.x	M45.x
Other arthritis conditions	Other unspecified arthropathies	716.x	M12.x-M13.x
	Internal derangement of knee	717.x	M23.x
	Other derangement of joint	718.x	M24.x
	Other and unspecified disorders of joint	719.x	M25.x
	Polymyalgia rheumatica	725.x	M35.3
	Peripheral enthesopathies and allied syndromes	726.x	M75.x, M76.x, M77.x
	Other disorders of synovium, tendon and bursa	727.x	M65.X-M68.X
	Disorders of muscle, ligament and fascia	728.x	M60.x-M63.x
	Other disorders of soft tissues	729.x	M79.x

Table 2 *Arthritis ICD-9/10 codes used in Chapter 8*

Category	ICD-9 codes	ICD-10 codes
All arthritis conditions	All the codes listed below combined together	M00-M25 M45 M46 M30-M36 M65-M79
Osteoarthritis	715.x	M15-M19
Rheumatoid arthritis	714.x	M05-M06
Other inflammatory and connective tissue diseases	99.3 274.x 446.x 696.0 710.x 711.x 712.x 713.x# 720.x	M07 M10 M11-M14 M30-M36
Other arthritis conditions	716.x 718.x 728.x 717.x# 719.x# 725.x# 726.x# 727.x 728.x 729.x	M00-M03 M20-M25 M65-M79

♦ #=codes not used in Ontario ♦ The codes for psoriatic arthritis and Reiter's disease (i.e. ICD-9: 696.0 and 99.3, respectively) were excluded in provinces where 4 digit ICD-9 codes were not available.

Table 3 *Arthritis ICD-9/10 codes used in Chapter 9*

Category	Conditions	ICD-9 codes	ICD-10 codes
Inflammatory Arthritis	Crystal arthropathies	274.x 712.x	M10.x (excluding M10.1) M11.x
	Arthropathy associated with other disorders	713.x (excluding 713.2)	M07.x M14.x
	Rheumatoid arthritis	714.x	M05.x-M06.x
	Ankylosing spondylitis	720.x 722.9	M45.x M46.x
	Other unspecified arthropathies	716.x (excluding 716.7 & 716.8) 719.2 719.3	M12.x M13.x M08.x M09.x
Osteoarthritis	Osteoarthritis	715.x	M15.x-M19.x
Systemic connective tissue	Polyarteritis nodosa and allied conditions	446.x 447.5	M30.x M31.x
	Diffuse diseases of connective tissue	710.x 725.x 279.4 728.5	M32.x-M36.x
Soft tissue disorder	Peripheral enthesopathies and allied syndromes	726.x	M70.0-M70.1 M70.3-M70.5 M70.9 M75.x-M77.x M73.8
	Other disorders of synovium, tendon and bursa	727.x (excluding 727.1)	M65.x M67.3 M68.0 M70.2 M70.6-M70.8
	Disorders of muscle, ligament and fascia	728.x (excluding 728.4 & 728.5)	M60.x-M63.x M72.x M79.x
	Other disorders of soft tissue	729.x	M66.x, M67.x (excluding M67.3), M68.8 M71.x, M73.0 M73.1
Other arthritis	Infectious arthropathies	711.x 716.8	M00.x-M03.x
	Internal derangement of knee	717.X-719.x (excluding 719.2 & 719.3)	M23.x-M25.x
		721.x 727.1 728.4	M20.x-M22.x M47.x- M48.x K07.68

Table 4 *CCI and CPP codes for joint replacement surgery used in Chapter 9*

Category	Procedures (examples)	CPP codes	CCI codes
Hip Replacement	Total joint replacement (primary and revision)	9351 9352 9353 9359	VA.53.LAPN
Knee Replacement	Total or partial joint replacement (primary and revision)	9340 9341	VG.53.LAPN VG.53.LAPP
Other Joint Replacement	Joint replacement (primary and revision)	9331 9339 9348 9371 9381 9384 9385 9386 9387	TA TM UB UC UG UK VP WA W WM, 53

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Glossary

Age-standardization: is a procedure for adjusting rates (e.g. death rate, prevalence rate) designed to minimize the effects of differences in age composition when comparing rates for different populations. The same procedure can be applied to minimize the effects of differences in sex composition or other appropriate variables.

Ankylosing Spondylitis (AS): is inflammatory arthritis of the spine. Causes pain and stiffness in the back and bent posture. In most cases, the disease is characterized by acute painful episodes and remissions. Disease severity varies widely among individuals.

