



Arthritis Community Research & Evaluation Unit (ACREU)

Availability of Specialist Care for Arthritis and Related Conditions in Ontario. Year 2000 Survey. Part 2: Orthopedic Surgery

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University of Toronto

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Year 2000 Survey. Part 2: Orthopedic Surgery**

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Executive Summary

- A survey of all the orthopedic surgeons in Ontario was carried out to determine the provision of and access to orthopedic services in 2000.
- Three hundred and thirty eight practicing orthopedic surgeons were identified in Ontario in 2000, 315 of whom saw arthritis patients as part of their patient population.
- In Ontario there were 3.4 orthopedic surgeons per 100,000 population (15+). This figure varied by region from 2.4 per 100,000 in the Central region to over 4 per 100,000 in the North West and Metropolitan Toronto.
- Across Ontario 18 half days of office time per week per 100,000 population (15+) were provided and approximately 10 half days of surgery time per week per 100,000 population (15+). The North West had over 30% more half days (surgery and office combined) per week per 100,000 than the provincial average and the North East had 17% less.
- The average waiting time for a new orthopedic consultation was 11 weeks. Apart from the North West, which had an average wait time of 36 weeks, the remaining regions had a wait times between 9 to 15 weeks.
- Ontario's orthopedic surgeons reported performing 18,000 hip and knee replacements in 2000, which represents approximately 200 replacements per 100,000 population (15+). The North West had the highest rate with 335 per 100,000 and the North East had the lowest with 106 replacements per 100,000 population (15+).
- The provincial wait time for hip and knee replacements was reported to be 16 weeks. The North West and the East had significantly higher waiting times than the provincial average with wait times of 30 and 40 weeks, respectively.
- Taking into account all the indicators of service provision and availability measured in the survey the East and North East overall had the worst orthopedic service availability and the Metropolitan Toronto area and the South West had the best overall orthopedic service availability.

Introduction

Currently 15% of the Canadian population report having arthritis and the prevalence is set to increase as the proportion of elderly in the population increases. This is expected to place an increased demand on the arthritis-related healthcare services, which primarily include family physicians, rheumatologists, orthopedic surgeons and rehabilitation therapists. The provision of health professional services for arthritis and related conditions for 1997 was documented in the *ICES Practice ATLAS: Arthritis and Related Conditions*¹, and gaps in the services available were highlighted for several regions of Ontario. An update of the study of provision of rheumatological services was completed recently² and found that variation in rheumatology provision still exists in Ontario. To update the study of orthopedic services a survey of the orthopedic surgeons in Ontario was carried out in 2000.

The most common arthritis-related orthopedic procedure, the joint replacement, has been shown to effectively reduce pain and improve functional capacity³. The rate of joint replacements in Ontario has increased over seven fold since 1981⁴. In addition, Hawker *et al* has shown that within a study population in Ontario there is unmet potential need for hip and knee replacements⁵. Therefore, it is important to determine the level and distribution of orthopedic services that currently exists to meet the needs of the arthritis community.

The objective of this study was to determine the provision of orthopedic services in Ontario in 2000. In addition, access to the available services in terms of waiting time for a new orthopedic consultation and for hip and knee replacements was also examined. Recognizing that orthopedic surgeons perform a variety of surgical procedures we also examined the proportion of surgery time dedicated to arthritis-related surgery.

Methods

Four hundred and five potential orthopedic surgeons were identified through the mailing list of the College of Physicians and Surgeons of Ontario, directory listings of the Ontario Orthopedic Association and graduate training programs. All were sent a self-administered and semi-structured questionnaire containing 19 questions, as well as stamped, addressed return envelopes, in 2000. Telephone follow-up of non-responders commenced four weeks after the initial mail-out. Orthopedic surgeons not practicing in Ontario or who did not see arthritis patients as part of their patient population were excluded (two surgeons that were on temporary sabbatical leave were not excluded).

The questionnaire contained three sections: Service Provision, Practice Patterns and Treatment Patterns. The Service Provision section included questions regarding the location and length (in hours) of all the clinics held by the orthopedic surgeon. The Practice Patterns section included questions regarding the types of surgery performed and the Treatment Patterns section asked specifically about arthritis-relevant orthopedic procedures and was slightly more time consuming to complete than the preceding two sections.

The survey data were analyzed using SPSS for Windows, release 9.0.0. Comparisons were made using Chi-square or non-parametric sample comparisons (Mann-Whitney U or Kruskal-Wallis H). Figures presented per capita use 1999 population estimates for individuals 15+yrs. The University Health Network Research Ethics Board approved the study.

Results

Of the 405 orthopedic surgeons surveyed 48 were not eligible because they were retired, still training, not practicing medicine or not practicing in Ontario. Twenty subjects could either not be found (14) or did not respond (6), resulting in a 94% response rate (338 orthopedic surgeons). Orthopedic surgeons who did not treat patients with arthritis-related disorders were excluded, leaving 315 active orthopedic surgeon in Ontario who saw arthritis patients as part of their patient population. Response rates to individual questions were calculated using the 315 orthopedic surgeons as the denominator. Unless otherwise stated the response rate for individual questions was above 80%.

Through rigorous telephone follow-up, responses from all 315 orthopedic surgeons were obtained for the Service Provision section of the questionnaire. The response to questions within the Practice Patterns and Treatment Patterns sections was less comprehensive. To determine if the sections with fewer questions completed (below 60%) were representative of orthopedic surgeons in Ontario comparisons of the responses to the Service Provision and Practice Patterns sections were made between the orthopedic surgeons who completed (a) 60% or less and (b) more than 60% of the Treatment Patterns section (Table 1). There were no significant differences between groups (a) and (b).

Table 1: The comparison of orthopedic surgeons in Ontario who completed less than 60% of the questions in the Treatment Patterns section with those who completed more than 60%.

