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**ORTHOPAEDIC SURGERY  
FOR ARTHRITIS AND  
RELATED CONDITIONS  
IN ONTARIO**

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## Table of Contents

Introduction.....	1
Findings.....	3
The provision of total joint replacement surgery in relation to the other services provided by orthopaedic surgeons focusing on arthritis and related conditions.....	3
Office time of surgeons.....	6
The relationship between the availability of orthopaedic resources and area variation in the use of, and waiting times for, total joint replacement .....	8
Discussion.....	13

## List of Tables

Table 1. Ambulatory visits to orthopaedic surgeons for musculoskeletal disorders in Ontario, 2000/2001	6
Table 2. Age and sex adjusted rates per 100,000 for total knee and total hip replacements by DHC, Ontario 1989 to 2001 .....	9

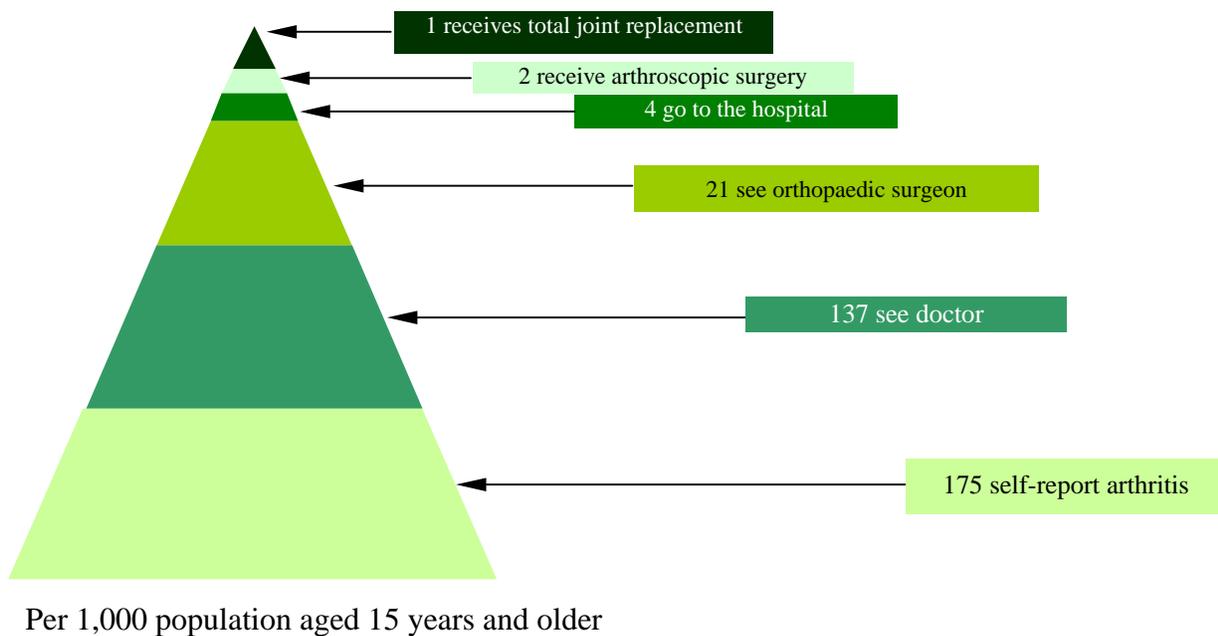
## List of Figures

Figure 1. Health care utilization of people with arthritis and related conditions .....	1
Figure 2. Number of arthritis-relevant orthopaedic procedures in Ontario, 2000 .....	3
Figure 3. Age and sex specific rate of all arthroscopic procedures and TJR per 100,000 population (15+) in Ontario .....	4
Figure 4. Age and sex standardized rates of THR, TKR and all arthroscopic procedures Ontario 1992-2001 .....	4
Figure 5. Acute Care length of stay for patients with TJR in Ontario 1995 to 2001 .....	5
Figure 6. Relationship between wait times and TJR rates in Ontario 1992 to 2001 .....	5
Figure 7. Distribution of visits to orthopaedic surgeons by diagnostic groups in Ontario, 2001 .....	7
Figure 8. Distribution of visits to orthopaedic surgeons by age group in Ontario, 2001 .....	7
Figure 9. Distribution of visits to orthopaedic surgeons by age and diagnostic groups in Ontario, 2001 .....	8
Figure 10. Orthopaedic provision by DHC in Ontario, 2001 .....	10
Figure 11. Relationship between TKR, THR rates and orthopaedic provision .....	11
Figure 12. Relationship between arthroscopic and total knee replacement rates in Ontario, 2001 .....	12
Figure 13. Relationship between rates of total knee and hip replacements and waiting times in Ontario, 2001 .....	13

## Introduction

Access to total joint replacement surgery is of major concern in Ontario. The 2004 ICES Research Atlas, *Arthritis and Related Conditions in Ontario* documented increases in the rates of total hip and knee replacement during the 1990s and increasing wait times for these surgeries 1. There was also considerable area variation in the rates of total joint replacement as well as in wait times.

Orthopaedic surgeons are essential to the provision of total joint replacement. The ICES research atlas *Arthritis and Related Conditions in Ontario* describes the availability of services reported on a survey of Ontario orthopaedic surgeons 2. Of the 357 orthopaedic surgeons identified in Ontario in 2000, 337 (94%) responded to the survey of whom 315 (93%) reported having at least some arthritis patients. Orthopaedic provision was captured in terms of half days per week of office and surgery time per 100,000 population. There was considerable area variation by District Health Council (DHC) in the amount of service provided, with a 2.6 fold variation in office time and a 3.6 fold variation in surgery time. The same survey identified that Ontario orthopaedic surgeons spent only 35% of their time dedicated to surgery while in the US the estimated dedication of time is 62%. *Arthritis and Related Conditions in Ontario* also drew attention to the fact that arthroscopy comprises almost half of orthopaedic surgery for arthritis, although its efficacy in the management of arthritis remains unclear 3.



