ONTARIO WOMEN'S HEALTH EQUITY REPORT

Musculoskeletal (MSK) conditions include diseases that affect the bones, ligaments, tendons, muscles and joints; together these conditions limit physical functioning, impose significant pain and suffering and are the number one cause of disability for Ontarians. As a result, the associated costs to our health care system and to society are staggering. Women develop osteoarthritis and autoimmune diseases, including inflammatory arthritis, more often than men. Since women experience accelerated bone loss at menopause, they are also more likely to develop osteoporosis and suffer from low-trauma fractures. As well, for most MSK conditions, the number affected and the associated disease severity is greater among specific racial/ethnic subgroups (particularly Aboriginal populations) and among women and men with lower income and less education.

Despite the high frequency of MSK conditions and their substantial—and growing—population impact, MSK conditions have received relatively little attention from health policy makers and health care professionals. To date, MSK conditions are not explicitly incorporated within the Ontario chronic disease strategy, nor are these conditions routinely considered in the context of chronic disease health care planning. However, prevention and management of other common chronic conditions—such as diabetes and heart disease—cannot be optimized in the presence of untreated problems arising from MSK conditions as they prevent individuals from engaging in physical activity to improve fitness and lose weight.

To date, quality improvement for MSK conditions has been addressed by only two provincial strategies: the Ontario Ministry of Health and Long-term Care's Osteoporosis Strategy and the Ontario Wait Times Strategy (which addresses wait times for hip and knee replacement surgery). We are hopeful that this report will help to encourage a broader response to this important public health problem. Strategies are needed to reduce the burden of MSK conditions in Ontarians including: improved access to health promotion and appropriate and timely diagnosis as well as access to care and services when required. Unless these strategies are developed and implemented in short order, it is anticipated that MSK conditions will place an even greater stress on the health care system over time as a result of the obesity epidemic and population aging, and will continue to negatively impact many lives.

The Musculoskeletal Conditions chapter is divided into four sections: General MSK Indicators, Osteoarthritis, Rheumatoid Arthritis and Osteoporosis

In the first section, **general indicators** of Ontario women and men with MSK conditions are profiled including: health and functional status (and the presence of other chronic conditions and probable depression, activity limitations, labour force participation and being overweight or obese) and access and utilization of services (including multiple pain medication use, primary care, specialty care, allied health professionals, home care and access to prescription drug coverage for adults under age 65). In the subsequent three sections, we examine the leading causes of MSK-related morbidity: **osteoarthritis, rheumatoid arthritis** and **osteoporosis**. We report on indicators that assess: prevalence; severity; treatment (including total joint replacement for patients with osteoarthritis and use of disease modifying anti-rheumatic drugs (DMARDs) and biologic agents for rheumatoid arthritis); screening for primary and secondary prevention of osteoporosis and outcomes including mortality after a hip fracture.

Exhibit 1 | Percentage of adults aged 25 and older who have arthritis or rheumatism^, by sex and age group, in Ontario, 2005

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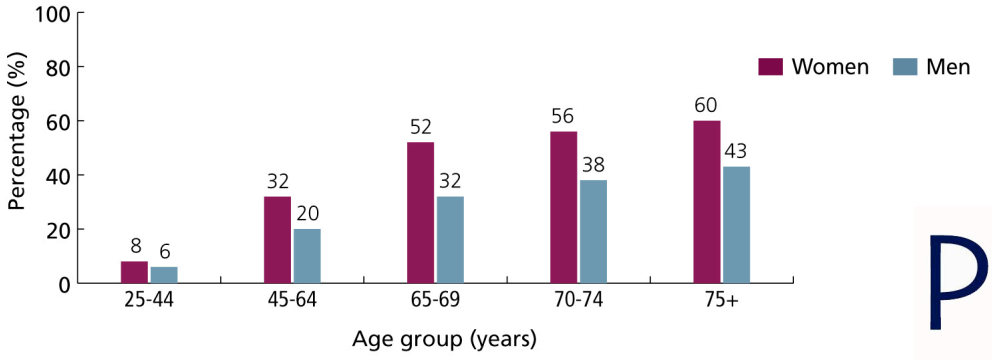

DATA SOURCE: Canadian Community Health Survey (CCHS), 2005 (Cycle 3.1)

^ Physician-diagnosed arthritis or rheumatism, excluding fibromyalgia

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KEY MESSAGES

We took a broad look at MSK conditions in the province, focusing on gender, socioeconomic and regional variations in MSK-associated burden and, where possible, health system performance. However, unlike many other chronic conditions that affect Ontarians, relatively few indicators of health system performance exist for MSK conditions that can be measured with existing data in Ontario.

