Issues in the Management of Specialist Physician Resources for Manitoba

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The Manitoba Centre for Health Policy and Evaluation (MCHPE) is a unit within the Department of Community Health Sciences, Faculty of Medicine, University of Manitoba. MCHPE is active in health services research, evaluation and policy analysis, concentrating on using the Manitoba health data base to describe and explain patterns of care and profiles of health and illness.

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MCHPE undertakes several major research projects every year under contract to Manitoba Health. All projects address substantive issues in health policy, and some, such as this one, address basic science issues in population health research. In addition, MCHPE researchers secure major funding through the competitive grants process. Widely published and internationally recognized, they collaborate with a number of highly respected scientists from Canada, the United States and Europe.

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INTRODUCTION

This is the second of two reports on physician resource requirements for Manitoba. The first report, released in June 1996, focused on generalist physicians. This second report focuses on specialist physicians and surgeons. Major parts of the analyses for both reports were carried out in support of the Physician Resource Committee (PRC) which was established when the province and the Manitoba Medical Association signed a 5-year agreement to co-manage the insured medical services program. As with all MCHPE reports, responsibility for the conclusions drawn and recommendations made remain with MCHPE authors, not with Manitoba Health nor with the Committee which requested many of these analyses. Unless otherwise noted, all analyses are based on Manitoba data for fiscal year 1994/95. Whenever possible, procedure rates were directly standardized to account for differences in age and sex characteristics of regional populations.

Understanding specialist resource requirements for Manitoba presents a challenge because:

1. There is no consensus on how to best estimate the number of specialists needed in any jurisdiction, either for current requirements or the future when practices may change.

2. Specialist supply bears no demonstrable relationship to population health status. Residents of some regions of Manitoba (most notably South Westman and Marquette) have equal or better health than Winnipeg residents despite much lower rates of contact with specialists. Similar observations have been made in the United States.

3. Some types of care delivered primarily by one specialty group can also be delivered by other specialists or by other types of practitioners. Paediatricians, general practitioners and nurse practitioners all provide certain types of care for children; paediatric subspecialists complement the care provided by general paediatricians, but there is a large area where they

also can substitute for one another; optometrists can provide a significant amount of care delivered by ophthalmologists; and mid-wives and family practitioners may substitute for obstetricians. This makes it difficult enough to plan for the major specialty groups such as internal medicine, psychiatry, paediatrics and surgery, but even more problematic to plan for the numerous subspecialties, each with its own quite distinct practice and training requirements.

4. Most specialists are located in Winnipeg and Brandon. Therefore, knowing that Manitoba has more or fewer specialists per capita than other provinces tells us little about Manitobans' access to specialist services, particularly if specialists are not providing an equal level of care to those who live outside the urban areas.

Although the first two limitations are quite serious, they also affect every other assessment of the adequacy of the specialist supply. Rather than pretend it is possible to overcome these limitations, we use the unique Manitoba health research database to bring a different perspective to the complex problem of understanding the needs for specialist physicians in Manitoba. By using the database to examine the actual delivery of specialist care across the province, we move the discussion to a more meaningful plane. Since two other methods of estimating the adequacy of Manitoba's specialist supply (specialist/population ratios and cross provincial comparisons) produced similar conclusions, we have confidence in the validity of the analyses.

This report reviews the available evidence on the number and type of specialists in Manitoba, and on the specialist services Manitobans receive, to address the questions:

1. Is Manitoba's current supply of specialists adequate? Since there is no direct way of answering this question, three types of evidence are reviewed:
   - the supply of specialists relative to recommended population/physician ratios
   - the supply of specialists relative to other Canadian provinces
   - the level of care delivered by Manitoba specialists relative to other provinces.

2. Is there a problem with the aging of Manitoba's specialist physicians, and will our supply of specialists be sufficient to keep up with the aging of the population?

The final questions focus on the relative availability of specialists and their services to residents of all regions of Manitoba:

3. How well do specialists serve as a provincial resource?

4. How well do specialists serve high need populations?

FINDINGS

Supply of Specialists

- Overall, Manitoba is well supplied with most specialists.

- Overall, the growth in the supply of specialists has kept up with the aging of the population, with some groups (e.g. psychiatrists and neurologists) growing faster than the population they serve, and others growing somewhat more slowly (e.g. ophthalmologists)

- We find no evidence that Manitoba's specialist supply has been threatened by recent departures. While some specialists have left, others have arrived. In 1995-96 the overall Manitoba supply of specialists **increased** by the equivalent of 10 full-time physicians.

- Manitoba's supply of psychiatrists and medical specialists is somewhat higher than several other provinces, and Manitoba has more paediatricians per capita than any other province in Canada. Between 1986 and 1994 the number of physicians in these

specialties grew more rapidly than the populations they serve. Moreover, fewer physicians in these specialties than in others are nearing the age of retirement.

- Most surgical specialty groups will face a somewhat increased need for replacements as senior physicians retire over the next several years. Orthopaedic surgeons have the smallest proportion of young physicians, while neurosurgeons and otolaryngologists have the largest proportion of practitioners in the 60 year and older range.

- The supply of some surgical specialists in Manitoba (e.g. ophthalmologists) is somewhat lower than that of other provinces. Also, Manitobans' surgery rates for some procedures (e.g. hip and knee replacement) are somewhat lower than other provinces. However, since the rates of many high-profile surgical and restorative procedures (cataract, knee replacement, angioplasty) are increasing faster than the growth in the number of specialists, the current supply of specialists may not be as much a limiting factor on procedure growth as other factors such as operating room time or prosthesis budgets. There is evidence that the supply of surgeons does not directly determine the amount of surgery available to residents. For example, Saskatchewan has the second lowest provincial supply of ophthalmologists per capita, but the second highest rate of cataract surgery in the country.

- Recently, Manitoba has become much less reliant on foreign physicians; Manitoba-trained specialists now comprise a higher proportion of specialist supply.

Access to Specialist Services

Although there is a strong rationale for locating many specialists and most sub-specialists in a central location, or at least in major population centres, this rationale assumes that the delivery of their services will be organized in a manner that makes them available to the entire population and responsive to the health needs of all patients, regardless of where they live.

- According to the frequency of consultation, Manitoba specialists provide more care to residents who live nearby, typically those in Winnipeg and Brandon. Residents of North Eastman, South Eastman and Interlake regions also receive more consultations than residents of other regions. Specialists provide relatively low rates of consultation to residents of Norman and Burntwood, even though residents of these regions tend to have the poorest health status. Thus the evidence suggests that there are opportunities to improve the organization and delivery of specialist services in Manitoba.

- A rich supply of specialists does not necessarily translate into equitable access to specialist care for all Manitobans. We have a particularly rich supply of paediatricians and psychiatrists, yet their services are somewhat less evenly distributed than some other specialty groups for which Manitoba is less well supplied.

- Even within Winnipeg, residents of low-income neighbourhoods, whose poor health status implies higher need for health care, receive no more specialist care than residents of wealthier neighbourhoods, whose health is much better. However, individuals in low and middle-income neighbourhoods make more contacts with general and family practitioners than residents of wealthy neighbourhoods. Therefore, it may be that primary physicians do not refer low-income residents as often for consultation s with specialists. Another possible factor, particularly for the poorest residents, may be that the problems associated with living in poverty impede their ability to use the health care system.

- General surgery represents a specialty group which has successfully established practices in several rural centres. Rural residents undergo many of the common surgical procedures performed by general surgeons at least as frequently as residents of urban areas.

As one physician notes: "*There was a significant change in the attitude of the University in the early 1970's which led to the production of general surgeons who now practise outside Winnipeg and Brandon and it is important that such precedence be recognized in a report on specialist services simply to show that maldistribution can be successfully addressed. There is also a relatively extensive program of regional surgery centres.*"

- Although most surgical subspecialists and intervention specialists are concentrated in Winnipeg and Brandon, residents of most regions of the rural South are referred for consultations with surgeons at a rate which suggests reasonable access. Residents of Parkland and Norman regions, however, have contact rates which are one-quarter that of Winnipeg residents. Contact rates to most subspecialists are markedly higher than average for Winnipeg residents and for Brandon residents to some subspecialties (particularly for the groups located there, including ophthalmology, orthopaedics and urology), and somewhat higher than average for North Eastman and Interlake residents (probably based on proximity to Winnipeg).

- Access to orthopaedic procedures was reasonably equitable across the province even though almost all specialists are located in Winnipeg and Brandon. In fact, the rate of hip replacement procedures among Winnipeg residents was lower than for most Non-Winnipeg regions (Burntwood residents were the exception, with a markedly lower rate). Access to prostatectomy, the most frequent procedure performed by urban-based urologists, was also reasonably consistent among all Manitoba residents.

- Patterns of access to cardiac procedures performed only by Winnipeg-based cardio-vascular surgeons and cardiologists were different: Winnipeg residents had higher rates of coronary artery bypass surgery, cardiac catheterization, and angioplasty (for which Winnipeg residents had almost twice the rate of Non-Winnipeg residents).

- The introduction of private clinics has introduced a new dimension into issues of access to specialist care. In 1994/95 a large proportion of Norman and South Westman residents paid (as much as $1270) to have their cataract surgery performed in private clinics. South Eastman, Winnipeg and North Eastman residents were less likely to have paid for private cataract surgery. Although those advocating for private clinics have argued the rich should be allowed to pay, and hence preserve publicly-funded health care for the less affluent, in fact middle and low-income Winnipeg residents were just as likely to have paid for private cataract surgery as were residents from more affluent neighbourhoods.

The Effects of Demographic Trends on Future Supply

To estimate the impact of aging on the future need for specialists, we developed a new approach based on utilization by age. Overall, specialists (and general practitioners) provide most of their care (69%) to the non-elderly (those younger than 65 years), with 15% of their care going to those age 65-74 and 16% to those age 75 and over. The age distribution of patients varies by specialty group: paediatricians, obstetricians/gynaecologists and psychiatrists provide the lowest proportion of their services to the elderly (less than 10%), while medical specialists, general surgeons and surgical specialists provide approximately 20% of their care to patients age 65-74, and 20% to those 75 years and older.

- Between 1986 and 1994, the increase in the number of specialists who serve the elderly population kept pace with the increase in the number of elderly, with some sub-specialty groups somewhat exceeding this growth (e.g. psychiatry and plastic surgery) and others lagging behind this growth (e.g. ophthalmology and otolaryngology).

- Statistics Canada's projections of growth in the number of elderly imply that by the year 2016, the province will need 15% more specialists - a growth of less than 1% per year if we assume that the supply in 1994 was appropriate. (In 1994 Manitoba was in the

middle range of specialist supply among Canadian provinces). To maintain the supply of specialists that Manitoba had in 1994, the province would need to add about four specialists per year, in addition to replacing those who leave or retire, to keep up with the needs of an aging population. This growth rate has been routinely achieved in the recent past.

- Our projection for paediatrics suggests a slightly decreased need in the next 10-20 years, based on our generous current supply and the decreasing number of children predicted by Statistics Canada. However, there is also a large projected increase in the number and proportion of aboriginal children. Currently, most aboriginal children are treated by general and family practitioners, even though many are high risk patients who probably need specialist care more than others. If this pattern changes and paediatricians replace GP/FPs in providing this care, then the need for paediatricians would be slightly higher than projected here.

Implications of the Findings

1. Specialist Supply and Access

Manitoba appears reasonably well supplied with most specialists. However, the province faces a two-part problem of access to specialist services: (1) there exists unequal regional access to the services of some specialists, especially among the highest need regions of the province (the North), and (2) access to specialist physicians is low relative to need by the poor and the middle class in Winnipeg.

Pathways for improving province-wide access to specialist services despite the concentration of practitioners in Winnipeg and Brandon include:

- Planning how to best organize specialist groups which currently under-serve high need populations. For example, paediatrics, a specialty in which Manitoba has a rich supply, might be encouraged to expand its provision of services to Northern regions where the

number of Aboriginal children is increasing and where the need for health care services is high. Paediatrics has taken important steps in this direction that should be supported and expanded. Moving at least some part of the funding for specialist services into the needs-based funding formula for the regional authorities might be one way of ensuring that residents of regions with limited access to specialist care can fund improvements.

- Sustained funding for interactive communication between rural/northern physicians and urban specialists should be developed as part of a structured program with appropriate reimbursement for delivery of specialist services that use mechanisms other than direct patient examination.

- Enhanced programs for specialist placement in on-site clinics and programs to provide expanded itinerant services in rural Manitoba (working in collaboration with local physicians) and enhanced services to Core area residents should be pursued.

- Pathways to improve access to specialist care among the middle class and the poorest (and least healthy) Winnipeg residents might include providing more specialist services in community clinic settings.

2. Demographics and Future Need

Projected growth in the number of elderly Manitobans indicates that the supply of specialists will need to expand by about four specialists per year (in addition to replacements for those who leave or retire) in order to maintain current rates of service. Manitoba's specialist supply has expanded at this rate in the recent past and should have no problem keeping up with this need.

Furthermore, difficulties which Manitoba has had in the past in recruiting and retaining some types of specialists may well ease given the projected substantial surplus of specialists, particularly surgical specialists, in the United States. There has recently been action by the US

government to limit and even reverse the relatively easy entry of Canadian specialists into the US. Some American medical certification boards are withholding their approval from Canadian trained doctors and others are considering doing so.

In some areas Canada appears to be producing too many specialists. For example in the next 4 years Canada will produce 120 new radiation oncologists despite the fact there are expected to be only 50 openings for these specialists across the country.

3. Alternatives to Recruitment for Improving Delivery of Specialist Services

To ensure all Manitobans have good access to the services delivered by surgeons, several problems at least as important as the supply of surgeons need to be resolved. The recent growth in surgery which occurred in the province was achieved by targeted funding increases and expanded outpatient capacity, rather than increasing the number of surgeons. However, despite this expansion, needs-based access to many types of procedures has not been achieved. To minimize the need for more surgeons and to maximize the usefulness of currently practising surgical specialists, actions to be taken must include:

- Routine feedback of data on surgical practice. Data on surgical rates across the province and within the city should be used to inform clinicians as part of continuing education approaches to improving the delivery of surgical care.

- Improving province-wide access to surgery on the basis of need (appropriateness and urgency) by implementing organized priority lists, particularly but not exclusively for procedures such as knee replacement, angioplasty and bypass surgery. Ontario, Alberta and British Columbia have all made much more progress in implementing organized waiting lists than Manitoba. The province should be an active partner in helping the regional authorities work with specialists in Winnipeg and Brandon for the purpose of organizing a priority system which would ensure good access for all residents. We should follow the Ontario example of preferentially allocating procedures to regions

now below the provincial average rate, particularly as incremental funding for expanding surgical resources becomes available.

- An assessment of the referral patterns for cataract surgery in the public system for residents of low-use regions and low-income neighbourhoods. A cataract priority list system for the public sector needs to be set up to ensure that residents living in remote areas of the province also have good access to publicly-funded care. Efforts are currently underway with the potential to establish such a system.

- A thorough review of the allocation of operating room times. Adding procedural specialists without ensuring that they have good access to operating facilities in the public sector will not only put intolerable pressure on the public sector, but more importantly, jeopardize the development of a rational delivery system.

- Examine the potential for expanding the group purchase of items such as hip and knee prostheses. A British study reviewed 62 different hip prostheses ranging in price from £250 - £2000 and judged two of the cheapest to be among the best performing.

- Improved management of residency training programs. The Medical School has reduced the number of residency positions in paediatrics, an action which makes sense given Manitoba's current supply and projections of a decrease in the paediatric population over the next 10-20 years. However, the Medical School and the government should continue monitoring the situation periodically to assess whether the current number should be maintained, further reduced, or increased. Such regular monitoring and the actions taken as a result should also apply to other specialties in which the number of practitioners has grown faster than the populations they serve (e.g. psychiatrists) as well as for those specialties where Manitoba's supply is relatively (e.g. ophthalmology).

4. Conclusion

Manitobans and their specialist physicians have a unique opportunity for improving the delivery of specialist care in the province. Never before have we had as much potential for improving the organization and delivery of specialist care and the data to identify the access problems. With the joint management contract signed between the medical profession and the province, and the new regional authorities moving to needs-based funding, there are real opportunities to do it better. The major challenge in planning for specialists in Manitoba is not one of supply nor expenditures, but how to organize and deliver specialist services so as to maximize their contribution to the health of all Manitobans.

Strengths and Limitations

Our cross-provincial comparisons of specialist supply and procedure rates were based on data obtained from Statistics Canada and the Canadian Institute for Health Information, while regional analyses of procedures within Manitoba were based on the Manitoba health research database. The Manitoba database contains information about the delivery of specialist services which is typically not available, making it possible to go beyond simplistic assessments of specialist numbers and availability. The work focusing on which specialists deliver care to the elderly, and hence will be most affected by the aging of the population, represents a major advance over previous approaches. Using the database to assess physician productivity at various ages, and physician supply using both full-time equivalents and individual physician counts, is not possible in most of North America. By working with the Physician Resource Committee and a national group interested in these issues, we have had the benefit of much expertise and insight in addressing these difficult questions.

Despite the unique strengths of the Manitoba health research database, it has limitations that affect this report. A number of subspecialties are not uniquely identified in the database (e.g. cardiologists, respirologists), preventing specific analyses and comparisons on these groups. However, extensive validity checks show that the database documents over 90% of ambulatory visits and other specialist contacts made by Manitobans. Most of the missing data apply to

known groups of salaried physicians who do not file evaluation claims: oncologists at the Manitoba Cancer Treatment and Research Foundation, psychiatrists in provincial facilities, and some ICU physicians. Churchill appears to be the only region of the province where our measures of ambulatory care may be significantly distorted by the missing data; we have therefore excluded Churchill from these analyses.

Some urban-based specialists provide telephone consults and/or follow-up to rural patients and their physicians, but the database does not include entries for telephone contacts, so this work is not included in the analyses. Also, no attempt was made to address the complex issues involved in dealing with the supply and future needs for academic physicians. To the extent that they deliver patient care, they are included in the analyses (with the few exceptions discussed in the appendix.) They were included in the cross-provincial comparisons, along with academic physicians from other provinces. Manitoba is a small province and maintaining a viable research and teaching program creates demands for specialists which we have not attempted to address. There are also issues of critical mass which are not addressed in the report. Finally, the timely issue of which highly specialized services Manitoba's population base should support (paediatric cardiac surgery? liver transplants?), and which should be organized on a larger multi-provincial basis, is also not addressed in this report.

1. INTRODUCTION

This is the second report on physician resources in Manitoba. The first report, released in June 1996, focused on needs-based planning for generalists physicians, including general practitioners, general paediatricians and general internists. This report focuses on care delivered by specialists and surgeons. (All paediatricians and internists are included in this report, including the generalists who were part of the first report.)

This report, as the first one, was largely carried out in support of the Physician Resource Committee (PRC), established when the province and the Manitoba Medical Association signed a 5-year contract and agreed to co-manage the insured medical services program. Part of this agreement was a plan to co-operate in the management of medical practitioner resources.

When MCHPE was appointed as a member of the PRC, we agreed to provide data and analyses helpful to the Committee's deliberations. In addition to the work focussing on needs-based planning for generalist physicians, MCHPE was appointed to the PRC's subcommittee on Specialist Physicians. At that time we agreed both to provide analyses in support of the subcommittee's work, and to do a second report on planning for specialist physicians as part of our contract with the province. This report has benefited from the insights provided by members of the PRC as well as feedback from many stakeholders across the province who critiqued early drafts.

Needs-based planning for specialist physicians represents a special challenge for a province like Manitoba, with a small population concentrated in Winnipeg and Brandon. There are not only the major specialty groups such as internal medicine, paediatrics and surgery, but also numerous subspecialties of these, each with quite individualized training requirements.

There is no agreed upon approach for determining the number of specialists needed in an area, and no evidence which makes it easy to decide when there are too few and when there are too many. The potential for substitutability among providers[1] (a general practitioner for a specialist, or one specialist for another) tends to make our estimates of the need for specialists more generous than they perhaps should be.

As US experts in this area have pointed out:

> *There is a general understanding that larger non-metro counties or urban areas will have higher per capita levels of certain services, reflecting the cost and quality rationale for centralizing some specialized services. On the other hand, there is an expectation that more common and routine services, including primary care and emergency care, be available in all geographic areas within a certain distance or travel time. Unfortunately, moving beyond these generalizations is quite difficult because of limitations in our understanding of need and demand characteristics of different areas, and the relationship between health services and health (Kindig and Ricketts, 1991).*

This report reviews various types of evidence which help inform us about whether we have too few or too many specialists in Manitoba. We also review how well specialists serve Manitobans from across the province. As the PRC struggled with issues of needs-based planning, it became clear that the number of physicians in the province was not always the most critical area of concern. Other important questions, particularly for specialists (most of whom practise in Winnipeg and Brandon) include: How well are residents of rural areas served? Is there good access to specialist care according to the needs of all Manitobans? This approach broadens the usual focus on physician numbers alone, and considers alternatives to recruitment and training for improving the delivery of specialist care in the province.

This report attempts to address the following questions:

1. Is Manitoba's current supply of specialists adequate? Since there is no direct way of answering this question, three types of evidence are reviewed:

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[1] The Royal College of Physicians and Surgeons (Scully, 1996) has recently obtained information via survey from specialists across Canada, asking them the extent to which they practice within and outside of the domain of their specialty.

- the supply of specialists in Manitoba relative to population/physician ratios
- the supply of specialists in Manitoba relative to other Canadian provinces
- the level of care delivered by specialists in Manitoba relative to other provinces

2. Is there a problem with the aging of the Manitoba specialist physician supply, and will our supply of specialists be sufficient to keep up with the aging of the population?

The final questions focus on the relative availability of specialists and their services to residents of all regions of Manitoba:

3. How well do specialists serve as a provincial resource?
4. How well do specialists serve high need populations?

Most of the analyses in this report provide results by specialty group (6 major specialty groups and 15 subspecialty groups). In several instances, corresponding results for General & Family Practitioners are also provided for purposes of comparison. Many analyses were divided according to Regional Health Authority boundaries, but the RHA of Churchill was excluded from analyses using ambulatory visits because of unstable results. However, data for surgical procedures was more reliable, so Churchill was included in analyses of surgical procedure rates (though the small population means that none of the differences were statistically significant).

In counting physicians, we used the number of individuals (head counts) and Full Time Equivalents (FTE). We used the Health Canada FTE methodology to count physicians based on annual payment benchmarks within specialties (see Methods appendix).

2. FINDINGS

2.1 Physician-Population Ratios as a Tool for Specialist Planning

The ratio approach, which uses a guideline to suggest the number of individuals needed to support the practice of one specialist, is the traditional method used to estimate the number of specialists needed. These ratios have been produced in various fashions, but usually involve committees of experts examining the existing supply, and then estimating the impact which changes in the population (increased number of elderly for example), or changes in the practice of medicine (such as increased number of female physicians or changing technology) will have on the need for specialists in the future.

In Canada there have been several attempts over the past decades to estimate the needs for specialists using recommended ratios. In the mid-1980's the Federal/Provincial/Territorial Advisory Committee on Health Human Resources undertook a review of physician manpower requirements across the country. Their review determined that the supply of physicians in Canada had increased 105% over the period 1961-1980, a period during which the population had grown only 33%. They attempted to estimate physician requirements for the year 2000. They estimated that if trends continued there would be a substantial surplus of physicians in general practice and the medical specialties by the year 2000, and a shortage of physicians in the surgical and laboratory specialties. They recommended that a set of ratios be used for planning purposes. In 1994, the Saskatchewan Physician Resource Planning Task Force went through a similar exercise and also produced a recommended set of specialty specific ratios to be used for planning purposes. These were the two sets of ratios which the Specialty subcommittee of the Manitoba PRC used in its recent planning exercise.

Table 1 illustrates the planning ratios recommended by these two groups. The Federal-Provincial group recommended that 1 full-time equivalent[2] (FTE) psychiatrist be available to serve every 10,232 residents, while the Saskatchewan Task Force recommended that more psychiatrists be available: 1 for every 8,379 - 9,129 residents. Usually the Saskatchewan figures resulted in recommending a richer specialist supply, although in some cases, such as dermatology, the Saskatchewan ratios recommend fewer specialists than the Federal-Provincial ratios.

There are other physician-population ratios which have been recommended by other groups. In 1988 the Canadian Medical Association, The Royal College of Physicians and Surgeons of Canada and the national specialty societies undertook a review of specialty needs and issued their own recommendations (Royal College 1988). In almost every case, their guidelines suggested the need for more specialist physicians than existed at the time of their study. Even where there was no perceived shortfall (for example in plastic surgery and psychiatry), they recommended that the existing ratio be considered the appropriate one.

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[2] Complexities enter at every stage of the process of calculating FTEs. While details on our methodology are presented in the appendix, it is important to appreciate the difficulties in accurately measuring specialist supply in Manitoba, and the detailed work which we and the specialist subcommittee (of the Physician Resource Committee) did to ensure the accuracy of the figures reported. Programmers at the MCHPE used billings and evaluation claims filed with Manitoba Health to estimate the physician supply. The footnotes to Tables 2 and 3 explain where our best estimate of the FTE supply likely over or underestimates actual supply for that group. Where it made more sense, the number of individuals was used, rather than FTEs. The Chair of the Specialty Subcommittee then used his knowledge and access to other data including medical faculty staffing, and worked with our programmers to refine these estimates. The Chair was able to add estimates of the number of physicians at the Manitoba Cancer Treatment and Research Foundation and other practitioners who do not file claims, and are therefore not found in MCHPE data files. Many of these corrections which the Chair was able to make to his estimates could not be integrated into MCHPE databases, so our analyses are based on our estimates only. However, as Table 23 demonstrates, estimates developed by the Chair were very close to those developed by MCHPE. Our estimates of physician supply are also very close to those of the PRC: we find 730.1 FTE specialists in Manitoba in 1994/95, while the PRC counted 768.6 FTE specialists. Given this close correspondence we feel confident in using the data base to analyze the delivery of specialist services across the province.

Table 1. Population per Physician Ratios from Federal-Provincial-Territorial Guidelines and Saskatchewan Physician Resource Task Force

Specialty	Federal-Provincial-Territorial Recommended Ratio	Saskatchewan Task Force Recommended Ratio
GP/FP	1,307	1,223
Medical Specialties:		
Neurology	89,948	79,529
Dermatology	77,098	107,323
Medical Generalists		22,958
Medical Specialists	8,166	(see Table 3)
Paediatrics	19,355	(see Table 3)
Generalists		34,283
Specialists		(see Table 3)
Psychiatry	10,232	8,379 - 9,129
Obs & Gyn	18,074	19,536 - 21,606
General Surgery	12,292	15,249
Surgical Specialties:		
CVT Surgery	128,213	119,387
Neurosurgery	165,761	119,108
Ophthalmology	30,099	27,030 - 27,766
Otolaryngology	51,456	52,285
Orthopaedic	34,127	29,553
Plastic	107,938	95,554
Urology	56,464	52,664
Anaesthesia	13,805	14,067

All population/physician ratios are acknowledged to have major limitations. There is little evidence relating specialist supply to population health needs, and therefore recommended ratios tend to represent best "guesstimates." However, ratios are widely used for planning purposes.

The Specialty subcommittee took the ratios recommended by the Federal-Provincial-Territorial Advisory Committee and those from the Saskatchewan Task Force, compared the recommended values with the number of full time equivalent (FTE) physicians practising in Manitoba in 1993/94, and used these to estimate the deficits and surpluses of specialists. The subcommittee also used the Saskatchewan recommended ratios to estimate Manitoba's needs for a variety of medical and paediatric subspecialists.

The subcommittee took an important next step, attempting to recommend a regional distribution of some specialists within Manitoba. Thus while it is generally agreed that some specialists (such as neurosurgeons and neurologists) should only be located in major referral centres because they are trained to provide care for relatively rare and specialized conditions, the subcommittee recommended that other specialists such as psychiatrists, paediatricians, internists and otolaryngologists should be located in several regional centres: Thompson, Flin Flon, The Pas, Dauphin, Portage la Prairie, Steinbach, Morden-Winkler and Selkirk.

Table 2 shows the number of specialists recommended for Manitoba using the Federal-Provincial-Territorial ratios, and Table 3 shows the corresponding values using the Saskatchewan ratios. Essentially, the subcommittee estimated the number of specialists which "the periphery" (Northern Manitoba, plus Rural Southern regions not near Winnipeg or Brandon) could support, and that became the recommended value for the periphery. The recommended supply for Brandon was determined by applying the ratios to the Westman population (approximately 100,000), and the remainder of the recommended provincial supply were designated for Winnipeg.

Table 2. Recommended Number of Specialists for Manitoba According to Federal-Provincial-Territorial Advisory Committee

	Total Recommended for Manitoba[1]	DISTRIBUTION		
		Periphery[2] Recommended	Brandon[3] Recommended	Winnipeg[4] Recommended
Medical Specialties:				
Neurology	13	0	1	12
Dermatology	16	0	1	15
Internal Medicine	147	9	15	123
Paediatrics	62	9	6	47
Psychiatry	117	19	8	91
Obs & Gyn	66	2	6	58
General Surgery	97	11	9	77
Surgical Specialties:				
CVT Surgery	9	0	1	8
Neurosurgery	7	0	0	7
Ophthalmology	40	0	4	36
Otolaryngology	23	1	2	20
Orthopaedic	35	0	3	32
Plastic	11	0	1	10
Urology	21	0	2	19
Anaesthesia	87	1	8	78

1. Recommended numbers calculated on the population of Manitoba as at June 1, 1993, as indicated in the 1993/94 Annual Report of Manitoba Health.
2. The "Periphery" refers to eight communities: Thompson, Flin Flon, The Pas, Dauphin, Portage la Prairie, Steinbach, Morden-Winkler and Selkirk.
3. The recommended number of physicians for Brandon was derived by applying physician / population ratios to the old Manitoba Health region known as "Westman."
4. The recommended number of physicians for Winnipeg is the number recommended for the province less the number recommended for the periphery communities and Brandon.