**Figure 1. Health care utilization of people with arthritis and related conditions**

Source: Adapted from chapter 1 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

Analyses of data from Ontario physicians billing from the Ontario Health-Insurance Plan (OHIP) illustrated the important clinical role played by orthopaedic surgeons. In 2000/01 orthopaedic surgeons saw 15.2% of the 1.3 million patients visiting physicians for arthritis and related conditions. Figure 1 illustrates the relative proportion of people with arthritis and related conditions receiving surgery, seeing an orthopaedic surgeon, and seeing any physician, in relation to the number reporting arthritis and related conditions as a long-term health problem. This shows that at least in terms of patients seen, total joint replacement is the tip of the iceberg of orthopaedic workload for arthritis and related conditions.

Nevertheless, total joint replacement plays a vital role in the successful management of end-stage arthritis. Demand for these procedures already outstrips supply as illustrated by increasing waiting times, and also by an Ontario study which found unmet need for total joint replacement, even in an area with one of the highest per capita rates of this type of surgery. The prevalence of arthritis will increase with the aging of the population 4;5 bringing with it a concomitant increase in the need for total joint replacement. An increase in orthopaedic and related services for total joint replacement will be necessary in order to respond to this increasing demand, alongside other initiatives to more successfully manage arthritis to reduce the need for these procedures. Issues related to the total management of arthritis are reviewed in ACREU Working Report 2005-03 *An Exploration of Comprehensive Interdisciplinary Models for Arthritis*.

While the findings published in *Arthritis and Related Conditions in Ontario* provided an overview, the information relating to orthopaedic services was presented in separate chapters. This brief report synthesizes these findings to provide an overall picture of orthopaedic provision in Ontario for arthritis and related conditions, drawing on data presented in the ICES Research Atlas, together with supplementary data from the Arthritis Community Research and Evaluation Unit's (ACREU) research and the literature.

As arthritis accounts for almost all total knee replacement and about 95% of total hip replacement, with most surgeries being carried out for osteoarthritis, this report will focus on arthritis and related conditions.

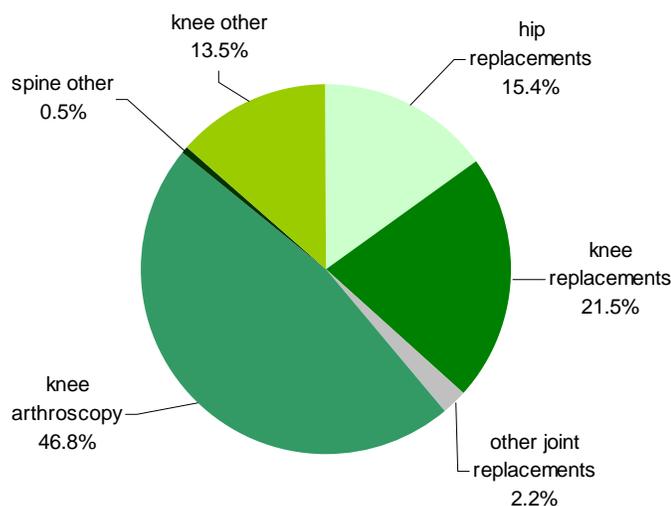
The purpose of this report is:

- a) to look at the provision of total joint replacement in relation to the other services provided by orthopaedic surgeons focusing on arthritis and related conditions; and
- b) to explore the relationship between the availability of orthopaedic resources and area variation in the use of, and waiting times, for total joint replacement.

## Findings

### *The provision of total joint replacement surgery in relation to the other services provided by orthopaedic surgeons focusing on arthritis and related conditions.*

Every year in Ontario, almost 44,000 surgical procedures are carried out for arthritis and related conditions. Total joint replacement represents only about two-fifths of these surgeries. Almost half of all arthritis-related surgery is arthroscopic (keyhole) surgery of the knee (Figure 2). These totals do not take account of the considerable workload of orthopaedic surgeries related to spinal conditions, acute trauma (such as fracture, dislocations and tendon repair), repair of damage from injury and musculoskeletal deformities (such as corrective foot and hand surgery) and other orthopaedic surgery related to other conditions such as musculoskeletal cancers. Further work is needed to set orthopaedic surgery for arthritis and related conditions in the wider context of all orthopaedic surgery.



**Figure 2.** Arthritis-relevant orthopaedic procedures in Ontario, 2000

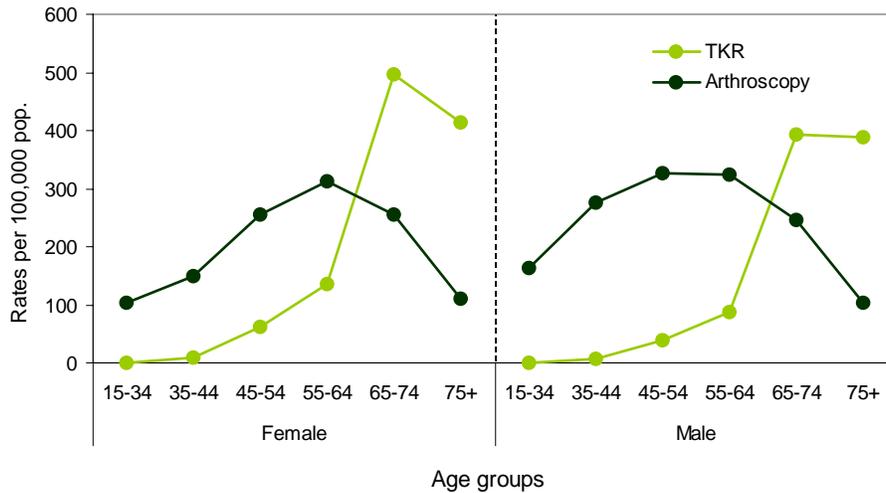
Source: Chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

Data on total joint replacement by age were not presented in *Arthritis and Related Conditions in Ontario*.