Our findings point to a number of key areas for intervention and improvement. We found sizeable variations by gender, socioeconomic status, and rural/urban residency for many indicators. These findings are important for the LHINs to consider in their priority setting, planning and quality improvement activities. The following five actions can help accelerate progress in reducing the burden of MSK conditions, improving health outcomes among people with these conditions and reducing related health inequities. Successful adoption of these actions needs to take into account gender and socioeconomic differences in the incidence, prevalence, burden and experiences with care for people with MSK conditions as well as the social context of the lives of women and men with these conditions.

Increase focus on prevention and health promotion to reduce the burden of MSK conditions.

- ❖ MSK conditions share many risk factors with other common chronic conditions, including diet, being overweight or obese and sedentary lifestyle. A common approach to the prevention of chronic diseases that highlights the benefits of risk factor modification in preventing MSK conditions and reducing their associated morbidity and functional limitations is needed.

- ❖ Health promotion strategies focused on physical activity and healthy weight maintenance must also take into consideration the high prevalence of hip and knee arthritis. These conditions may limit patients' abilities to comply with recommendations to increase physical activity, which is an important component of chronic disease management.

Wide implementation of a patient-centred approach to chronic disease management can help improve the quality of life and health outcomes of women and men with MSK conditions.

- ❖ The common occurrence of MSK conditions (primarily osteoarthritis) with other chronic conditions (e.g., depression, diabetes and cardiovascular disease) has implications for the management and outcomes of each of these conditions. Self-management is a cornerstone of the management of all chronic conditions and has been shown to reduce depression and increase physical activity among people with MSK conditions and other chronic conditions. Expanded use of chronic disease self-management models is required to optimize patient outcomes.

- ❖ Chronic disease self-management must also take into consideration the high prevalence of multi-morbidity among older Ontarians. The adoption of a more patient-centred focus to chronic disease management that acknowledges the high prevalence of MSK conditions among people with other common chronic conditions, such as diabetes and heart disease is needed.

Increase the focus on early diagnosis and treatment of people with inflammatory arthritis, in particular rheumatoid arthritis, to reduce associated disability.

- ❖ Approximately 5 percent of the population is affected by Inflammatory Arthritis. Rheumatoid arthritis is the most common, affecting 1-2 percent of Ontarians, often presenting in women in their child-bearing years. Much research has clearly shown that getting these individuals onto effective disease-modifying drug therapies within the first few months of symptoms can substantially change their risk for long-term disability and thus improve their quality of life. Strategies are needed to raise arthritis awareness and to ensure that those with possible inflammatory arthritis receive a timely referral to rheumatology for diagnosis and treatment.

Continued support for the Ontario Osteoporosis Strategy is needed to reduce persistent gaps in care.

- ❖ Care gaps persist in the management of osteoporosis following a low-trauma fracture as well as in screening and diagnosis. The rate of low-trauma fracture varied significantly across LHINs and by income with higher rates in lower-income neighbourhoods. Follow up for osteoporosis after fracture is less than optimal. Only one-quarter of adults received a BMD test to check for osteoporosis after a fracture. The percentage of adults who were placed into long-term care after having suffered a hip fracture also varied across LHINs, suggesting that opportunities exist to reduce these rates.

- ❖ Among older adults aged 66 and older with a new fracture, two-thirds were not assessed or treated for osteoporosis. In addition, among older adults (aged 68-70) who did not have a previous BMD test, only 45 percent of women and nine percent of men were screened using BMD testing. After age 65, the percentage of eligible adults who were screened varied across LHINs and by neighbourhood income.

Improve the quality, availability and timeliness of data to assess MSK conditions and their care in the province.

- ❖ MSK conditions are predominantly managed in the ambulatory care setting. As a result, high quality data regarding these conditions is lacking. Better and more comprehensive data on management of these conditions in primary care and other ambulatory care settings is needed. There is a need for validation studies to evaluate the current accuracy of diagnostic coding for MSK conditions. There is a need to expand surveillance of prescription drug use for younger individuals, in order to enable assessment of the quality of care for many MSK conditions, but in particular inflammatory arthritis. For osteoporosis, quality of care cannot be adequately evaluated without knowledge of the results of BMD testing.

KEY FINDINGS

MSK conditions are a significant cause of pain and disability in Ontario. MSK conditions affect over one-third of the population. In this chapter, we focused on MSK conditions that are important causes of morbidity and mortality among women in Ontario: ***osteoarthritis***, ***rheumatoid arthritis*** and ***osteoporosis***. Osteoarthritis, a common condition that is often suboptimally managed, represents approximately two-thirds of the burden due to MSK conditions.

The burden of MSK conditions is greatest among older women, particularly those with less education or low income. All indicators of disease prevalence and severity identified a greater burden of illness due to MSK conditions among women than men, with increasing age **(Exhibits 1 [see front cover] and 2 [below])**, and for those with lower versus higher socioeconomic status. While these variations may reflect a differential risk for developing MSK conditions (e.g., due to exposure to occupational risk factors and other risk factors, like obesity); as well as greater disease severity or differences in the availability of social support, they may also reflect gender or socioeconomic inequities—in access to, and quality of, care.