Arthritis: is a term used to describe more than 100 rheumatic diseases and conditions that affect joints, the tissues that surround the joints, and other connective tissues. Most of these conditions are characterized by pain, stiffness and swelling in and around joints or elsewhere in the musculoskeletal system. They can affect the structure and functioning of the joints, leading to increased pain and disability in performing everyday tasks and activities.

Arthroscopy: means scoping or looking into a joint by means of a miniature telescope called an arthroscope.

Arthroplasty: is a surgical procedure in which an artificial joint replaces a damaged joint, usually a hip, knee, shoulder or ankle.

Body Mass Index (BMI): is a measure of human body size and proportion. It is defined as the weight in kilograms divided by the square of height in meters. It is a standard measure used for the purpose of detecting overweight and obesity. According to the World Health Organization International Standards, individuals are considered underweight if they have a BMI ≤18 and a BMI between 19 and 24.9 indicates normal weight. Individuals are considered overweight if they have a BMI between 25 to 29.9 and obese if they have a BMI ≥ 30.

Case definition: is a set of criteria that must be fulfilled in order to identify a person as representing a case of a particular disease. Case definitions can be based on geographic, clinical, laboratory, or a combination of those criteria, that match the features of a disease.

Childhood arthritis or Juvenile Idiopathic Arthritis (JIA): is a rare chronic condition of children and adolescents. Although rarely fatal, JIA is long-term and associated with serious physical disability.

Direct costs: refer to the value of those goods and services for which a payment was made or resources were used in the treatment, care or rehabilitation related to illness or injury. Direct costs comprised expenditures on hospital care (public and private), physician care (all fee-for service and alternative payment plans) and drugs (publicly and privately prescribed and non-prescribed products), as well as expenditures for care in other institutions and additional direct health expenditures (such as other professionals, other health spending, capital and public health and administration).

Disability: according to the World Health organization, disability covers a spectrum of various levels of functioning at the body level (impairments in body functions and structures), person level (limitations in activity) and societal level (participation restrictions). Disability therefore involves dysfunctioning at one or more of these levels: impairments, activity limitations and participation restrictions.

Drug expenditures: included both public and private expenditures for prescribed drugs and non-prescribed products, but did not include expenditures associated with drugs dispensed in hospitals and other institutions.

Gout: is a type of arthritis caused by too much uric acid in the body that is not adequately flushed out by the kidneys. It most often affects the big toe but can also affect the ankle, knee, foot, hand, wrist or elbow. Gout is often characterized by painful flare-ups lasting days or weeks followed by long periods without symptoms.

Hospital care expenditures: comprised all hospital expenditures for public and private hospitals in Canada regardless of service type. These expenditures also included costs incurred within hospitals, such as drugs dispensed in hospitals, therapeutic and diagnostic outpatient costs, administrative costs, and some research and research in-kind costs.

ICD-9: International Classification of Disease, 9th edition.

ICD-10: International Classification of Disease, 10th edition.

Incidence: is the number of instances of an illness commencing, or of persons falling ill, during a given period in a specified population. More generally, it is the number of new health-related events in a defined population within a specified period of time.

It may be measured as a frequency count, a rate, or a proportion.

Indirect costs: refer to the value of economic output lost as a result of illness, injury or premature death. They are comprised of the lost production attributable to disability (morbidity costs) and the lost production associated with premature death (mortality costs). Disability measures the value of activity days lost due to short-term (duration six months or less) and long-term (duration greater than six months) disability.

Long term disability: Individuals with long-term disabilities were defined as those who experienced a period of restricted activity for six months or more or who were residents of health institutions.

Morbidity: is any departure, subjective or objective, from a state of physiological or psychological well-being.

Mortality rate: is an estimate of the portion of a population that dies during a specified period.

Myopathies: are diseases that affect muscles connected to bone (i.e., skeletal muscles) and can be caused by inherited genetic defects (e.g., muscular dystrophies), endocrine, inflammatory (e.g., dermatomyositis, polymyositis), and metabolic disorders.

Osteoarthritis (OA): results from the deterioration of the cartilage in one or more joints. It leads to joint damage, pain, and stiffness. OA typically affects the hands, feet, knees, spine and hips. It is the most common type of arthritis.

Osteotomy: is a surgical operation whereby a bone is cut to shorten, lengthen, or change its alignment.

Physical activity: is defined according to the total daily Energy Expenditure values (kcal/kg/day) expended during leisure time activities. Energy Expenditure is calculated using the frequency and duration per session of the physical activity as well as the MET value of the activity. The MET is a value of metabolic energy cost expressed as a multiple of the resting metabolic rate. Respondents are categorized as being "active" (≥ 3 MET), "moderate" (1.5 to < 3 METS) or "inactive" (0 to < 1.5 METS) based on their total daily energy expenditure value.