Juxtaposition of sex and age specific rates for 1996/97 for total hip and total knee replacement

with similar data for arthroscopic surgery (Figure 3) shows that the rate of arthroscopic surgery peaks in the 55-64 year age group, whereas the rate of total joint replacement increases with age. However, there is a low but appreciable rate of total joint replacement in individuals aged 45-64 years and even surgeries performed in individuals aged less than 45 years. In data presented in Figure 3, there is an apparent decline in total joint replacement in the 75 and over age group. Data from the ICES Atlas *Access to Health Services in Ontario* for 2003/04 provide more insight into this age group. This recent data demonstrates that rates of total joint replacement increase in the 75-84 year age group compared to the 65-74 year age group but fall in the population over aged 85 years 6. This suggests that most of the decline shown in Figure 3 is likely due to the lower rate of surgeries in the 85 years and older age group.

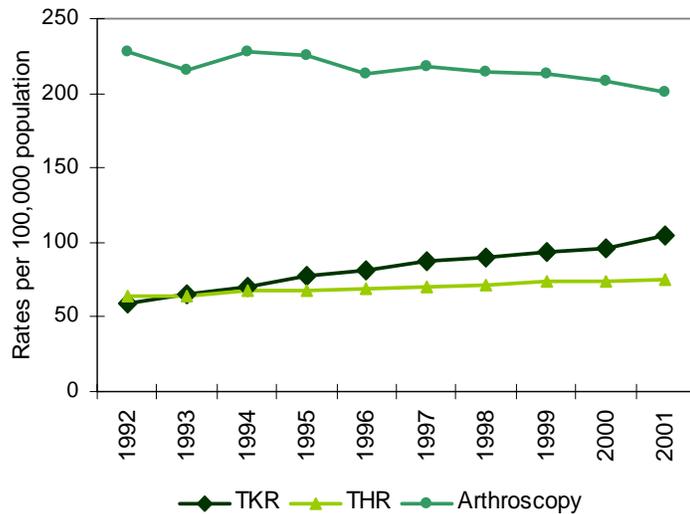
While the role of arthroscopic surgery in the management of osteoarthritis is questionable 7, the younger profile of patients, particularly younger men, undergoing this type of surgery raises questions about the role of arthroscopic corrective and repair surgery in younger patients in relation to mitigating the later development of osteoarthritis. This is an area that needs further research.



**Figure 3.** Age and sex specific rate of all arthroscopic procedures and TKR per 100,000 population (15+) in Ontario

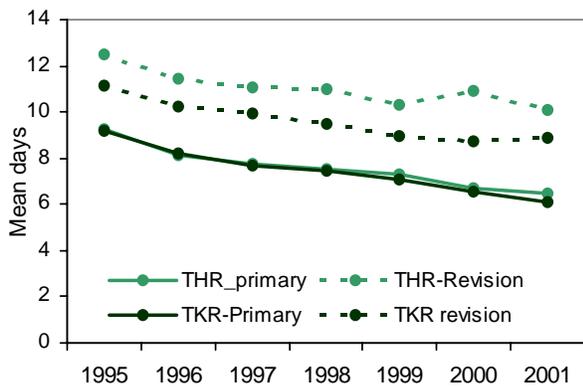
Source: Integrated data from chapter 7 of *Arthritis and Related Conditions in Ontario: ICES Practice Atlas* and from chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

As indicated in *Arthritis and Related Conditions in Ontario* for 1992 to 2001, age and sex standardized rates of total hip and total knee replacement in Ontario have been increasing, whereas the rates of arthroscopic surgery have declined slightly (Figure 4). Rates for total knee replacement have continued to increase at a greater rate than those for total hip replacement, and by 2001 rates for total knee replacement were 30% higher (113.7 knee replacements per 100,000 population compared to 88.2 hip replacements per 100,000 population).



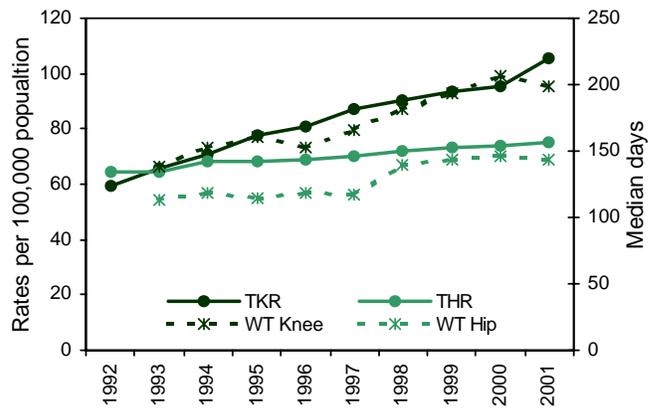
**Figure 4.** Age and sex standardized rates of THR, TKR and all arthroscopic procedures Ontario 1992-2001

Data Source: Canadian Institute for Health Information; Statistics Canada



**Figure 5.** Acute Care length of stay for patients with TJR in Ontario 1995 to 2001

Source: Integrated data from chapters 6 and 7 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*



**Figure 6.** Relationship between wait times and TJR rates in Ontario 1992 to 2001

Source: Integrated data from chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

Arguably at least some of the increase in rates for total joint replacement over time has been facilitated by a decrease in mean length of stay (LOS) in acute care hospitals as demonstrated in Figure 5. In 2001 the average LOS in Ontario was approximately 6 days for both total hip and knee replacements. The Ontario estimates were greater than those reported in the US where the average LOS after primary TJR was less than 4 days<sup>8</sup>. However, during the same time period median waiting times for total joint replacement have also increased (Figure 6), particularly for total knee replacement.

The higher rate for total knee replacement versus total hip replacement is to be expected given the prevalence of knee arthritis is approximately twice that of hip arthritis in the population<sup>9-12</sup>. However, the rates for knee and hip replacement vary widely in the Organisation for Economic Co-operation and Development (OECD) countries; Canada and Australia have higher rates for total knee replacements versus hip replacements. This is the opposite of the situation in Norway and New Zealand where the rates for hip replacements are considerably higher than the rates for knee replacement<sup>13;14</sup>. It should be noted that current demand does not likely reflect current need. Cohort studies in Oxford County and East York<sup>15;16</sup> showed that persons with a lower socioeconomic (SES) status had a greater need for, and were equally willing to consider total joint replacement, compared with those with higher SES<sup>17</sup>. Less education and lower income levels were independently associated with a greater likelihood of having a potential need for total joint replacement<sup>17</sup>. The ICES Atlas *Access to Health Services in Ontario* shows that rates of total hip and total knee replacement in Ontario were lowest in the poorest neighborhoods and highest in wealthier neighborhoods. The authors point out that this finding is opposite to what is expected as the burden of disease is greater in the poorest neighborhoods<sup>6</sup>.