Table 3. Recommended Number of Specialists for Manitoba According to Saskatchewan Physician Resource Task Force

		DISTRIBUTION					
		Periphery		Brandon		Winnipeg	
	Total Recommended for Manitoba[1]	Rec.[2]	Actual FTEs 1993/94	Rec.[3]	Actual FTEs 1993/94	Rec.[4]	Actual FTEs 1993/94
Neurology	15	0	0	1	1	14	18.6[+]
Dermatology	11	0	0	1	1	10	12.0[*]
Internal Medicine (Total)	185	9	1	14	10	162	152.8
General Internal	52	9	1	6	9	37	51.2
Cardiology	34	0	0	3	0	31	23.0[*]
Immunology & Allergy	3	0	0	0	0	3	1.0
Endocrinology	8	0	0	0	0	8	5.7
Gastroenterology	13	0	0	1	0	12	12.5[*]
Geriatric Medicine	7	0	0	0	0	7	3.5
Hematology/ Oncology	26	0	0	2	0	24	13.6
Infectious Diseases	4	0	0	0	0	4	3.4
Nephrology	14	0	0	1	1	13	9.0[*]
Respiratory Medicine	9	0	0	1	0	8	12.5[+]
Rheumatology	8	0	0	0	0	8	5.4
Physical Medicine	7	0	0	0	0	7	6.1
ICU	N/A	-	-	-	-	N/A	5.9
Paediatrics (Total)	75	9	2	7	5	59	83.9
General	35	9	2	6	5	20	53.0
Neonatology	10	0	0	0	0	10	2.9
Cardiology	2	0	0	0	0	2	2.1
Allergy	7	0	0	1	0	6	4.6
Endocrinology	1	0	0	0	0	1	3.4
Gastroenterology	2	0	0	0	0	2	0.8
Hematology/ Oncology	5	0	0	0	0	5	2.7
Infectious Disease	1	0	0	0	0	1	0.6
Rheumatology	1	0	0	0	0	1	0.7
Neurology	2	0	0	0	0	2	1.9
Developmental	5	0	0	0	0	5	3.2
ICU	1	0	0	0	0	1	1.3

	Total Recommended for Manitoba[1]	DISTRIBUTION					
		Periphery		Brandon		Winnipeg	
		Rec.[2]	Actual FTEs 1993/94	Rec.[3]	Actual FTEs 1993/94	Rec.[4]	Actual FTEs 1993/94
Respiratory Medicine	N/A	-	-	-	-	-	1.9
Genetics	3	0	0	0	0	3	2.9
Nephrology	N/A	0	0	0	0	-	1.9
Psychiatry	143	19	14[5]	8	6[5]	117	101.8
Obs & Gyn	61	2	1	6	4	53	51.4
General Surgery	79	11	8	9	7	59	51.0
CVT Surgery	10	0	0	1	1	9	11.9
Neurosurgery	7	0	0	0	0	7	5.0
Ophthalmology	44	0	0	4	2	40	34.8
Otolaryngology	23	1	1	2	0	20	13.3°
Orthopaedic	41	0	0	3	2	38	25.6
Plastic	13	0	0	1	0	12	12.3
Urology	23	0	0	2	1	21	15.7
Anaesthesia	85	1	0	8	4.5	76	85.2

1. Recommended numbers calculated on the population of Manitoba as at June 1, 1993, as indicated in the 1993/94 Annual Report of Manitoba Health.
2. The "Periphery" refers to eight communities: Thompson, Flin Flon, The Pas, Dauphin, Portage la Prairie, Steinbach, Morden-Winkler and Selkirk.
3. The recommended number of physicians for Brandon was derived by applying population/physician ratios to the Manitoba Health region known as "Westman."
4. The recommended number of physicians for Winnipeg is the number recommended for the province less the number recommended for the periphery communities and Brandon.
5. The actual number of FTEs for psychiatry was determined, in part, from information provided by individual psychiatrists.

+ Instead of FTEs, individual physicians are shown. FTE calculations for procedural subspecialties within non-procedural specialties are made difficult by differences in the fee schedule.

* This number likely overestimates the number of FTEs. Because specialists with dissimilar fee schedules are aggregated for the purposes of calculating FTE benchmarks, a distortion in the estimate of FTEs arises.

° This number likely underestimates the number of FTEs. Because specialists with dissimilar fee schedules are aggregated for the purposes of calculating FTE benchmarks, a distortion in the estimate of FTEs arises.

The Specialist subcommittee's summary of these data[3] was as follows:

> *Because of its size and isolation, Thompson should have two physicians in each specialty of paediatrics, general internal medicine, general surgery, psychiatry and obstetrics, an otolaryngologist and an anaesthetist. Further, Dauphin and Morden-Winkler have shown they can support two general surgeons, so these were added to the plan.*
>
> *The number of general surgeons in the periphery does not take any account of surgery done by non-specialist surgeons. The subcommittee found that the number and distribution of surgical specialists in Manitoba was not a significant departure from that recommended by either formula. Surgeons in the specialties of otolaryngology, ophthalmology, orthopaedics, and urology, and general surgeons in Winnipeg appear to be in short supply. Several surgical subspecialties - plastic surgery, cardio-vascular and thoracic surgery - appear to have appropriate number of physicians. It must be recognized that in our capped fee-for-service system, new specialists can only earn at the expense of those already in the Province. Surgical workloads are relatively easy to document, and one approach to assessing need is to see if Manitobans receive less surgery than residents of other provinces.*
>
> *The number of psychiatrists in Winnipeg is in slight surplus according to the FPTAC recommendation, but under-supplied by the Saskatchewan. There are 14 psychiatrists outside Winnipeg-Brandon - seven in Selkirk, three in Morden-Winkler and the remainder in the rural south. There are none in Dauphin, Thompson, Flin Flon or The Pas, so filling these positions would give a recommended complement of 19 in the "periphery". At the request of Manitoba Health, the Chief Provincial Psychiatrist developed a Psychiatric Manpower Plan which recommended that there be some 30-40 psychiatrists practising in rural Manitoba. In view of remoteness factors and/or the imminent opening of psychiatric inpatient units, the most urgent need for psychiatrists would appear to be in Thompson, Flin Flon, The Pas, Dauphin and Portage la Prairie.*
>
> *The number of physicians practising anaesthesia appears adequate. In the periphery, anaesthesia is given by non-specialist anaesthetists, an arrangement that works well and should continue. The slight "surplus" of anaesthetists in Winnipeg does not pose a problem since their workload is dependent on surgical rates over which they a have no control.*
>
> *General internal medicine is over-supplied in Winnipeg by the FPTAC recommendations. Similarly, by the Saskatchewan requirements, a case can be made that Winnipeg is over-supplied with general internists. However, specific subspecialties may be in short supply in Winnipeg. The periphery, on the other hand, is lacking general internists. Brandon is reasonably well supplied with internists, but might accommodate more sub-specialists.*

---

[3] The excerpt is taken from the "Recommendations of the Physician Resource Committee for a Comprehensive Physician Resource Plan" which was submitted by the Manitoba Medical Services Council to the Minister of Health in 1996. The Deputy Minister agreed to our quoting from this report.

General paediatricians in the periphery communities are in short-supply, and in over-supply in Winnipeg. Compared to the Saskatchewan recommendation, the number of paediatric subspecialists is reasonable. The shortage of neonatologists in Winnipeg may not be as purported. Neonatologists are paid on a sessional rate and may not always be submitting evaluation claim cards to Manitoba Health. Physician resource policies favouring fewer general paediatricians in Winnipeg and more in the periphery appear rational.

It should be noted that in some cases - internists, paediatricians, psychiatrists - the numbers recommended for the periphery should be regarded as floors rather than ceilings; there would be no objection to increased cognitive specialists in the periphery.

With regard to specialists, the Committee concludes that:

1. *The number and distribution of surgeons and surgical specialists, including anaesthetists, in Manitoba does not require substantial change.*
2. *Cognitive specialists (internists, psychiatrists, and paediatricians) are needed outside Winnipeg and Brandon.*
3. *Additional cognitive specialists are not needed in Winnipeg or Brandon, and increases in their numbers should be discouraged. Indeed, there is an oversupply of general paediatricians in Winnipeg.*
4. *The number of subspecialists within the cognitive specialties vary as to supply and must be considered separately.*

2.2 Specialist Services Delivered to Non-Manitoba Residents

Manitoba physicians provide care not only to Manitoba residents, but also to some residents of Saskatchewan and Northwestern Ontario. In support of the subcommittee's work we analysed the billings data to determine what proportion of Manitoba's specialist supply is used by non-Manitobans. As can be seen in Table 4, internists provide the equivalent of 4.5 FTE physicians to out of province residents; paediatricians, general surgeons and ophthalmologists the equivalent of 2-3 physicians, and all other groups lesser amounts. Only for neurosurgeons and cardiovascular surgeons does the amount of care provided to out of province residents approach even 10% of the local specialist supply. The subcommittee's conclusion was that out of province care could justify one additional FTE to the provincial recommended numbers in most of the surgical subspecialties, but made little difference to medical specialties, given present supply.

Table 4. Specialists Needed in Manitoba to Serve Out of Province Residents

	Total Fees Billed by Specialty Group			
	Manitoba Residents	Out of Province Residents	OOP as % of Total Billing	FTE Physicians Needed to Serve OOP Residents
Medical Specialties:				
Neurology	$ 2,397,180	$ 97,828	3.9	0.6
Dermatology	2,398,578	39,508	1.6	0.3
Other	23,719,372	820,290	3.3	4.8
Paediatrics	9,799,670	283,033	2.8	2.6
Psychiatry	11,624,683	145,325	1.2	1.4
Obs & Gyn	11,381,142	383,902	3.3	1.9
General Surgery	12,261,233	470,145	3.7	2.5
Surgical Specialties:				
CVT Surgery	2,206,662	196,141	8.2	0.8
Neurosurgery	757,966	83,742	9.9	0.4
Ophthalmology	7,717,641	511,041	6.2	2.1
Otolaryngology	2,789,012	191,380	6.4	0.9
Orthopaedic	6,006,639	235,182	3.8	1.1
Plastic	2,808,987	158,503	5.3	0.7
Urology	3,636,317	220,798	5.7	1.0
Total	$99,505,082	$3,836,818	3.7	21.0

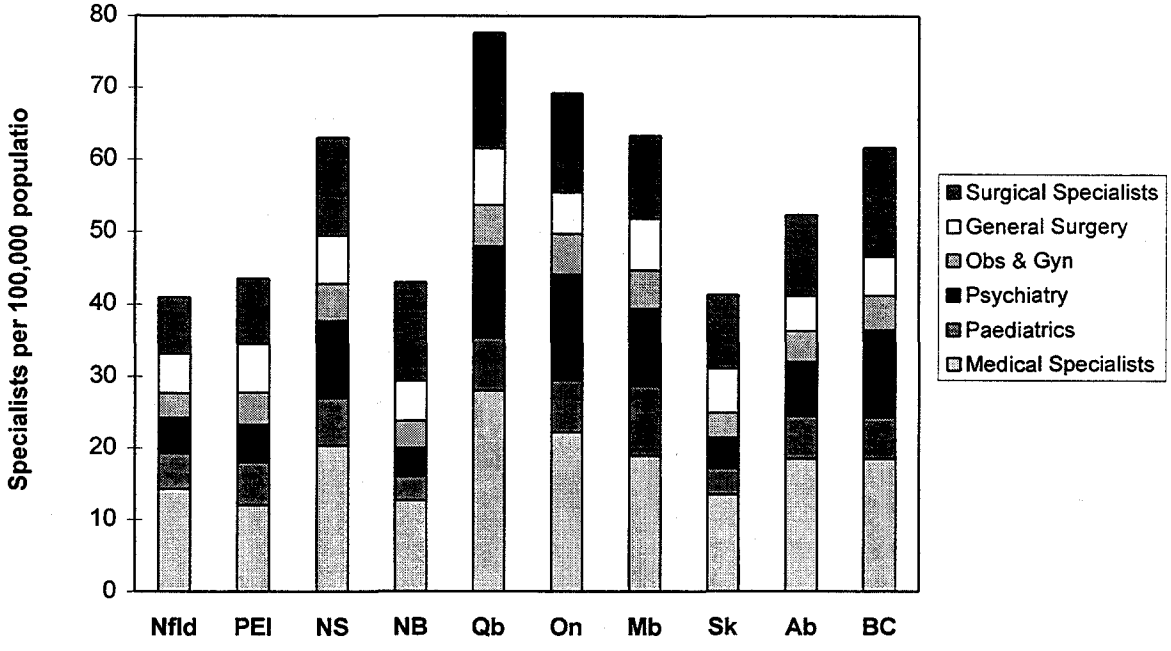
2.3 THE SUPPLY OF SPECIALISTS IN MANITOBA RELATIVE TO OTHER PROVINCES

Given the uncertainties associated with a ratio-based approach, another way to evaluate the supply of specialists in Manitoba is to compare our supply to that of other provinces on a per-capita basis. Figure 1 shows that overall Manitoba has a good supply of specialists, similar to that of BC and Nova Scotia, and more than Saskatchewan, Alberta and three Maritime provinces.[4] Quebec and Ontario stand out as the provinces with the richest supply of specialists. While these are data are based on individuals[5] rather than full time equivalents, Manitoba's position is similar in terms of FTEs.

[4] 1995 data from the Canadian Institute for Health Information (CIHI), based on information from Southam Business Lists. Data for Figure 1 include only those specialty groups analyzed in this report, but the rankings are virtually identical when we include all specialists (i.e. radiologists, pathologists, laboratory specialists, etc). Based on specialists only, Manitoba's supply ranks 3rd; when all physicians are included, Manitoba ranks 5th.

[5] 1995 data from CIHI. The values for Manitoba are very close to those we obtain directly from Manitoba Health data: within 3% overall and within 10% for all except the smallest subspecialty groups where a difference of 1 physician appears large.

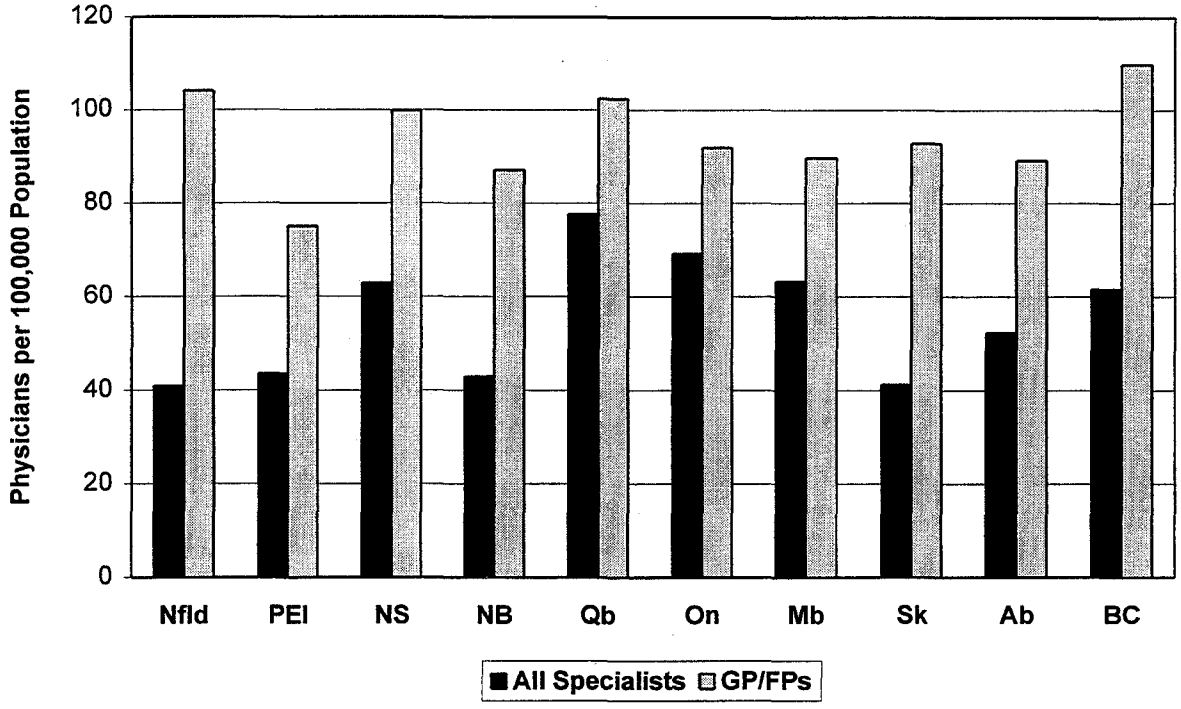
Figure 1: Specialist Physician Supply by Province, 1995
Source: Canadian Institute for Health Information



Because there are many specialists (primarily general paediatricians, general internists and obstetricians/gynaecologists) whose services overlap with those delivered by general and family practitioners, it is important to understand the total physician supply picture in Manitoba. If Manitoba had a relatively limited supply of general and family practitioners, its supply of specialists might seem less generous. However, Manitoba's supply of general/family practitioners is also relatively generous (Figure 2). As a result, Manitoba's overall physician supply is greater than that of Alberta, Saskatchewan, New Brunswick, PEI, and Newfoundland; only Quebec and British Columbia have significantly more physicians per capita than Manitoba.

Figure 2: Supply of Specialists and GP/FPs by Province, 1995

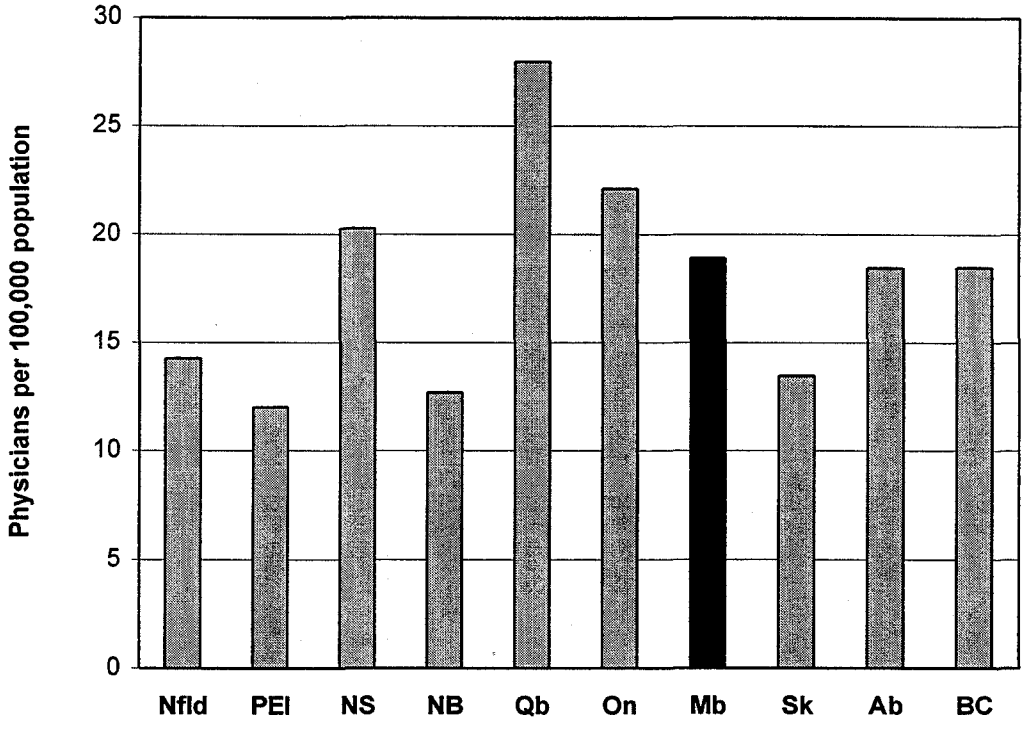
Source: Canadian Institute for Health Information



Figures 3 - 17 compare the supply of each specialty group in Manitoba to that of the other provinces. These are based on mailing lists which are commercially available from Southam Business Lists; they group specialists according to their latest acquired specialty. These data identify the number of individuals in each province, but do not account for workload variations, so they may not perfectly reflect the clinical output provided (this would only be a major problem if workload distributions differed markedly among provinces). However, these data will not be affected by differences in provincial fee schedules, something which can affect calculations of full-time equivalents.

Figure 3: Supply of Medical Specialists by Province, 1995

Source: Canadian Institute for Health Information



Manitoba is reasonably well supplied with Medical specialists; only Quebec and Ontario have significantly more (Figure 3). Manitoba has more paediatricians per capita[6] than any other province (Figure 4). Manitoba is also well supplied with psychiatrists (Figure 5) and obstetricians and gynaecologists, particularly when compared to the other prairie provinces (Figure 6). Manitoba has more general surgeons than most other provinces (Figure 7), and is just below the middle of the supply figures for surgical specialists (Figure 8).

[6] Manitoba's position as having the richest supply of paediatricians also holds if the calculations are per 1000 children age 0-14.

Figure 4: Supply of Paediatricians by Province, 1995

Source: Canadian Institute for Health Information

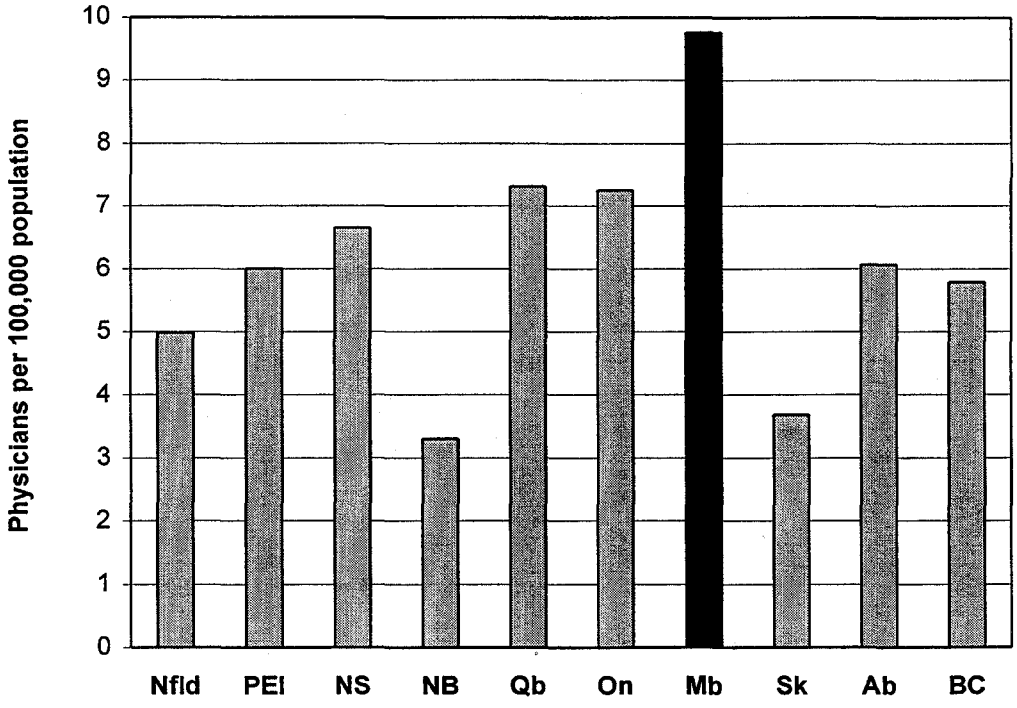


Figure 5: Supply of Psychiatrists by Province, 1995

Source: Canadian Institute for Health Information

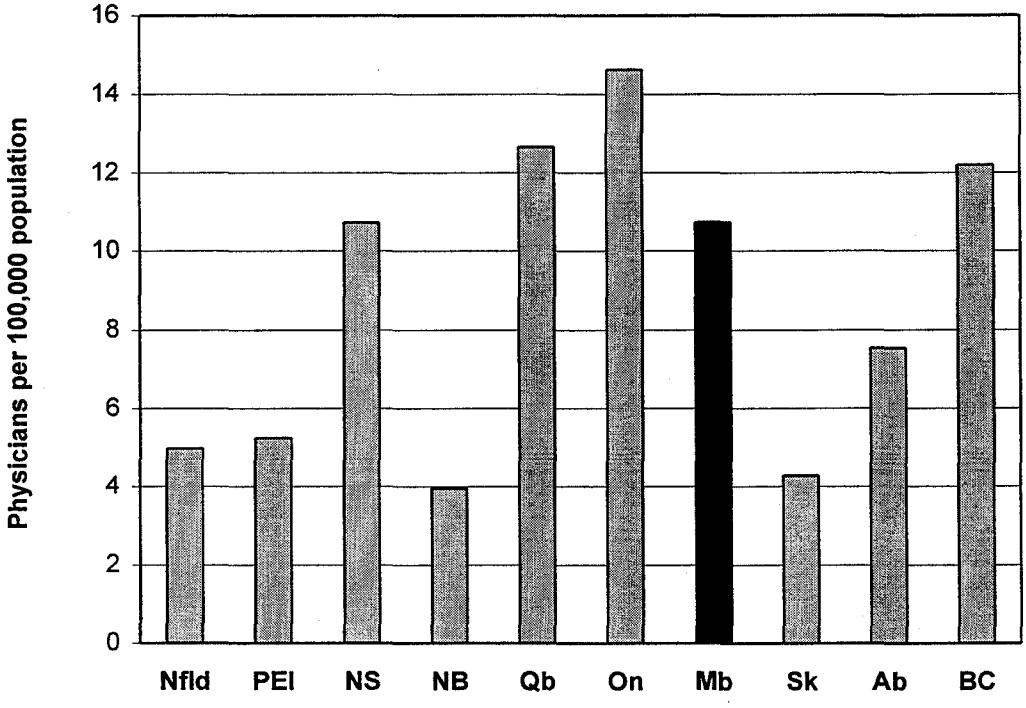


Figure 6: Supply of Obstetricians & Gynaecologists by Province, 1995

Source: Canadian Institute for Health Information

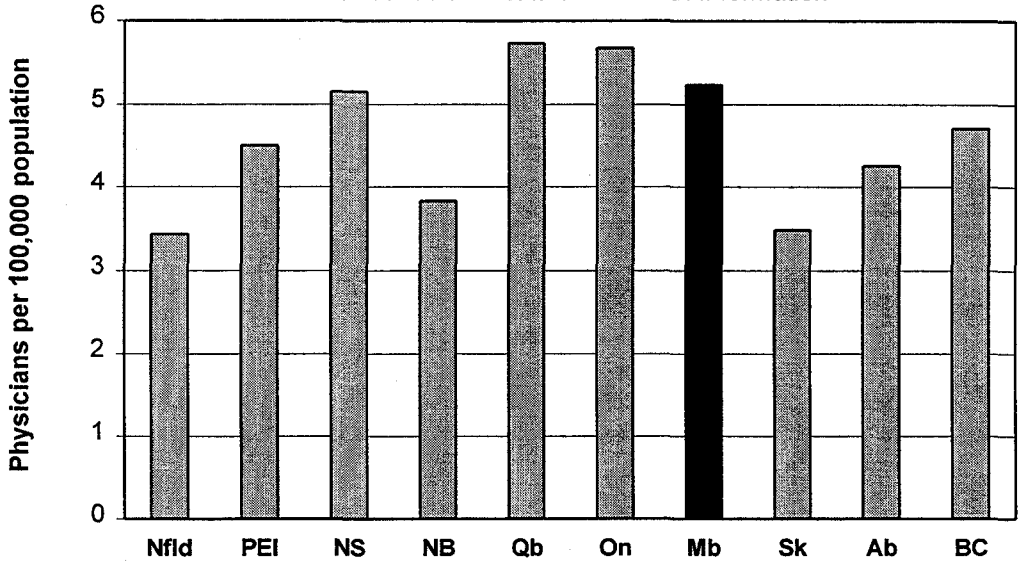


Figure 7: Supply of General Surgeons by Province, 1995

Source: Canadian Institute for Health Information

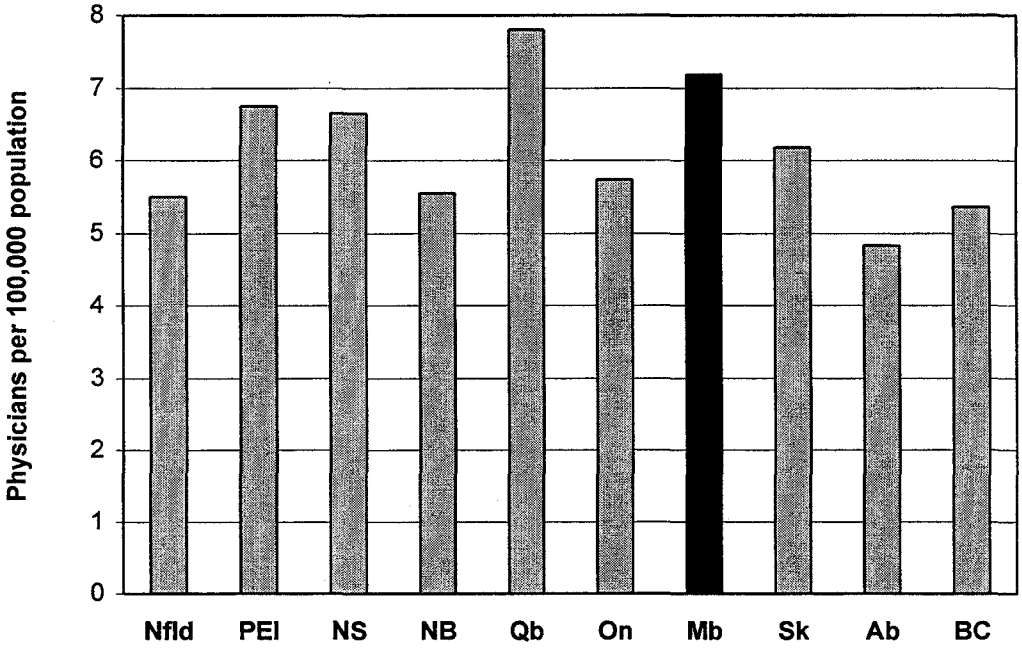
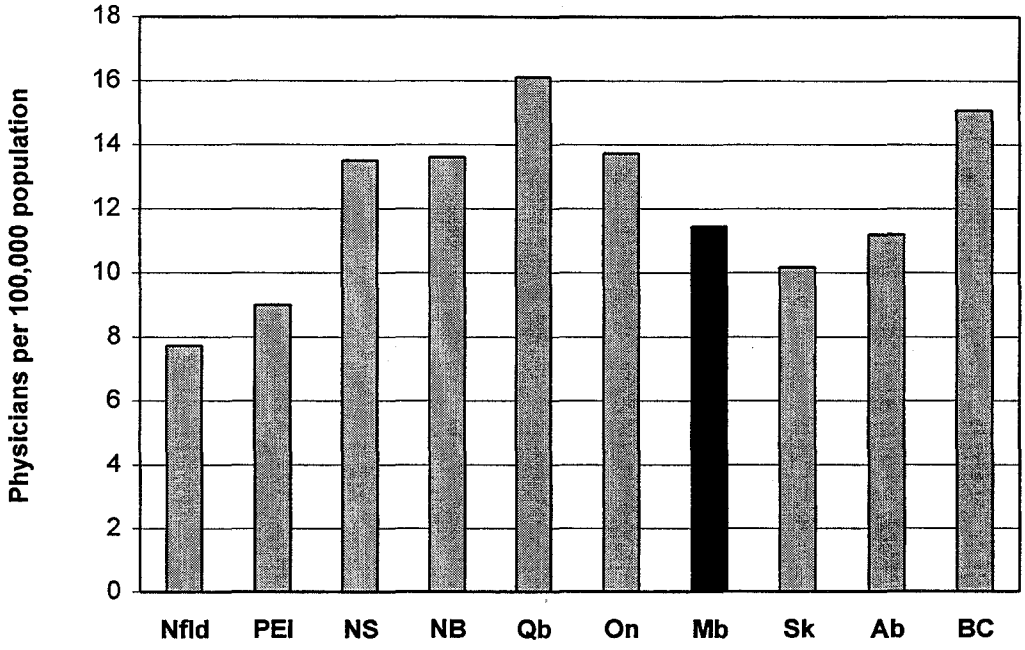


Figure 8: Supply of Surgical Specialists by Province, 1995

Source: Canadian Institute for Health Information



Examining the subspecialties individually, Manitoba is reasonably well supplied with neurologists, with only Quebec and Nova Scotia having significantly more (Figure 9)[7]. The supply of dermatologists in Manitoba appears lower than several other provinces[8] (Figure 10). Manitoba is well supplied with cardio-vascular & thoracic surgeons (Figure 11), but has a relatively low supply of ophthalmologists (Figure 13) and neurosurgeons (Figure 12), though 2 new neurosurgeons established practise in 1995/96 (representing a significant expansion of the supply). Manitoba has a slightly low supply of otolaryngologists[9] (Figure 14), and a supply of orthopaedic surgeons similar to most other provinces, with only Quebec and BC having substantially more (Figure 15). Manitoba has a somewhat low supply of plastic surgeons (though it is similar to the other prairie provinces - see Figure 16), and is reasonably well supplied with urologists (Figure 17).