Exhibit 2 | Low-trauma fracture^ rate (per 10,000) among adults aged 50 and older, by sex and age group, in Ontario, 2007/08

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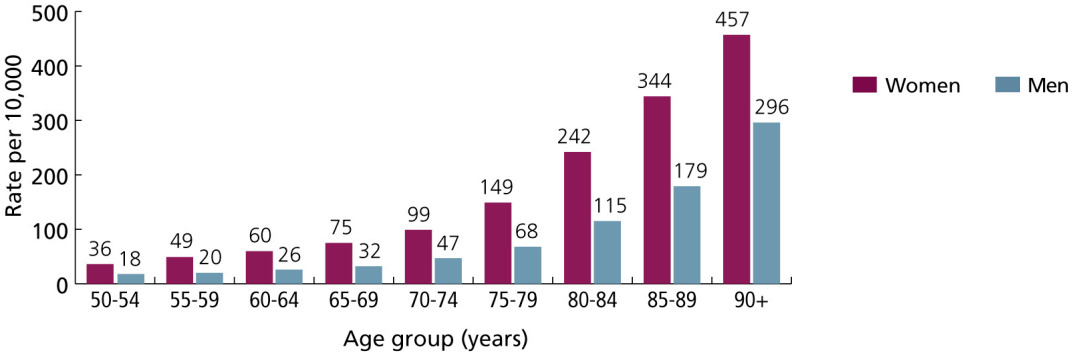

DATA SOURCES: Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD); National Ambulatory Care Reporting System (NACRS)

^ Low-trauma fractures likely due to osteoporosis include fractures of the hip, spine (rib, sternum, thoracic, and lumbar spine), wrist and forearm, shoulder and upper arm

MSK conditions commonly occur in the setting of other chronic conditions. People living with other common chronic conditions, such as diabetes and heart disease, are likely to also have an MSK condition. The increased risk of MSK conditions with older age and the commonality of risk factors (e.g., diet, being overweight or obese and sedentary lifestyle) all contribute to the high rate of coexisting illness (comorbidity) among people affected by MSK conditions. Women with MSK conditions have a higher burden of comorbidity than men with these conditions (**Exhibit 3**). Yet, the impact of MSK conditions on the management of these other conditions has been greatly under appreciated. For example, physical activity and weight loss in a person with diabetes may be difficult in the setting of painful hip or knee arthritis. On the other hand, these other conditions may also impact appropriate management of MSK conditions. For example, use of non-steroidal anti-inflammatory medications may be unsafe in the setting of hypertension. This has implications for Ontario's chronic disease strategy and underscores the necessity of patient-centred models of chronic disease prevention and management.

Exhibit 3 | Age-standardized percentage of adults aged 25 and older with a chronic condition who reported having at least one other chronic condition¥ diagnosed by a health professional among those with and without an MSK condition^, by sex, in Ontario, 2005 and 2007

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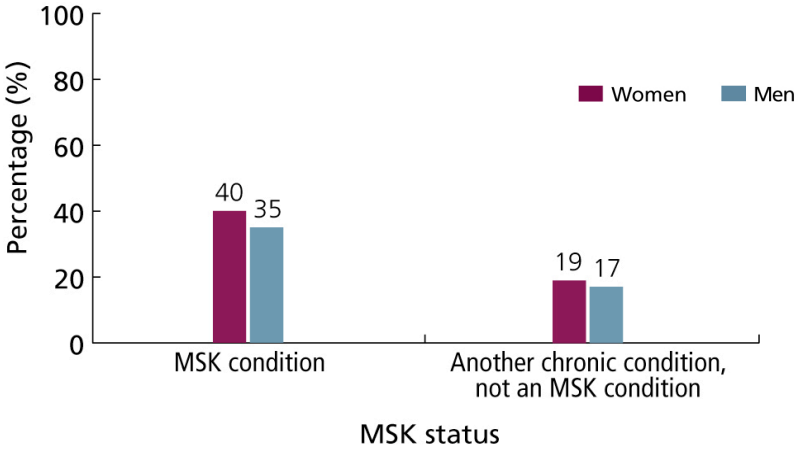

DATA SOURCES: Canadian Community Health Survey (CCHS), 2005 (Cycle 3.1) and 2007

^ People with MSK conditions include those with physician-diagnosed arthritis, rheumatism and/or back pain

¥ Chronic conditions included in the analyses were: Alzheimer's and other dementia; bowel disorders, Crohn's disease or colitis; urinary incontinence; cancer; heart disease; stroke; diabetes (non-gestational) or using insulin; or emphysema, asthma or COPD

KEY FINDINGS (continued)

MSK conditions are associated with high rates of depression. Among individuals with MSK conditions, 10 percent had probable depression, with the proportion higher among women than men and among those with low compared to high income (21 percent of low-income women with MSK conditions had probable depression) **(Exhibit 4)**. This is concerning as research has shown that comorbid depression may worsen outcomes and increase health care utilization. Recognition and treatment of comorbid depression has the potential to improve outcomes for people with MSK conditions, yet, mental health conditions appear to be under recognized and under treated in older adults, the same population that is disproportionately affected by MSK conditions.