Willingness to have surgery and patient preferences are also important factors that may impact surgical rates. Demonstrable need and willingness were found to be greater in areas with high rates of surgery, suggesting these factors may explain part of the area variations for total joint replacement. Among those with severe arthritis, no more than 15% were definitely willing to

undergo total joint replacement 18;19. Clearly, this is an area that requires further understanding.

### *Office time of surgeons*

Surgery is only a small component of the work of orthopaedic surgeons. As indicated above, ACREU's survey of orthopaedic surgeons in Ontario showed that orthopaedic surgeons spend approximately two-thirds of their clinical time seeing patients in an office setting. This is the opposite of the situation in the US where surgeons spend two thirds of their time in the operating room. In 2000/01 there were over 0.5 million visits to orthopaedic surgeons in Ontario for musculoskeletal disorders, excluding visits for trauma-related conditions (Table 1). Three hundred sixty five thousand of these visits were for arthritis and related conditions.

**Table 1.** Ambulatory visits to orthopaedic surgeons for musculoskeletal disorders in Ontario, 2000/2001

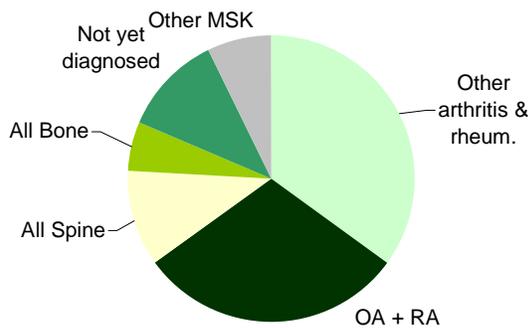
Condition	Persons visiting physicians per 1,000 population <sup>1</sup>		Visits rates per 1,000 population <sup>2</sup>	
	All physicians	Orthopaedic Surgeon	All physicians	Orthopaedic Surgeon
Osteoarthritis	56.6	8.5	115.9	16.3
Synovitis	41.9	4.4	66.2	7.8
Other MSK Disorders	26.5	2.5	44.4	4.1
Joint Derangement, Dupuytren's Contracture	14.1	6.3	23.1	11.1
Fibrositis	8.7	0.1	15.5	0.2
Rheumatoid Arthritis	8.5	0.3	24.6	0.6
Gout	5.0	0.03	7.7	0.05
Connective Tissue Disorders	1.8	0.004	4.1	0.01
Traumatic Arthritis, Pyogenic Arthritis	1.7	0.2	3.0	0.4
Ankylosing Spondylitis	0.9	0.1	23.1	0.2
<b>Arthritis and Related Conditions</b>	<b>137.1</b>	<b>20.8</b>	<b>261.9</b>	<b>36.5</b>
Sign and symptoms not yet diagnosed	84.3	3.8	147.4	6.4
Spine disorders	59.9	3.8	117.7	6.1
Bone disorders	17.2	1.7	26.0	3.0
<b>MSK disorders</b>	<b>139.1</b>	<b>28.9</b>	<b>597.4</b>	<b>56.1</b>

Source: Adapted from chapter 4 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

<sup>1</sup> Number of patients seeing physicians per 1,000 population

<sup>2</sup> Number of visits to a physician per 1,000 population. Patients may have more than 1 visit.

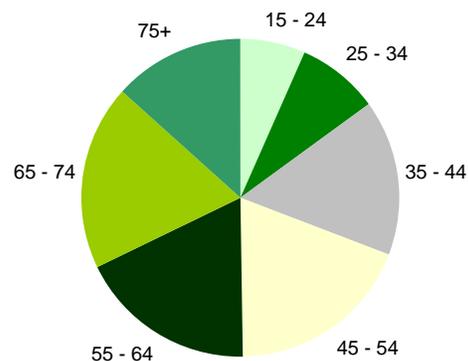
Only one quarter of visits to orthopaedic surgeons were for osteoarthritis or rheumatoid arthritis, conditions for which total joint replacement might be indicated (Figure 7). The proportion of visits for conditions of the spine, in particular, is likely to be an underestimate. In other work, it has been shown that many of the same diagnoses have been coded using multiple diagnostic codes (International Classification of Diseases - Ninth Revision (ICD-9) codes). For example, a study of soft tissues disorders of the neck and upper limb found that 31% of visits for inflammation were coded as sprain/strain as were 42% of visits for pain 20;21. Variation in coding is likely to affect findings for arthritis and related conditions and back disorders such that some visits are missed.