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[7] The Chair of the Department of Internal Medicine has pointed out that some members of this group are primarily involved with research and deliver little clinical care, which would suggest the data overestimate Manitoba's supply of neurologists. However, as stated in the Appendix, several internists not officially registered as neurologists also practice in this specialty, counteracting the former problem.

[8] The supply of dermatologists in Manitoba is under-represented in the figure because the CIHI data include only 10 dermatologists, versus 13 according to Manitoba datasets. This demonstrates the potential difference between CIHI data and that from provincial sources, a limitation which affects all of these cross-provincial comparisons.

[9] In this specialty, Manitoba has significantly fewer FTEs than individuals, partially due to fee schedule differences. If this is not similar in other provinces, the graph may be somewhat over-stating Manitoba's supply.

Figure 9: Supply of Neurologists by Province, 1995

Source: Canadian Insitute for Health Information

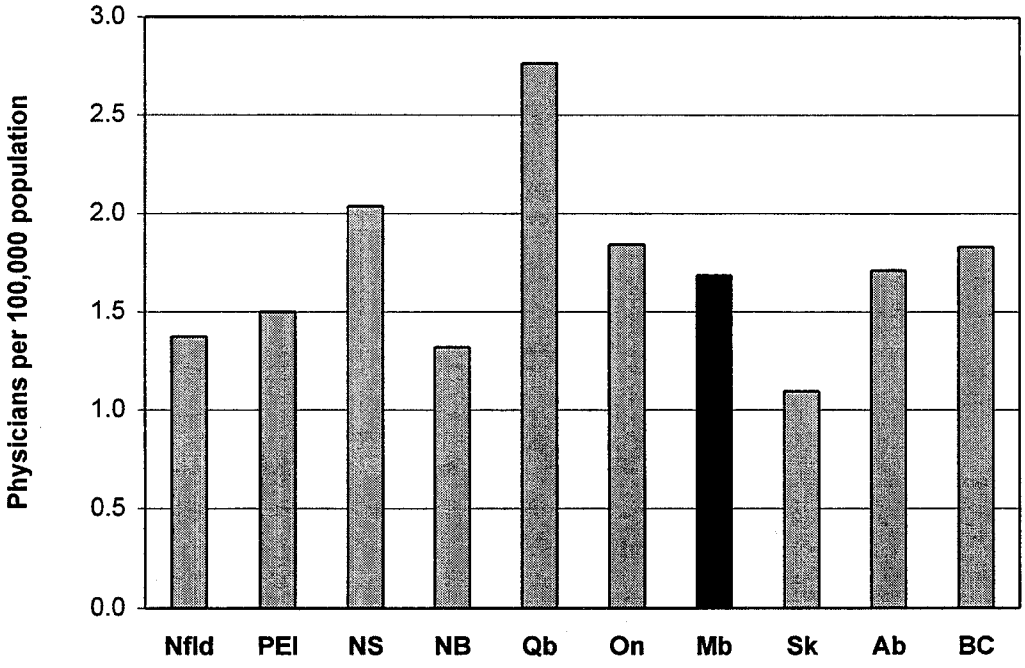


Figure 10: Supply of Dermatologists by Province, 1995

Source: Canadian Institute for Health Information

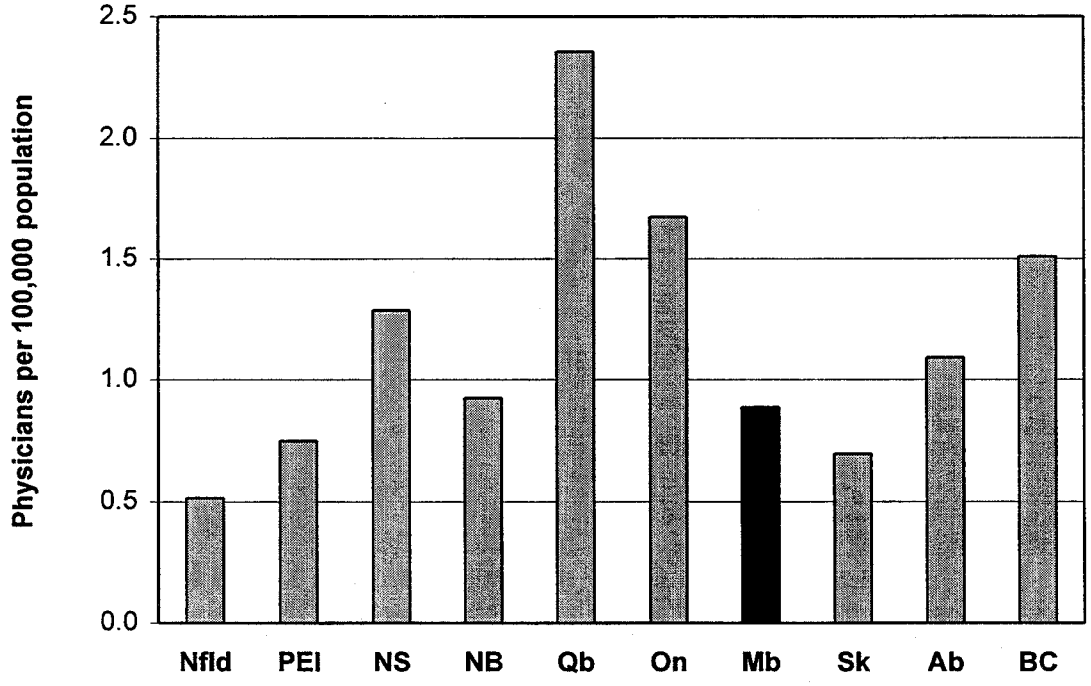


Figure 11: Supply of CVT Surgeons by Province, 1995

Source: Canadian Institute for Health Information

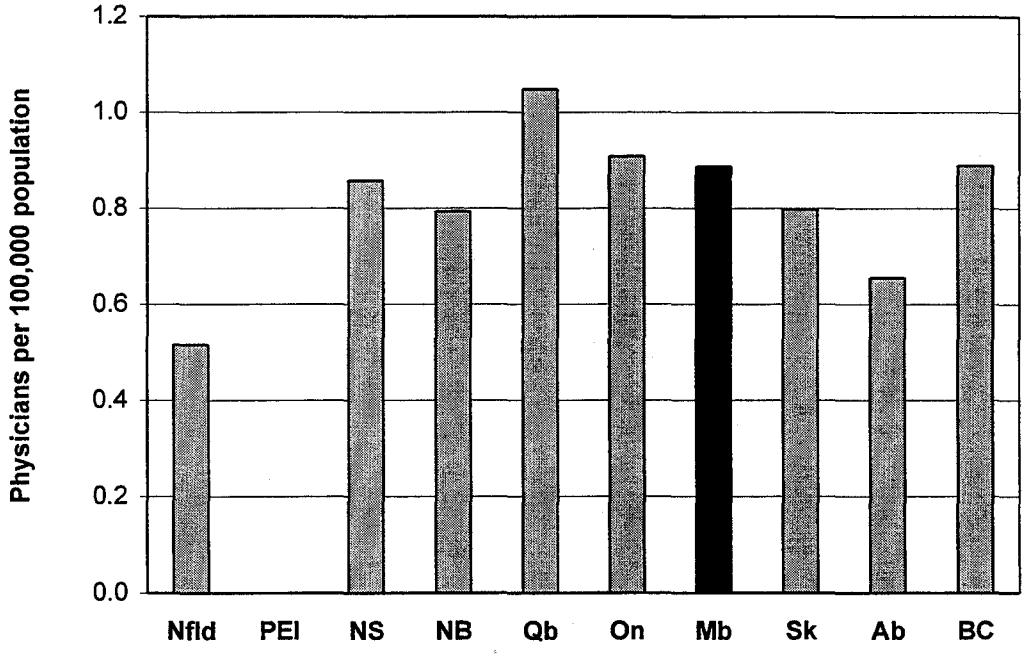


Figure 12: Supply of Neurosurgeons by Province, 1995

Source: Canadian Institute for Health Information

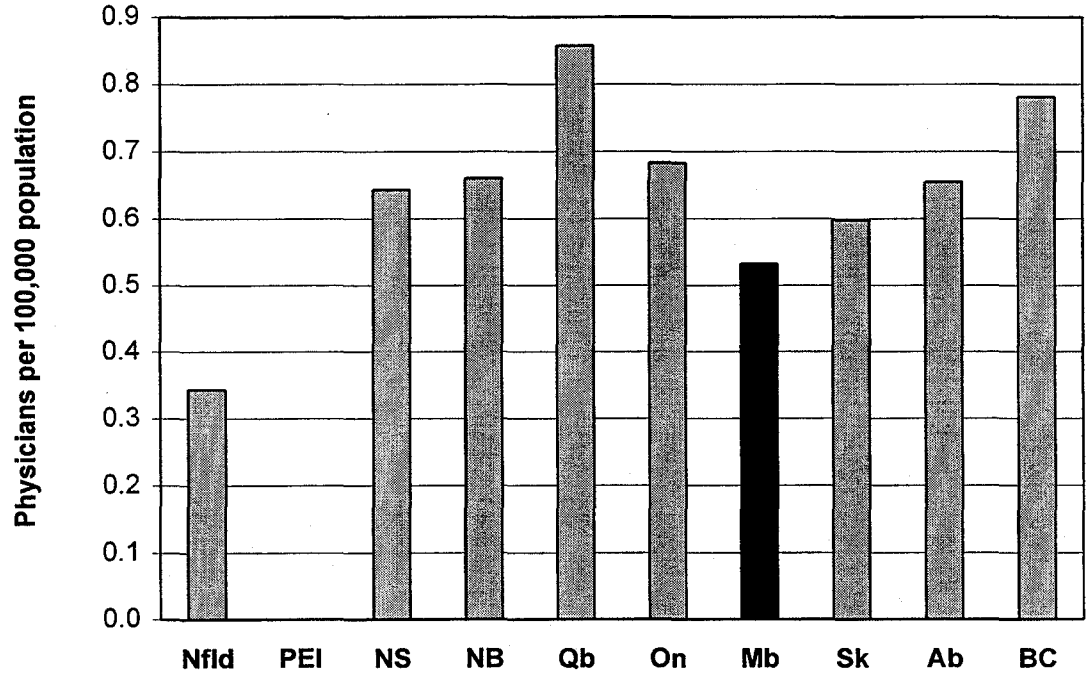


Figure 13: Supply of Ophthalmologists by Province, 1995

Source: Canadian Institute for Health Information

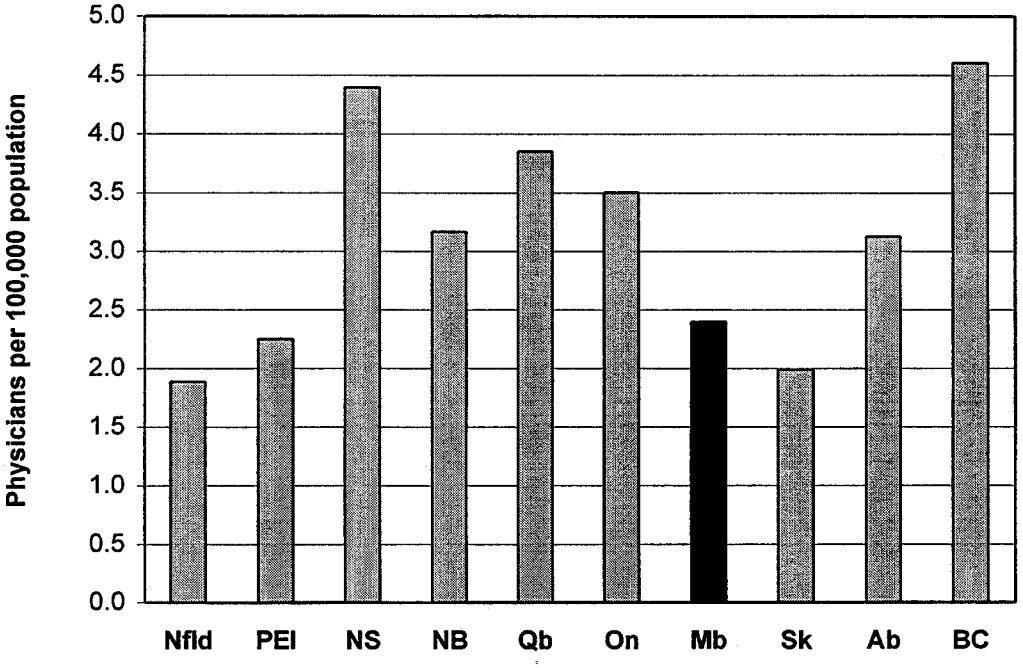


Figure 14: Supply of Otolaryngologists by Province, 1995

Source: Canadian Institute for Health Information

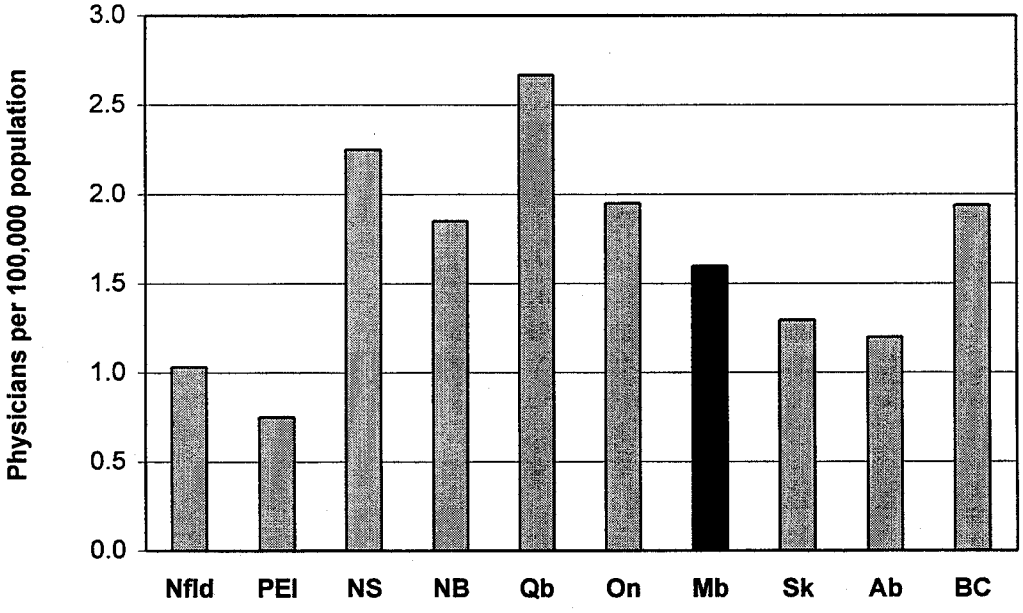


Figure 15: Supply of Orthopaedic Surgeons by Province, 1995
Source: Canadian Institute for Health Information

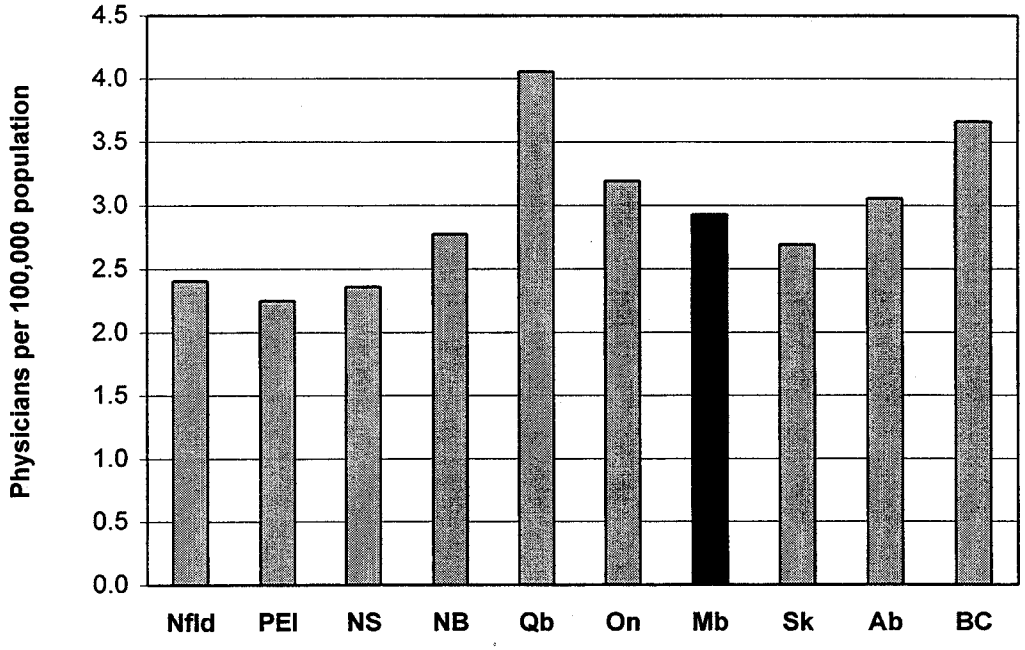


Figure 16: Supply of Plastic Surgeons by Province, 1995
Source: Canadian Institute for Health Information

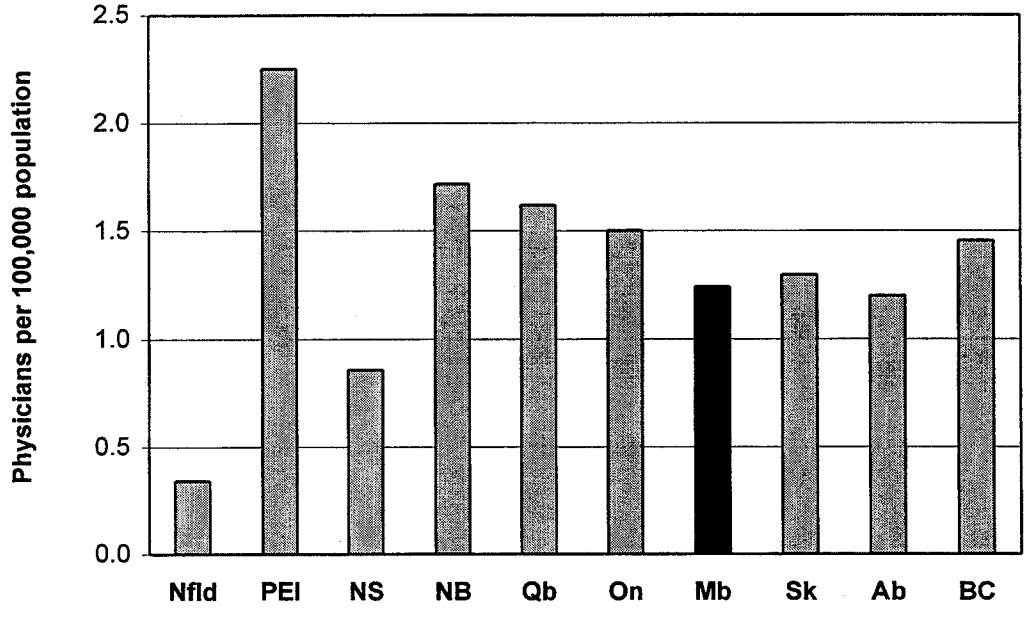
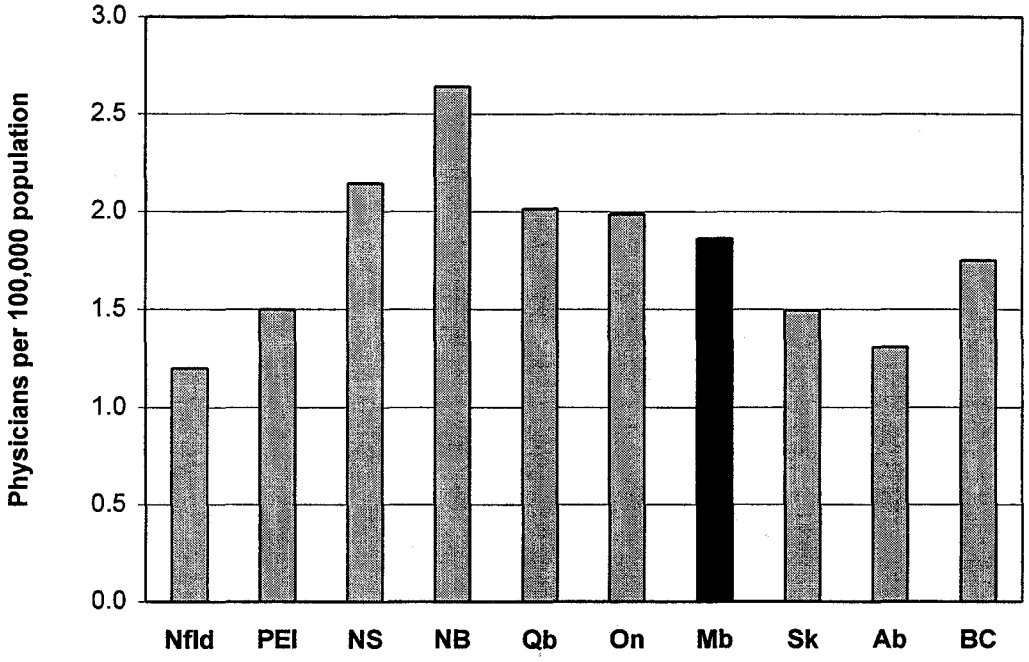


Figure 17: Supply of Urologists by Province, 1995

Source: Canadian Institute for Health Information



2.4 Procedure Rates In Manitoba Compared to Other Provinces

Because the supply of specialists is not directly related to the amount of specialist care delivered, it is important to examine the level of services delivered as an alternative approach to understanding whether the current supply of specialists is adequate to serve the population.[10] Data for this section were supplied by Statistics Canada.[11]

Obstetricians and Gynaecologists. Two of the common procedures frequently performed by gynaecologists are caesarean section and hysterectomy. As can be seen in Figure 18, Manitoba residents have among the lowest rates of these procedures when compared with other Canadian provinces. Low rates for these procedures do not necessarily suggest a shortage of specialists; they may represent appropriate, conservative standards of care (Cohen, Young 1996; Anderson, Axcell 1996). Winnipeg residents, who have better access to gynaecologists than anyone else in the province, have lower rates of hysterectomy than residents of almost any other region of the province (Roos et al. 1995). This is not a recent phenomenon associated with bed closures in Winnipeg hospitals; data from the 1980's confirm this pattern. Ontario data also show that residents of areas served by teaching hospitals have lower rates of hysterectomy than residents of other areas (Cohen, Young 1996).[12] Similarly, low rates of Caesarean section are not likely reflective of a shortage of specialists but may instead represent appropriate, evidence-based standards of practice recommended by the professional association (Anderson, Axcell 1996). Other important procedures provided by obstetricians/gynaecologists include tubal ligations and abortions.

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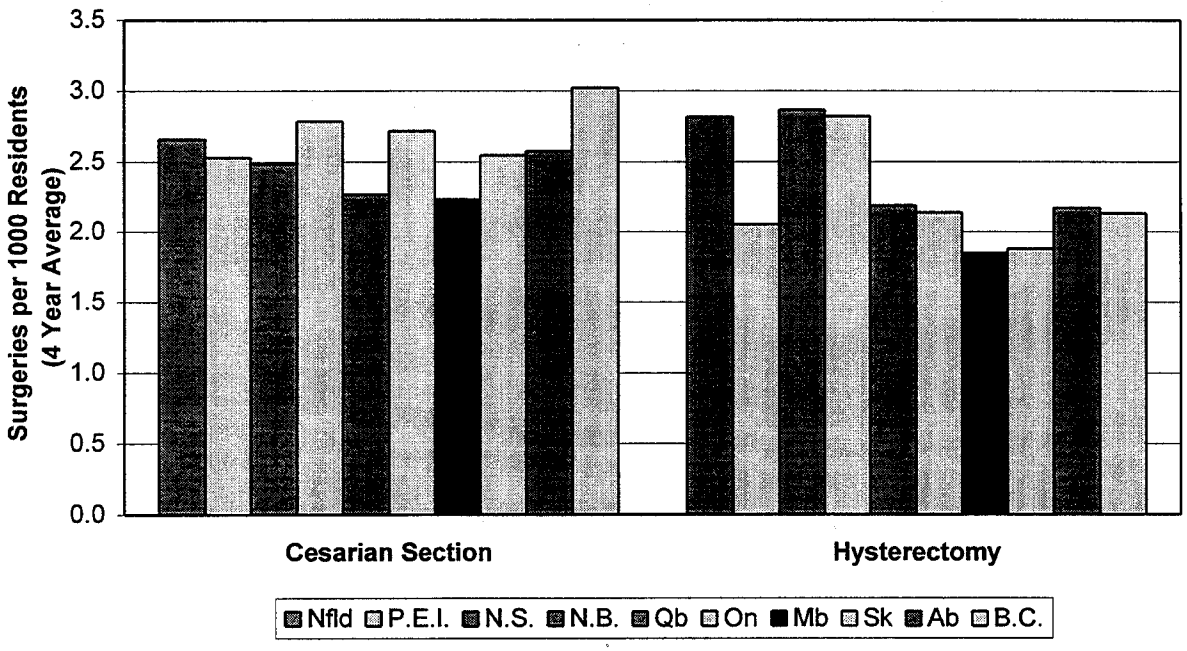
[10] Plastic surgeons are not included in this analysis as we did not have reliable comparative data available on core procedures performed by this group of surgeons.

[11] Statistics Canada data include inpatient procedures only. Therefore, for each procedure, we analyzed Manitoba data from 1994/95 to ensure less than 10% were performed as outpatient procedures.

[12] As can by seen in Figure 72, in Maine where there has been a study group of physicians monitoring hysterectomy practice patterns and rates of surgery across the province for 20 years there has been a small but steady decline in the rate at which women undergo these procedures.

Figure 18: Obs & Gyn Surgical Procedures
Source: Statistics Canada (unadjusted data)



General Surgeons. Figures 19 and 20 present rates of procedures frequently performed by general surgeons, although some of the procedures are also performed by other types of specialists.[13] In general Manitobans appear to have reasonable access to most procedures performed by general surgeons.

[13] Carotid endarterectomy is a procedure performed by vascular surgeons. In Manitoba Health's coding system vascular surgeons and other subspecialists of general surgery are grouped with general surgeons. Records from the College of Physicians and Surgeons suggest that just under half of the practicing general surgeons are subspecialists.