Exhibit 4 | Age-standardized percentage of adults aged 25 and older who had probable depression¥ among those with and without an MSK condition^, by sex and annual household income, in Ontario, 2000/01

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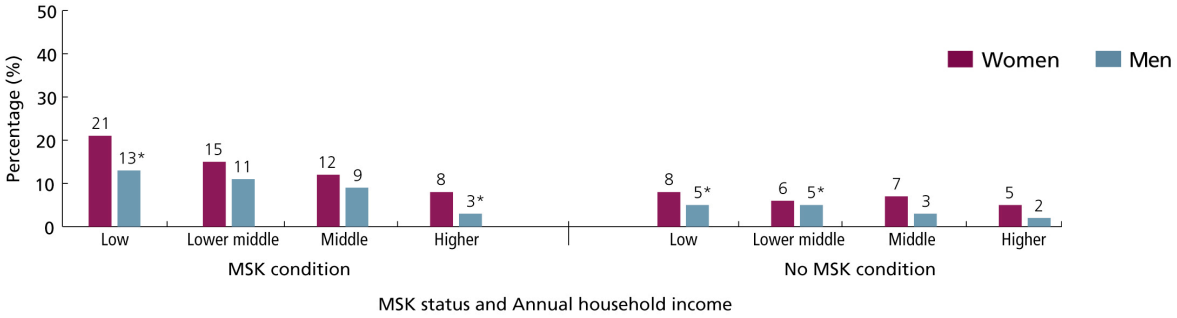

DATA SOURCE: Canadian Community Health Survey (CCHS), 2000/01 (Cycle 1.1)

^ People with an MSK condition include those with physician-diagnosed arthritis, rheumatism and/or back pain
¥ Composite International Diagnostic Interview-Short Form for Major Depression score of > 0.9
* Interpret with caution due to high sampling variability

MSK conditions have a greater impact on disability than other chronic conditions. Compared with Ontarians who reported having a chronic condition not including an MSK condition, those with an MSK condition were more likely to report moderate to severe activity limitations. As was the case for other indicators, the impact was greatest among older women; 53 percent of women aged 65 and older with MSK conditions reported limitations in their ability to perform instrumental activities of daily living (IADL) and/or activities of daily living (ADL), such as shopping, meal preparation or bathing **(Exhibit 5)**. Increased disability associated with MSK conditions may reflect not only the nature of these conditions, but also their relative under management. Research suggests that exercise and optimizing pain management in these individuals can substantially reduce the disability associated with MSK conditions.

Exhibit 5 | Percentage of adults aged 25 and older who reported having limitations in IADLs and/or ADLs among those with and without an MSK condition^, by sex and age group, in Ontario, 2005

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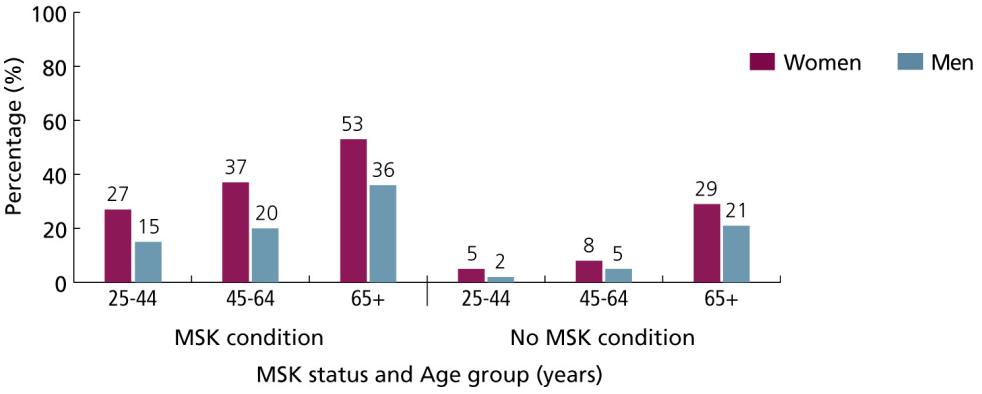


DATA SOURCE: Canadian Community Health Survey (CCHS), 2005 (Cycle 3.1)