**Figure 7.** Distribution of visits to orthopaedic surgeons by diagnostic groups in Ontario, 2001

Note. Trauma is not included

Data Source: Canadian Institute for Health Information



**Figure 8.** Distribution of visits to orthopaedic surgeons by age group in Ontario, 2001

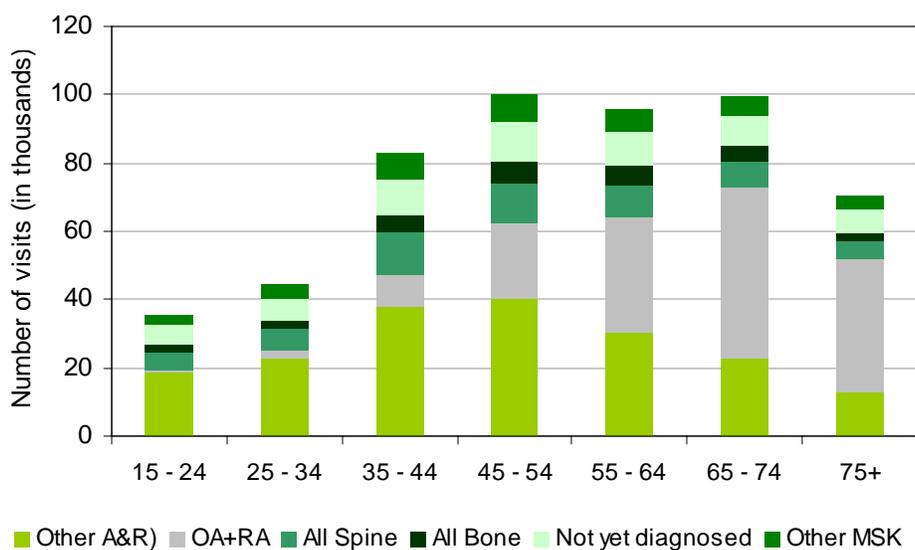
Note. Trauma is not included

Data Source: Canadian Institute for Health Information

Overall 84,000 patients made 158,000 visits for osteoarthritis or rheumatoid arthritis. These totals contrast to the approximately 19,000 total joint replacements that were carried out in the same year. Figure 8 shows the distribution of visits to orthopaedic surgeons by age. Half the visits are by patients aged less than 55 years and therefore younger than the age range for which total joint replacement is typically carried out.

Figure 9 shows the distribution of visits by age and major musculoskeletal groups of diagnosis. Only for patients aged 65 years and older (approximately one third of all visits) are the majority of visits for osteoarthritis or rheumatoid arthritis.

In summary, orthopaedic surgeons play a major role in the clinical management of musculoskeletal conditions. Visits from patients likely to be candidates for total joint replacement represent a relatively small proportion of this workload. The actual proportion is likely to be smaller than presented here, as data on trauma related conditions are not included in this report.



**Figure 9.** Distribution of visits to orthopaedic surgeons by age and diagnostic groups in Ontario, 2001

Note. Trauma is not included

Data Source: Canadian Institute for Health Information

### *The relationship between the availability of orthopaedic resources and area variation in the use of, and waiting times for, total joint replacement*

There is a 2-fold variation in the rate of total knee replacement by DHC and a 1.5 fold variation in the rate of total hip replacement. Table 2 shows the variation in the rates of total hip and knee replacement by DHC over the last 12 years. There is considerable variation in both total hip and total knee replacements among the DHCs. In 2000/2001, the highest rates for both total hip and total knee replacements were found in Northwestern Ontario. Conversely, the lowest rates for both surgeries were in Toronto. These findings warrant further exploration.

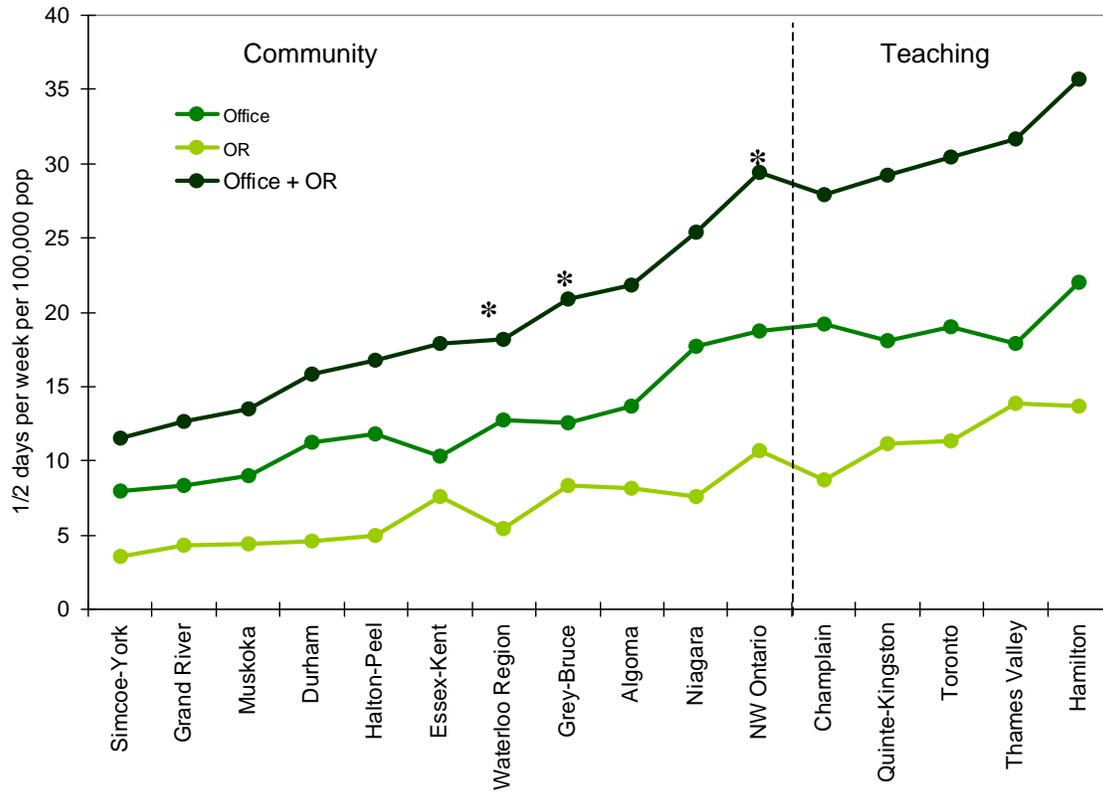
Orthopaedic surgeons are a key resource for total joint replacement. The provision of orthopaedic surgery and office ½ days per week per population also shows considerable variation by DHC as indicated in the introduction to this working paper. Between 1997 and 2000, the overall provision of orthopaedic surgeon office and operating room (OR) half days per week declined by just over 2 half days per week per 100,000 population. There was a decrease in provision in 11 of the 16 DHCs. Figure 10 shows the provision of orthopaedic office and OR half days per week by DHC, ordered in increasing amount of overall provision for community and teaching DHCs in 2000. The three DHCs marked with an asterisk (\*) are those where there was a more than two 1/2 days per week per 100,000 population increase in provision. In general provision is higher in teaching DHCs. Teaching DHCs are the five DHCs where Ontario medical schools and associated teaching hospitals are located. There was a major increase in provision in Northwestern Ontario, which is likely related to recruitment of surgeons to this

DHC. The situation in Northwestern Ontario instructive in the light of strategies that the Canadian Orthopedic Association (COA) have suggested, in their National Standard Committee report, to address the manpower shortage of orthopedic surgeons in Canada. Among the strategies presented in the report are: find ways to recruit and retain surgeons, improve provincial networks and to set an optimal surgeon/patient ratio based on international benchmark 22.