	>60% Group (n=242)	<60% Group (n= 73)
Office time per week (median half days)	5	5
Surgery time (median half days)	3	3
Patients (%):		
Adults	95	90
From outside region	20	30
Percentage of practice:		
workers compensation	5	10
medico-legal	10	20
Location of primary practice, n (%)		
Central	47 (19)	13 (18)
Central West	37 (15)	13 (18)
East	34 (14)	12 (16)
North East	9 (4)	5 (7)
North West	5 (2)	3 (4)
South West	33 (14)	10 (14)
Toronto	77 (32)	17 (23)

>60% Group: orthopedic surgeons who completed greater than 60% of the Treatment Patterns section

<60% group: orthopedic surgeons who completed 60% or less of the Treatment Patterns section

Orthopedic Surgeons in Ontario: Year 2000

315 practicing orthopedic surgeons with at least some arthritis patients were identified in Ontario in 2000 (Table 2) giving a provincial rate of 3.4 orthopedic surgeons per 100,000 population (15+).

Table 2: The Number And Rate Per 100,000 Population (15+) Of Orthopedic Surgeons With At Least Some Arthritis Patients Practicing In Ontario, By District Health Council, in 2000

District Health Council	N (%)	Orthopedic Surgeons/100,000 (15+)
Central		
Durham, Haliburton, Kawartha & Pine Ridge	17 (5)	2.68
Halton-Peel	28 (9)	2.65
Simcoe-York	15 (5)	1.79
Total	60 (19)	2.37
Metropolitan Toronto ^{*1}	94 (30)	4.53
Central West		
Grand River	3 (1)	1.62
Hamilton-Wentworth ^{*2}	20 (6)	5.03
Niagara Region	13 (4)	3.80
Waterloo region - Wellington – Dufferin	14 (4)	2.63
Total	50 (16)	3.43
East		
Champlain ^{*3}	33 (11)	3.85
Quinte, Kingston, Rideau ^{*4}	13 (4)	3.25
Total	46 (15)	3.66
North East		
Algoma, Cochrane, Manitoulin & Sudbury	11 (4)	3.21
Muskoka, Nipissing, Parry Sound, Timiskaming	3 (1)	1.69
Total	14 (4)	2.69
North West		
NW Ontario	8 (2)	4.03
Total	8 (2)	4.03
South West		
Essex, Kent and Lambton ^{*5}	13 (4)	2.61
Grey, Bruce, Huron, Perth	7 (2)	2.97
Thames Valley	23 (7)	4.85
Total	43 (14)	3.56
Ontario	315	3.41

* Teaching hospitals: 1. University of Toronto 2. McMaster University 3. University of Ottawa 4. Queen's University 5. Western University population.

The number of surgeon per 100,000 population (15+) varied slightly by region with the Central region having the fewest orthopedic surgeons per capita with less than 2.5 orthopedic surgeons per 100,000 and Metropolitan Toronto having the most with approximately 4.5 per 100,000.

Educational Information

Table 3: Years in Practice of Orthopedic Surgeons in Ontario

	N*	Years in Practice (median)
NE	10	23
C (excluding TO)	46	12.5
E	35	18
CW	37	12
SW	34	13.5
TO	78	15
NW	5	27
ONT	245	14

* Number of responding orthopedic surgeons (78% responded rate)

The median time that orthopedic surgeons in Ontario had been practicing is 14 years (interquartile range 7 to 25 yrs). The median years in practice of the orthopedic surgeons in the North East and North West was higher than the provincial average suggesting that the orthopedic surgeons in these two areas were significantly older than orthopedic surgeons in the other regions.

Location of Training

Table 4: The Countries in Which the Orthopedic Surgeons Practicing in Ontario Received at Least Some Of Their Orthopedic Training.

Country	N (%)
Canada	235 (96)
USA	35 (14)
UK	32 (13)
Australia/NZ	7 (3)
Other Europe	7 (3)
Other	6 (2)

78% response rate

Over 96% of the orthopedic surgeons practicing in Ontario received orthopedic training in Canada. Of the orthopedic surgeons training in Ontario 51 also received training in the UK (n=27) and/or USA (n=29). Of the 11 (3%) orthopedic surgeons who did not receive any orthopedic training in Canada, 10 received training in the UK and/or USA.

Specialty Training

Table 5: Fellowship Or Advanced Specialty Training Of Orthopedic Surgeons In Ontario (n=245*)

Fellowship/Advanced Training	N(%)
Joint Replacement	93 (38)
Spine Surgery	28 (11)
Neurosurgery	2 (1)
Sports Medicine	46 (19)
Upper Extremities	41 (17)
Other	83 (34)

*78% response rate

Of the suggested training areas the single most common advanced training was in joint replacement surgery. Of the 83 surgeons in the “other” section the most common area of advanced training was trauma (n=23) followed by pediatric orthopedics (n=11).

Service Provision

The provincial rate of office and surgery time offered by orthopedic surgeons in Ontario was approximately 18 and 10 half days per week per 100,000 population (15+), respectively (Table 6).

The North West regions had 33% more orthopedic services per capita than the provincial average while the North East had approximately 17% less.

The average orthopedic surgeon offered 8.16 surgery and office (combined) half days per week (Table 6). The workload of orthopedic surgeons did not vary greatly by regions (difference of 1 day per week between region with highest and lowest workload) or by individual surgeon (interquartile range of the workload of individual surgeons was just over 1 day per week).

Practice Patterns - Patients

73% (229) of responding orthopedic surgeons saw predominantly (greater or equal to 90% of practice) adults. Twenty one percent of orthopedic surgeons saw adult patients exclusively and only 2% saw pediatric patients exclusively.

Five percent of orthopedic surgeon’s practices in Ontario were made up of medico-legal work, and worker’s compensation work made up a further 10%.

For the average orthopedic surgeon, 24% of their patients came from outside their region. However, for 15 orthopedic surgeons greater than 60% of their patients come from outside their region. The majority of these surgeons were practicing in areas with teaching hospitals.