Figure 19: General Surgical Procedures #1
Source: Statistics Canada (unadjusted data)

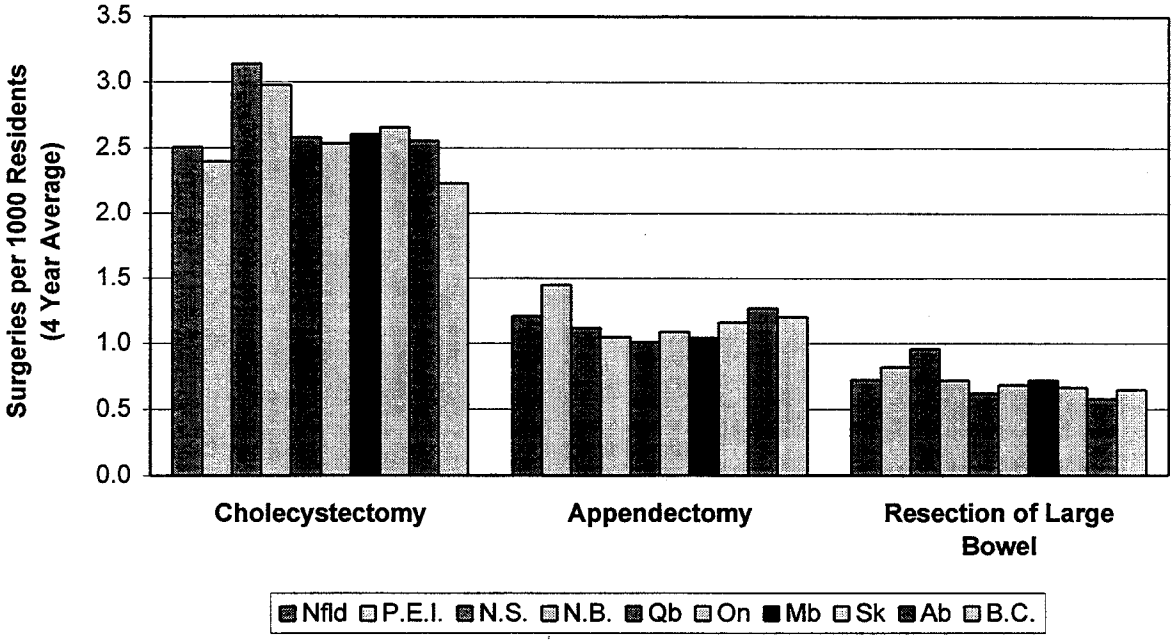
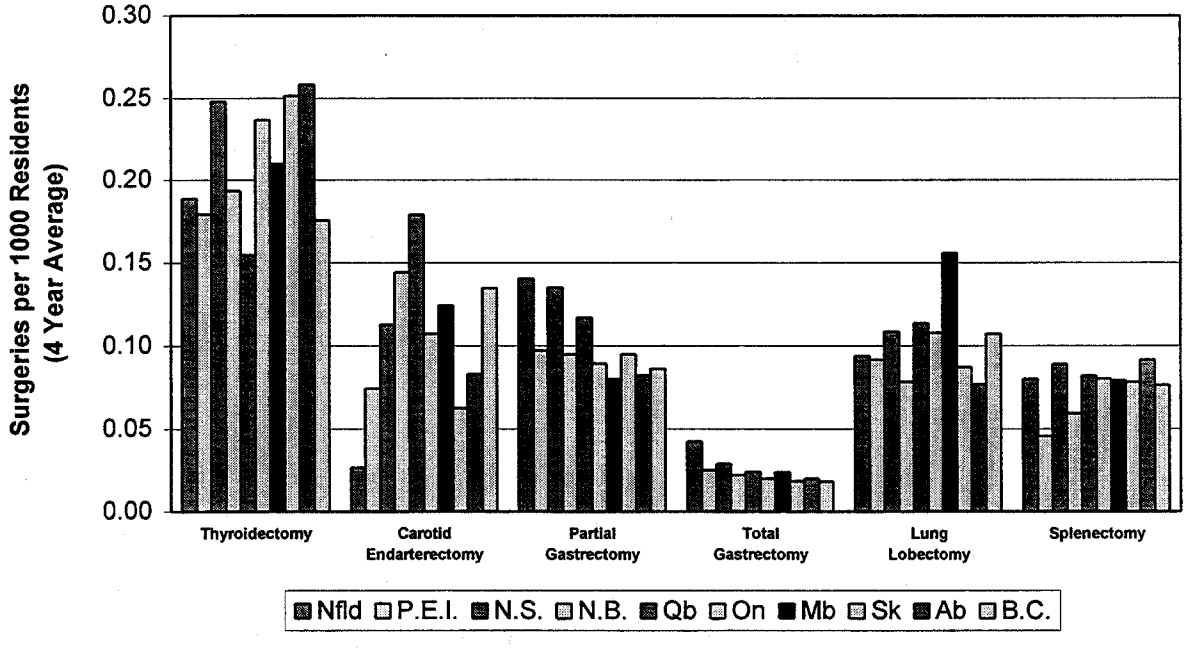
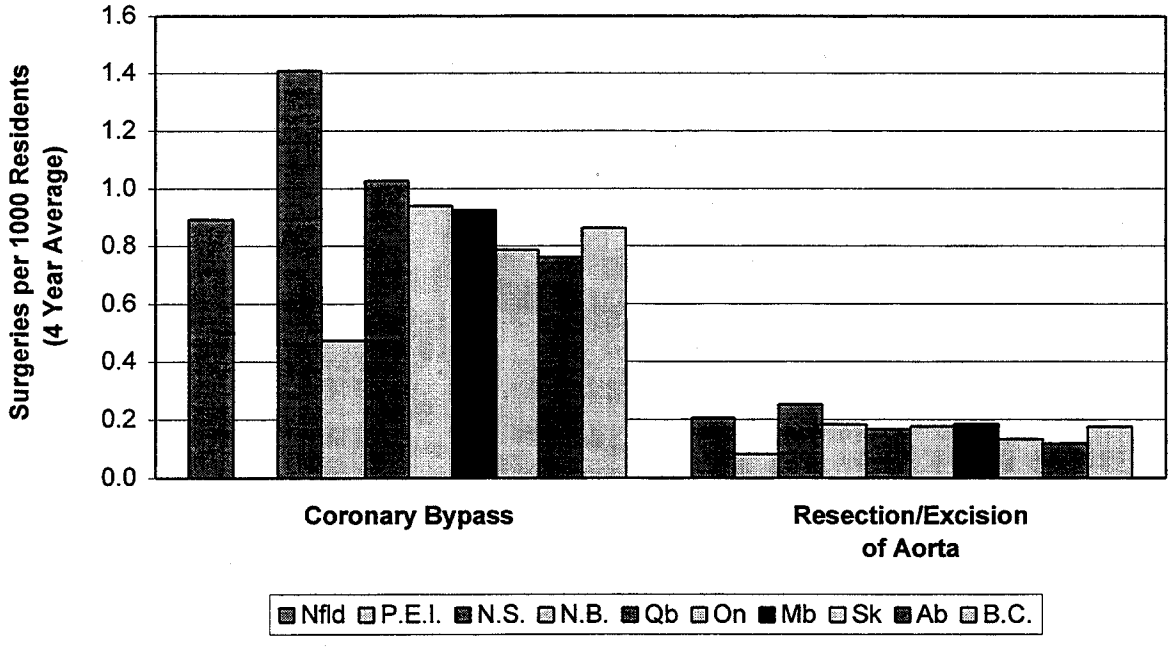


Figure 20: General Surgical Procedures #2
Source: Statistics Canada (unadjusted data)



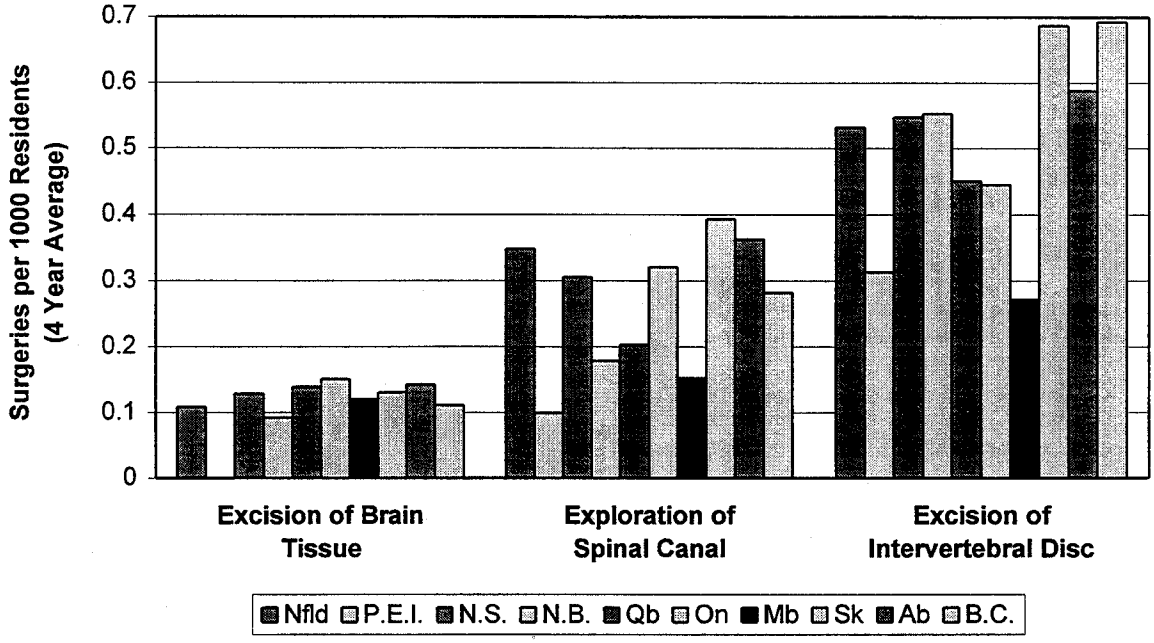
Cardiovascular and Thoracic Surgeons. Consistent with the good supply of cardiovascular and thoracic surgeons, Manitobans appear to have above average access to the major procedures performed by this specialty group (Figure 21). Manitobans have equal or higher rates of coronary artery bypass surgery than residents of several other provinces including New Brunswick, Saskatchewan, Alberta and British Columbia. Manitobans' rate of aorta surgery also appears in the upper range of the rates across the provinces.

Figure 21: CVT Surgical Procedures
Source: Statistics Canada (unadjusted data)



Neurosurgery. Figure 22 shows Manitobans' access to procedures performed by neurosurgeons relative to other provinces. In the area of neurosurgeons' exclusive domain, 'excision of brain tissue,' there are similar rates of surgery across the provinces, likely reflecting consensus on conservative standards for the diagnosis and indications for this serious surgical intervention. While the low rates of 'exploration of spinal canal' may reflect Manitoba's tight supply of neurosurgeons, they may also reflect appropriate, conservative standards of treatment.

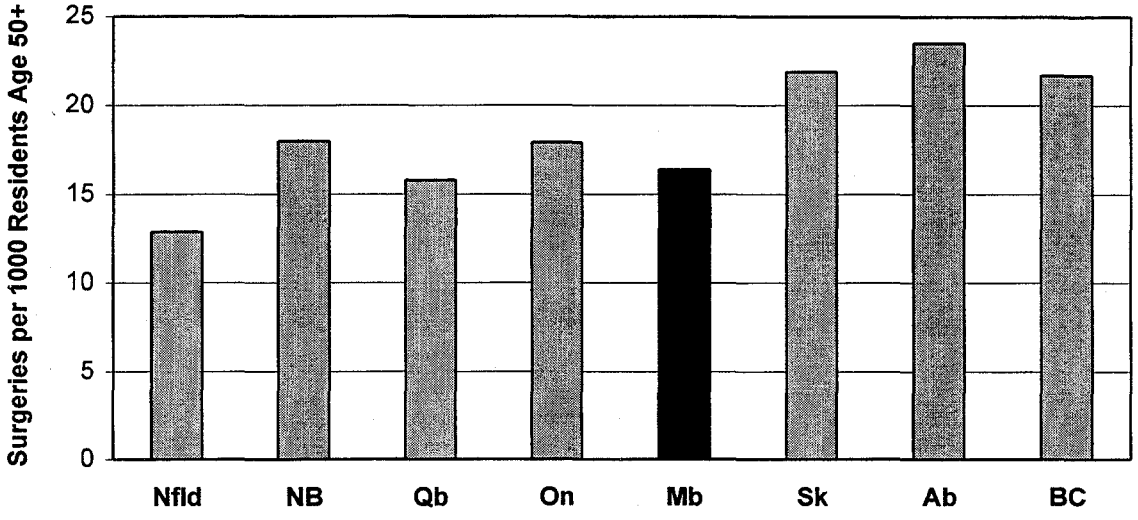
Figure 22: Neurosurgical Procedures
Source: Statistics Canada (unadjusted data)



There is some controversy over the effectiveness of back surgery (Deyo 1995; Cherkin et al. 1994; Hoffman et al. 1993). Thus Manitobans' low rate of excision of inter-vertebral disc (also performed by orthopaedic surgeons), may reflect a tight supply of neurosurgeons, or a more conservative approach to back surgery. Manitoba's rate for back surgery is much lower than rates reported in US jurisdictions such as Maine, where patterns of surgery are reviewed by the profession.

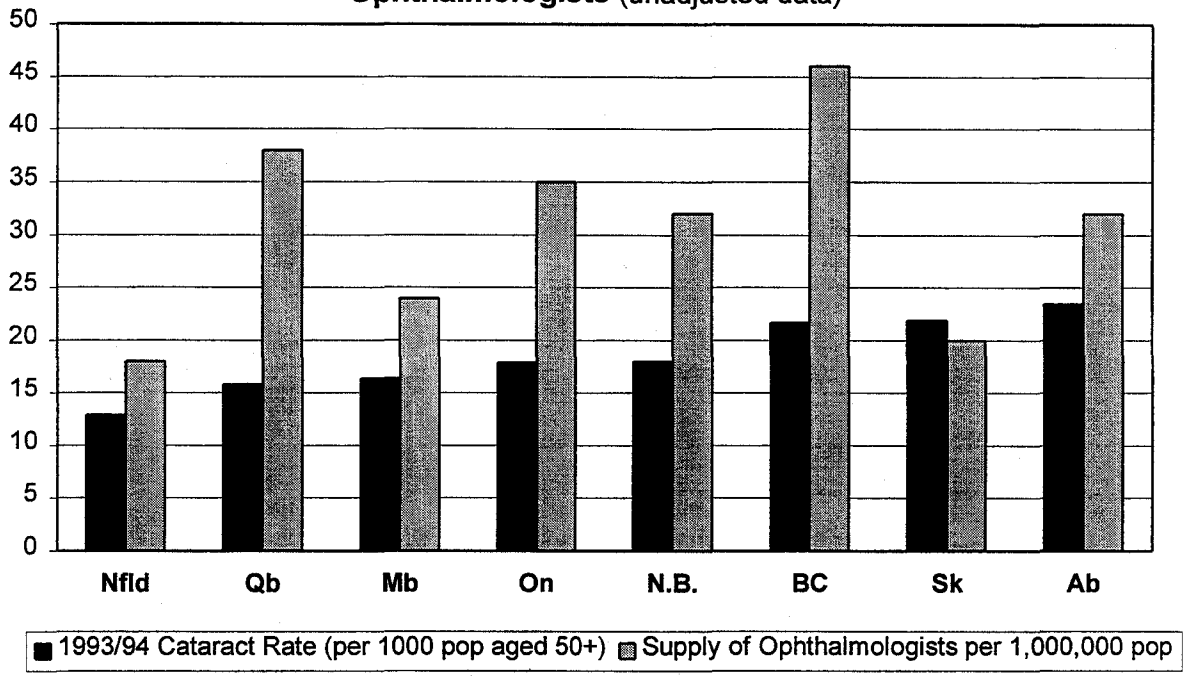
Ophthalmology. As can be seen in Figure 23 (data from 1993/94), Manitoba is among a group of Canadian provinces with cataract surgery rates lower than those of Saskatchewan, Alberta and British Columbia. The data used in Figure 23 only included procedures performed in the public sector, but private clinics also provide cataract surgery, so the absolute levels should all be somewhat higher. In 1994/95, Manitobans underwent 5320 procedures in public facilities, and 692 procedures in private clinics (11.5%).

Figure 23: 1993/94 Cataract Extraction Rates, Selected Provinces
Source: Saskatchewan Health Services Utilization Research Commission (unadjusted data)



However, it is not obvious that the supply of ophthalmologists is the determining factor in Manitoba's relatively low rate of cataract surgery. Figure 24 graphs cataract surgery rates beside ophthalmologist supply rates (per capita), allowing direct comparison. The graph is ordered according to increasing surgical rates, and shows that there is remarkably little relationship between the supply of ophthalmologists and rates of cataract surgery. For example, Saskatchewan had one of the highest rates of cataract surgery despite having the second the lowest supply of ophthalmologists (next to Newfoundland). Individual specialists will also have markedly different practice patterns. For example, in Saskatchewan, there are 25 physicians performing cataract surgery; 3 of the 25 performed more than 1000 procedures in 1993/94, and accounted for almost half (47%) of the procedures performed in the province in 1995/96 (HSURC, 1996). In Manitoba, 21 physicians performed cataract surgery, and the 6 who performed more than 400 per year accounted for 60% of all surgeries. Clearly, factors other than the number of surgeons, possibly relating to the availability of operating room times across and within specialty groups, also affect residents' access to various procedures.

Figure 24: Cataract Surgery Rate and Supply of Ophthalmologists (unadjusted data)



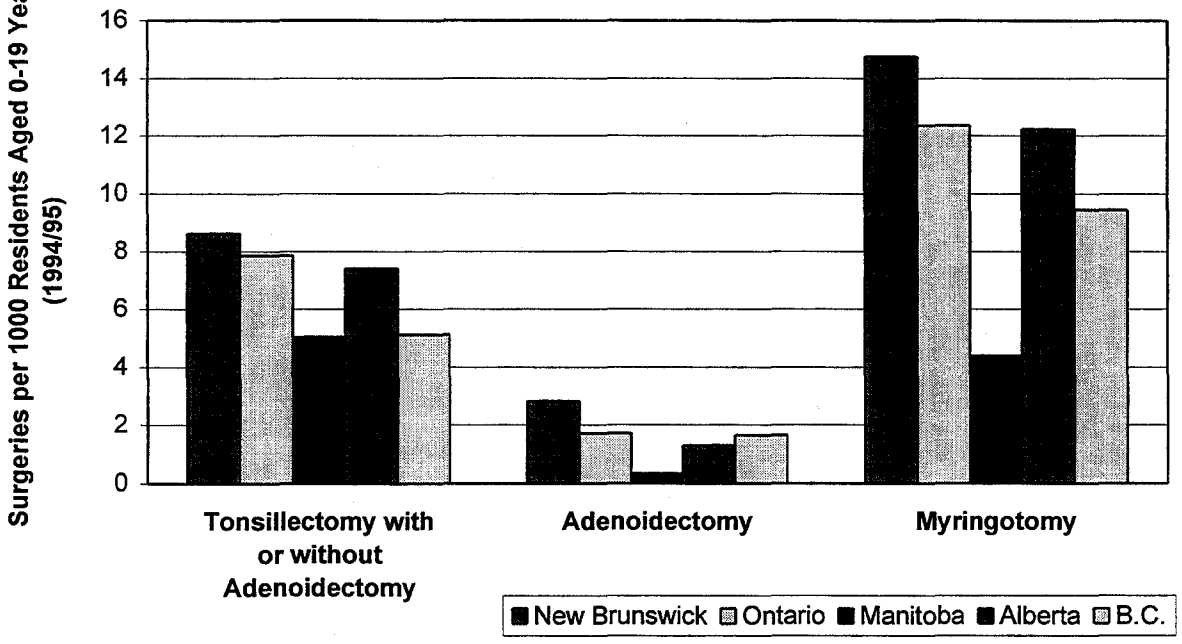
Otolaryngologists. Three of the most frequent procedures performed by ear, nose and throat specialists (otolaryngologists) are myringotomies, tonsillectomies and adenoidectomies[14]. As can be seen in Figure 25, Manitobans have quite low rates of all of these procedures. These procedures are also performed by general surgeons and specially qualified general practitioners, particularly in rural Manitoba. As a recent MCHPE report has noted, rates of tonsillectomy have declined in past years, related to an evolving understanding about indications for, and benefits of, the procedure (Black et al. 1996). A 1994 review of over 6000 cases of tympanotomy tube insertion by ENT surgeons in very young children in the United States (a procedure which is typically part of myringotomy), concluded that less than half of these were inserted for indications considered medically appropriate (Kleinman et al. 1994). Hence, Manitoba's low rate on these procedures may reflect appropriate, conservative standards of

[14] Data for these procedures came from the Discharge Abstract Database of CIHI. This alternate source was used for these procedures, as their database includes outpatient procedures, and many of these procedures are performed in outpatient settings.

treatment rather than a low supply of specialists in Manitoba. This specialty group also has a significant medical as well as surgical practice.

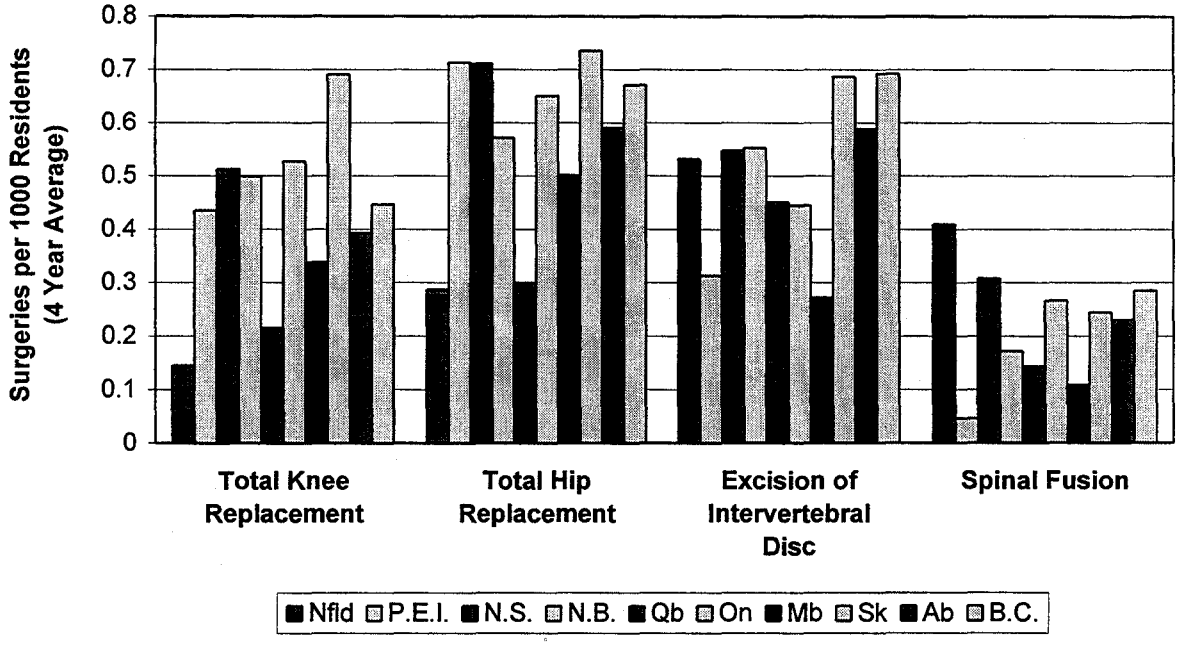
Figure 25: Otolaryngological Procedures

Source: CIHI - Discharge Abstract Database (unadjusted data)



Orthopaedic Surgeons. Figure 26 shows Manitoba's rates for some of the procedures performed most frequently by orthopaedic surgeons. Manitoba has low rates of knee and hip replacement; only Quebec and Newfoundland had lower rates. These procedures have been shown to offer substantial pain relief and dramatic improvements in quality of life (Cleary et al. 1991; Kantz et al. 1992; Laupacis et al. 1993; Liang et al. 1986; Jonsson, Larsson 1991; Katz et al. 1992). These low rates might suggest a need to increase the number of orthopaedic surgeons in the province. However, increasing supply alone is unlikely to be the only or even the best solution to improving Manitobans' access to these procedures. Figures 27 and 28 compare provincial rates of hip and knee replacements to the supply of orthopaedic surgeons. Several provinces have fewer orthopaedic surgeons per

Figure 26: Orthopaedic Surgical Procedures
Source: Statistics Canada (unadjusted data)



capita than Manitoba (Nova Scotia, New Brunswick and Saskatchewan for example), yet residents of these provinces all have higher rates of hip and knee replacements than Manitobans.[15]

Alternative approaches for increasing Manitobans' access to and knee replacement may be necessary, including improving orthopaedic surgeons' access to operating time for these procedures, or examining the allocations in hospital budgets to support the purchase of the expensive prostheses associated with these procedures. A review of Ontario residents' access

[15] About half of Manitoba's orthopaedic surgeons perform hip and knee replacements, with only 7 performing 75 or more procedures a year. The supply of orthopaedic surgeons would not appear to be the major limiting factor on the amount of surgery performed.

Figure 27: Hip Replacement Rate vs Orthopaedic Surgeon Supply (unadjusted data)

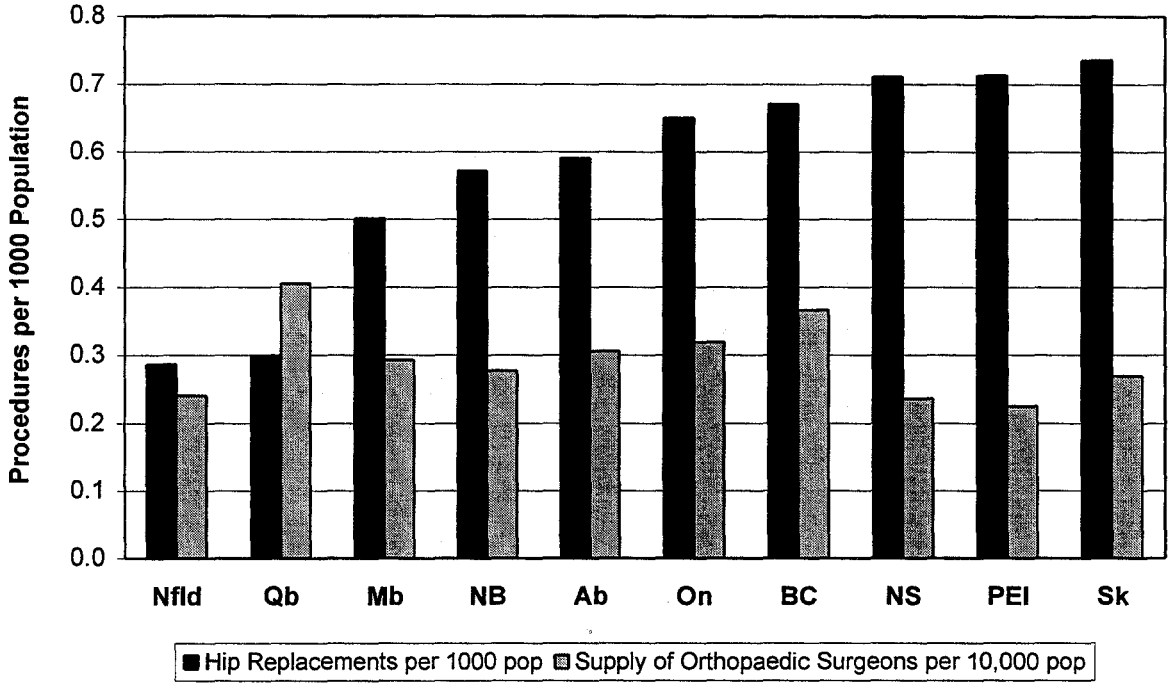
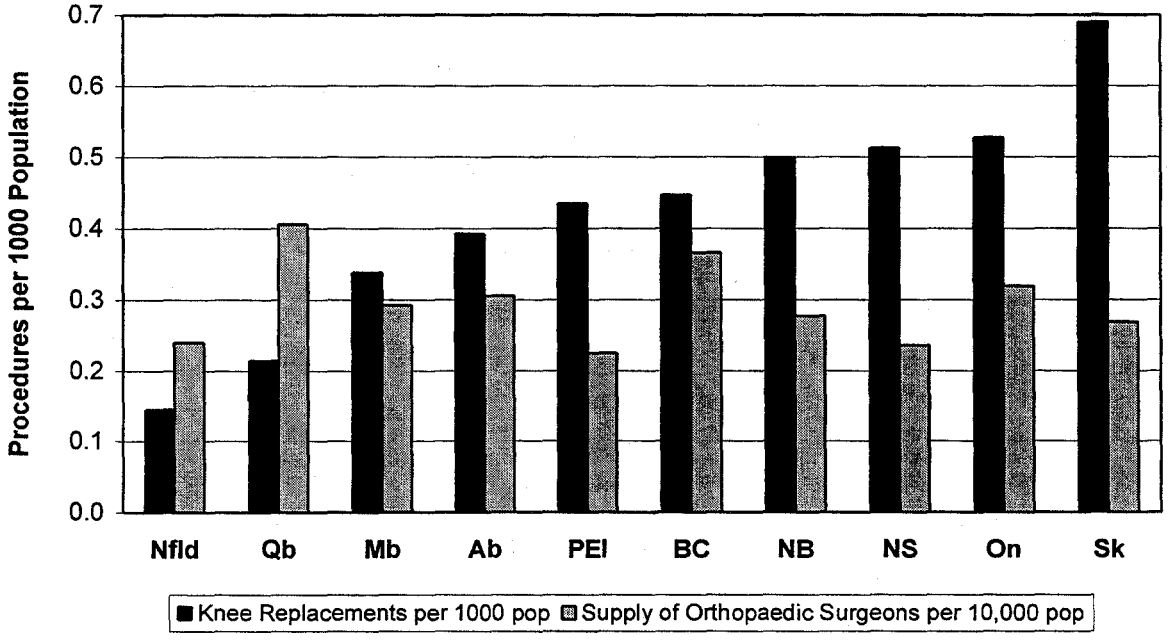


Figure 28: Knee Replacement Rate vs Orthopaedic Surgeon Supply (unadjusted data)



to hip and knee replacements led to several suggestions for ways to increase the number of procedures performed without increasing total expenditures: (1) establish provincially coordinated purchasing of prostheses to ensure lowest cost (2) continue to critically evaluate outcomes associated with new, more expensive prostheses before widespread adoption, and (3) reduce post-operative lengths of stay in acute care facilities by utilizing rehabilitation facilities (Naylor, DeBoer 1996, p. 61).

Urologists. Figure 29 suggests that Manitoba has rates of nephrectomy and kidney transplant similar to most other provinces. Manitoba's rate of prostatectomy, one of the most common procedures performed by urologists, is lower than that of several provinces (including BC, Saskatchewan, PEI), but it is also equal to or higher than several others (including Alberta, Quebec and Newfoundland; see Figure 30). Rates of this procedure have been falling in recent years, as alternative medical and surgical treatments have been introduced; Manitoba's rate likely reflects the profession's appropriate response to these changing indications (To et al. 1996).

Figure 29: Urological Surgical Procedures #1
Source: Statistics Canada (unadjusted data)

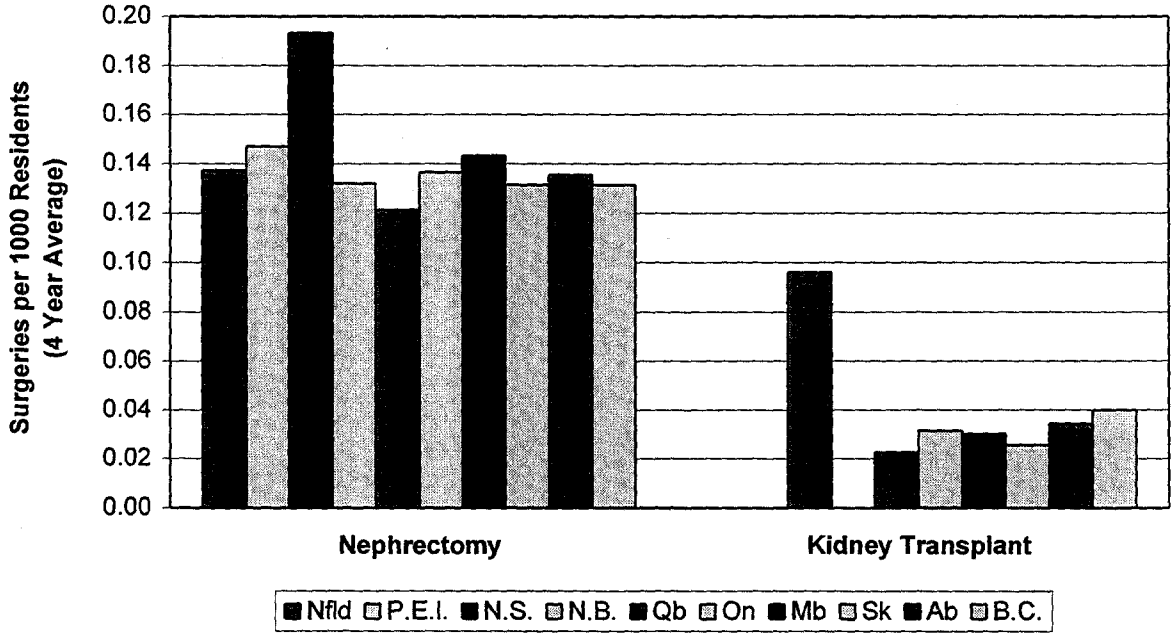
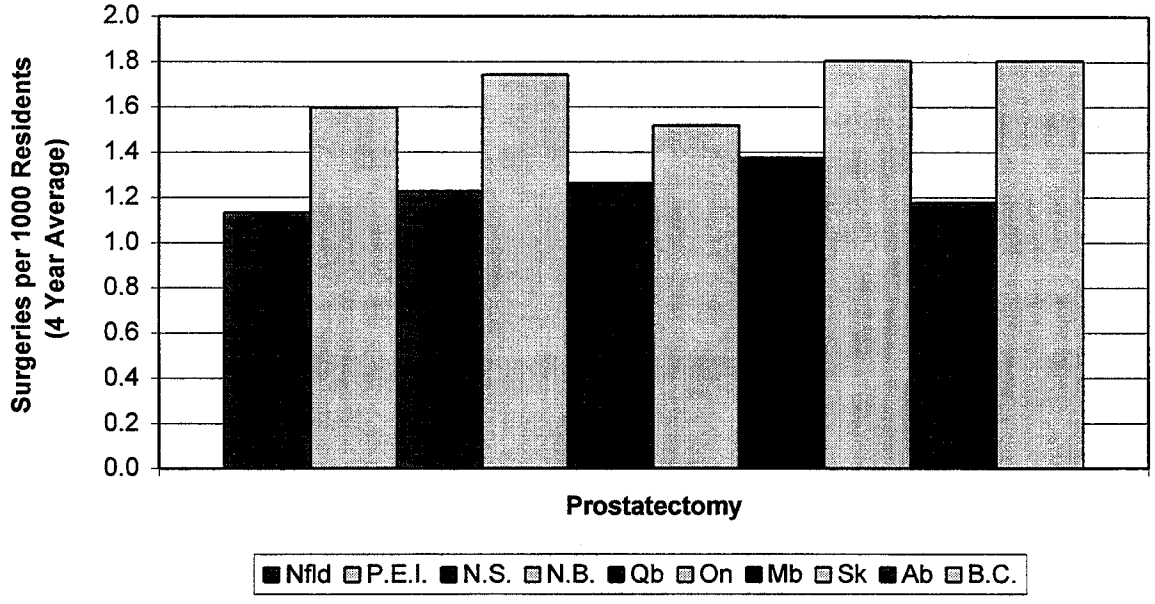


Figure 30: Urological Surgical Procedures #2
Source: Statistics Canada (unadjusted data)



2.5 Age Structure of Manitoba's Specialist Physician Supply

There has been a particular concern that Manitoba's specialist physician group is aging and not being replaced and that this may create a problem in the not too distant future. Rather than using counts of individual specialists, supply is presented in terms of full time equivalents, since this gives a better idea of the active workload of physicians at various points in their life cycle. However, as seen in Table 5, our assessment of the relative availability of specialists is similar using either measure.