**Table 2.** Age and sex adjusted rates per 100,000 for total knee and total hip replacements by DHC, Ontario 1989 to 2001

District Health Council	1989/90 - 1991/92		1992/93 - 1994/95		1995/96 - 1996/97		2000/2001	
	TKR	THR	TKR	THR	TKR	THR	TKR	THR
Algoma-Cochrane-Manitoulin-Sudbury	61.1	74.0	74.9	76.1	82.9	73.0	123.4	98.5
Champlain	56.7	71.9	67.8	70.7	74.9	77.3	115.7	92.7
Durham-Haliburton-Kawartha-Pine Ridge	47.1	75.9	68.6	89.7	95.9	97.1	125.2	99.5
Essex-Kent-Lambton	82.5	83.8	108.3	94.5	135.7	97.5	120.4	96.9
Grand River	78.7	88.8	94.0	91.7	101.4	96.1	116.7	95.4
Grey-Bruce-Huron-Perth	104.6	102.4	119.8	105.0	131.7	105.4	137.7	103.4
Halton-Peel	50.5	76.8	66.8	84.4	86.6	77.0	113.6	86.4
Hamilton	59.6	73.4	68.3	82.9	91.8	90.4	113.7	90.5
Niagara	46.0	72.2	75.1	76.2	89.1	85.0	148.8	105.8
Northern Shores	59.9	81.6	88.1	84.1	104.3	89.7	112.0	85.2
Northwestern Ontario	79.7	79.3	81.5	78.6	68.8	74.1	180.2	109.9
Simcoe-York	52.3	73.0	71.0	79.1	90.0	85.0	106.5	76.0
Southeastern Ontario	66.1	91.0	81.3	95.4	98.5	107.0	130.7	101.1
Thames Valley	79.9	89.8	102.2	92.3	122.3	97.7	105.3	76.0
Toronto	40.1	67.7	57.8	73.4	74.9	73.3	90.9	74.4
Waterloo Region-Wellington-Dufferin	48.5	73.7	69.0	78.4	84.6	84.6	109.7	84.9
<b>Ontario</b>	<b>56.7</b>	<b>76.2</b>	<b>74.2</b>	<b>81.5</b>	<b>90.7</b>	<b>84.4</b>	<b>113.7</b>	<b>88.2</b>

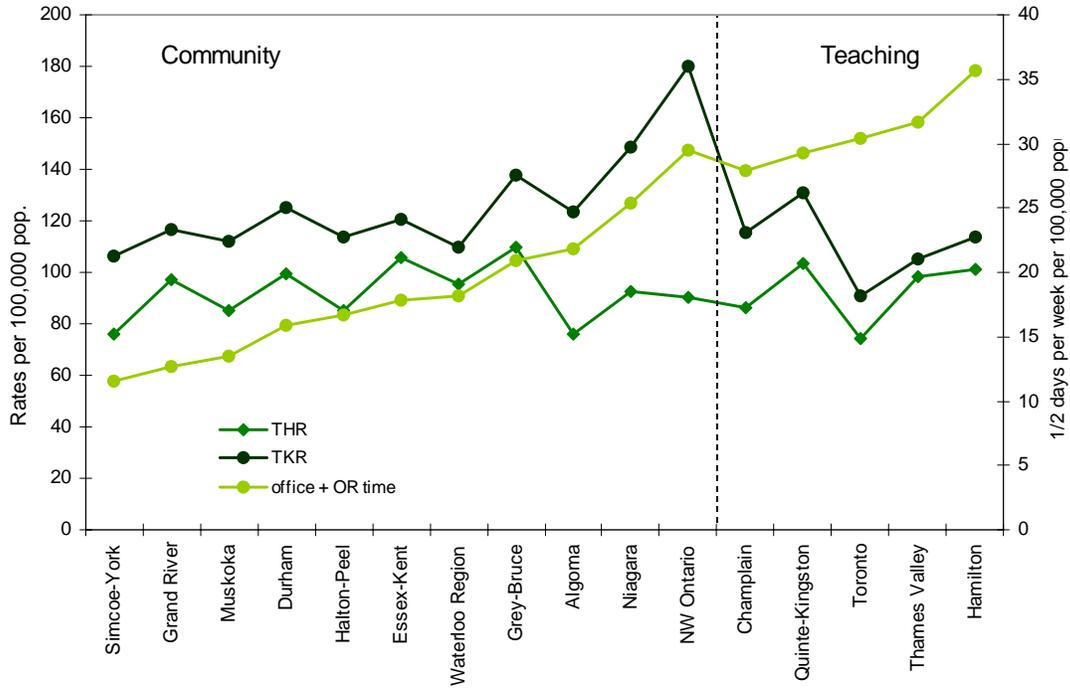
Source: Integrated data from chapter 7 of *Arthritis and Related Conditions in Ontario: ICES Practice Atlas* and from chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*



**Figure 10.** Orthopaedic provision by DHC in Ontario, 2001

Source: Integrated data from chapter 3 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