Table 6: Availability Of Orthopedic Services By District Health Council Per 100,000 (15+) Population In Ontario In 2000

District Health Council	Office Half Days/week /100,000	Surgery Half Days/ week/ 100,000	Office and Surgery Half Days/ week/ 100,000	Office and Surgery Half Days/ wk/Surgeon
Central				
Durham, Haliburton, Kawartha & Pine Ridge	14.51	5.98	20.50	7.64
Halton-Peel	15.48	6.49	21.97	8.29
Simcoe-York	10.56	4.78	15.34	8.56
Total	13.61	5.80	19.40	8.17
Metropolitan Toronto	22.20	12.94	35.14	7.76
Central West				
Grand River	10.63	5.46	16.09	9.94
Hamilton-Wentworth	25.33	16.07	41.40	8.23
Niagara Region	21.99	9.44	31.44	8.28
Waterloo region - Wellington – Dufferin	16.52	7.03	23.56	8.97
Total	19.46	9.86	29.32	8.55
East				
Champlain	20.19	9.20	29.39	7.64
Quinte, Kingston, Rideau	18.82	11.87	30.69	9.46
Total	19.75	10.05	29.80	8.15
North East				
Algoma, Cochrane, Manitoulin & Sudbury	16.71	9.91	26.63	8.29
Muskoka, Nipissing, Parry Sound, Timiskaming	10.04	5.44	16.48	9.78
Total	14.77	8.38	23.16	8.61
North West				
NW Ontario	23.59	13.48	37.07	9.19
Total	23.59	13.48	37.07	9.19
South West				
Essex, Kent and Lambton	13.01	9.56	22.57	8.63
Grey, Bruce, Huron, Perth	15.67	10.42	26.09	8.78
Thames Valley	21.44	16.56	38.00	7.83
Total	16.84	12.48	29.32	8.23
Ontario	18.00	9.80	27.80	8.16

Practice Patterns - Consultations

The wait time (median) for a new orthopedic consultation was 11 weeks [range 1 to 80 weeks]. Approximately 20% of orthopedic surgeons had wait times of 5 weeks or less and another 20% of orthopedic surgeons had wait times of 20 weeks or more.

Table 7: Waiting Time for a Consultation with an Orthopedic Surgeon in Ontario for New Patients in 2000

Region	N*	Wait Times for new consultations (wks)
CW	35	9
TO	76	9
C	47	10
NE	9	10
E	31	12
SW	54	15
NW	5	36
ONT	257	11

* Number of responding orthopedic surgeons (75% response rate)

Excluding the North West region, which had a median wait time for new consultations of 36 weeks, the remaining regions had relatively similar median wait times for new patients; varying from 9 to 15 weeks.

The average orthopedic surgeon reported that they will eventually operate on 50% of their patients. This proportion ranged considerably for individual surgeons [interquartile range 20 – 70 %] and moderately by regions. Orthopedic surgeons in the South West region operate on the highest proportion of their patients (58%) while orthopedic surgeons in the East operate on only 36% of the patients they see (Figure 1).

Orthopedic surgeons with higher wait times for new patients reported operating on a higher proportion of patients.

Orthopedic surgeons reported that they will refer half of the patients they do not operate on back to the GP and continue to see approximately 25% for ongoing management [interquartile range 10% - 60 %]. Twenty one percent of surgeons continue to see 70% or more of their non-surgery patients. Orthopedic surgeons refer only 5% of non-surgery patients to other medical specialists or surgeons. There is no correlation between the percentage of patients who are eventually operated upon and the proportion of non-surgery patients that are followed up.

Practice Patterns - Surgery

Orthopedic surgeons in Ontario reported spending most elective surgery time on hip and knee replacement surgery and least on axial (spine) surgery (Figure 2).

Table 8: Reported Hip and Knee Replacements and Waiting Times for orthopedic surgeons In Ontario In 2000

District Health Council	N*	Crude H/K repl Rate /100,000 (15+)	N*	Medium Waiting Time# (wks)
Central				
Durham, Haliburton, Kawartha & Pine Ridge		123		12
Halton-Peel		150		14
Simcoe-York		118		15
Total	45	132	41	14
Metropolitan Toronto	79	278	60	12
Central West				
Grand River		27		8
Hamilton-Wentworth		327		30
Niagara Region		156		14
Waterloo, Wellington – Dufferin		120		12
Total	36	173	21	14
East				
Champlain		127		33
Quinte, Kingston, Rideau		189		43
Total	34	148	26	40
North East				
Algoma, Cochrane, Manitoulin & Sudbury		102		10
Muskoka, Nipissing, Parry Sound, Timiskaming		114		24
Total	9	106	8	17
North West				
NW Ontario		335		30
Total	5	335	5	30
South West				
Essex, Kent and Lambton		162		11
Grey, Bruce, Huron, Perth		257		21
Thames Valley		364		30
Total	35	260	27	15
Ontario	243^S	193	188	16

Waiting time defined as time from decision to have surgery to actual surgery

* Number of responding orthopedic surgeons

77% response rate

Knee and Hip Replacement Volumes

Orthopedic surgeons in Ontario reported performing approximately 18,000 hip or knee replacements in 2000. The provincial rate of reported hip and/or knee replacements was approximately 200 per 100,000 population (15+) (Table 8). This rate varied considerably by region with orthopedic surgeons in the North East reporting the lowest rate at 106 hip and/or knee replacements per 100,000 population (15+) and in the North West reporting over 300 replacements per 100,000 population (15+).

High, Medium and Low Volume Surgeons

Excluding the 50 orthopedic surgeons who did not perform hip or knee replacements, the average number of hip and knee replacements per orthopedic surgeon in Ontario in 2000 was 80.

The orthopedic surgeons performing hip or knee replacements were categorized as performing a high (>100), medium (51-100) or low (1-50) number of hip or knee replacements.

Table 9: The Number Of Reported Hip And Knee Replacement Performed By Orthopedic Surgeons In Ontario per Year.