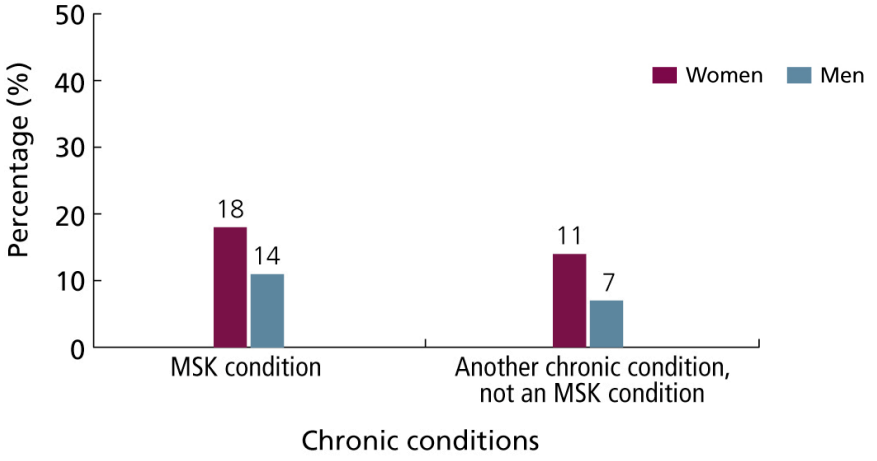
^ People with an MSK condition include those with physician-diagnosed arthritis, rheumatism and/or back pain

MSK conditions are associated with a greater use of multiple pain medications. We found that 16 percent of adults with MSK conditions were using two or more types of medications used to manage symptoms of pain including pain relievers (non-narcotic and/or narcotic) and/or anti-depressants compared with only nine percent of adults with another chronic condition **(Exhibit 6, see over)**. This finding suggests that the population with MSK conditions may be at increased risk for adverse drug events leading to hospitalization and mortality. Perhaps not surprisingly, the highest use of multiple pain medications was among women with MSK conditions (18 percent), in whom the risk of comorbid depression is highest and for whom disease severity may be greater. We also documented a decrease in reported medication use with increasing age. Research suggests this decrease is not associated with reduced need, but rather reflects an increased prevalence of other conditions which preclude the safe use of pharmacological treatments for MSK conditions and/or physician discomfort managing these complex patients as well as suboptimal pain management in this population.

KEY FINDINGS (continued)

Exhibit 6 | Age-standardized percentage of adults aged 25 and older with a chronic condition who reported taking two or more types of medication in the past month¥ among those with and without an MSK condition^, by sex, in Ontario, 2000/01

POWER Study



DATA SOURCE: Canadian Community Health Survey (CCHS), 2000/01

^ People with MSK conditions include those with physician-diagnosed arthritis, rheumatism and/or back pain
¥ Medications included pain relievers (narcotic and/or non-narcotic) and/or anti-depressants

Allied health care providers are underutilized for MSK conditions. Physical therapy and chiropractic are integral to the management of most MSK conditions. Yet, consistent with previous studies, our results indicate they are being under utilized. Only 15 percent of adults with an MSK condition reported consulting a physiotherapist at least once in the previous year. While the numbers who had never seen a physiotherapist may be higher, our findings nonetheless suggest an important care gap. Under use of allied health care providers for MSK conditions may be related to cost barriers (many services provided by these health care providers are not covered) as well as a lack of appreciation of the role of these health care providers in the management of MSK conditions. Greater use of allied health care by those with higher income likely reflects better access, which may result from having greater resources or supplementary insurance. While the correct rate for use of allied health care providers is unclear, development and implementation of guidelines for use of allied health care providers coupled with mechanisms to facilitate access when indicated has the potential to enhance the care and thus outcomes of people with MSK conditions.

One in five adults aged 25-64 with an MSK condition had no prescription drug insurance coverage. Medical management of most MSK conditions includes pharmacologic agents to manage pain and inflammation. Particularly for inflammatory arthritis conditions, recommended drug therapies may be costly. Surveys have documented that lack of insurance coverage for expensive disease modifying anti-rheumatic drugs (DMARDs) or biologic agents for inflammatory arthritis is a major barrier to timely and effective management of these conditions. This is particularly concerning in light of the fact that the proportion of adults aged 25-64 who lacked drug insurance coverage was highest among those in the lowest annual household income group, in whom the burden—and thus need for medication—is likely to be greatest **(Exhibit 7)**. Only sixty-four percent of low-income adults with MSK conditions reported having prescription drug coverage.