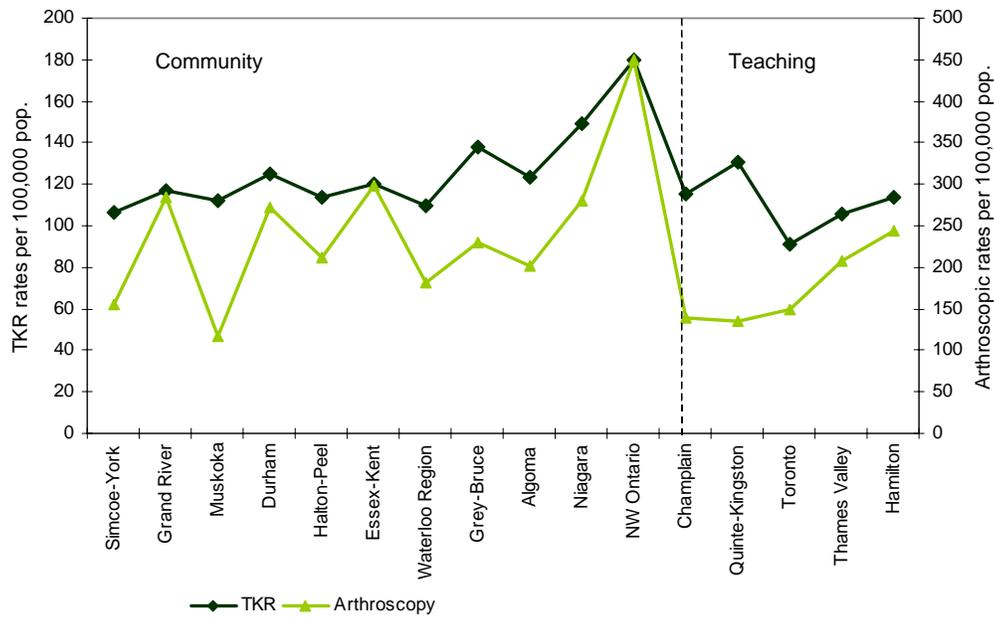
While the rates of total joint replacement are higher in community DHCs compared to teaching DHCs, the gap between orthopaedic office/OR time and rates of total joint replacement is greater in the teaching DHCs (Figure 11). The rates here refer to the place of residence of patients, not where the surgery was performed. Clearly, patients from other communities travel to teaching DHCs for their surgery and orthopaedic surgeons in teaching hospitals may have increased teaching responsibilities and other duties. The extent of cross-DHC flow for surgery is an area where further documentation is needed. For most DHCs, the pattern of total hip replacement mirrors that for total knee replacement. The relationship between provision of orthopaedic services and rates of total joint replacement requires further investigation. In 2000/2001 there appears to be moderate correlations between the amount of orthopaedic provision and rates of total knee replacement for both community and teaching DHCs ( $r= 0.6$  and  $0.7$  respectively). This was not the case for 1996/97 where the equivalent correlations were  $0.06$  and  $0.56$ .



**Figure 11.** Relationship between TKR, THR rates and orthopaedic provision

Source: Integrated data from chapters 3 and 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

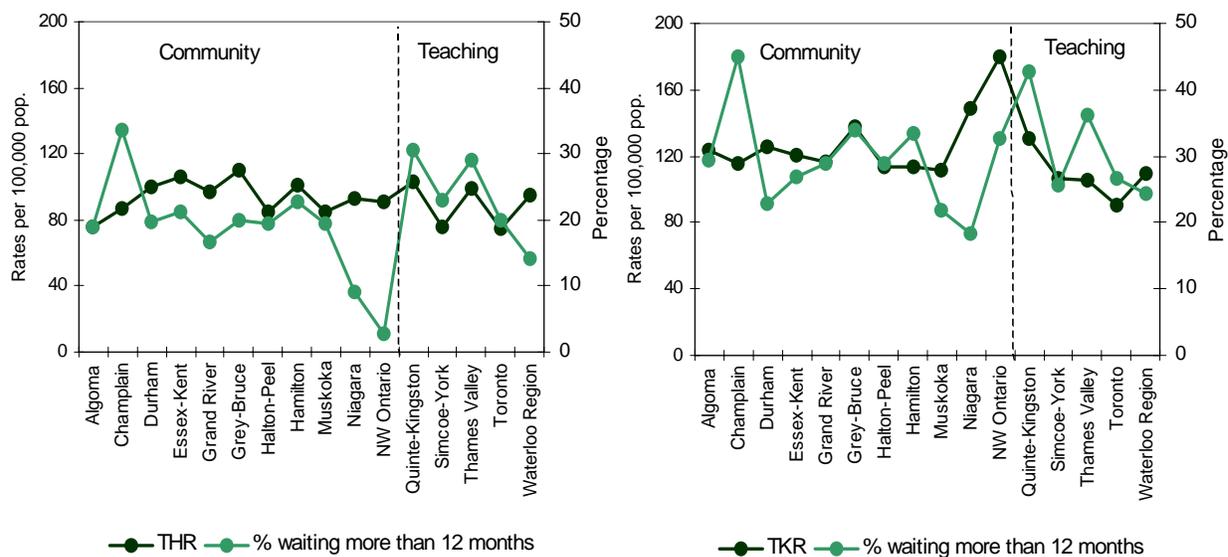
There also appears to be an overall relationship between rates of total knee replacement and knee arthroscopy by DHC (Figure 12). In other words, DHCs with relatively higher rates of total knee replacements also have higher rates of knee arthroscopies. Given the relatively favourable billing rewards and hospital resources utilization, one theoretical concern regarding arthroscopic surgery is that there may be pressure from the health system to carry out knee arthroscopic surgery rather than total knee replacement. The relationships presented here imply there is no evidence at a DHC level that surgeons are carrying out arthroscopic surgery instead of total knee replacement.



**Figure 12.** Relationship between arthroscopic and total knee replacement rates in Ontario, 2001

Source: Integrated data from chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

There were also no clear relationships between the rates of total hip and total knee replacement by DHC and waiting times. For example, some DHCs have higher rates of surgery as well as long waits, while in other DHCs this pattern does not hold true. Findings from the 2005 ICES Atlas *Access to Health Services in Ontario* also found no obvious relationship between wait times and the rates of total joint replacement among Local Health Integration Networks (LHINs). These findings suggest that there is a need to further understand this relationship. Figure 13 shows the rates per 100,000 population for total hip and knee replacement and the percentage of patients who waited 12 months or more for their surgery.