	N (%)	% of All Hip and Knee Replacements
High (>100)	59 (31)	57
Medium (51-100)	73 (38)	23
Low (1-50)	61 (32)	10
Total	193	

The proportion of surgeons that were high, medium and low volume surgeons varied considerably by region (Figure 3). In the East 35% of the orthopedic surgeons were low volume and only 21% were high volume, whereas in the South West only 9% were low volume and 40% of the orthopedic surgeons were high volume.

Wait Time For Hip And/Or Knee Replacements

The average reported wait time for elective hip or knee replacement was 16 weeks (interquartile range 10 – 30). The waiting times for elective hip and knee replacement was related to both the volume of the individual surgeon and the crude replacement rate. Orthopedic surgeons reporting high hip/knee replacement volumes had a wait time of 26 weeks compared with only 12 weeks for the medium and low volume orthopedic surgeons ($P < 0.0001$). In addition, regions with high replacement rates tended to have higher waiting times for replacements ($R^2 = 0.53$ $p = 0.03$).

Knee Arthroscopy

A large proportion of orthopedic surgeons (44%) reported performing knee arthroscopy either often or always, while a quarter reported performing knee arthroscopy rarely or never (Figure 4).

Non Elective Surgery

Sixty percent of non-elective surgery time was taken up by trauma-related surgery and 30% by hip fracture repair.

220 (70%) orthopedic surgeons responded.

Discussion

There were 315 practicing orthopedic surgeons in Ontario in 2000 whose patient population included arthritis patients. Across Ontario there were 3.4 orthopedic surgeons per 100,000 population (15+). The average number of years that the Ontario orthopedic surgeon had been practicing was 14, which differed only very slightly from when last measured in 1997. Most of the orthopedic surgeons in Ontario completed all their training in Canada.

The amount of office and surgery time provided in Ontario was 18 and 10 half days per week per 100,000 population (15+), respectively. The amount and distribution of orthopedic services provided in Ontario has not significantly changed from that provided in 1997 (Figure 5). There has, however, been a slight increase in the amount of orthopedic services in Thunder Bay in the North West region since 1997. This can probably be explained by the recruitment of new orthopedic surgeons to Thunder Bay within the last few years. Across Ontario the average number of office and surgery half days was approximately 8 per orthopedic surgeon.

The most commonly reported types of elective surgery was hip and knee replacements, the least common was axial (spine) surgery. Orthopedic surgeons in Ontario reported performing approximately 18,000 hip and knee replacements in 2000, representing approximately 200 replacements per 100,000 population (15+). This estimate approximately agrees with the figure obtained from OHIP 1999/2000 billing data analysis of 17,000.

Of the orthopedic surgeons who reported performing hip and knee replacements there were equal proportions of high (> 100 replacements/year), medium (51-100) and low (<50) volume surgeons. The high volume surgeons performed the majority of the replacements. Low volume surgeons were found in all regions of Ontario. The number of hip and knee replacements performed per surgeon was not related to the number of patients from outside the orthopedic surgeon's region.

The majority of orthopedic surgeons performed some arthroscopies and nearly three quarters reported performing them 'often' or 'always'.

The provincial wait time for new consultations was reported to be 11 weeks, and for hip and knee replacements was 16 weeks.

Orthopedic surgeons reported that they will eventually operate on 50% of patients they see and of the patients not operated on the orthopedic surgeon will continue to see approximately one quarter for on-going management. These practice patterns varied considerably by orthopedic surgeon. However, there appeared to be no correlation between the proportion of patients operated on and the proportion of non-operative patients seen for ongoing management i.e. there are not discreet populations of surgeons who mainly operate or surgeons who mainly manage their patients non-operatively.

Orthopedic surgeons with high wait times for new consultations reported operating on a higher proportion of their patients. One explanation for this association is that more severe or complicated patients, with a higher likelihood of needing surgery, are referred to surgeons known to perform a large amount of surgery.