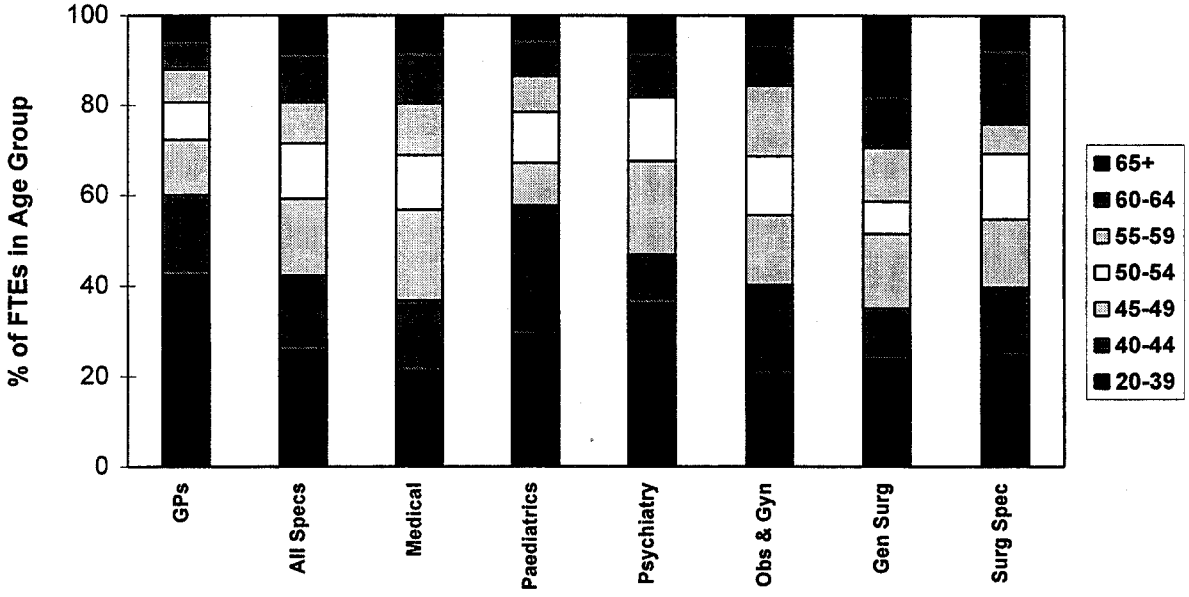
Table 5. Manitoba Supply of Specialists 1994/95

	Practitioners	%	FTEs	%
Medical Specialties	226	31.0	180.8	29.9
Paediatrics	104	14.2	93.7	14.5
Psychiatry	131	17.9	111.1	17.4
Obs & Gyn	61	8.2	58.2	9.1
General Surgery	79	10.8	67.5	10.6
Surgical Specialties	130	17.8	119.3	18.6
Total	731	100.0	630.6	100.0

Figure 31 illustrates the age characteristics of physicians in Manitoba in 1994/95, according to the percentage of physicians in each age group. Paediatrics has the youngest age profile, with almost 60% of their members under 45 years old while other groups have 35-40% of their members under 45 years old. Psychiatry has the second youngest group, with a particularly

large group in the 39 and younger range. At the other end of the age range, paediatrics and psychiatry have the smallest proportion of their members in the 60 years and older groups (13.5 and 14% respectively) while almost one-third of the general surgeons are over age 60.

Figure 31: Age Profile by Specialty



* Note: In Psychiatry, those aged 55-59 yr were added to the 60-64 yr group, as there were fewer than 5 practitioners in the former group.

Stated somewhat differently, many more physicians entered practice in psychiatry and paediatrics (particularly general paediatrics) in the last 15-20 years than was true in the previous 15 years. This is easier to see in Figures 37 and 38 (page 74). There are 20-30 paediatricians in the age groups 35-39 and 40-44, but only 5-10 in each of the 5 year cohorts from age 50 through 64. This will mean retirements will have little effect on reducing the number of these specialists over at least the next decade, and for paediatricians, for at least two decades. Most other specialty groups have not had this large recent influx, and hence will face significant retirements as members in their 60's and 70's cease practice. This is also easier to see in Figures 36 and 39-41 (pages 73-76).

Focusing on the subspecialty groups (figures not presented due to small sample sizes in each age group), the paediatric subspecialists are a particularly young group as are the neurologists, cardiovascular surgeons and plastic surgeons. Conversely, orthopaedic surgeons have the smallest group of young members, while neurosurgeons and otolaryngologists have the largest proportion of members over 60 years old.

2.6 Recent Changes in Specialist Supply Compared to Changes in the Manitoba Population

In order to undertake needs-based planning for specialists, it is important to understand patterns of growth or decline for each specialty group over the recent past and how these relate to changes in the Manitoba population. The number of specialists in Manitoba increased rapidly during the 1970's, as in Canada generally (28%, while the population grew 4%; Roch et al . 1985 p. 84), although the growth in the number of specialists then and since has always been somewhat slower than growth in the number of general and family practitioners.

There have been concerns about how the aging of the population will affect Manitoba's need for specialist physicians. As can be seen in Table 6, while there has been little growth (2%) in the total Manitoba population over the period 1986-1994, there has been a somewhat larger increase in the number of Manitobans age 65-74, and remarkable growth in the number age 75 and over (23%). There was no growth in the paediatric population (those age 0-14) and although not presented here we found a small decrease (2%) in the very young age group (0-2) over the same period.

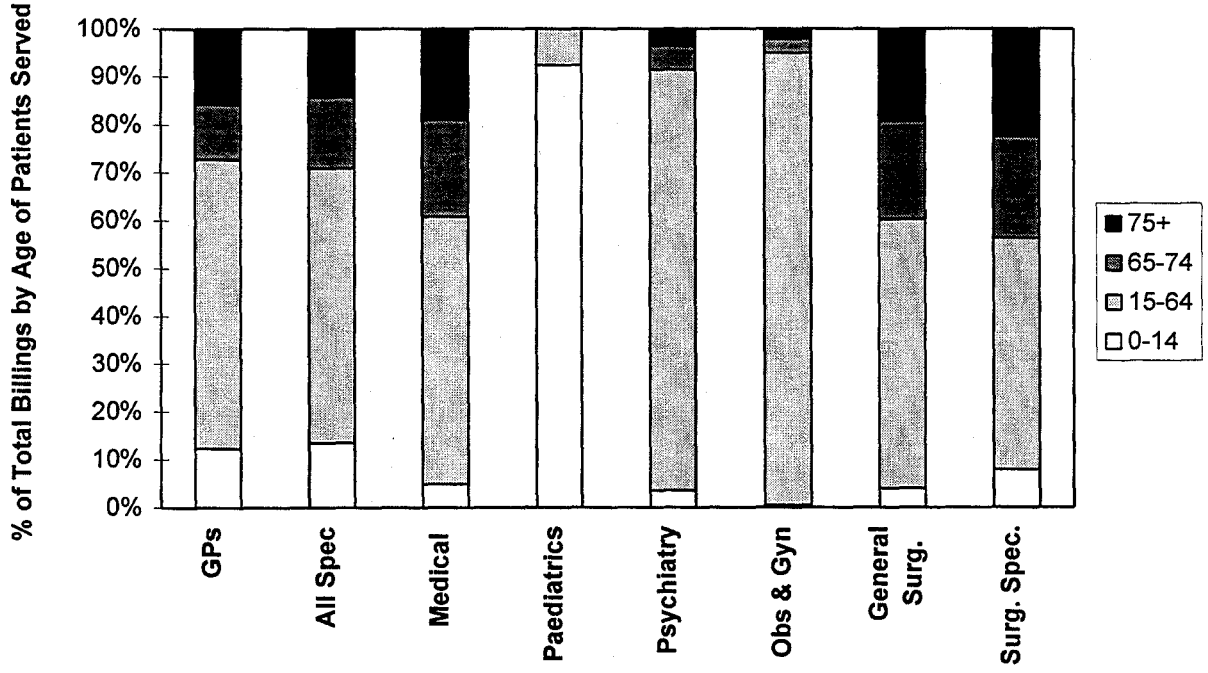
Table 6. Changes in the Manitoba Population 1986-94

Population:	1986	1990	1994	% Growth 1986 - 94
Total	1,119,790	1,135,792	1,138,338	2%
Age 0-14	248,784	249,036	248,161	0%
Age 15-64	733,742	739,667	736,586	0%
Age 65-74	80,766	83,177	84,201	4%
Age 75+	56,498	63,912	69,390	23%

Note: population values are derived from the Manitoba Health Population Registry file.

Since different specialists serve different age groups, it is interesting to identify which specialist groups were most likely to have been affected by the increasing number of elderly in the recent past. Figure 32 allocates the total billings for all services (visits, surgery, etc.) filed by each specialty group according to the age of patient served. While total billings is not a perfect representation of the relative time and skill devoted to specific services, it is, at least within specialty groups, a reasonable proxy, and is frequently used for this purpose. (The biggest problem with using fees to represent labour inputs by specialists is when comparisons are made across specialty groups which is not done here).

Figure 32: Patient Age Distribution by Physician Specialty



As the "All Spec" column in Figure 32 shows, specialists provide most of their care to the non-elderly (71%), with 15% going to those age 65-74 and 14% to those age 75 and over. (Comparative figures for general practitioners are similar: 73% of their total billings are for services to the non-elderly, with 11% and 16% respectively to older age groups.) The age characteristics of the patients served varies by specialty group, with paediatricians, obstetricians/gynaecologists and psychiatrists providing relatively fewer of their services to the

elderly (less than 10%), and medical specialists, general surgeons and surgical specialists providing approximately 20% of their care to those 65-74, and 19-23% of their care to those 75 years and older (the higher number reflects the practice of surgical specialists).

When one examines the more detailed subspecialty groups (Figure 33), ophthalmologists, cardiovascular & thoracic surgeons, and urologists provide a significant amount of their services to the elderly, while the other surgical specialists, along with dermatologists and neurologists, provide relatively few of their services to the elderly.

Figure 33: Patient Age Distribution by Physician Sub-specialty

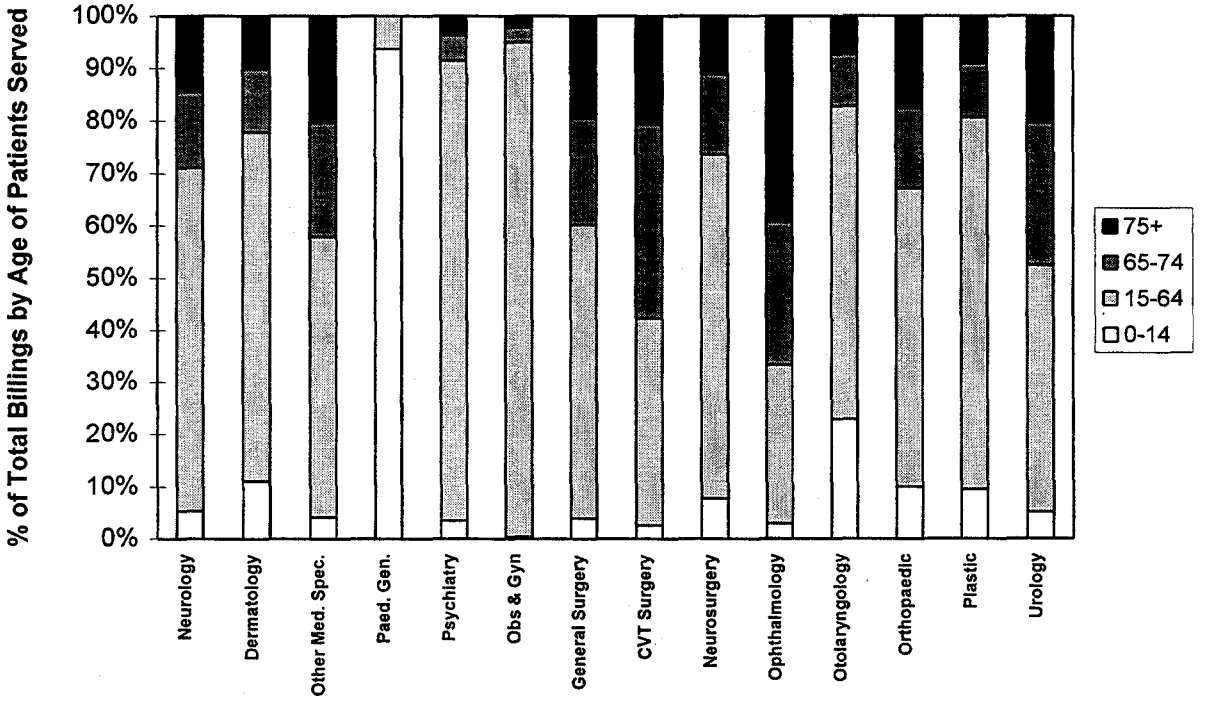


Table 7 documents the changes in the number of specialists in Manitoba over the same period for which population growth was calculated (1986/87 through 1994/95), showing the actual

increase or decrease in the number of specialists which occurred[16], and the increase which would have been required to match the changes in the population served by each group.

Table 7. Changes in Manitoba's Specialist Supply 1986-1994 Compared to Changes Predicted by the Growth in Age Groups Served

	1986 Actual*	1994 Predicted**	1994 Actual*	Predicted % Growth 86-94	Actual % Growth 86-94
GP/FP	963	1004	1010	4%	5%
Medical	220	232	226	5%	3%
Paediatrics	104	104	110	0%	6%
Psychiatry	103	104	124	1%	20%
Obs & Gyn	68	69	58	1%	-15%
General Surgery	81	85	80	5%	-1%
Surg. Specialties	126	134	131	6%	4%
All Specialists	702	728	729	4%	4%

* Values provided by CIHI (# practitioners, not FTEs).

** 1994 Predicted values are the expected number of practitioners needed in 1994, given numbers in 1986 and growth of populations served by that group.

[16] These figures are based on individuals, not FTEs, although as we have shown (Table 5), these tend to be reasonably similar for specialists. Comparisons between these values from CIHI and those produced from the Manitoba Health data are reasonably close based on comparisons of the four most recent years. In 1991-1993, counts from Manitoba Health files are typically 1-3 higher for most specialty and subspecialty groups (8 to 14 higher for "other medical specialists", 5-9 higher for psychiatrists and 2-8 higher for ophthalmologists). Thus our estimates of growth in these specialties may be somewhat underestimated by the analyses. However, in 1994, several specialties showed somewhat higher counts in the CIHI data: paediatrics, orthopaedic surgery and urology all had 4 more in the CIHI values than the Manitoba Health values.

Overall, the increase in the supply of specialists (4%) was twice the growth of the Manitoba population (2%). However, 4% was exactly the rate of growth required in the specialist supply to keep pace with the aging of the population (if we assume the supply of specialists in 1986 was reasonable), since many services provided by specialists are provided to the elderly. However, the specialties in which most of this growth occurred, (psychiatry with a 20% increase and paediatrics with a 6 % increase) were not the specialties whose patient pool was growing.[17] That is, given the growth in the age groups served by psychiatrists, one would have projected a need for one additional psychiatrist from 1986/87 to 1994/95; instead there was an increase of 21. In the other major specialty groups, the rate of growth was similar to or somewhat less than needed to keep up with growth in the populations they serve. The biggest difference was in the number of obstetricians & gynaecologists in the province: there were 10 fewer in 1994 than in 1986, whereas one would have expected an increase of 1. However, despite this drop, Manitoba's supply of obstetricians & gynaecologists remains among the highest in Canada. Also, the recent move by the province to recognize midwifery should reduce the need for obstetricians.

Table 8 reviews the same set of data for the subspecialists. The numbers are small in several of these groups and there can be substantial fluctuations from year to year if there are 2 or 3 arrivals or departures. The large increase in Neurologists shown may over-state the increase in neurologic services, since according to the Chair of the Department of Internal Medicine, several of the recent recruits are primarily researchers, and deliver little patient care. There were also increases in the supply of plastic, urological and orthopaedic surgeons which exceeded need, and a drop in the number of otolaryngologists, dermatologists and other medical specialists relative to population growth.

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[17] If psychiatrists had been in particularly short supply in Manitoba in 1986, then the 20% increase might have represented a need for "catch-up." However, this does not appear to have been the case. Throughout the 1980's, Manitoba was in the top group of Canadian provinces in the number of psychiatrists per capita; only Ontario, Quebec and B.C. consistently had more psychiatrists per capita.

[18] Our projections use the Statistics Canada medium growth projections. We also reviewed the potential impact of the low and high growth projections. For example, using the low growth projection, the paediatric population is projected to shrink by 22% by the year 2016 rather than the 8% reported above; using the high growth projection the paediatric population is projected to increase by 12%.

Table 8. Changes in Manitoba's Subspecialist Supply 1986-1994 Compared to Changes Predicted by the Growth in Age Groups Served

	1986 Actual*	1994 Predicted**	1994 Actual*	Predicted % Growth 86-94	Actual % Growth 86-94
Medical Specialties:					
Neurology	11	11.5	20	4%	82%
Dermatology	13	13.4	11	3%	-15%
Other	196	207.3	195	6%	-1%
Paediatrics	104	103.8	110	0%	6%
Psychiatry	103	104.4	124	1%	20%
Obs & Gyn	68	68.7	58	1%	-15%
General Surgery	81	85.4	80	5%	-1%
Surgical Specialties:					
CVT Surgery	12	12.8	11	6%	-8%
Neurosurgery	6	6.2	6	3%	0%
Ophthalmology	30	33.1	27	10%	-10%
Otolaryngology	22	22.5	18	2%	-18%
Orthopaedic	30	31.5	36	5%	20%
Plastic	9	9.2	12	3%	33%
Urology	17	18.0	21	6%	24%
All Specialists	702	727.8	729	4%	4%

* Values provided by CIHI (# practitioners, not FTEs).

** 1994 Predicted values are the expected number of practitioners needed in 1994, given numbers in 1986 and growth of populations served by that group.

2.7 Estimating the Number of Specialists Needed to Meet Population Changes over the next 10-20 years.

While the previous section reviewed changes in specialist supply as it relates to population change over the recent past, we are continually reminded that more changes, particularly an increasing number of elderly, are yet to come. How many specialists will we need in the future?

Statistics Canada is the major source of population projections for the provinces. Their medium range projection for Manitoba is shown in Table 9. The paediatric population is expected to **decrease** in size by a total of 8% by the year 2016. The adult population is projected to grow relatively little (12%) over the same period, and Manitoba's elderly population is expected to continue to expand, by essentially one-third.[18]

Table 9. Manitoba Population Growth Estimates*

	Projected % Change by Age Group				
	0-14	**15-64**	**65-74**	**75+**	**Total**
1994 to 2006	-5.9%	9.0%	-3.3%	22.0%	5.6%
1994 to 2016	-8.0%	12.0%	34.4%	29.8%	10.4%

* From Statistics Canada: Population Projections for Canada, Provinces and Territories, 1994.

If we combine the information contained in Figures 32 and 33 identifying the age distribution of patients by specialty with the projected growth rates for each age group in Table 9, we can estimate the number of additional specialists we need in Manitoba over the next two decades to serve the aging population. This projection assumes that the current number of specialists is the

appropriate number (despite, for example, recent rapid growth in such specialties as psychiatry), that new substitutions across specialty groups and from non-physicians such as midwives and nurse practitioners will not occur, and that existing practitioners will not expand (or contract) their current patient loads.

Table 10 presents the results of this analysis, including the number of specialists in each of the major specialty groups in Manitoba in 1994/95 (FTEs), and the number we estimate we will need to serve Manitobans in 2006 and 2016.[19] The right-most column estimates the number of additional physicians which need to be added to the existing supply each year to meet the projected need. In this analysis, we ignore the number of physicians retiring and departing; they would have to be replaced as well. As can be seen, paediatricians are the only major group for which we project a decreased need, consistent with the projections of decline in the age group they serve. Modest growth is projected for the other groups, with 1.6 additional medical specialists needed per year and 1.6 additional surgeons. Although we project a need for 14.5 additional psychiatrists by 2016, this is likely an over-estimate since growth was very rapid in this specialty group in the recent past. Overall, using the Statistics Canada growth projections we estimate that a total of 10 physicians a year (4.0 specialists and 5.5 general practitioners) added to the Manitoba physician supply (in addition to those replacing physicians retiring or departing) will be sufficient to keep up with the aging of the population.[20] The increase in the number of physicians in Manitoba over the recent past (1986 - 1994) averaged 9.3 physicians a year, which suggests that the province has not had a problem achieving this growth rate. (The Medical Faculty graduates 72-73 physicians per year.)

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[19] All projections for this analysis are in full-time equivalents. The analyses in Table 7 were based on individuals because we didn't have full-time equivalent data for 1986.

[20] Using the same methodology and Statistics Canada's low growth projections, Manitoba would need to add a total of 2 rather than 4 specialists a year. Using the high growth projections 7.6 additional specialists per year would be needed.

Table 10. Estimated Numbers of Additional Specialists Needed to Meet Population Growth by 2006 and 2016

	Actual 1994 FTE	Projected: 2006	Projected: 2016	Annual Growth
Medical Specialties	180.8	195.7	215.0	1.6
Paediatrics	93.7	89.6	88.4	-0.3
Psychiatry	111.1	120.4	125.6	0.7
Obs & Gyn	58.2	63.4	65.7	0.3
General Surgery	67.5	73.2	80.5	0.6
Surgical Specialties	119.3	129.0	141.9	1.0
All Specialists	630.6	671.3	717.1	4.0
GP/FP	808.4	871.6	928.7	5.5
Total	1439.0	1542.5	1645.3	9.5

Table 11 contains the same set of calculations for Manitoba's subspecialist physicians. The only subspecialist group for which significant growth is projected is medical specialists (other than dermatologists and neurologists) for which a need for 1.4 additional specialists per year is projected. Note that this is a large group covering many subspecialists (i.e. cardiologists, geriatricians, etc.). We also estimate a need for an additional 8 ophthalmologists over the next 20 years.

Table 11. Estimated Number of Additional Subspecialists Needed to Meet Population Growth by 2006 and 2016

		Projected		Annual
	Actual 94 FTEs	2006	2016	Growth
Neurology	16.6	18.0	19.4	0.1
Dermatology	14.5	15.5	16.6	0.1
Other Medical Specialties	149.6	162.1	179.0	1.4
Paediatric Generalists	55.7	52.9	52.0	-0.2
Paediatric Specialists	37.0	35.8	35.4	-0.1
Psychiatry	111.1	120.4	125.6	0.7
Obs & Gyn	58.2	63.4	65.7	0.3
General Surgery	67.5	73.2	80.5	0.6
CVT Surgery	10.2	10.9	12.6	0.1
Neurosurgery	3.7	4.0	4.3	0.0
Ophthalmology	33.2	36.6	41.3	0.4
Otolaryngology	14.4	15.1	15.9	0.1
Orthopaedic	28.6	30.9	33.3	0.2
Plastic	12.2	13.1	13.9	0.1
Urology	17.1	18.4	20.6	0.2
All Specialists	**630.6**	**671.3**	**717.1**	**4.0**

Aside from examining the population growth projections contained in Tables 10 and 11, we also analyzed the potential impact of the projected major increase in the number of aboriginal children over this period. In 1996, treaty status aboriginal children made up 11.7% of Manitoba's children age 0-14; by 2011 this is expected to increase to 17.4% (Postl 1995, p.21). While this is a group with poor health and high health care needs (Postl 1995), these projections will not markedly affect our assessments of the need for paediatricians unless there is a marked change in how care is delivered to aboriginal children. Data on expenditure patterns (Table 12) suggest that there is a real opportunity for targeting more paediatric care to this high risk population. Most aboriginal children are located outside Winnipeg, and even by 2011 they are not expected to make up more than 10% of the number of children in Winnipeg, where general practitioners deliver much more of their care than paediatricians. In Winnipeg the province spends $75 per aboriginal child for care delivered by general and family practitioners, compared with $41 per aboriginal child for care delivered by general paediatricians[21] (Table 12). Hence, if patterns of delivery don't change, any increase in aboriginal children in Winnipeg is likely to have more impact on general practitioners than on paediatricians. But if aboriginal children make up only 10% of the paediatric population in Winnipeg, the impact should not be substantial. If mechanisms were developed to change current delivery patterns which would allow more targeting of paediatric care to the high risk Winnipeg and rural residents, some (small) revision of our projected need for paediatricians over the next decades should be made.

[21] The values cited represent average per capita expenditures for all claims made by physicians (ambulatory, inpatient and special visits and services, exams, etc)

Table 12. Per Capita Expenditures on Aboriginal vs. Non-Aboriginal Children (0-14)

	Aboriginal		Non-Aboriginal	
	Winnipeg	Non-Winnipeg	Winnipeg	Non-Winnipeg
GP/FP	$ 75	$ 68	$ 49	$ 70
Paediatric Generalists	$ 41	$ 14	$ 48	$ 16

Notes:

- Values represent expenditures for all billings by physicians (ambulatory, inpatient, and special visits and services, exams, etc.).
- Values for Paediatric Subspecialists were excluded because the claims data are known to under-represent their activity (see Methods Appendix).

2.8 Age Characteristics of Physicians Leaving and Entering Practice in Manitoba; Updating the Data to March 1996

Because of the time delay in our receiving data, and in developing the analyses necessary to understand the data, our figures often seem somewhat dated. Most of this report relies on data from the 1994/95 fiscal year ending March 31, 1995; this section incorporates 1995/96 data, covering the period up to March 31, 1996.

Table 13 summarizes the changes in Manitoba's specialist supply (both individuals and FTEs) over the period 1991 - 1995. There has been little change in the overall specialist supply. In 1994 there was a loss of the equivalent of one FTE specialist (although a gain of 4 individuals); all other years showed gains.

Table 13. Changes in Physician Supply in Manitoba - Updated with 1995/96 data

Number of Physicians in Manitoba

Full-Time Equivalents					
Total	**1991**	**1992**	**1993**	**1994**	**1995**
General Practitioners	807	800	813	808	797
Specialists	615	629	631	630	640
Net Change over Previous Year:					
General Practitioners		-7	+13	-5	-11
Specialists		+14	+2	-1	+10
# Physicians					
General Practitioners	1070	1072	1081	1062	1050
Specialists	744	755	746	750	758
Net Change Over Previous Year:					
General Practitioners		+2	+9	-19	-12
Specialists		+11	-9	+4	+8

In 1995-96, there was an increase of the equivalent of 10 FTEs to the Manitoba specialist supply (including 8 new individuals). The increasing FTE values suggest that many of the concerns about changing work hours and decreased productivity of an increasingly feminized workforce are misplaced; the physician supply in Manitoba has continued to grow and to remain productive enough to accommodate changing practice patterns and meet the needs of an aging population.

Table 13 describes aggregate changes. Recently, there has been a concern that although there has been no major decrease in the number of specialists in Manitoba, that the specialists leaving Manitoba were in their most productive years, while the entrants have been young specialists who may take years to build up their practices. The changes in specialist supply as described by the full-time equivalent counts in Table 13 suggests that this has not been happening. However, to further investigate this issue, we decided to look at the age profile of physicians over the last 5 years; overall and for each of the major specialist groups.

Table 14. Productivity of Manitoba's Specialist Physicians by Age Group (excluding Geographic Full Time Physicians)

Age of Physician	FTE/Physician	Median FTE	Percentage of Physicians Above 1.0 FTE	# Physicians
25-34	.72	.94	17	58
35-39	.95	1.00	39	77
40-44	.89	1.00	37	68
45-49	.94	1.00	42	74
50-54	1.08	1.05	55	51
55-59	1.14	1.08	54	35
60-64	.84	1.00	40	57
65 and older	.55	.50	7	72

Since productivity has been the concern, we first examined the productivity of Manitoba's specialists by age group (Table 14). While there are no commonly accepted measures for this comparison, we calculated the ratio of FTEs to individuals (the higher the ratio the higher the productivity of the group), the FTE status of the median physician in each age group, and the

proportion of specialists practising at a level higher than 1 FTE [22]. The median identifies the FTE level above and below which half of the physicians in the group are working.

Table 14 suggests that specialists in the age group 50-59 are most productive, although markedly lower levels of productivity are only evident in the youngest and oldest age groups (those under 35 and those over 64).

Figures 34 - 41 illustrate the changes in the number of FTE specialists in Manitoba, by age group, over the last 5 years. This data provides insight not only into the change in number of physicians in Manitoba, but also some indication of whether there has been a change over time in the number of physicians who have full time practices.[23]

Overall, the age specific data (Figure 34) echoes the data in Table 13 suggesting little change in the specialist supply over the last 5 years, though the data for some groups merit further comment. We have included data on changes in the supply of general practitioners (Figure 35) for comparison: while there have been losses of young GPs, there have been substantial increases in the more productive groups, particularly those age 45-54 [24]. The same pattern is found in paediatrics: decreases in the ranks of the youngest physicians and increases in the more productive age groups (Figure 36). In both of these groups, the decreases in the youngest groups may reflect difficulties establishing a practice, particularly in the Winnipeg area, which appears over-saturated with primary care physicians (Roos et al. 1996). Psychiatrists (Figure 37), the other group in which the number has increased much more rapidly than the population served,

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[22] Because we know that many of the paediatric subspecialists and medical subspecialists who are geographic full-time faculty (GFT) members have their productivity underrepresented in the billings data, we excluded all GFT physicians from this calculation (only).

[23] Our work in estimating full-time equivalents over time has convinced us that there are problems with the current methodology; it may be difficult to distinguish the difference between the impact of fee changes and the impact of changes in productivity, particularly as they interact with how benchmarks are defined. We are still attempting to understand the best method of tracking changes in FTE over time.

[24] There have been some losses of GPs beyond the youngest group, but this is overshadowed by the overall expansion of the physician supply in Manitoba, particularly since the 1980s. For example: 60 GPs between age 35 and 44 in 1991 were no longer in practise in Manitoba in 1995, but the total number of GPs age 35-44 increased from 134 in 1991 to 175 in 1995. Similarly, the number of GPs between age 45 and 54 (generally the most productive period) was 134 in 1991, and 175 in 1995.

show the same pattern. In the other specialty groups, for example Medical Specialists (Figure 38), this pattern is less apparent. Obstetricians & gynaecologists (Figure 39) show decreases in most age groups.