Physician care expenditures: comprised all fee-for-service payments made by provincial/territorial medical care insurance plans to physicians in private practice as well as payments made through alternative payment plans (i.e. other forms of physician reimbursement such as salaries, sessional fees and capitation). They did not, however, include expenditures for non-traditional practitioners and other health care professionals. Nor did they include hospital-based physician care expenditures, which were included in the Hospital Care Expenditures component.

Premature death: refers to a death occurring before the age of 75.

Prevalence: is a measure of the occurrence or disease frequency often used to refer to the proportion of individuals in a population who have a disease or condition.

Population projections: are estimates of total size or composition of populations in the future. Based on the most recent Census data, Statistics Canada's population projections for the years 2007–2031, provide a means for estimating the prevalence of arthritis and the number of people with arthritis over the next 25 years. Statistics Canada provides three population growth scenarios: "high", "medium" and "low" growth. Population figures used for this report are based on the "medium" scenario, which assumes medium growth projections and medium rates of fertility, life expectancy, immigration and inter-provincial migration. This medium growth scenario combines assumptions of fertility and immigration similar to recent years along with moderate growth in life expectancy. Medium growth scenarios are typically used for projecting prevalence and number estimates for arthritis. The projected arthritis estimates presented in chapter 1 are based on the most recent age- and sex-specific arthritis prevalence estimates from the 2007 CCHS, Cycle 4.1. Projections assume that age- and sex-specific arthritis prevalence estimates remain the same over time. This particular assumption was used to maintain consistency with previous reports and does not take into account trends in obesity or other factors that might cause arthritis.

Psoriatic Arthritis (PsA): causes swelling and pain in the joints. It most often affects the wrists, knees, ankles, fingers and toes, and it can also affect the back. PsA is linked to psoriasis, a disorder causing areas of the skin to become inflamed and covered with silvery or grey scales.

Public health surveillance: is the tracking and forecasting of any health event or health determinant through the continuous collection of high-quality data; the integration, analysis and interpretation of data into surveillance products (such as reports, advisories, warnings); and the dissemination of these products for a specific public health purpose or policy objective.

Quality of life: refers to the physical, psychological, and social domains of health, seen as distinct areas that are influenced by a person's experiences, beliefs, expectations, and perceptions.

Rates: is an expression of the frequency with which an event occurs in a defined population. A rate is composed of a numerator and a denominator.

Reactive Arthritis (ReA) or Reiter's disease: is an autoimmune condition that develops in response to an infection in another part of the body.

Rheumatoid Arthritis (RA): is an inflammatory disease caused by the body's immune system attacking the body's joints (primarily hands and feet). This leads to pain, inflammation and joint damage. RA may also involve other organ systems such as eyes, heart, and lungs. RA is the second most common type of arthritis.

Scleroderma: there are two types, localised which affects mainly the skin and can involve muscles and joints and there is generalized scleroderma that affects the skin as well as the internal organs.

Self management: refers to the tasks that a person must undertake in order to live well with one or more chronic conditions.

Short-term disability: Individuals with short-term disabilities were defined as those who experience restricted activity that lasted for a period of less than six months. Short-term disability costs were available for all musculoskeletal diseases combined but could not be calculated specifically for arthritis. As a result, they are not included in the figures, causing the underestimation of the indirect and total costs attributed to arthritis.

Sjögren's syndrome: is a chronic disorder that causes damage to the salivary glands, resulting in dry mouth, and the tear glands, resulting in dry eyes. It can also affect other parts of the body including joints, muscles and nerves, organs, or glands.

Synovitis: is the medical term for inflammation of a synovial membrane, which lines those joints which possess cavities, namely synovial joints. The condition is usually painful, particularly when the joint is moved. The joint usually swells due to fluid collection.

Systemic Lupus Erythematosus (SLE): is a connective tissue disorder causing skin rashes, joint and muscle swelling and pain. It may also affect the organs. The symptoms of this disease fluctuates over time i.e., flare-ups and periods of remission. SLE is rare but can be very disabling.

Traumatic arthritis: is a form of arthritis that is caused from blunt, penetrating, or repeated trauma or from forced inappropriate motion of a joint or ligament.

Vasculitis: refers to a heterogeneous group of disorders that are characterized by inflammatory destruction of blood vessels - both arteries and veins are affected.

Notes

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