Geographical Variation

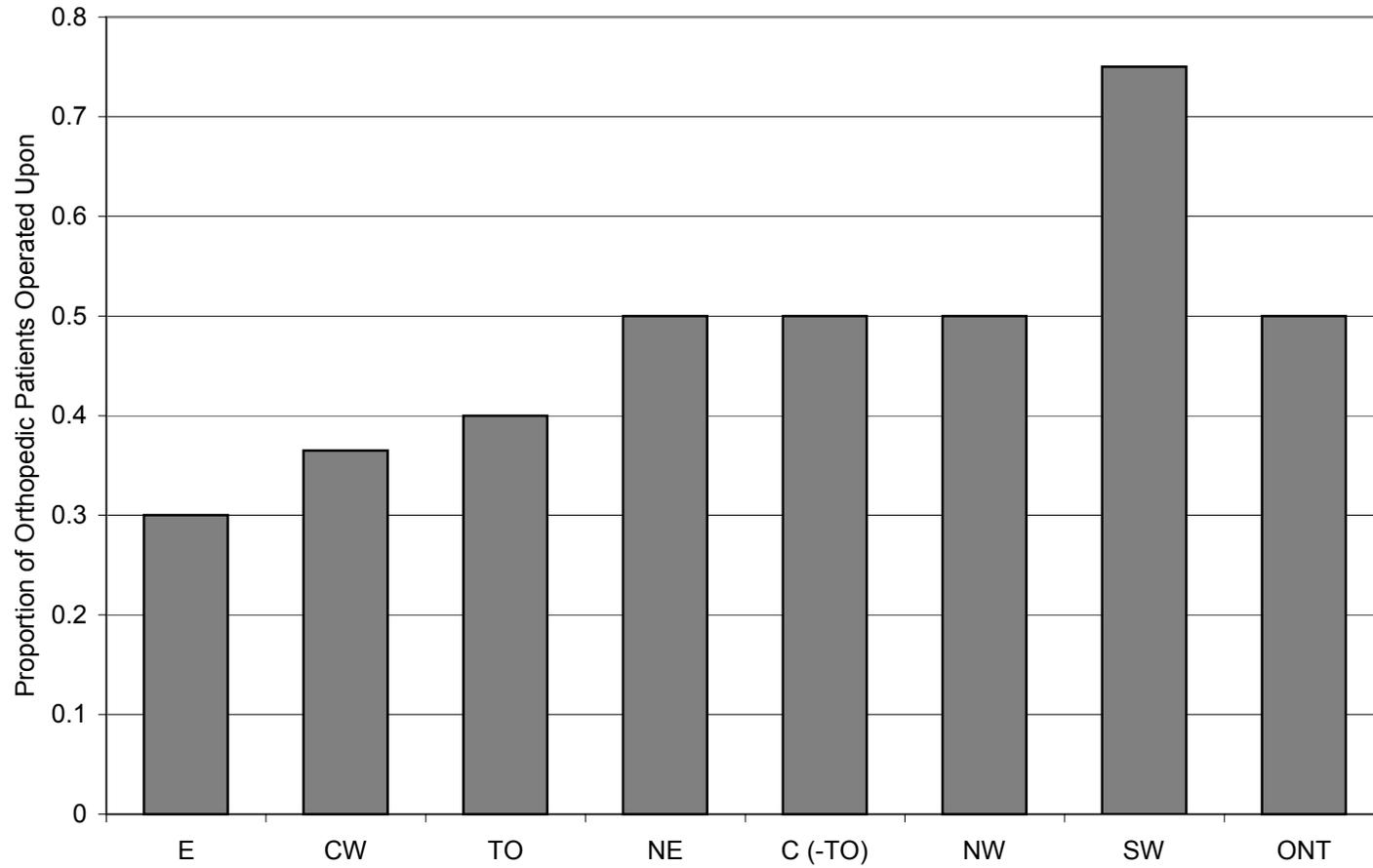
There was considerable variation in the reported provision of and access to various orthopedic services across the regions of Ontario. The regions of Ontario were ranked according to the following reported indicators of service access and provision: office & surgery half days/wk/100,000 population (15+), hip and knee replacements/100,000 population (15+), wait time for hip/knee replacement, proportion of high volume (for hip/knee replacements) surgeons, wait time for new consultations (see Appendix 2 for explanation of ranking method). On aggregate service access and provision was ranked higher than the provincial average in Metropolitan Toronto and lower in the East and North East. The Central, South West, Central West, and North West region service access and provision was similar to that of the provincial average.

Although the North West had the highest levels of service provision in terms of office and surgery hours and joint replacements, it also had the highest wait times for both new consultations and joint replacements. In 1997 the North West had the lowest level of service provision and had recently recruited several new orthopedic surgeons to the region. The disparity between waiting times and service provision may be a reflection of the backlog as a result of the low level of service provision before the recent increase in new orthopedic surgeons.

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Figure 1 : Reported Proportion of Orthopedic Patients that will Eventually be Operated Upon in Ontario (2000)



72% response rate

Figure 2: Reported Percentage Of Elective Surgery Time By Orthopedic Surgeons In Ontario (2000) By Type Of Surgery