**Figure 13.** Relationship between rates of total knee and hip replacements and waiting times in Ontario, 2001

Source: Integrated data from chapter 6 of *Arthritis and Related Conditions in Ontario: ICES Research Atlas*

## Discussion

This report brings together information on orthopaedic services in Ontario in the context of enhancing services for total joint replacement and related procedures in Ontario. The findings set total joint replacement in the context of the services that orthopaedic surgeons provide for people with arthritis and related disorders. Total joint replacement is only one part of the overall services provided by orthopaedic surgeons, even when only the services related to arthritis and related disorders are included. Further work needs to be carried out to widen the scope of the present report to include the role of orthopaedic surgeons in the clinical and surgical management of musculoskeletal trauma, spinal disorders, including low back and neck conditions, and other soft-tissue conditions, such as frozen shoulder.

The report highlights the increasing pressure on total joint replacement, and points to a number of areas where further attention might be paid to better understand the constraints in the system and how they might be overcome. At the time of writing, a number of initiatives are taking place in Ontario to increase capacity for total joint replacement and hence reduce waiting times, including: a) increasing availability of prostheses and operation time, b) the Toronto Joint Network is streamlining inpatient stays and subsequent rehabilitation to further reduce lengths of stay in acute care, and c) active management of waiting lists in relation to priorities for surgery. The Ontario Joint Replacement Registry is playing a pivotal role in many of these endeavors.

The ICES Atlas *Access to Health Services in Ontario* recommended initiatives to improve management of access to health care in Ontario such as development and implementation of Ontario-specific wait time benchmarks, using work in other jurisdictions and implementation of

existing patient urgency prioritization systems for selected services 6. Whilst initiatives such as these are critical to managing wait times for total joint replacement in Ontario, it is also important to examine alternative models of care to maximize the time and skills of orthopaedic surgeons for delivering surgeries, such as total joint replacement.

Two other major aspects that need to be considered in increasing capacity for total joint replacement are the availability of orthopaedic surgeons and the total management of patients with arthritis and other joint conditions across the continuum, including primary and secondary prevention strategies that may have the capacity to prevent or delay surgery.

Availability of orthopaedic surgeons can refer to the absolute number of surgeons in a region or area, or their availability to perform total joint replacement. The findings in this report refer to the year 2000, as this was the year where a survey of orthopaedic surgeons' practice and treatment patterns was carried out. This survey showed an overall decline in the availability of orthopaedic surgeons since 1997, and an increase in the average age of surgeons 23. Our analyses also hint at the possible importance of the amount of local orthopaedic provision in determining the rate of surgery for the population. In particular, the high rates of total joint replacement in Northwestern Ontario were noted. This was a DHC that had a major increase in orthopaedic provision between 1997 and 2000. Further work needs to be carried out to better understand the relationship between surgical provision and rates and waiting times for total joint replacement.

While increasing the number of orthopedic surgeons in Ontario could clearly play an important role in increasing capacity for joint replacement surgery, this is a longer-term strategy, particularly if new surgeons have to be recruited and trained. With appropriate funding and resources it may be possible to relocate some of those Canadian surgeons who have chosen to practice in the USA. In the meantime a further strategy may be to look to ways of making current surgeons more available for joint replacement surgeries.

This report looked at the work of orthopaedic surgeons by juxtaposing different sources of data, in particular data from the OHIP and on surgical procedures from the Canadian Institute of Health Information including their joint replacement registry. We showed that the number of visits from patients with arthritis and related conditions far exceed the number of surgeries carried out, and that half of the visits are from younger patients (age less than 55 years). However, it is not known what proportion of patients seen by surgeons eventually have surgery. Analysis of linked data for a number of years would be necessary to establish this. Moreover, anecdotal accounts from surgeons suggest that a sizeable proportion of patients referred for hip or knee arthritis are not yet ready for surgery, and neither are they fully aware of other treatment options for the management of their arthritis, including the role of exercise, physical therapy and use of appropriate medications. Other studies have pointed to deficiencies in the primary care management including both under and over use of non-steroidal anti-inflammatory medications and lack of referral for physical therapy 24. There is clearly a need for the better education of both family physicians and the general public about relevant aspects of what can be done to reduce the painful and disabling impact of arthritis and related conditions.

Our analysis of OHIP billing data points to the important role that orthopaedic surgeons play in the management of musculoskeletal disorders in general. A potential strategy for increasing the availability of orthopaedic surgeons for surgery is to ensure that patients who are referred are those who are likely to need surgery. Enhancement of the capacity of primary care physicians to diagnose and treat musculoskeletal conditions is clearly important, including musculoskeletal trauma and back and other soft-tissue disorders. It is also timely given primary care reform in Ontario with the formation of primary care teams to look at other options including a wider role for other health professionals.

In this way it may be possible to increase capacity for total joint replacement by decreasing the amount of clinic time of orthopedic surgeons by delegating some of the routine follow-up and triage of patients to another arthritis health professional. However, decreasing office hours of orthopedic surgeons may have some unintended consequences. Surgical wait times have three components including: the time between a family doctor's referral to a surgeon and the date of the first consult with surgeon; the time from date of the patient's first surgical consult to the date the surgeon and patient decide to proceed with a total joint replacement; and the time between the decision date for surgery and the actual date of surgery 6. Due to this, it is possible that if orthopaedic surgeons spend less time in the clinic, it may increase waiting times to see the surgeon. These considerations underline the importance of ensuring appropriately trained health professionals that can manage the full spectrum of the non-surgical management of musculoskeletal and joint conditions, and identify those patients likely to benefit from surgical intervention.

In this regard, studies have shown that specially trained physiotherapists can assess and manage some patients with musculoskeletal conditions while working with orthopaedic surgeons 25;26. The potential role of other health professionals in the routine management and monitoring of arthritis is a future option for the management of the increasing burden of arthritis and other chronic diseases. When addressing orthopaedic capacity, it is important to consider the total management of joint conditions across the continuum of care. Alternative models of care are discussed further in ACREU Working Report 2005-03 *An Exploration of Comprehensive Interdisciplinary Models for Arthritis*.

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