Exhibit 7 | Age-standardized percentage of adults aged 25-64 with an MSK condition^ who had prescription drug coverage, by sex and annual household income, in Ontario, 2005

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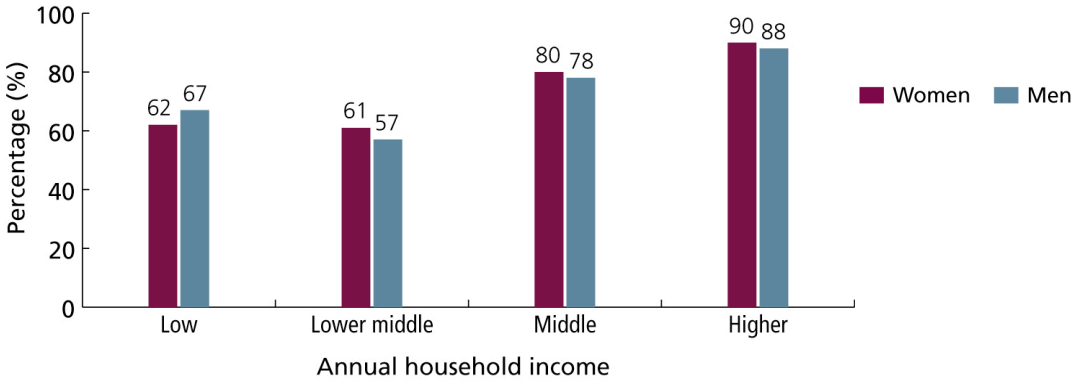

DATA SOURCE: Canadian Community Health Survey (CCHS), 2005, (Cycle 3.1)

^ People with MSK conditions include those with physician-diagnosed arthritis, rheumatism and/or back pain

KEY FINDINGS (continued)

Rates of joint replacement based on administrative data tell us about who got care, not who did not. We used data collected through the Ontario Hip/Knee Osteoarthritis Cohort to assess potential need and willingness to undergo joint replacement surgery. Women and those with less education and lower income were far more likely than men and those with higher socioeconomic status to have a need for surgery, yet less likely to be on a waiting list. Willingness to consider a joint replacement was lower among those with less education or lower annual income than their better educated or wealthier counterparts. Research suggests that the major reason for these differences is that individuals with lower socioeconomic status are more likely to overestimate the risks and underestimate the benefits of joint replacement surgery. Subsequent research has pointed to the need for educational interventions and improved patient-physician communication to address misperceptions about, and thus unwillingness to consider, joint replacement surgery as well as to address the gender or socioeconomic disparities that persist in the receipt of these procedures among those who may benefit. These findings are concerning as they reflect inequities in the provision of this very effective procedure.

There is substantial variability in rates of discharge to rehabilitation post total joint replacement surgery. What constitutes the correct rate for inpatient rehabilitation post surgery is unclear. For those who are able to be discharged home, there is evidence that outcomes following inpatient rehabilitation are not superior to those following home-based post-operative care. However, we found substantial variability by LHIN in the proportion of patients discharged to an inpatient setting following a primary hip or knee replacement surgery. This variability likely reflects a number of factors, including the availability of inpatient rehabilitation beds and surgeon/hospital practice variation. While we found no relationship between patients' income or education and this indicator, the need might be expected to be higher among those with less education or lower income and the absence of a gradient may reflect overuse among patients with higher socioeconomic status.

Back pain is higher among those with lower versus higher education or income. Although no gender differences were observed, the prevalence of back pain was significantly associated with income such that the proportion affected was highest among low-income women and men (in whom approximately 28 percent reported a back pain diagnosis). Further, the greatest increase in prevalence occurred in the middle age group (aged 45-64). Both findings are consistent with greater risk for back pain associated with physically demanding occupations, particularly those requiring heavy lifting, and the high rates of work disability in this age group associated with back pain.

Rheumatoid arthritis is a serious MSK condition that is under treated in Ontario. Rheumatoid arthritis, a systemic autoimmune disease that affects approximately twice as many women as men, is associated with substantial morbidity as well as mortality. We estimated that approximately one percent of Ontarians aged 25 and older had been diagnosed with rheumatoid arthritis and the rate among women was twice that among men (1.2 percent versus 0.6 percent, respectively). There was variability across the province by LHIN in the prevalence of rheumatoid arthritis, with the highest rates in the Northwest. This finding is likely related to the known higher prevalence of rheumatoid arthritis among the Canadian Aboriginal population.

Guidelines for treatment of this condition recommend early initiation of immune-suppressing medications to prevent joint destruction that leads to disability. Because these medications require routine monitoring, it is recommended that patients with rheumatoid arthritis be under the care of a specialist, usually a rheumatologist. Among Ontarians with rheumatoid arthritis, only 40 percent had been seen by a specialist (including: rheumatologists, orthopaedic surgeons, general internists and/or physical medicine specialists) during a one-year period (42 percent in women versus 35 percent in men) and the proportion was higher among those from higher-income neighbourhoods **(Exhibit 8)**.