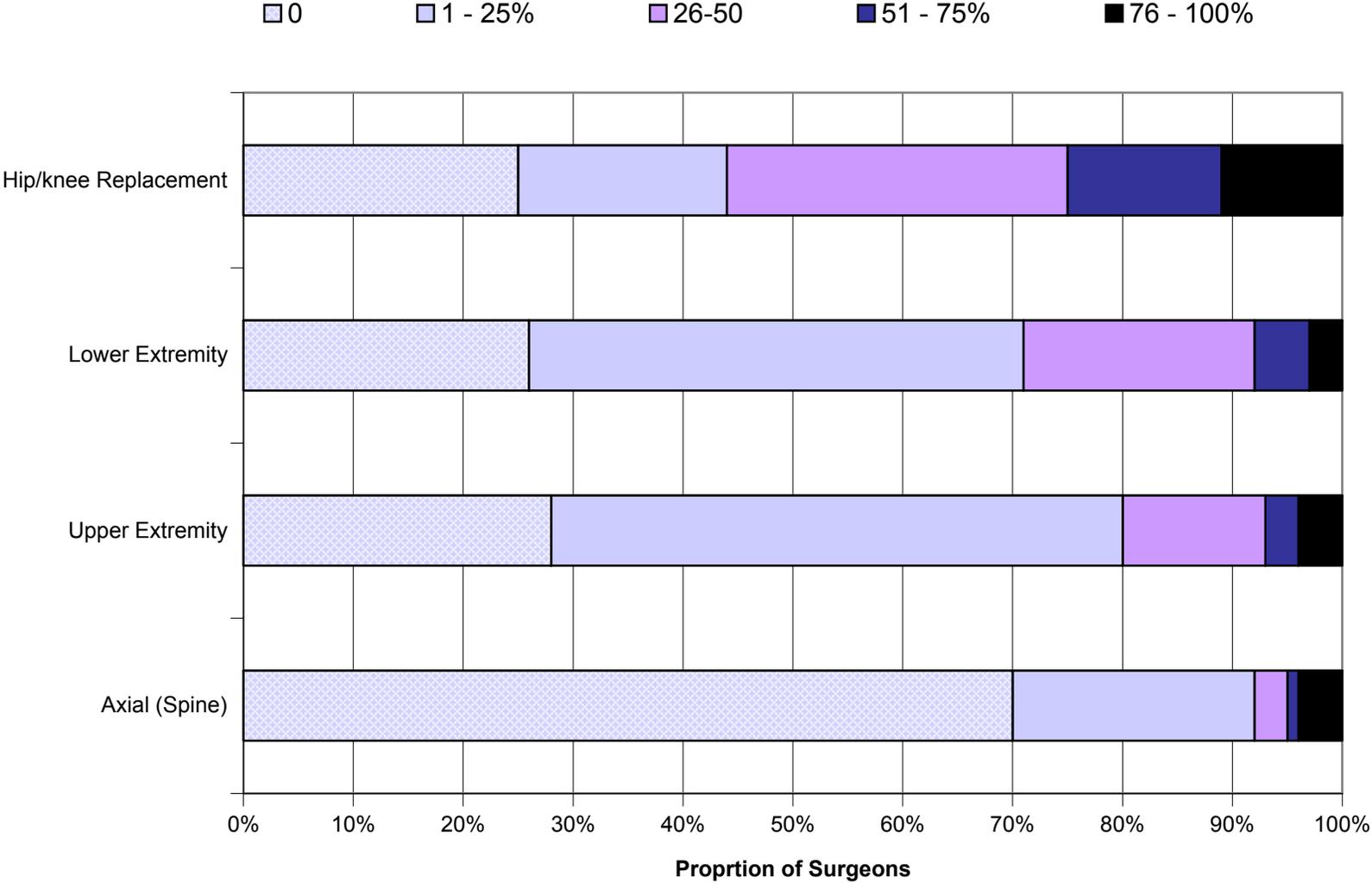


Figure 3: Proportion of High, Medium and Low Volume (for Total Joint Replacement) Surgeons in Ontario (2000)