Figure 34: Age Profile of All Specialists in Manitoba, 1991- 95 FTEs

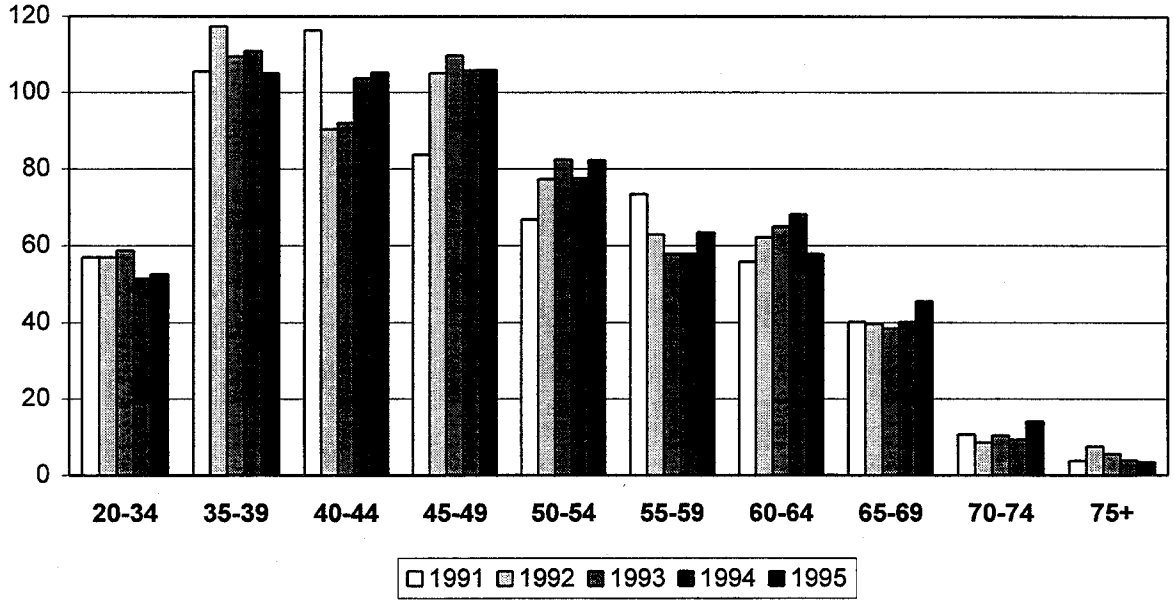


Figure 35: Age Profile of GPs in Manitoba, 1991- 95 FTEs

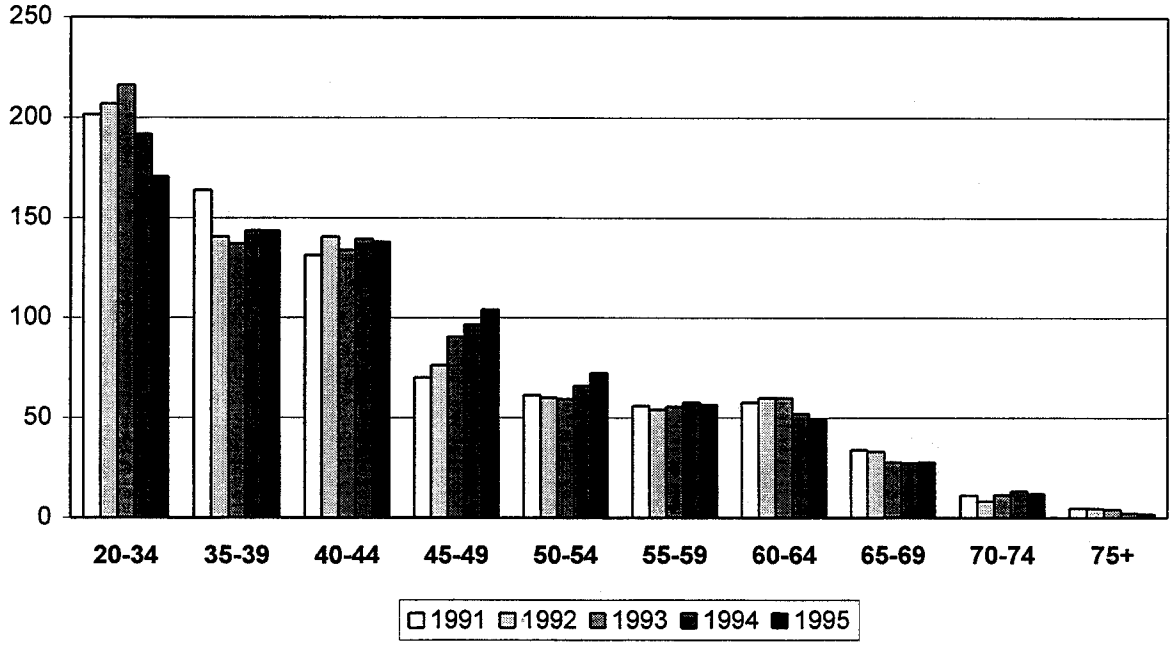


Figure 36: Age Profile of Paediatricians in Manitoba, 1991- 95 FTEs

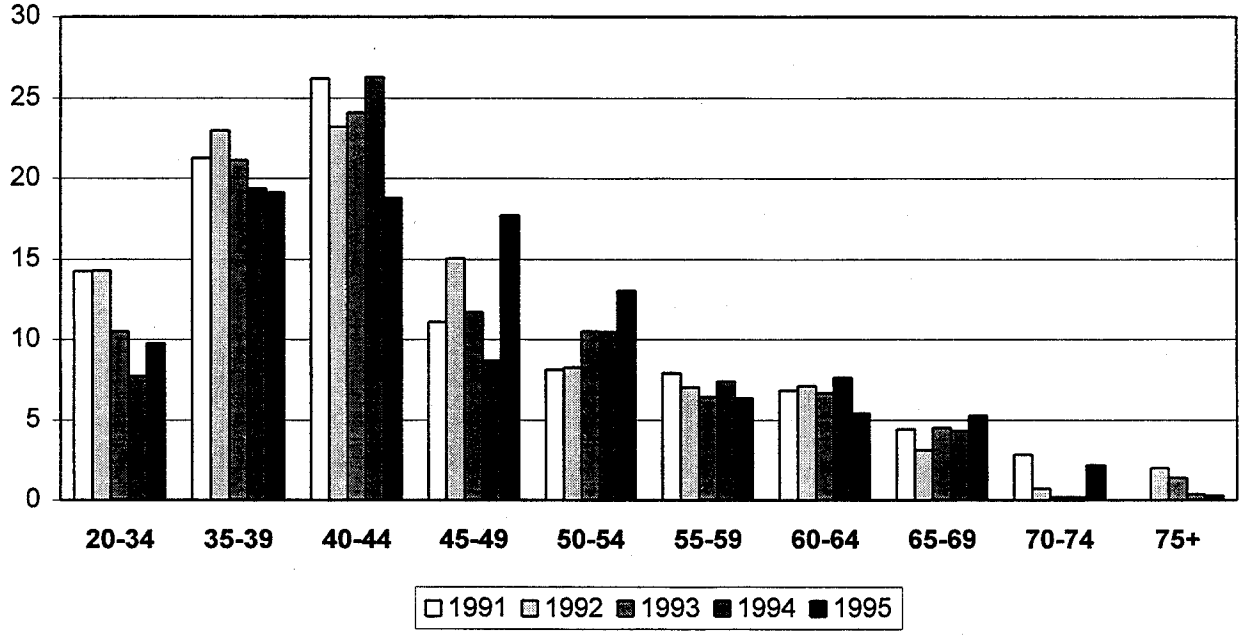


Figure 37: Age Profile of Psychiatrists in Manitoba, 1991- 95 FTEs

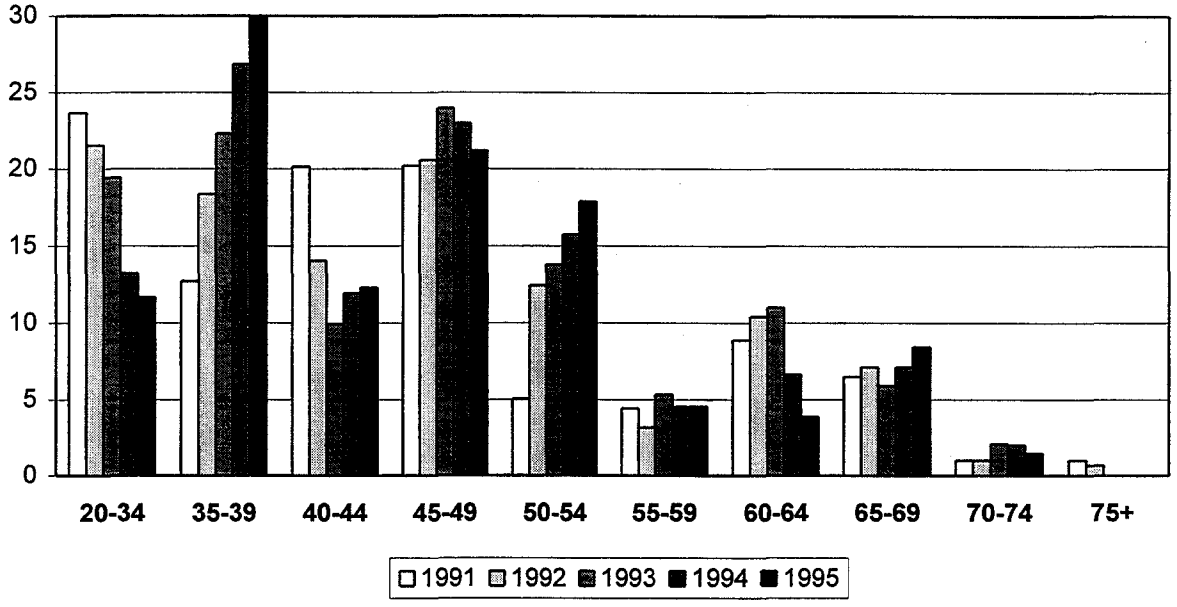


Figure 38: Age Profile of Medical Specialists in Manitoba, 1991- 95 FTEs

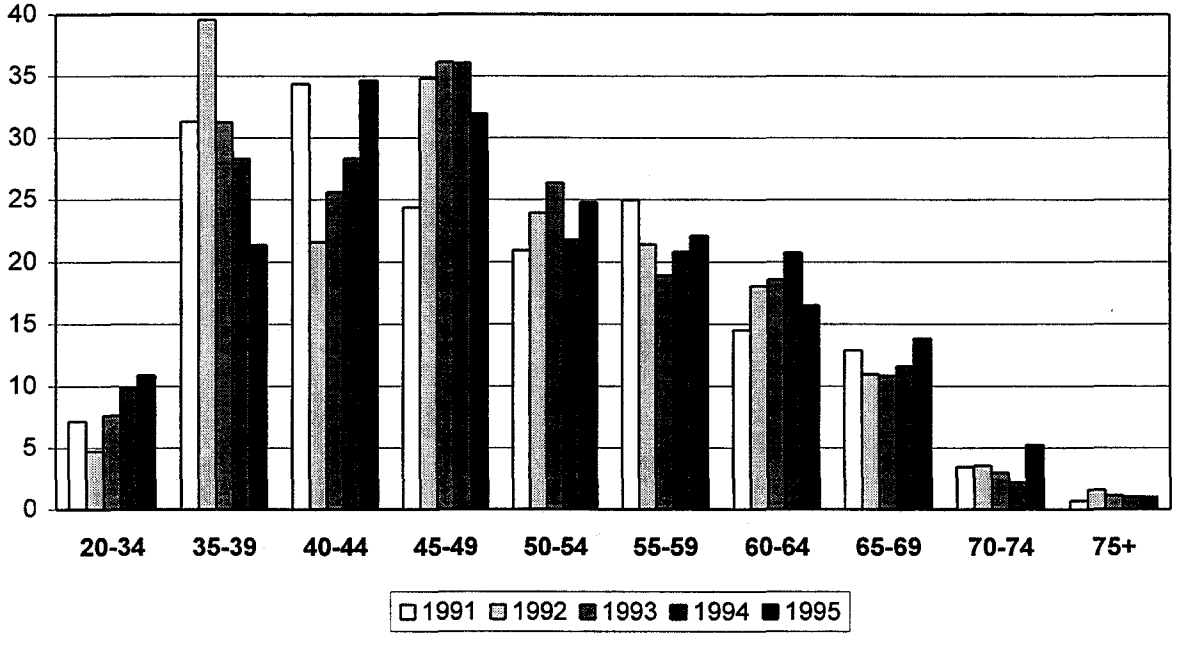


Figure 39: Age Profile of Obstetricians & Gynaecologists in Manitoba, 1991- 95 FTEs

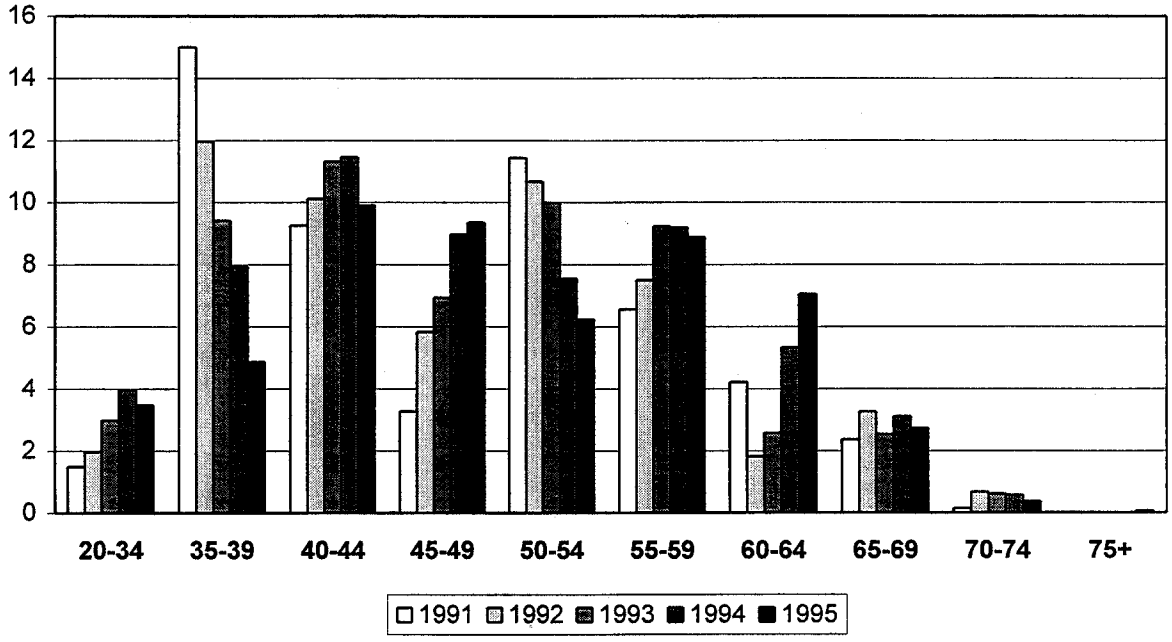


Figure 40: Age Profile of General Surgeons in Manitoba, 1991- 95 FTEs

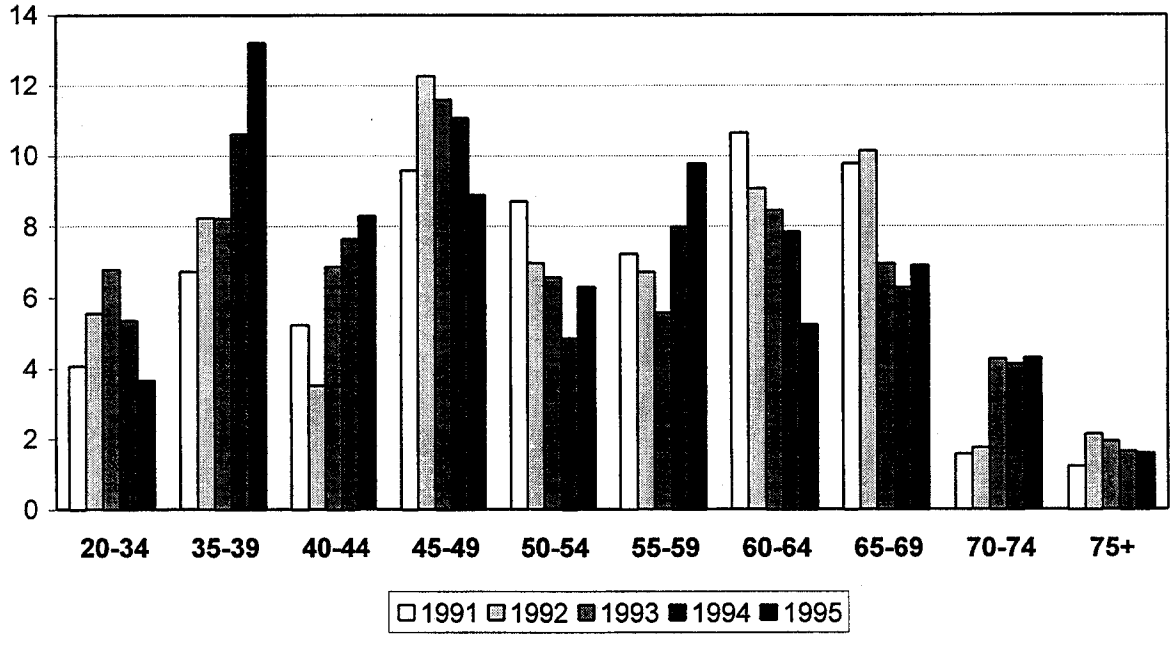
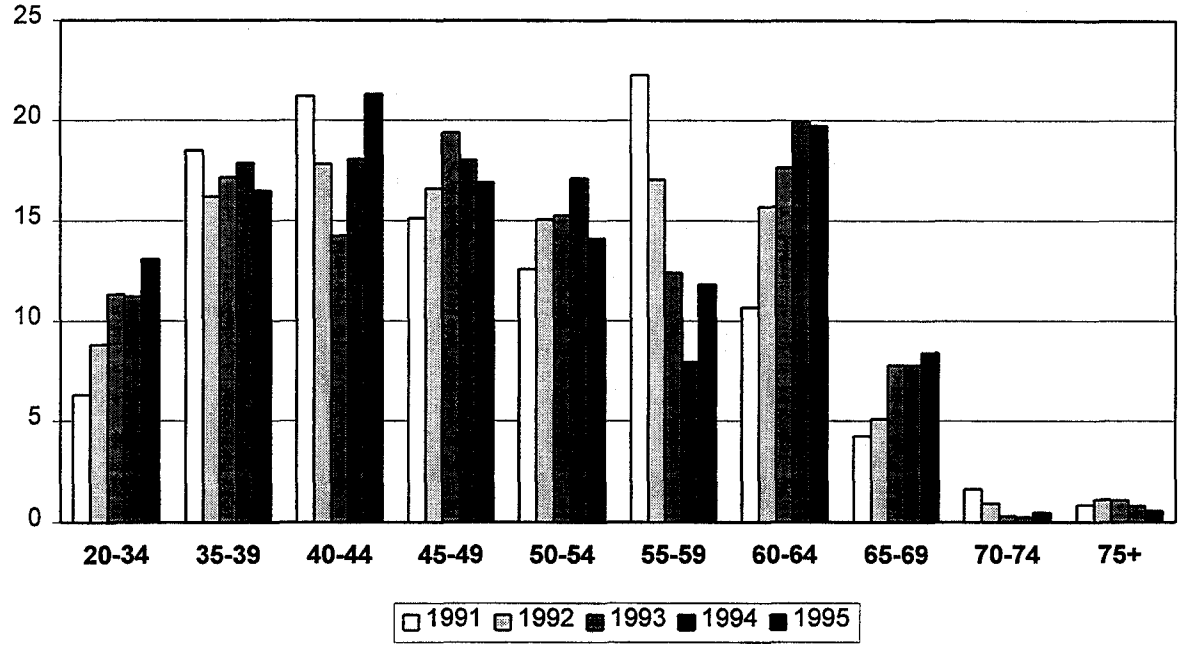


Figure 41: Age Profile of Surgical Specialists in Manitoba, 1991- 95 FTEs



2.9 Implications of Increasing Number of Women in the Physician Supply

Women's participation in the medical profession has increased in the past 25 years. While only 14% of Manitoba's physicians age 45-64 are women, 33% of physicians age 35-44 are women and 30% of those age 25-34 are women. As can be seen in Table 15, women are heavily represented among paediatricians (where they represent 36% of the individuals in practice), obstetricians/gynaecologists, psychiatrists and family practitioners, but comprise a smaller proportion of the supply of medical and surgical specialists (15% and 5% respectively). Table 15 also illustrates that women in most specialties have a less active practice than males. For example, although women comprise 36% of paediatricians, they account for only 28.6% of the FTEs. Only in obstetrics do female practitioners have a practice profile as active as their male counterparts. Although not presented in Table 15, additional analyses suggest that the pattern may be changing, as recent female graduates have practice profiles which more closely resemble that of males: the ratio of FTE's to individuals is 0.85 for female physicians age 25-34, 0.79 for those age 35-44, and 0.76 for those age 45-64. Thus physician supply changes in the recent past, particularly in the paediatric and psychiatric groups, reflects the tendency of the effective supply of Manitoba physicians to grow despite the somewhat reduced workloads of female physicians.

Table 15. Contribution of Females to Specialist Supply

	Physicians		Full-Time Equivalents		Ratio
	No.	Percent	Number	Percent	FTE/Physician
General Practice	276	27%	166	21%	.77
Medical Specialties	34	15%	20	11%	.73
Paediatrics	37	36%	26	29%	.79
Psychiatry	34	26%	22	20%	.77
Obstetrics & Gynaecology	18	30%	18	31%	1.03
General Surgery	*		*		
Surgical Specialties	6	5%	5	4%	.80
All Physicians		23%		18%	.78

*less than 5 therefore data not reported

2.10 Contribution of Foreign Trained Physicians to Manitoba's Specialist Supply

An important issue in assessing the adequacy of Manitoba's supply of specialist physicians is understanding the source: how many are trained in the province, how many come from other Canadian provinces and how many come to Manitoba from other countries? If Manitoba is heavily dependent on recruitment of specialists from outside the province, its supply will be more vulnerable. Figure 42 shows the proportion of Manitoba's specialists in each age group according to their place of graduation. While a large proportion of specialists in the 46-65 year age group were trained in other countries, the younger cohorts have a much larger proportion of their members trained in Manitoba, with a small increase in the number trained elsewhere in Canada. As can be seen in Figure 43, a similar pattern has occurred even among the 8 sub-specialty groups which have been most reliant on foreign trained physicians.

Figure 42: Place of Training of Manitoba Specialists, by Age Group

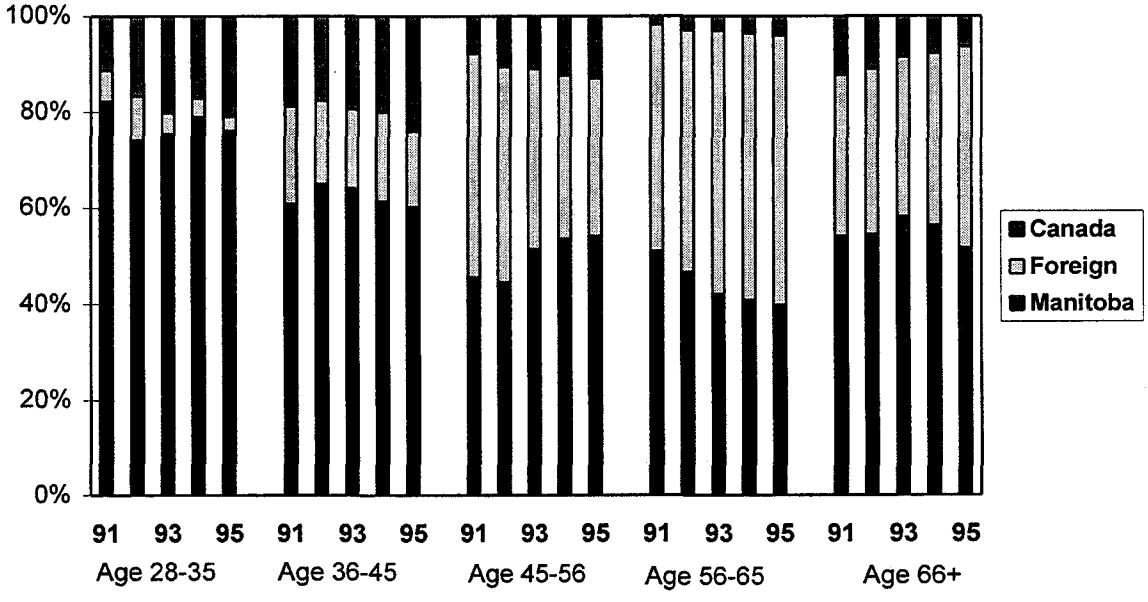
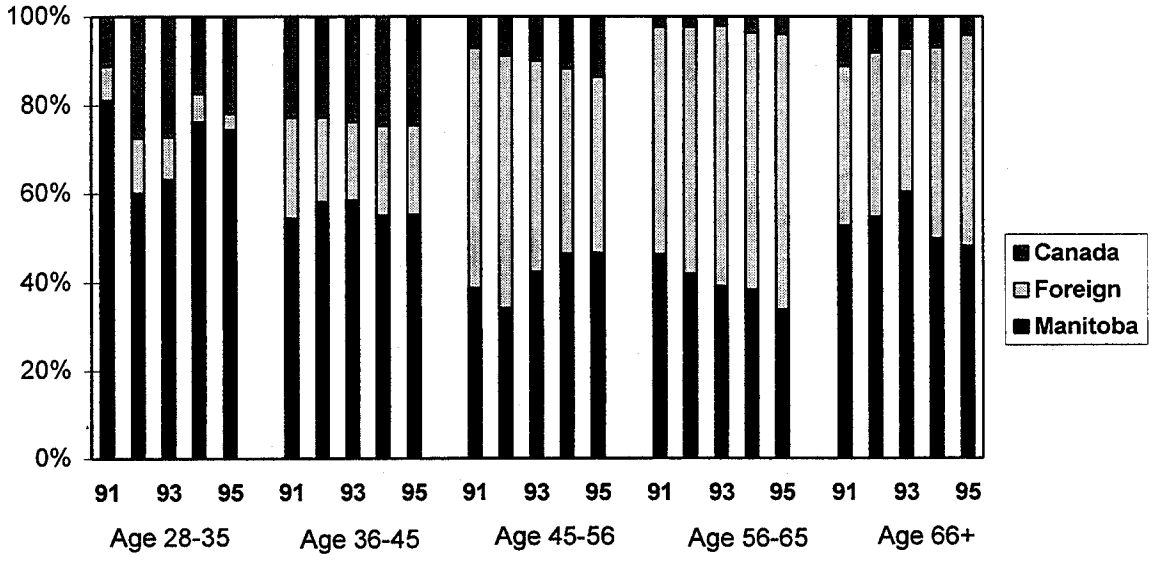


Figure 43: Place of Training of Selected Manitoba Specialists, by Age Group

Data for those Specialties Most Dependent on Foreign Graduates*



* Includes Neurologists, Dermatologists, Other Medical Specialists, Obstetricians & Gynaecologists, Ophthalmologists, and Orthopaedic, CVT, and Plastic Surgeons.

2.11 Summary Observations on Adequacy of Manitoba's Specialist Supply: Now and over the Next 20 Years

Several sources of evidence have been reviewed to assess the adequacy of Manitoba's specialist supply. The findings are summarized in two tables: Table 16 for the major groups, and Table 17 for the subspecialties.

Medical Specialties: Manitoba is quite well supplied with medical specialists; only Quebec and Ontario have significantly more per capita. The PRC, after reviewing the recommended ratios, concluded that Winnipeg is oversupplied with general internists. They also concluded that the periphery is lacking general internists and there may be short supply of some of the subspecialists in both Winnipeg and Brandon. Over the recent past there was somewhat less growth than expected given the increase in the number of elderly (an increase of 6 versus an expected increase of 11) but given Manitoba's relatively rich supply, our future need is likely less than the projections suggest. Manitoba's medical specialists have a younger age profile than surgeons, but will be affected more by retirements over the next 20 years than paediatricians or psychiatrists. We estimate that 2 additional medical specialists per year over the next 20 years would meet the needs of an aging population. It must be appreciated that these additions encompass needs for all of the medical specialists including general internists, neurologists, dermatologists, geriatricians, cardiologists, etc, though replacement for specialists who retire or depart must also be added.

Table 16. Summary Observations on the Adequacy of Manitoba's Specialist Supply Now and for Next 20 Years.

	Medical Specialties	Paediatrics	Psychiatry	Obstetrics & Gynaecology	General Surgery	Surgical Specialties
Physician Resource Committee Using Ratios	Winnipeg: surplus maybe deficit of subspecialists Periphery: deficit	Winnipeg: surplus Periphery: deficit	Winnipeg: slight surplus or undersupplied. Periphery: deficit	Fewer than ratios suggest, but no substantial change recommended	Short supply in Winnipeg Ratios understate availability in rural	Short supply otolaryng., ophthal., ortho. and urologists
Manitoba Supply relative to the Rest of Canada	Lower than Que, Ont; higher than 4 other provinces	Highest in Canada	Higher than Sask. & Alta; lower than 3 others	One of highest but all similar	Second highest	Middle; higher than Sask.
Manitobans' access to key procedures relative to rest of Canada	N/A	N/A	N/A	Low rates likely indicate good practice, not physician shortage	Adequate access	Low rates for procedures by ortho. & ophthal.
Will Supply be Affected by Retirements in the next 10-20 years ?	Medium aging profile	Youngest and fewest oldest	2nd youngest and fewest oldest	Medium to high aging profile	High aging profile	High aging profile
Growth in recent past (86-94)	Adequate	Slightly exceeded need	Exceeded need	Significant loss	Less than needed	Close to need
Need in future relative to growth in recent past	Add 2 per year	Need fewer than now have	Met by growth in recent past	Slow growth (.4/year)	Slow growth (.6/year)	Add 1 per year to total of surgical specialists

Paediatrics: A variety of evidence suggests that Manitoba's current supply of paediatricians is more than adequate, and given population projections, there will be a somewhat decreased need for this specialist group over the next 20 years.

The PRC, using population to physician ratios, concluded that the number of paediatric subspecialists in Winnipeg was reasonable (this is our only source of evidence on the adequacy of paediatric subspecialist supply; none of the other types of analysis could be applied to this group). They also concluded that there was an oversupply of general paediatricians in Winnipeg. Overall, Manitoba has the richest supply of paediatricians in Canada. Paediatricians in Manitoba are a young group and have fewer of their members reaching retirement age in the near future than any other group. In the recent past their growth has exceeded that of the population they serve.

Psychiatry: Manitoba also has a generous supply of psychiatrists, particularly when compared to other prairie provinces. It is a young group which has expanded much more rapidly in the recent past than the population it serves. Over the next 20 years, the growth in the number of elderly should have some impact on this group. However, the excess growth in psychiatrists between 1986 and 1994 (estimated to be 20 more than indicated by population growth) is more than the 14.5 additional psychiatrists which we estimate need to be added to the Manitoba supply in the next 20 years. Some limited additions of psychiatrists in the province may be appropriate to replace retirements. However approaches other than further expansion of existing numbers would appear appropriate for meeting the needs which have been identified, especially in rural Manitoba.