Exhibit 8 | Age-adjusted percentage of adults aged 25 and older with rheumatoid arthritis who were seen by a specialist^ during a one year period, by sex and neighbourhood income quintile, in Ontario, 2005/06

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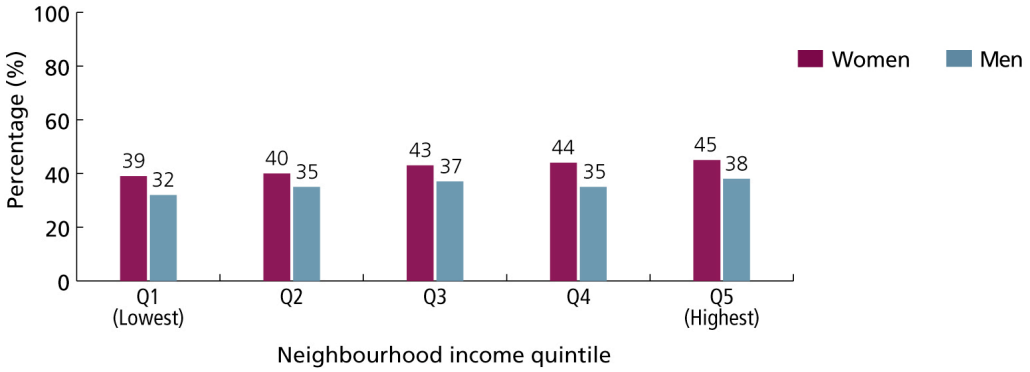


DATA SOURCES: Ontario Health Insurance Plan (OHIP); ICES Physician Database (IPDB); Statistics Canada 2006 Census; Registered Persons Database (RPDB)

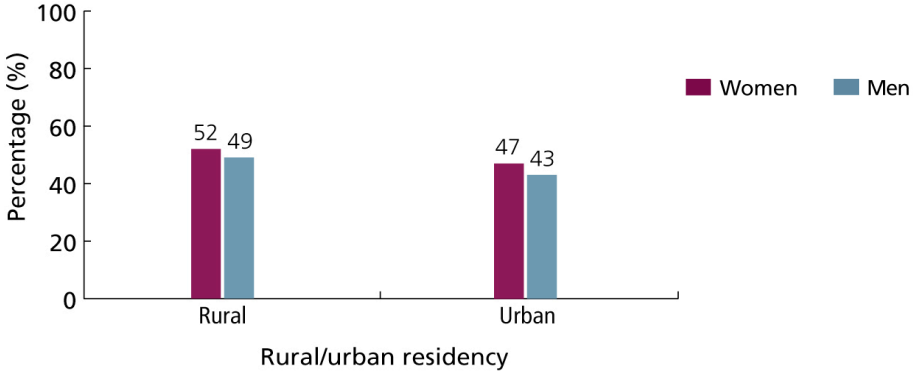
^ Includes rheumatologists, orthopaedic surgeons, general internists and physical medicine specialists

KEY FINDINGS (continued)

We examined the proportion of adults aged 65 and older with rheumatoid arthritis who were on first line recommended therapies. Interestingly, although specialist care for rheumatoid arthritis was higher in urban than rural regions of the province, likely related to enhanced access to specialist care, the proportion receiving appropriate medications was actually higher among those residing in a rural region **(Exhibit 9)**. One potential explanation for this observation is that among those referred to a specialist for treatment of rheumatoid arthritis, disease severity, and thus need for treatment, may be substantially higher for those residing in a rural compared to an urban region (i.e. the threshold for referral to a specialist is higher among rural as compared to urban physicians due to specialist availability).

Exhibit 9 | Age-standardized percentage of adults aged 65 and older with rheumatoid arthritis who filled a prescription for a DMARD or biologic agent, by sex and rural/urban residency, in Ontario, 2005/06

POWER Study



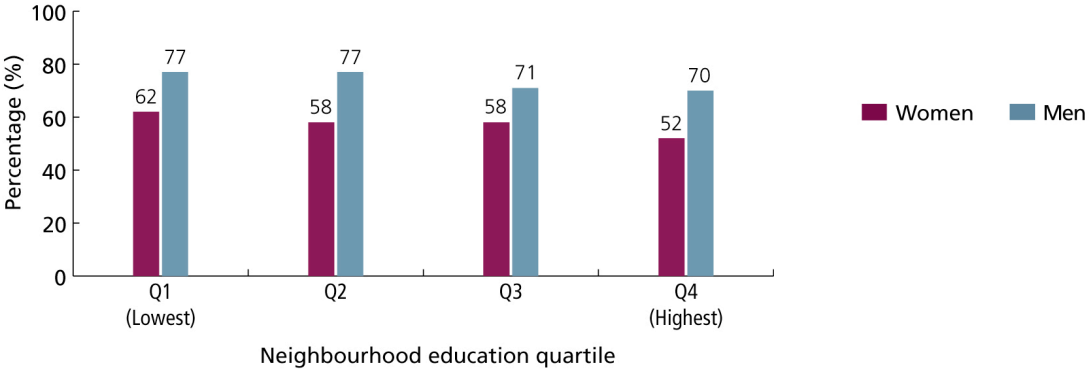
DATA SOURCES: Ontario Health Insurance Plan (OHIP); ICES Physician Database (IPDB); Ontario Drug Benefits (ODB) database; Registered Persons Database (RPDB)