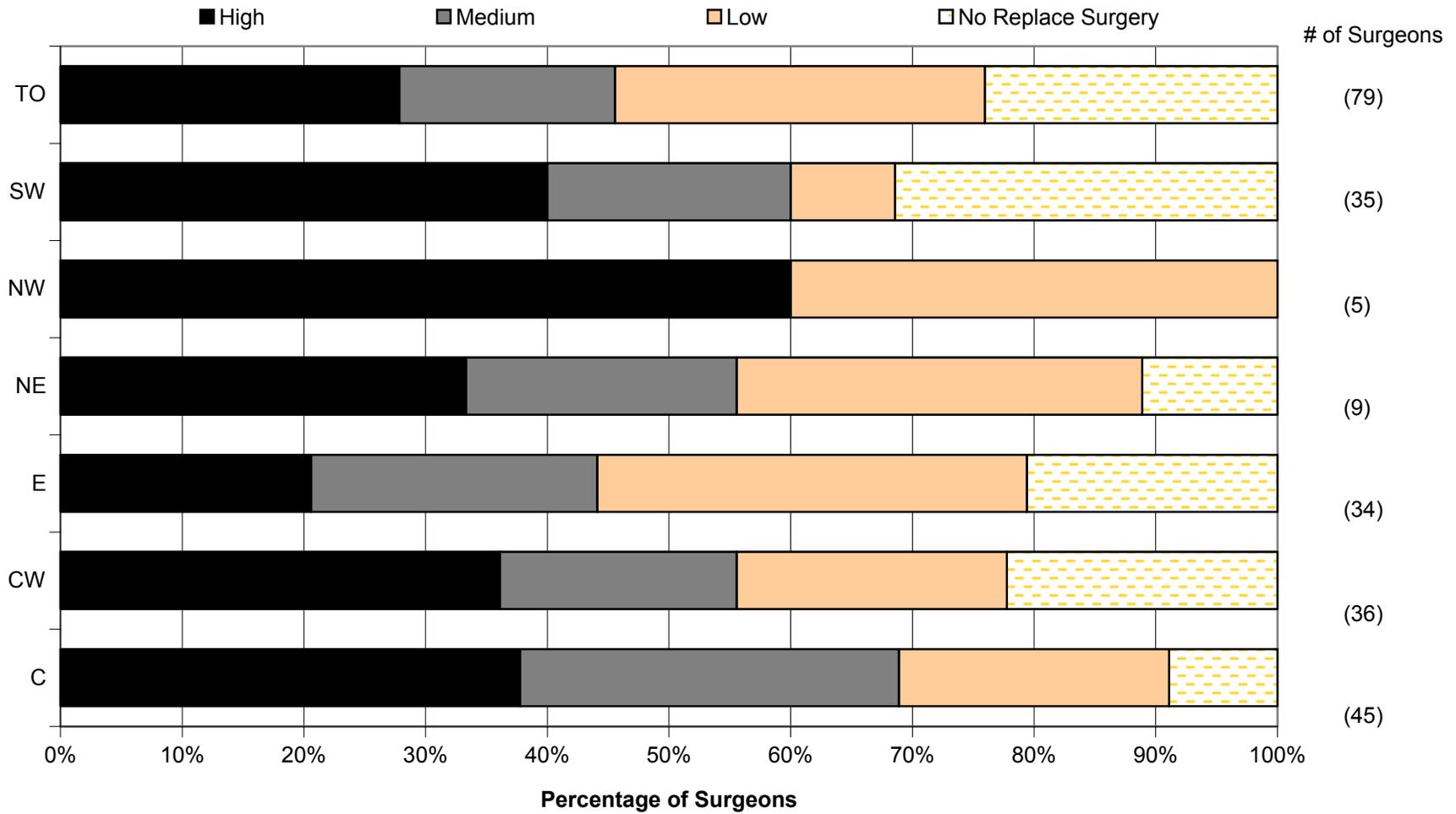
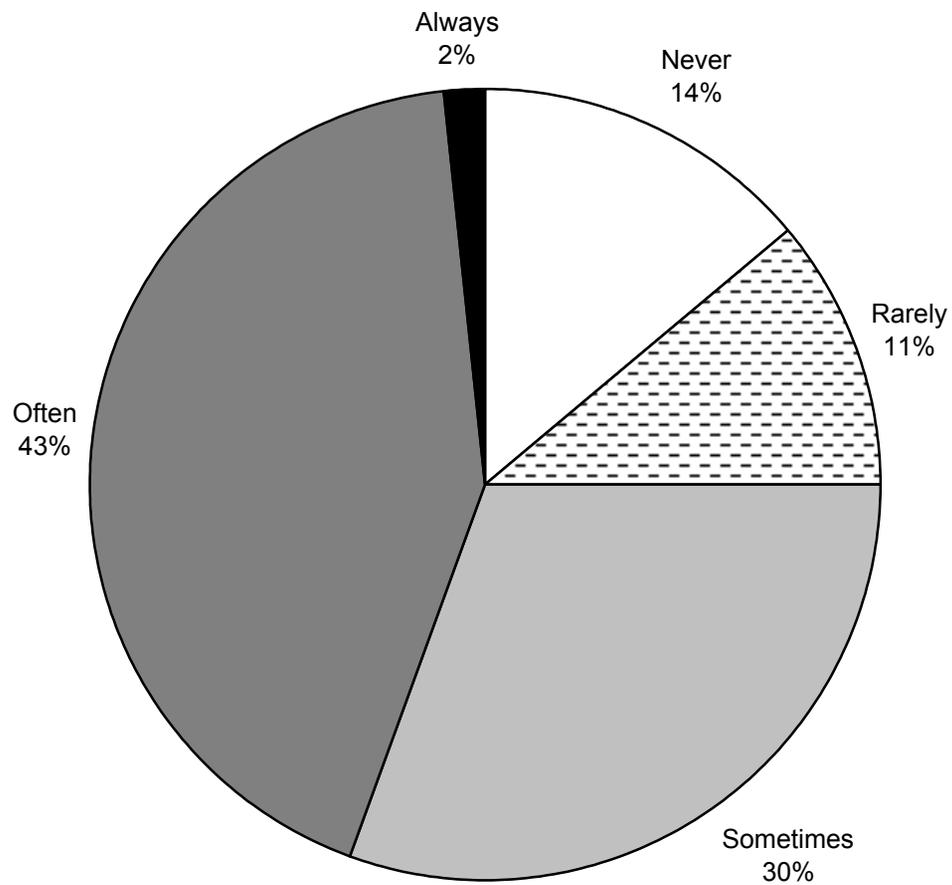
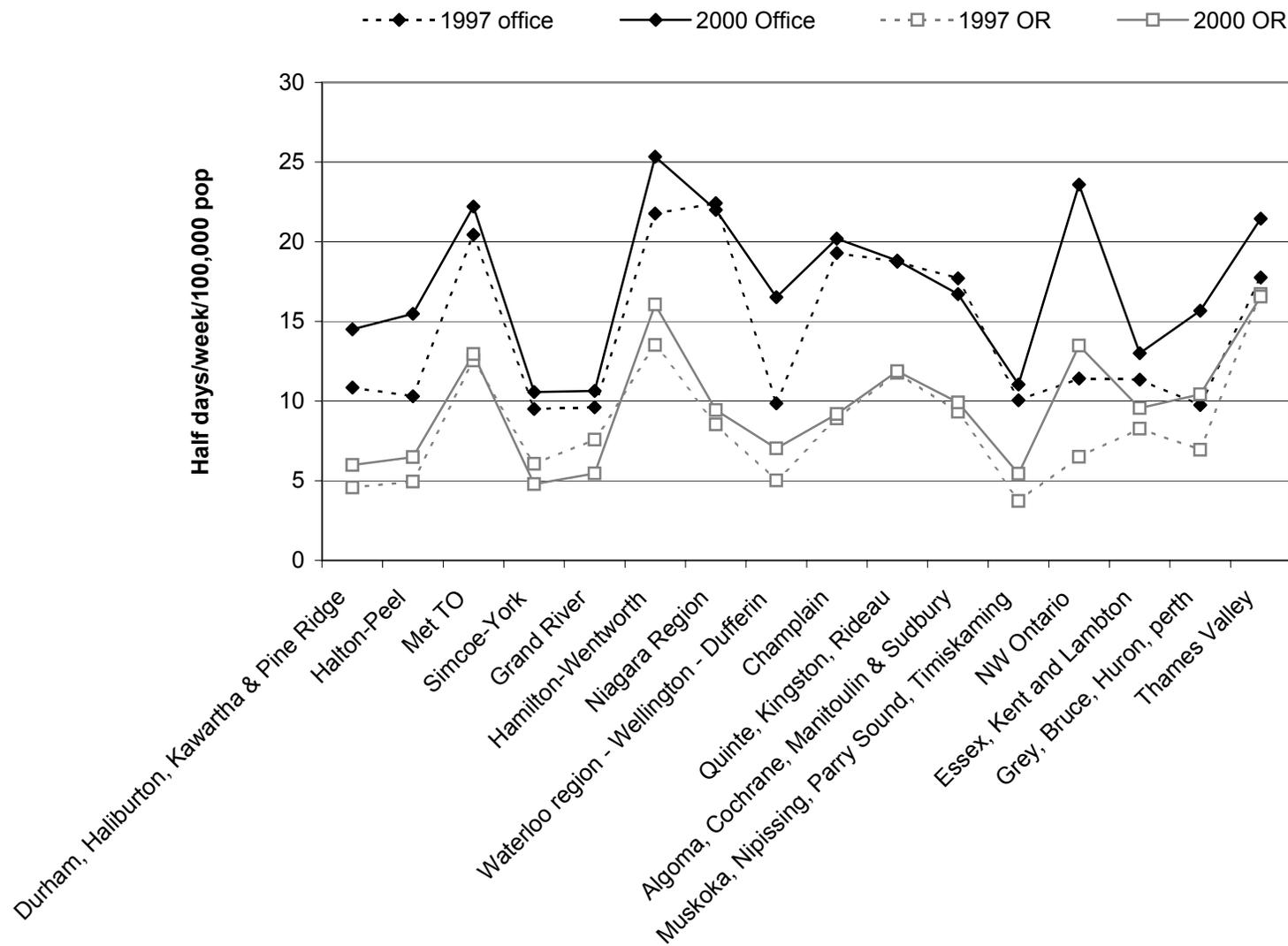


Figure 4: Proportion of Orthopedic Surgeons in Ontario that report performing knee arthroscopy (2000)