Obstetrics & Gynaecology: Although there are somewhat fewer specialists in this group than recommended by the ratios, the PRC recommended no substantial change. The supply of obstetricians/gynaecologists does not vary much across Canada, but Manitoba has substantially more of these specialists than the other prairie provinces. Relatively low rates of procedures performed by these specialists likely represent good practice patterns, not a shortage of practitioners. These specialists have a younger profile than other surgical specialists, but will

be affected by retirements over the next several years. This specialty group lost several members in the recent past, but will be little affected by the aging of the population, hence our projections show little need for future growth in this specialty (estimated at .4/year). A significant amount of the care provided by this group, obstetrics and well-woman care, could be provided by other physicians (general practitioners), by midwives and nurse managed programs and centres.

General Surgery: Although there are fewer specialists in this group than recommended by the ratios, the PRC only identified Winnipeg as being in short supply. Manitoba has the second most generous supply of general surgeons in Canada. In rural areas a significant amount of surgery is performed by non-surgeons, and as noted earlier, rural Manitobans experience higher surgical rates for procedures performed by general surgeons than Winnipeg residents. The Manitoba supply also appears adequate judging by Manitobans' rates of general surgical procedures relative to other provinces. However, a significant number of general surgeons are reaching retirement age, and in the recent past there were 5 fewer added to the supply than would have been necessary to keep up with changes in the population. Therefore, we project the need for expansion in the number of general surgeons over the next 20 years (though less than one per year).

Surgical Specialties: The PRC identified that Manitoba had a somewhat low supply of otolaryngologists, ophthalmologists, orthopaedic surgeons and urologists, but that the supply of plastic surgeons and cardio-vascular and thoracic surgeons was appropriate. Compared to other provinces, Manitoba's combined supply of all surgical specialists is in the middle, somewhat higher than that of Saskatchewan. Judging by Manitobans' access to core procedures performed by each of the subspecialty groups, it appears that only those performed by ophthalmologists and orthopaedic surgeons are in need of significant increase. The current supply of surgical subspecialists is aging, and will require replacements in the next several years. In the recent past their growth has essentially kept pace with the aging of the population (lagging by only 2 the number which we estimate would have been required). We estimate that over the next 20 years approximately 1.1 additional surgical specialists will be needed each year to keep up with the

aging of the population (this is 1.1 per year for all subspecialist surgeons combined, not for each subspecialist group).

Neurology: Using the ratios reviewed by the PRC, Manitoba has somewhat more neurologists than needed, although the committee made no specific observations about this group. Manitoba has an average supply of neurologists compared to other provinces. Manitoba's neurologists are a relatively young group and will be affected little by retirements in the coming years. The number of neurologists almost doubled between 1986 and 1994 (from 11 to 20) although as discussed before, part of this growth includes research scientists who provide little patient care. Recent growth in the population served by this group was small, and little increase would have been required based on these requirements. Although our analysis suggests that 2 should be added to the current supply over the next 20 years, recent growth may have already provided an adequate supply to keep up with future needs.

Dermatology: Using the more recent Saskatchewan recommended ratios, Manitoba has a sufficient supply of dermatologists, but compared to the rest of Canada, our supply appears somewhat low. As with neurologists, our dermatologists are relatively young and will not be greatly affected by retirements in the coming years. In the recent past there was a loss of 2 from this small group. The aging of the population will affect need for this specialty group very little and we project no needed expansion of this group over the next 20 years.

Cardiovascular and Thoracic Surgery: According to the recommended ratios, Manitoba has an adequate supply of cardiovascular and thoracic surgeons. Most provinces have a similar supply of this specialty group, with only Quebec higher and Alberta and Newfoundland lower. The same conclusion was reached after reviewing Manitobans' access to procedures performed by this group relative to other provinces. Manitoba has a relatively young group of CVT surgeons, but several will be reaching retirement age soon. There has been little recent change in this group: a loss of one since 1986, whereas one would have expected the supply to increase by one.

Table 17. Summary Observations on the Adequacy of Manitoba's Subspecialist Supply Now and for the Next 20 Years.

	Neurology	Dermatology	CVT Surg.	Neurosurg	Ophthalmology	Otolaryngology	Orthopaedic	Plastic	Urology
Physician Resource Committee (using ratios)	Adequate to high	Adequate	Adequate	Adequate to 2 low	Short supply 37 vs. 40-44 recommended	Short supply: 14 vs 20-23 recommended	Short supply 28 vs 35-41 recommended	Adequate	Short supply 17 vs 21-23
Manitoba supply relative to the rest of Canada	Lower than Que. but in higher group	In lower group	One of highest; most similar	One of lowest in Canada	With Sask. one of lowest in Canada	Middle; higher than Sask. & Alta.	Quebec & BC high; rest similar	Middle; similar Sask. & Alta.	Middle-higher than Sask. & Alta.
Manitobans access to key procedures relative to rest of Canada	N/A	N/A	Adequate	Adequate to low	Low rates of cataract surgery	Low rates; likely mean good practice not shortage	Low rates of hip and knee replacement	N/A	Adequate
Will supply be affected by retirements in the next 10-20 years ?	Relatively young	Relatively young	Relatively young but expecting significant retirements	Expecting significant retirements	Relatively young	Relatively young but expecting significant retirements	Few young; most in middle years	Relatively young but expecting significant retirements	Expecting significant retirements
Growth in recent past	Exceeded need	Loss of 2	Small loss; needed growth	No change	Small loss; needed growth	Loss of 4	Increased by 6	Increased by 3	Increased by 4
Future Need	Add 0-2 over 20 yrs	No increase required	Add 2 over 20 years	No change	Add 8 over 20 years	Add 2 over 20 years	Add 4 over 20 years	Add 2 over 20 years	Add 3 over 20 years

Neurosurgery: The PRC found the supply of neurosurgeons to be adequate, although supply is 2 less than the 7 suggested by the recommended ratios. Manitoba's supply is one of the lowest in Canada, and approximately half of the current supply is nearing retirement age. Since 2 neurosurgeons were recruited to Manitoba in 1995, the situation has changed markedly - illustrating the problems with balancing between under and oversupply in small subspecialist groups. Manitobans appear to have adequate to low access to the procedures performed by this group. There has been no growth in the recent past. Although it will be necessary to replace retiring neurosurgeons, no increase in supply will be required to meet the needs of an aging population.

Ophthalmology: This group was identified by the PRC as being in short supply, with Manitoba having 37 instead of 40-44 as suggested by the ratio calculations. Manitoba, along with Saskatchewan, has one of the lowest supplies of ophthalmologists in Canada. Manitobans have mid-range access to cataract surgery compared to residents of other provinces. This group of specialists is relatively young, although in the recent past there was a small loss (3) instead of an expected increase of 2 specialists. This group has the highest proportion of fees earned through serving elderly patients, and we estimate an increase of 8 will be required over the next 20 years.

Otolaryngology: This group appears to be in somewhat short supply in Manitoba. The PRC noted the ratios suggest Manitoba should have 20-23 specialists while we have 18. Our supply is in the middle range relative to most other Canadian provinces, and somewhat higher than the other prairie provinces. Manitobans appear to have reasonable access to core procedures performed by this specialty group. Low rates of procedures such as tonsillectomy and myringotomy likely reflect good practice patterns in the province, not a shortage of specialists. Although there are a significant number of young specialists, there are also significant retirements coming. In the recent past there has been a loss of 4 specialists in this area. We project a need for 2 additional specialists in the next 20 years.

Orthopaedic Surgery: This specialty was identified as being in short supply by the PRC, with 28 versus 35-41 surgeons recommended by the ratios. Although Quebec and BC have richer supplies of this specialty group than Manitoba, most other provinces are similar. Manitobans appear to have relatively low access to hip and knee replacement procedures, at least compared to other Canadians. There are few young specialists; most are in their middle years. In the recent past there was an increase of 6, and the aging of the population suggests that over the next 20 years the supply should be expanded by 4.

Plastic Surgery: The PRC found this group to be adequately supplied in Manitoba. Our supply is similar to that of Alberta and Saskatchewan, essentially in the middle range of the other provinces. Over the next 20 years we estimate that the supply would only need to expand by 2 to meet future needs.

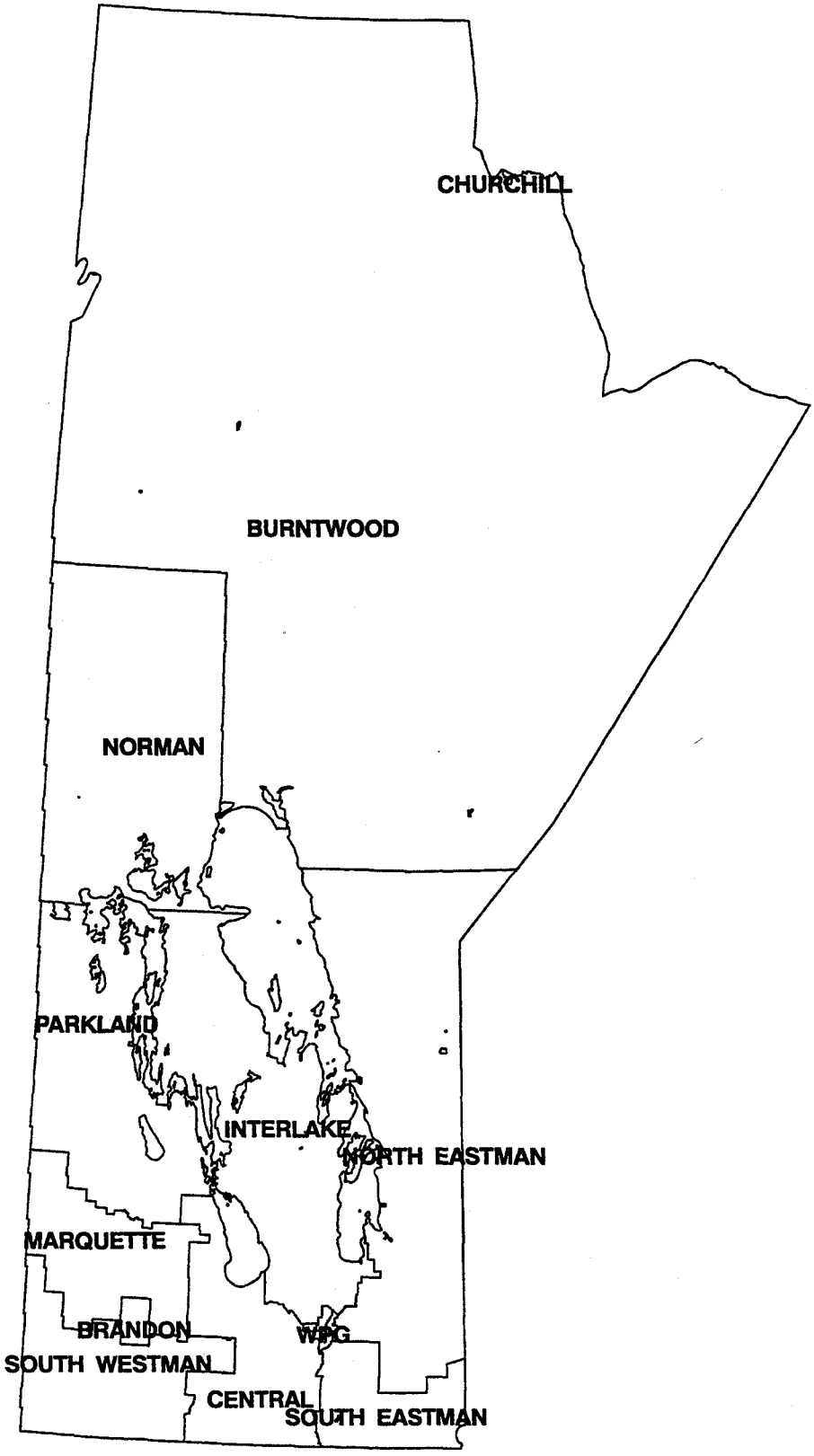
Urology: This group was also found to be in somewhat short supply by the PRC. The Manitoba supply is higher than that of Saskatchewan and Alberta, and in the middle range of other provinces. Manitobans appear to have adequate access to procedures performed by this specialty group. There will likely be significant retirements in the next 10 years. In the recent past the supply increased by 4, and over the next 20 years an expansion of 3 urologists would be suggested.

2.12 Regional Indicators of Need for Specialist Care

There are no clear formulas for estimating which individuals need more or less specialist care. In principle, regions with more children have more need for the services of paediatricians, while regions having more elderly are likely to have a greater need for surgeons to provide cataract surgery, hip replacements, etc. Similarly, regions having more individuals with heart disease will need more contact with specialists who treat this problem: cardiologists and cardiovascular surgeons. Neither measuring instruments nor accepted standards for identifying specialty-specific needs at the regional level have been developed. However, it is important to have some sense of whether access to specialists and the care they deliver is directed toward the overall health needs of the population. In this section, we review some of the widely accepted indicators of the health status of populations, attempting to identify the regional populations which are in the poorest health, where one might expect the need for specialist care to be highest. The geographic boundaries we use are those of the new Regional Health Authorities (Figure 44).

The Premature Mortality rate (reflecting deaths among individuals age 0-74) has been suggested as the best single indicator of health status capturing the need for health care (Carstairs, Morris 1991; Eyles et al. 1993). It is currently used in the British formula for allocation of funds from the Department of Health to regional health authorities. It has been shown to be strongly associated with most of the self reported health status indicators and physical measures used in the Health and Lifestyle Survey, including self-assessed health, number of symptoms, self reported rheumatism and temporary sickness (Mays et al. 1992). That is, populations which have higher premature mortality rates are also more likely to report their health to be poor, to report a higher number of symptoms and to report being sick more often.

Figure 44. Regional Health Authorities in Manitoba



As can be seen in Figure 45, Winnipeg[25] and Brandon residents' scores on premature mortality are not significantly different from the provincial mean on this key measure of health status. Residents of all Northern regions (Burntwood, Churchill[26] and Norman) and Interlake have premature mortality rates substantially higher than the provincial average, while residents of South Westman and South Eastman have rates lower than the provincial average.

Figure 45: Premature Mortality by RHA
Based on 5 Years of Data: 1990/91 through 1994/95

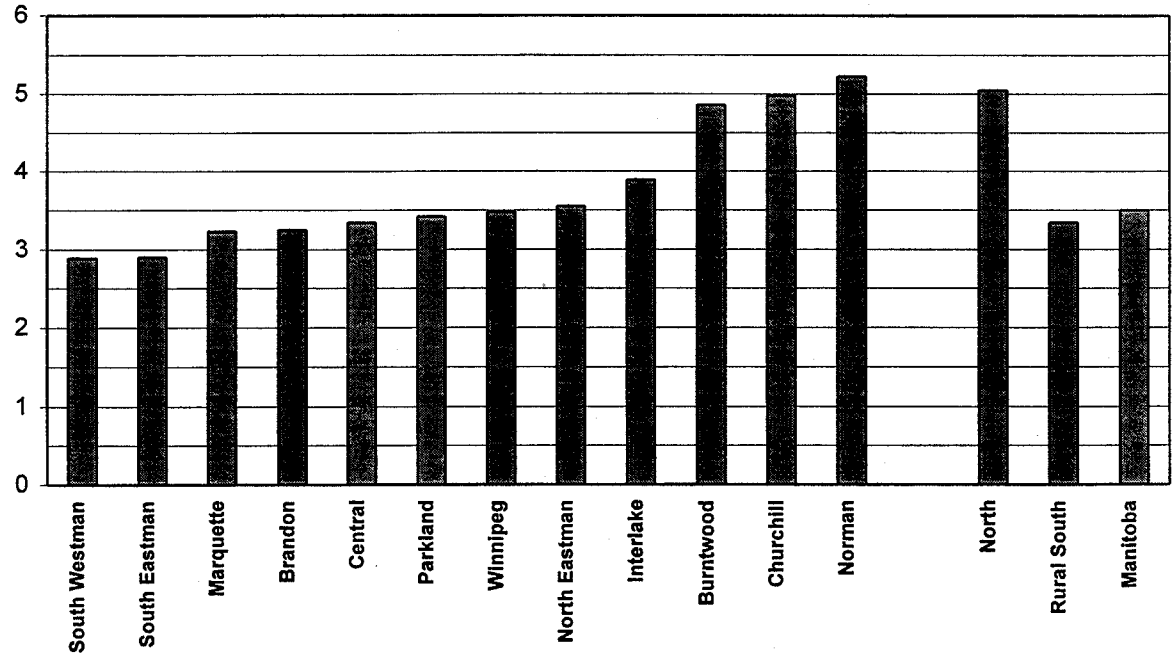


Table 18 provides several additional measures of health status and other characteristics which might influence need for specialist care. Life expectancy at birth for males and females is a

[25] The Winnipeg score represents a summary across the diverse Winnipeg population. When one analyzes this by sub-areas, residents of the Core areas and Old St. Boniface have premature mortality rates higher than the provincial average, while residents of all other Winnipeg sub-areas have scores lower than the provincial mean (Our upcoming report "A Project to Investigate Expenditures on Health Care" will provide a more thorough discussion).

[26] Churchill's population is so small that even with 5 years of data, its rates are unstable. Even though the rate shown in Figure 45 is higher than the provincial average, the difference is not statistically significant.

commonly accepted indicator of population health. This indicator has the advantage of describing the experience of all people in the population, not just those age 0-74 (as for the premature mortality measure). In general, male residents of the three regions of the North have substantially shorter life expectancies (71.3 years) than residents of Winnipeg (75.2), Brandon (75.8) and the rural South (75.7). Statistics are not typically used to identify differences in life expectancy rates. However, to illustrate the magnitude of these differences, if female residents of the Northern regions could achieve the life expectancy of females in Winnipeg, this would represent a greater overall gain in life expectancy (4.2 years) than could be achieved by eliminating all types of cancer (estimated by Manton, 1991 to be 2.8 years).

The subsequent three indicators in Table 18 identify the rate at which residents of each region were admitted to hospital (anywhere in the province) for three indicators which the literature suggests reflect the need for health care: ambulatory care sensitive conditions (Billings et al. 1993), avoidable hospitalizations (Weissman et al. 1992), and conditions amenable to medical treatment (Charlton et al. 1983; Poikolainen, Eskola 1986; Desmeules, Semenciw 1991). Each of these measures is based on hospital use for specific types of conditions for which medical treatment is believed to be effective in either preventing the condition, finding and treating the condition in an early phase to avoid major consequences, or treating the condition in a late phase thus avoiding death or disability. These measures reinforce the general pattern of the poorest health in the province being found among residents of the North. Outside of the North, the two regions with the highest rates on these indicators are Parklands and Marquette.[27] Residents of Winnipeg have particularly low rates on these indicators. Better access to specialists may contribute to their lower rates, although we have also found these measures (and other indicators based on hospital use) to be sensitive to both

[27] These measures are based on rates of individuals hospitalized (if an individual was hospitalized more than once during the year for these conditions it would only be counted once). However, as we reported in our work attempting to develop health status measures from hospital admissions data, these rates are sensitive to the overall rate of hospitalization; Winnipeg residents have a short stay (1-59 days) hospital admission rate which is much lower than non-Winnipeg residents; hence Winnipeg and its neighbouring regions typically have low rates on these measures.

differences in a group's underlying health status[28] as well as to the tighter bed supply in Winnipeg (Cohen, MacWilliam, 1995; Roos, Mustard 1997).

Table 18 also contains data on three important chronic diseases for which specialist care may contribute to good management: diabetes, hypertension and cancer. Residents of the North have markedly higher rates of diabetes than residents of most regions of the rural south, although rates for Parkland, Interlake and North Eastman are also higher than the provincial average.[29] Hypertension prevalence is higher among residents of Marquette, North Eastman and Interlake, while South Westman and South Eastman have low rates.

Cancer is the only indicator in Table 18 which shows very little regional variation in rates. These rates are based on new cases reported to the Manitoba Cancer Treatment and Research Foundation Registry over the three year period 1993-1995.

As a final measure of need for specialist care, we include an indicator of the socio-economic characteristics of each region's residents (the Socio Economic Risk Index, or SERI). Studies in both the US and Canada have demonstrated repeatedly that individuals whose socio-economic status is poor have poor health status, spend many more days in hospital, and, at least in Canada, have more contact with physicians. In a recent National Population Health Survey, 78% of Manitoba women in the highest income households reported their health to be excellent or very good, compared to 64% of those in the upper middle-income groups, and 42% in the lowest income groups. There was a similar pattern for males.

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[28] Within Winnipeg for example, residents of low-income neighbourhoods (who have poor health status) are twice as likely to be hospitalized for these conditions as residents of high-income neighbourhoods (Roos, Mustard, 1997).

[29] Prevalence rates for diabetes and hypertension are developed largely from the information contained in medical claims (see Methods Appendix). Because residents of Winnipeg and Brandon have higher rates of contact with physicians, indicators developed from physician claims will tend to identify higher rates among Winnipeg and Brandon residents than among residents of other areas (Cohen, MacWilliam 1994). However, this bias was not found to be large, and despite this bias, Winnipeg and Brandon residents have rates of these chronic diseases which are somewhat lower than other regions.

TABLE 18. Indicators of Health Status and Other Characteristics Which Might Influence Need for Specialist Care (directly standardized)

	S.W.	S.E.	Marq	Bdn	Cent	Pkld	Wpg	N.E.	Inter	Burt	Chur	Norm	North	South	Man
Life Expectancy[1]															
Males	76.6	76.7	76.6	75.8	75.4	74.9	75.2	75.5	73.9	71.6	66.8	71.1	71.3	75.7	75.1
Females	82.7	81.9	82.2	81.6	81.5	82.0	81.1	80.3	79.5	76.9	73.6	77.3	76.9	81.5	81.0
Rate of individuals hospitalized[2] **for conditions which were:**															
Ambulatory Sensitive	22.5+	14.5	30.0+	17.1+	19.1+	33.5+	9.4 -	18.4+	19.0+	42.2+	38.4+	34.0+	36.8+	21.6+	15.3
Avoidable	7.7+	6.2	9.8+	6.5	7.2+	10.2+	4.6 -	7.1	7.2+	15.8+	16.4+	11.3+	13.4+	7.7+	6.1
Amenable	20.2+	13.9 -	28.3+	16.1	17.5+	35.9+	10.6 -	17.7+	16.7+	32.8+	27.7+	31.8+	31.8+	20.3+	15.4
Disease Prevalence[3]															
Diabetes (1993/94-95/96)	41.0 -	36.8 -	46.7	39.0 -	38.9 -	56.4+	44.9 -	51.1+	49.7+	98.4+	NA[4]	70.4+	85.6+	45.2 -	46.3
Hypertension (1993/94-94/95)	21.3 -	22.6 -	27.9+	22.8 -	23.7	25.3	24.2	26.3+	28.7+	23.3	NA[4]	24.0	24.1	25.2+	24.5
Cancer Incidence[5]	5.14	4.47	5.19	5.25	4.77	5.09	5.22	4.63	5.43	4.20	7.20	5.71	5.05	4.98	5.13
Socio-Economic Risk Index (SERI)	.09	.12	.35	-.28	.11	.72	-.30	.20	.17	1.55	.64	.67	1.21	.23	0.0

'+' Following any value indicates rate significantly higher than provincial average; '-' indicates significantly lower (using 99% confidence intervals for each region)

Rows without any +/- signs contain values which have not been statistically tested.

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[1] Based on mortality data from 1990 through 1994.
[2] Rate per 1000 residents. For definitions, see Methods Appendix.
[3] Number of residents who meet criteria for the disease (see Methods Appendix).
[4] Data unreliable due to under-reporting of physician claims for services provided to Churchill residents.
[5] Rate of new cases (per 1000 residents) of all cancers (except skin), based on 3 years of data from MCTRF (see Methods Appendix).

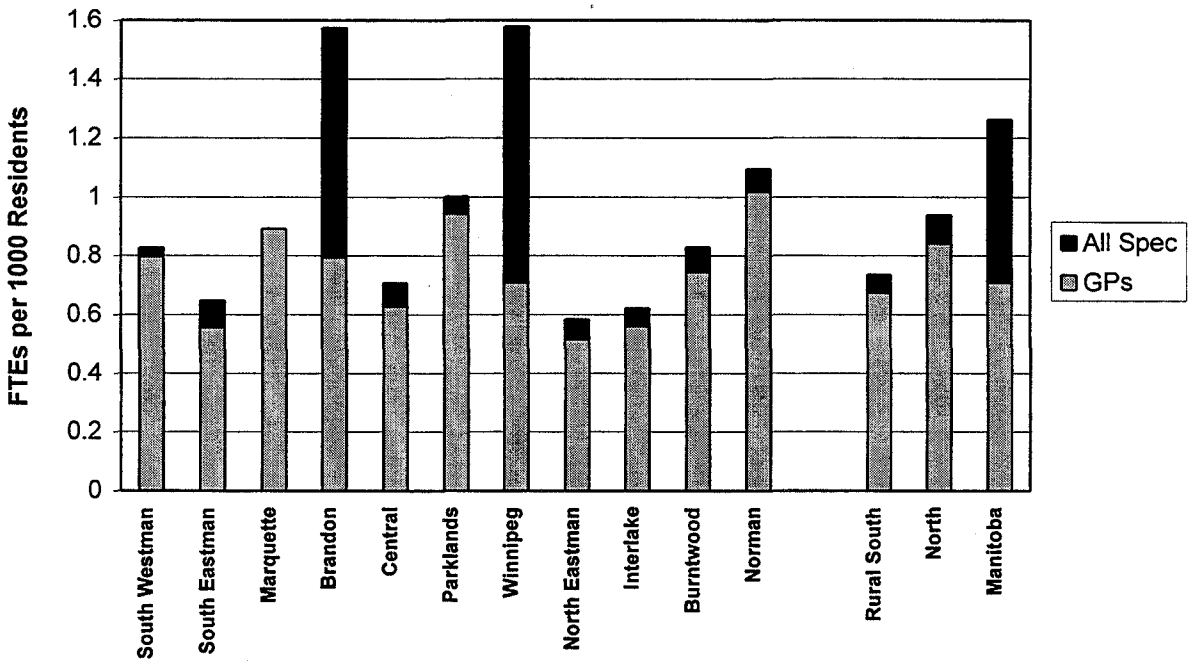
The SERI is a composite index developed at MCHPE (Mustard, Frohlich 1995), and has been updated to include data from both the 1986 and the 1991 census. Indicators which reflect environmental, household and individual conditions which put residents of an area at risk for poor health were used in the development of this index. The provincial average on this index is 0, with negative values identifying regions at lower risk. High scores on this index identify regions whose residents have high unemployment rates, high rates of single female parent families, low housing values and low participation in the labour force by women. The three Northern regions have high scores on this index, as does Parkland. Brandon and Winnipeg both score low on this index, reflecting their residents' relatively low risk on this measure. (The value for Winnipeg represents a composite measure for the entire city; there are sub-populations such as the Core area which have much higher risk than other areas.)

We order the regions by their premature mortality rate to underscore the assumption that we would expect those regions whose residents have high premature mortality rates (Burntwood, Churchill and Norman) to have a greater than average need for contact with specialists and the services they deliver. The high health needs of the Northern regions is reinforced by their scores on the indicators in Table 18. These measures also suggest that residents of the Rural South generally have at least as high a need for specialist services as residents of Winnipeg and Brandon. However, those regions with lower premature mortality tend to have lower scores on the need indicators.

2.13 Regional Access to Specialist Care

There is a marked concentration of specialists practising in Winnipeg and Brandon. Figure 46 confirms that the supply of all physicians (GPs and specialists) in Winnipeg and Brandon (measured in FTEs per capita) is almost twice that of any other region, including the high need Northern regions. The supply of general & family practitioners alone in these two regions is higher than that of all physicians combined in at least four regions (South Eastman, Central, North Eastman and Interlake), and the Winnipeg and Brandon supplies are essentially doubled when specialists are added. Specialists constitute only a small proportion of the physician supply in most other regions.

Figure 46: In-Area Physician Supply: GPs and Specialists



It is appropriate that many surgical subspecialists be located in a major medical centre with specialized equipment and surgical facilities. A similar case exists for locating medical and paediatric subspecialists in urban areas, because their expertise is important for conditions

which are relatively rare and which require special facilities to diagnose and treat. However, this reasoning assumes that specialist care will be organized to ensure that through referral networks and outreach clinics, their services will be made available to the entire population, according to the needs of all patients. Since health needs are particularly high among residents of the Northern regions, one might expect higher rates of specialist care being delivered to these populations. As Figure 47 (and those to follow) illustrates, this does not describe how specialist care is delivered in Manitoba. Not only are almost all specialists located in Winnipeg and Brandon, but Winnipeg and Brandon residents receive care from specialists much more frequently than residents of any other region. (All rates in this section have been adjusted to account for regional differences in age and gender characteristics.)

Figure 47: Ambulatory Visits to GPs and All Specialists

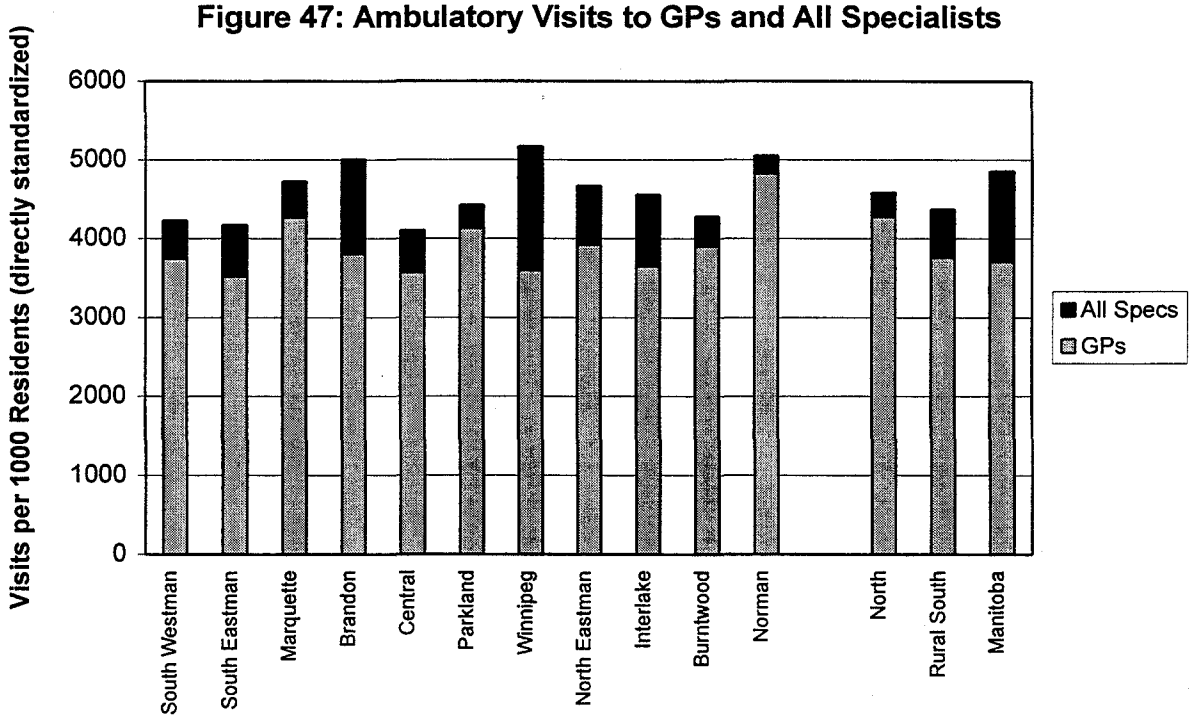


Figure 47 shows the average number of ambulatory visits to specialists and general/family practitioners received by residents of each region.[30] Whereas specialists deliver a substantial proportion of the physician contacts received by Winnipeg and Brandon residents, they deliver relatively little care to residents of several other regions, including South Westman, Marquette, Central, Parkland, and all three Northern regions.[31]

Figure 48 shows ambulatory visit rates to each specialty group. Clearly, specialists of every type contribute to the high visit rates of Winnipeg and Brandon residents. We have concentrated on ambulatory visits because this constitutes the route through which patients typically access specialist care; however, when we include all contacts with specialists, including both hospital-based and ambulatory visits,[32] contact patterns are quite similar (Figure 49).