Substantial gaps in care for osteoporosis persist. Osteoporosis is a very common MSK condition which predominantly affects older women and men, and which is characterized by reduced bone quality and quantity, increasing risk for fracture. Over the past two decades, a number of studies have documented care gaps in osteoporosis. To address the growing numbers of osteoporosis-related fractures in Ontario, the Ontario MOHLTC established the Osteoporosis Strategy. This multi-pronged strategy has largely targeted interventions to individuals who have experienced a fracture (as these individuals are at particularly high risk for another fracture) and effective treatment exists and benchmarks for quality of post-fracture care have been developed. Risk for fracture is associated with a number of factors, including older age, falls, specific medical conditions and low bone mineral density (BMD). Fracture rates are higher among women than men due to a higher propensity of these risk factors among women.

Only one-third of men and women received a BMD test to assess for low bone mass, or a prescription for an effective bone-sparing agent, within a year of experiencing a low-trauma fracture. Contrary to other indicators in this chapter, the care gap for osteoporosis is wider for men than for women; however similar urban/rural and socioeconomic gradients **(Exhibit 10)** persist with worse care noted among lower socioeconomic groups and for Ontarians from rural areas.

Exhibit 10 | Age-standardized percentage of adults ≥ 66 who received neither a BMD test nor prescription drug treatment[¥] within one year post-discharge after a low-trauma fracture^, by sex and neighbourhood education quartile, in Ontario, 2007/08

POWER Study



DATA SOURCES: Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD); National Ambulatory Care Reporting System (NACRS); Registered Persons Database (RPDB); Ontario Health Insurance Plan (OHIP); Ontario Drug Benefits (ODB) database; Statistics Canada 2006 Census

^ The sample is limited to adults who had a low-trauma fracture (fractures of the hip, spine (rib, sternum, thoracic, and lumbar spine), wrist and forearm, shoulder and upper arm) who were alive one year post discharge and who had not filled a prescription for an osteoporosis medication or had a BMD test within twelve months prior to their fracture.

Among those aged 66 and older who initiated treatment for osteoporosis, persistence on effective treatment was relatively low; only 38 percent remained continually on medication one year following the first prescription. This is concerning as high adherence to medications is required to optimize benefit. Non-adherence has been linked with patients' inability to "feel" the drug working (bone loss/gain is silent) and relatively large side effect profiles for these medications.

STUDY

The indicators we report are the result of a rigorous selection process, which included an extensive literature review of existing indicators as well as input and agreement from experts in the field (see chapter 1 – Introduction to the POWER Study). The indicators that have been included have been identified through many sources including: Statistics Canada; the Canadian Institute for Health Information; Health Canada; the Association of Public Health Epidemiologists of Ontario; Public Health Agency of Canada, Ontario Women's Health Council; the Institute for Clinical Evaluative Sciences; the American College of Rheumatology; the US Arthritis Foundation; the Joint Commission; National Committee for Quality Assurance; Public Health Research Education and Development and the Australian Institute of Health and Welfare. Many of these indicators are widely used to measure quality of care. We build on these reports by incorporating a gender and equity analysis (see The POWER Study Framework, Chapter 2). This is important because women and men have different patterns of disease, disability, and mortality. Women and men also have different social contexts and different experiences with health care which, together with differences in biology, contribute to observed gender differences in health. Furthermore, well documented health inequities among women and men associated with sociodemographic factors are associated with differences in illness burden between subgroups of women and may be larger than overall differences between women and men.

Data from several sources were used to produce this chapter. These include: Statistics Canada's Canadian Community Health Survey (CCHS) 2000/01 (Cycle 1.1); 2005 (Cycle 3.1) and 2007; Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD); Ontario Drug Benefit (ODB) Database; Ontario Health Insurance Plan (OHIP), physician claims data; the National Ambulatory Care Reporting System (NACRS); National Rehabilitation Reporting System (NRS); Continuing Care Reporting System (CCRS); data from the Ontario Hip/Knee Osteoarthritis Cohort; the Registered Persons Database (RPDB); the Institute for Clinical Evaluative Sciences (ICES) Physician Database (IPDB) and the Statistics Canada 2006 Census. Data on general MSK indicators were first stratified by sex and then further stratified by socioeconomic variables including annual household income, educational attainment, age, ethnicity, years of immigration and LHIN and analysed as allowed by sample size. Indicators of general health and functioning were measured among those with MSK conditions and those without MSK conditions, either with or without another chronic condition. Data on clinical care and outcomes were also first stratified by sex and then further stratified by age, neighbourhood income, neighbourhood educational attainment and LHIN and analysed as allowed by sample size. Data from the Ontario Hip/Knee Osteoarthritis Cohort were stratified by age, income, education and rural or urban location. Age-adjustment was done using indirect standardization and data were standardized to the population with MSK

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