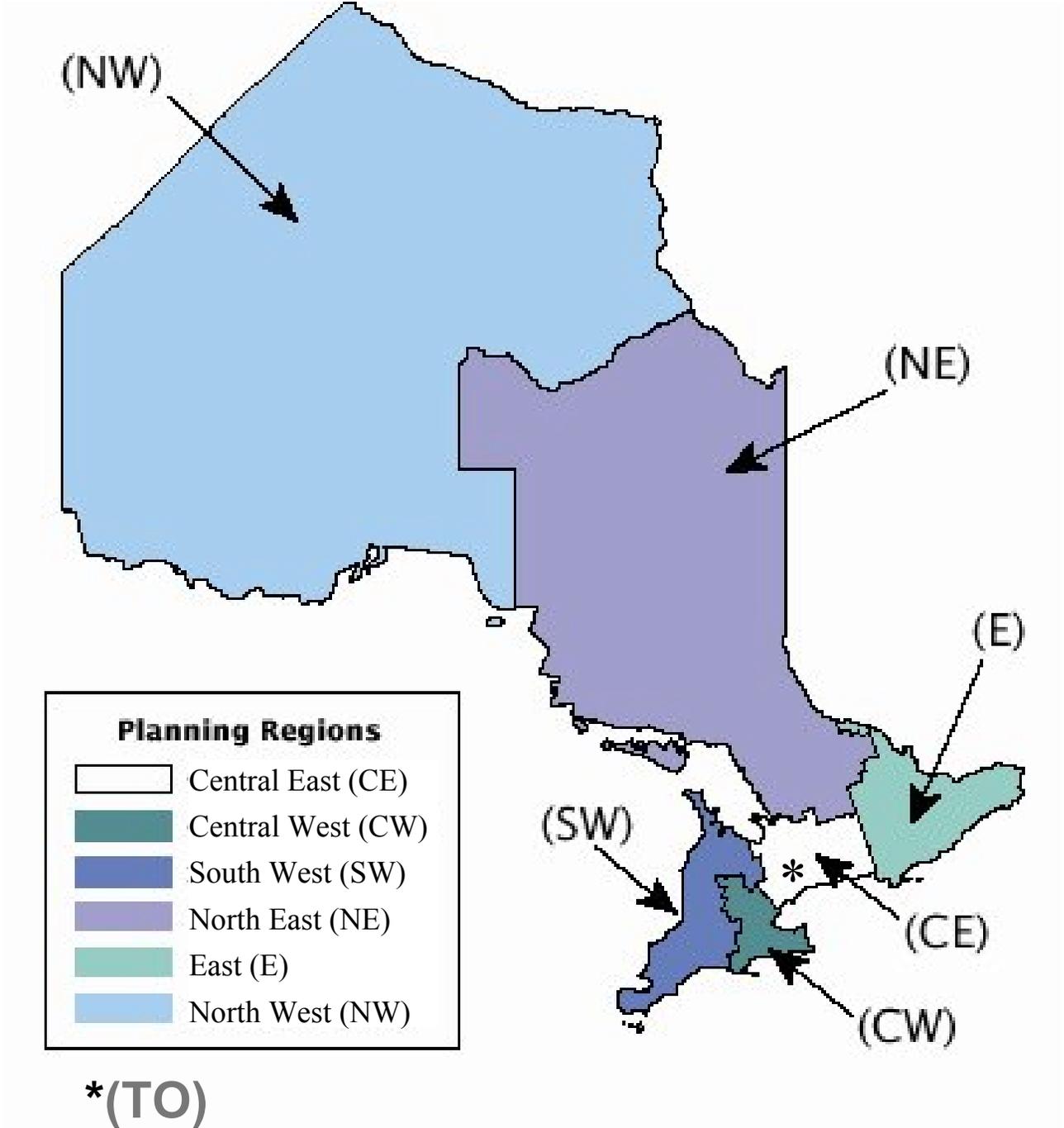
77% response Rate

Figure 5: Orthopedic Service Provision by District Health Council in Ontario in 1997 and 2000



Technical Appendix

TA1: Ontario Health Planning Regions



TA2: Ranking of Ontario Regions

The regions of Ontario were assigned a separate score according to how they compared with the provincial average in all of the five reported indicators of service access and provision. The mean score, over the five indicators are reported and used to rank the regions.

Indicators of service access and provision:

Office & Surgery half days/wk/100,000 population (15+)
 Hip and Knee Replacements/100,000 population (15+)
 Wait Time (wks) for Hip/Knee replacement
 Proportion of High Volume (for hip/knee replacements) Surgeons
 Wait Time (wks) for New Consultations

Scoring System:

4 = Greater than 50% more/better than the Ontario Average
 3 = Between 35 and 50% more/better than the Ontario Average
 2 = Between 21 and 35% more/better than the Ontario Average
 1 = Between 10 and 20 % more/better than the Ontario Average
 0 = Within 10% of the Ontario Average
 -1 = Between 10 and 20 % fewer/worse than the Ontario Average
 -2 = Between 21 and 35% fewer/worse than the Ontario Average
 -3 = Between 35 and 50% fewer/worse than the Ontario Average
 -4 = Greater than 50% fewer/worse than the Ontario Average

Ranking of Regions Within Ontario Using Several Indicators of Availability of Arthritis related Orthopedic Services

	E	NE	C	SW	CW	NW	TO
Office & Surgery half days/wk/100,000 population (15+)	0	-1	-2	0	0	2	2
Hip and Knee Replacements/100,000 pop	-2	-3	-2	2	-1	4	3
Wait Time for Hip/Knee replacement	-4	0	1	0	1	-4	2
Proportion of High Volume (for hip/knee replacements) Surgeons	-2	0	2	2	1	4	0
Wait Time for New Consultations	0	0	0	-3	1	-4	1
Mean Rank c.f. to provincial average	-1.6	-0.8	-0.2	0.2	0.4	0.4	1.6