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[30] All ambulatory visits, including consultations, were included in this analysis: visits to physician offices, emergency rooms and outpatient clinics. All analyses in this section are population-based, reflecting the utilization patterns of all residents of each region, regardless of where the services were provided. Therefore, the Winnipeg rate reflects only the contacts made by residents of Winnipeg; when a rural resident (eg. from Central) visits a Winnipeg specialist, that visit is added to the contact rate for Central residents.

[31] Churchill region is not included in the analyses based on ambulatory visits. As we noted in the report on generalist physicians, Churchill residents' physician contact rate appears extremely low. This may be due to under-reporting of evaluation claims by salaried specialists, or may reflect a reality of a low contact rate with specialists. It is likely a combination of both factors.

[32] Here we present data on ambulatory and hospital visits. Although more of the specialist care received by rural residents is in the more expensive form of consultations, data based on hospital and ambulatory expenditures look quite similar.

Figure 48: Ambulatory Visits by Specialty

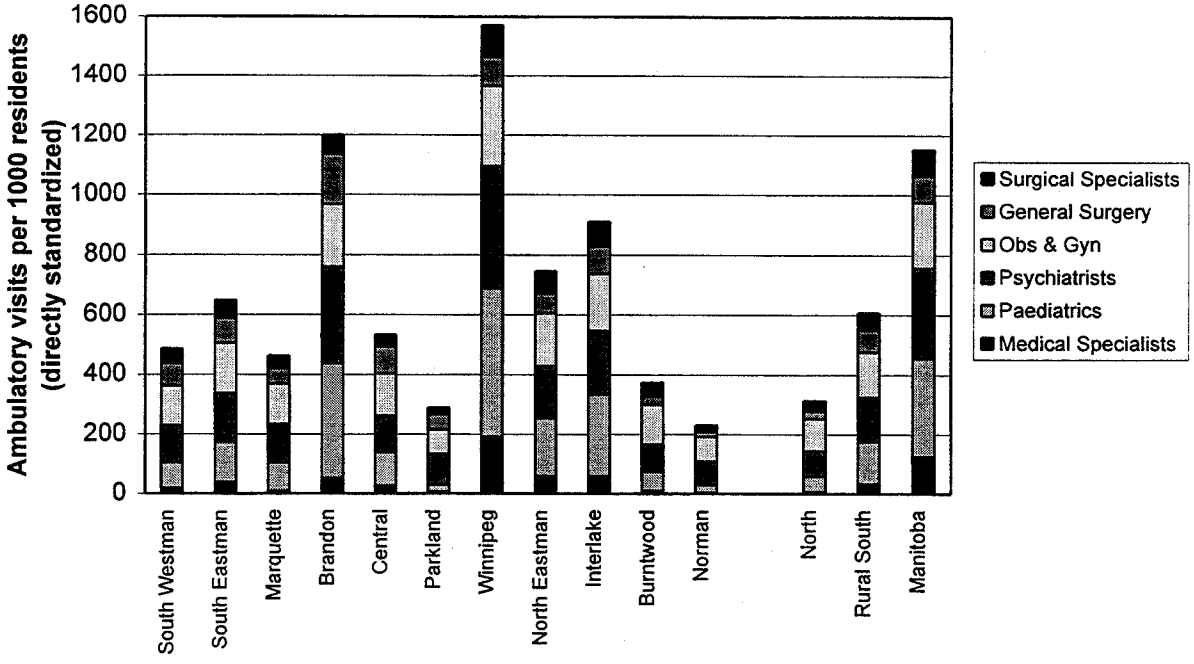
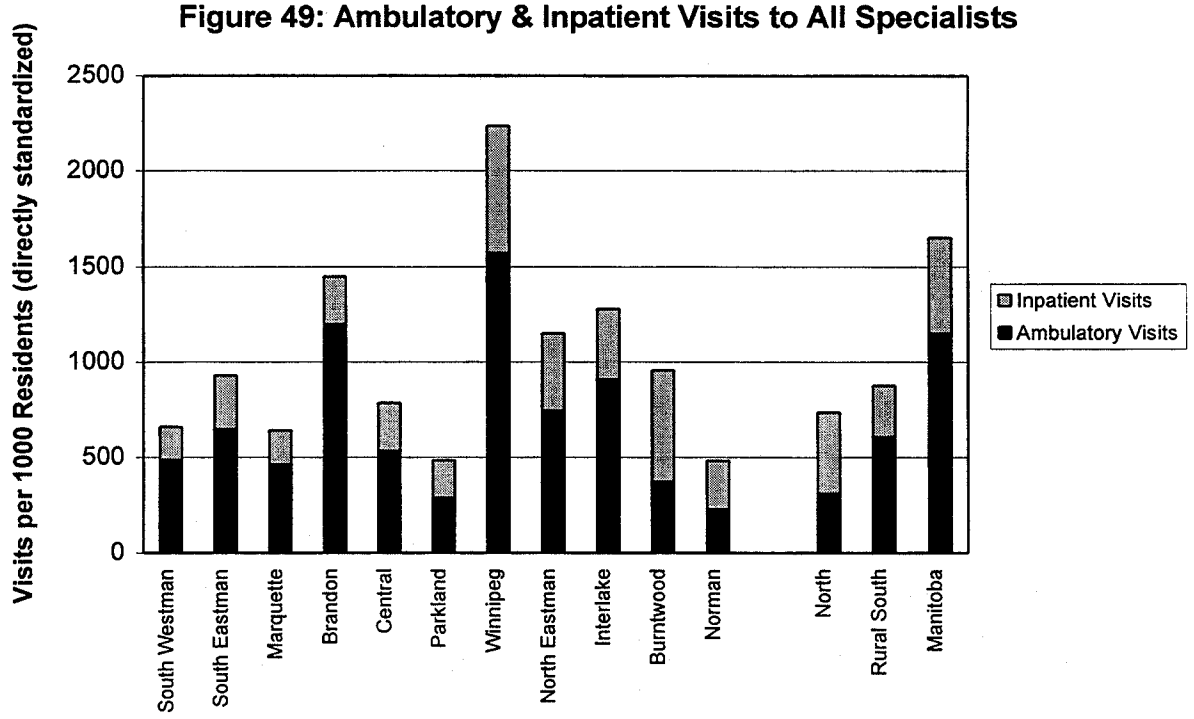


Figure 49: Ambulatory & Inpatient Visits to All Specialists



The nature of patient contact with specialists varies markedly from specialty to specialty. Contacts with surgeons are typically to determine whether surgery should take place, and are somewhat delimited by this question.

As one physician reviewer notes: *"medical specialists, paediatricians and psychiatrists are much less likely to be involved in 'definitive' therapies like excising, replacing and grafting. Indeed, these specialists often take care of patients with chronic disease. It should not be surprising, therefore, to find that 'contacts' with these specialists are higher for people in Winnipeg-Brandon than for people who are not. A much better measure of 'accessibility' and perhaps of 'service' is the rate of ambulatory consultations, which are much more evenly distributed than contacts."*

Consultations are ambulatory visits in which the patient is referred by one physician seeking the opinion of another physician because of the "complexity, obscurity, or seriousness" of a patient's illness, or because a second opinion is requested either by the patient or another person acting on the patient's behalf. After a consultation, the patient is usually returned to the care of the referring physician. Figure 50 shows what proportion of residents' ambulatory contacts were consultations. Manitobans' rates of consultations are much more evenly distributed than non-consultative contacts.[33] For example, Winnipeg residents have 7 times as many non-consultative contacts with specialists than Parkland residents, but they only have 77% more consultations. In some regions, most notably Parkland and the North, some general practitioners have specialist expertise. When consultations to GPs are included (Figure 51), regional access to specialist services becomes even more uniformly distributed.

[33] Questions have been raised about the accuracy of the data describing specialist contacts with Northern residents. Since most of these contacts are delivered by specialists who file "evaluation" not fee-for-service claims, there is a concern that they may be under-reported. Because the department of paediatrics and the Northern medical unit organize an extensive program to provide paediatric services in the North, they provided us with a list of the communities in which they ran paediatric clinics, and the dates of these clinics. We checked whether the billings data identified Winnipeg based paediatricians who were delivering services to Northern residents during the appropriate time periods. We found that 2/3 or more of these visits were recorded in the billings data. Hence we are confident that the data reported in Figure 50 and those that follow are reasonably accurate.

Figure 50: Ambulatory Visits to All Specialists: Consults vs Non-Consults

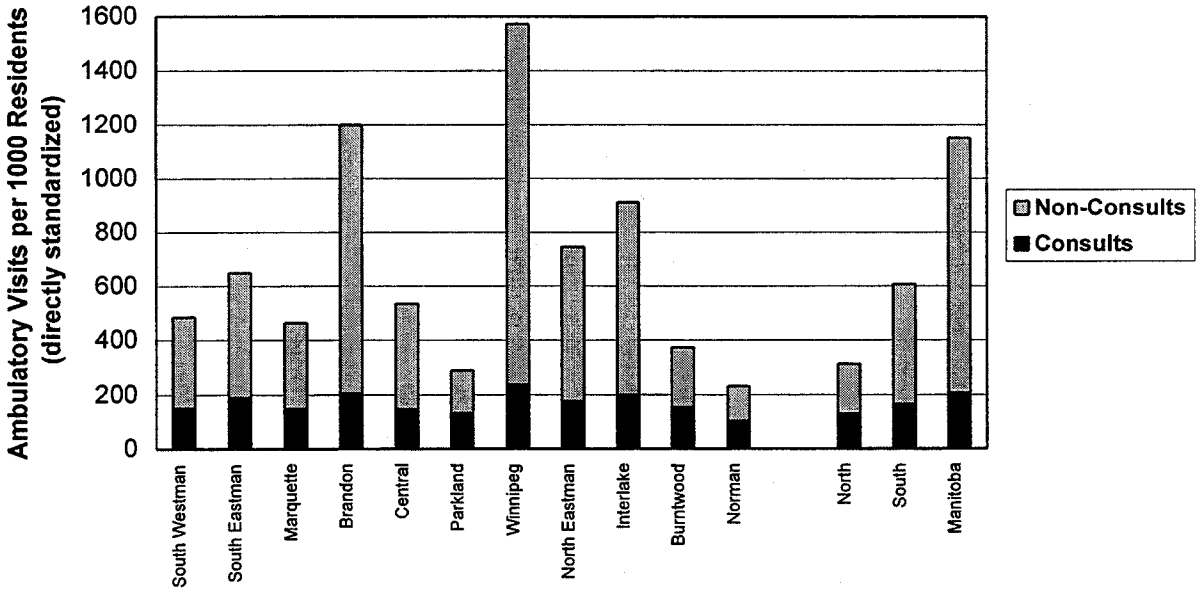
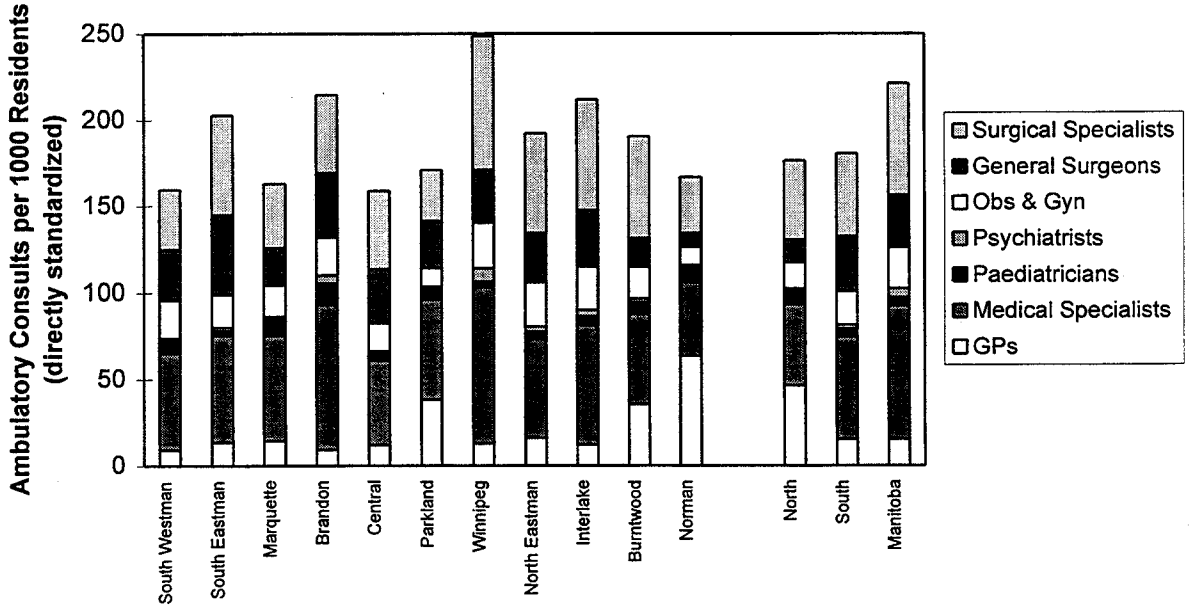


Figure 51: Ambulatory Consults to Specialists and General Practitioners



Medical Specialties. Figure 52 identifies the rate at which residents from across the province have contact with all medical specialists. Consultations make up approximately a quarter of the ambulatory contacts with these specialists. As noted earlier, this category includes many subspecialty groups - cardiologists, gastroenterologists, intensivists, oncologists, neurologists, dermatologists, geriatricians, rheumatologists and several other groups. The current specialty classification system used by Manitoba Health does not support identifying most of these subspecialties.[34] Hence, for analyses of the activities of medical specialists, we refer either to the entire group together, or Neurologists, Dermatologists, and Other Medical Specialists.

Winnipeg and Brandon residents are treated by medical specialists at a rate 2 to 3 times that of other regions. Residents of the high need Northern regions have quite low rates of contact with medical specialists, although regional rates of consultations are much more comparable. These patterns are quite similar when inpatient contacts are included, with one exception: residents of Burntwood have a high rate of in patient contact with medical specialists, likely reflecting their high rate of hospitalization in Winnipeg.

Neurology. More than half of the contacts delivered by neurologists were consultations to other physicians (Figure 53). Care delivered by neurologists is somewhat more equitably distributed across the province, although residents of the Northern regions have lower than expected rates of contacts with these specialists, given their generally poor health characteristics.

[34] All Medical Specialists were included in this group (including those classified as 'General Internists' in our previous report on Generalist Physicians). Only Neurologists and Dermatologists could be individually identified.

Figure 52: Ambulatory Visits to Medical Specialists: Consults vs Non-Consults

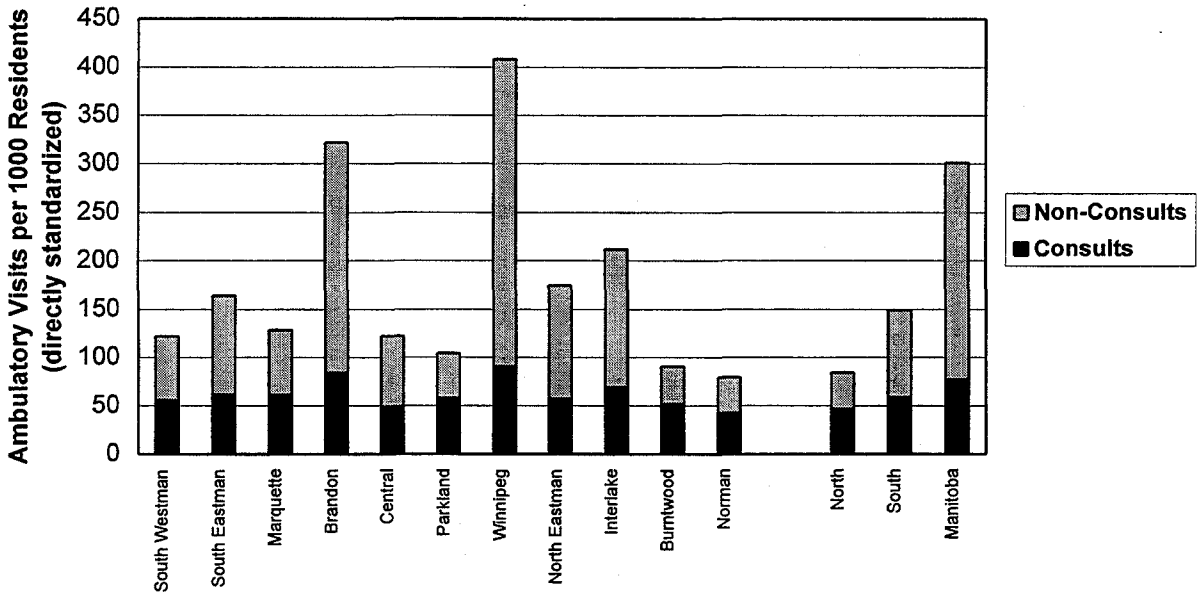
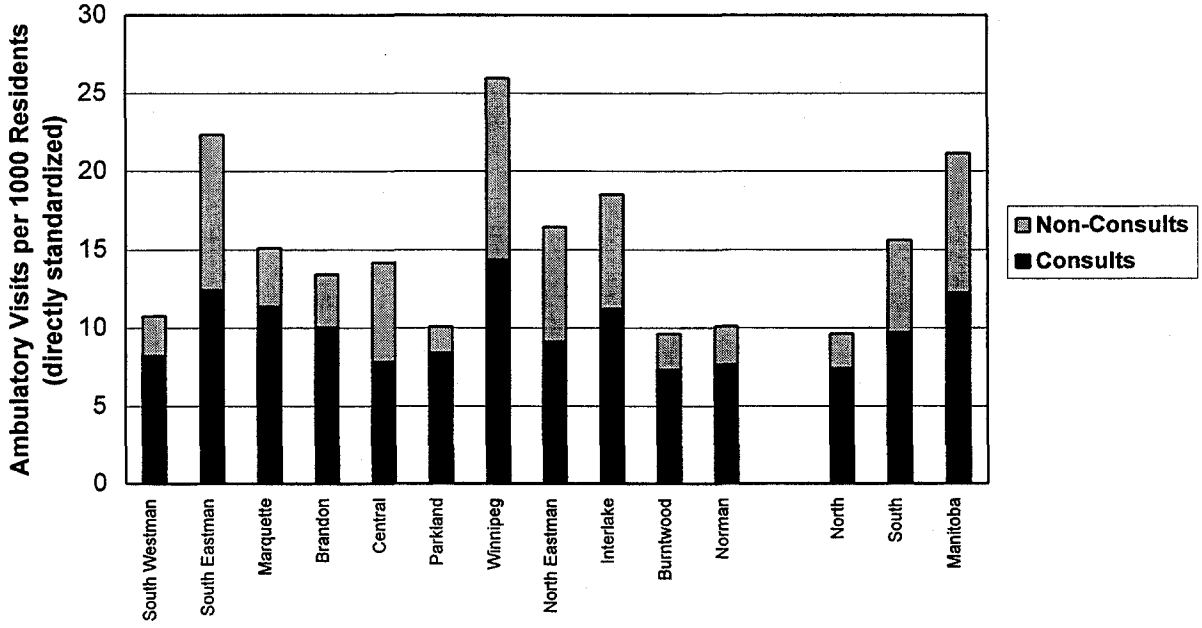


Figure 53: Ambulatory Visits to Neurologists: Consults vs Non-Consults



Dermatology. Care delivered by dermatologists is also not distributed as one might expect if this group served as a provincial resource (Figure 54). Among both consultative and non-consultative visits, Winnipeg and Brandon residents receive two to three times as much care as residents of any other region, and Northern residents have particularly low contact rates.

Paediatrics. Our previous report on generalist physicians acknowledged the fact that paediatricians in Winnipeg and Brandon provide much of the primary care to children which, for rural residents, is delivered by general practitioners. In that report we worked with several key informants and used practice-based criteria to distinguish between generalist and subspecialist paediatricians. One would expect particularly the latter to serve as a provincial resource.

As Figure 55 illustrates, very little of the care delivered by general paediatricians is provided as consultations. In serving as primary physicians to children in Winnipeg and Brandon, they provide many visits to residents of these regions (and also North Eastman and Interlake, both of which border Winnipeg). The Department of Paediatrics and the Northern Medical Unit have long had organized programs for sending paediatricians to remote Northern communities such as Norway House, Garden Hill and Berens River, making approximately 60-70 trips a year. More recently, Winnipeg-based paediatricians have been making regular visits to paediatric clinics organized in southern areas including Winkler, Steinbach, and St. Rose. These programs should be commended and expanded. Most of these contacts are captured in the data used to construct Figure 55. However, since these clinics are only held periodically (monthly in the rural South and 1-4 times a year in each community in the North), the volume of visits delivered is relatively low. Therefore, their effect on overall patterns of contact rates shown in Figure 55 is dwarfed by the volume of visits provided by even one or two general paediatricians in Winnipeg.

Figure 54: Ambulatory Visits to Dermatologists: Consults vs Non-Consults

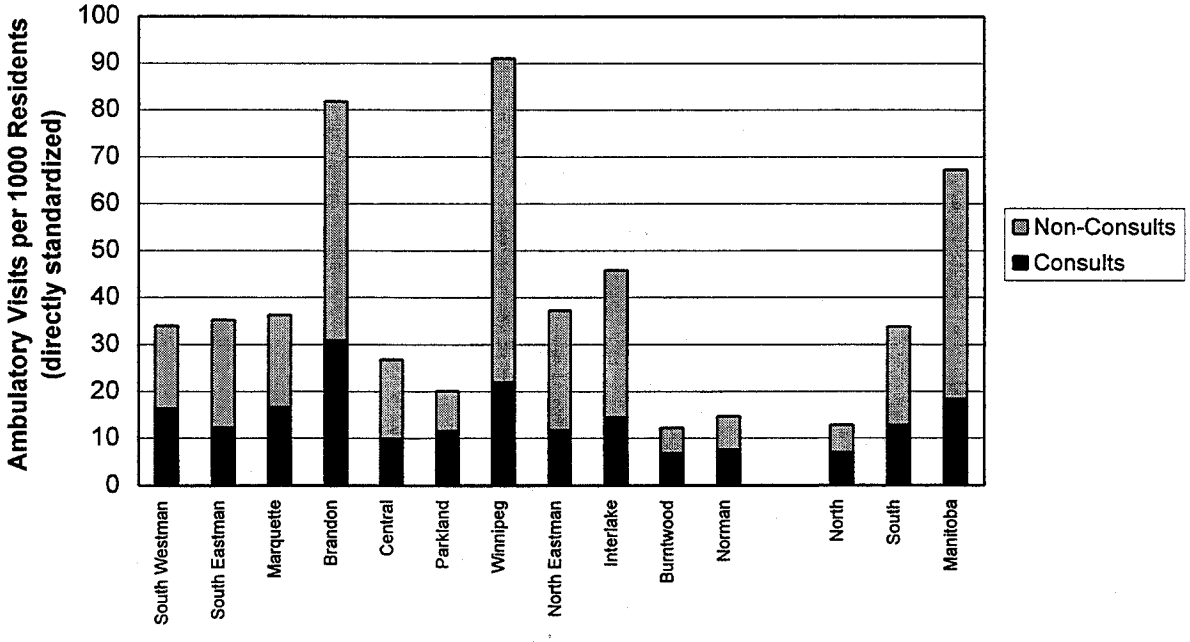
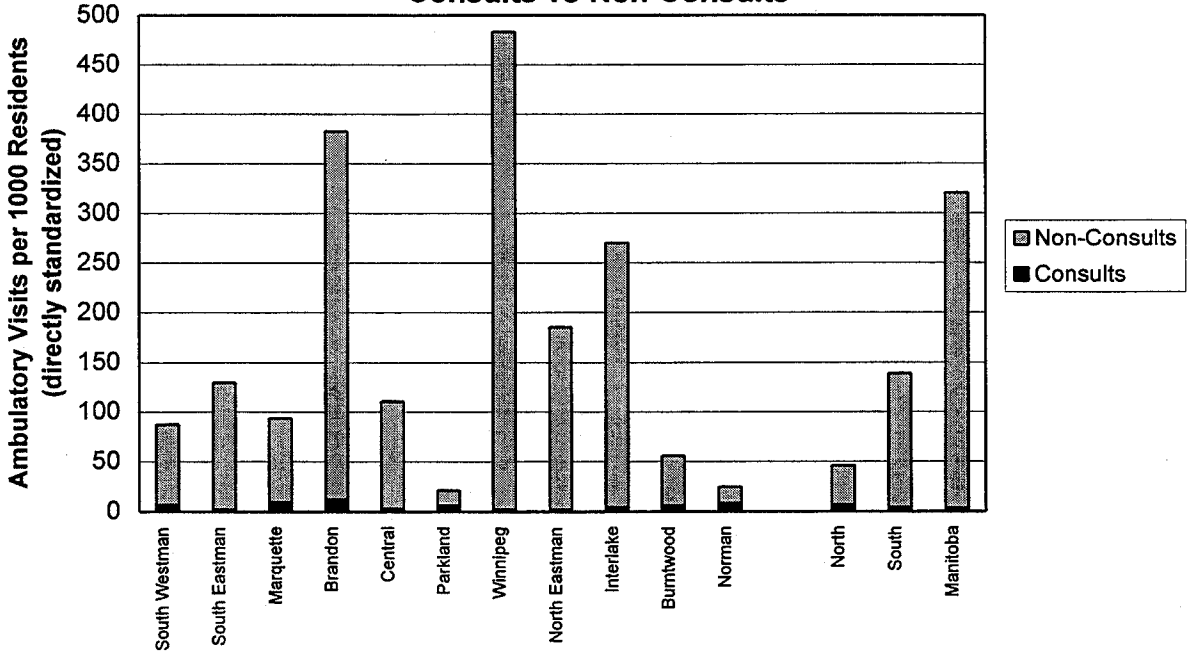


Figure 55: Ambulatory Visits to Paediatric Generalists: Consults vs Non-Consults



As we discuss in the Appendix, care delivered by subspecialist paediatricians is not well documented in the Manitoba Health data. We estimate that only about 25% of the care they provide is captured in the claims files. Therefore we do not report regional access to their services, as the data may be quite unrepresentative[35].

Psychiatry. Less than 5% of the contacts delivered by psychiatrists involve consultations. Care delivered by psychiatrists is particularly concentrated on Winnipeg residents (Figure 56). Although data for this graph did not include contacts delivered by salaried psychiatrists under contract with the province, some of which are captured in the Mental Health Management Information System, the number of visits excluded because of this is relatively small (approximately 8600 out of 144,314 in 1994/95), and almost 40% of these were received by Winnipeg residents. Rough estimates of how the excluded psychiatrists would affect the results suggest that psychiatry is still the specialty group which provides the lowest relative level of contacts to rural Manitobans (although the correct Winnipeg to Non-Winnipeg ratio may be 4 to 1 rather than 6 to 1 as suggested by the billings data.) Figure 56 includes all visits billed by psychiatrists through the fee for service & evaluation claims system. When an analysis including inpatient visits (in addition to ambulatory visits) was performed, the pattern of high rates of care to Winnipeg residents was further accentuated.

Obstetrics & Gynaecology. Figure 57 shows reasonably similar rates of consultation to obstetricians and gynaecologists across the province, with the lowest rates of consultation available to Norman and Parkland residents. For Winnipeg women and those in Eastman and Interlake regions, these specialists almost certainly provide a significant amount of primary care.

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[35] Because we have no other source of information on the delivery of care by paediatric subspecialists, we did analyse the data available, limited though it is. Since these specialists are very much a hospital based group, we included inpatient as well as ambulatory visits. Their care was delivered at much higher rates to residents of Winnipeg and surrounding areas than to other residents of the province. The one exception to this pattern was a high rate of contacts delivered to residents of Burntwood. It is likely that this reflects the high rate of hospitalization of these residents at Children's Hospital.

Figure 56: Ambulatory Visits to Psychiatrists: Consults vs Non-Consults

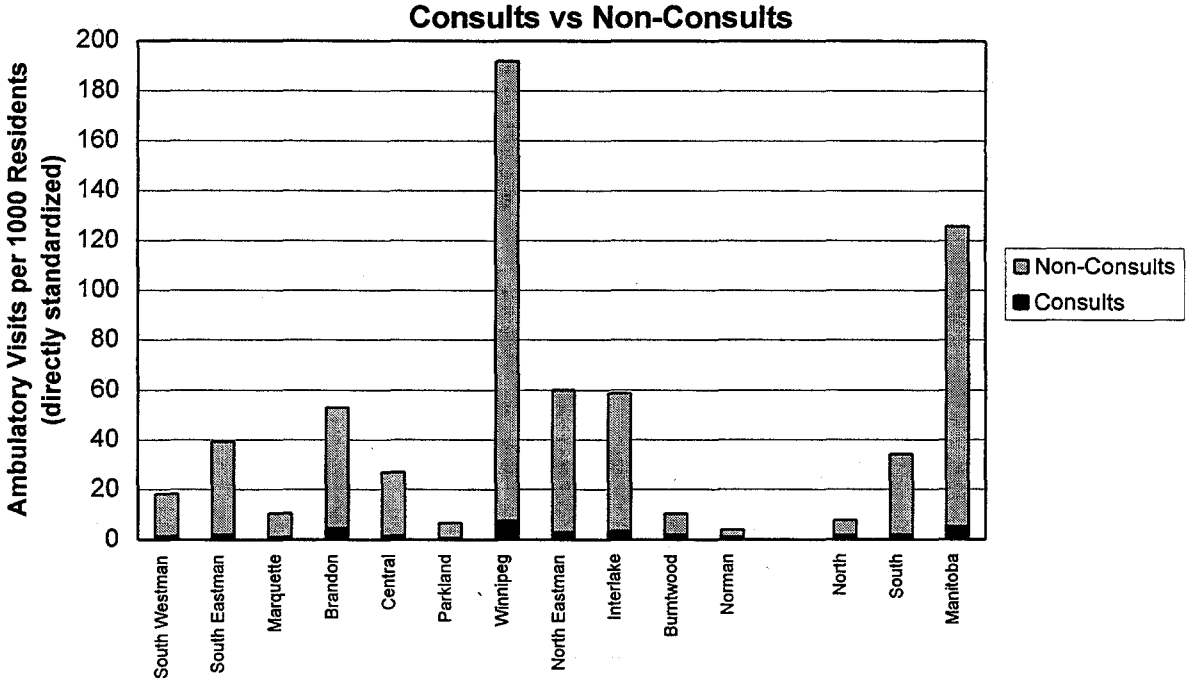
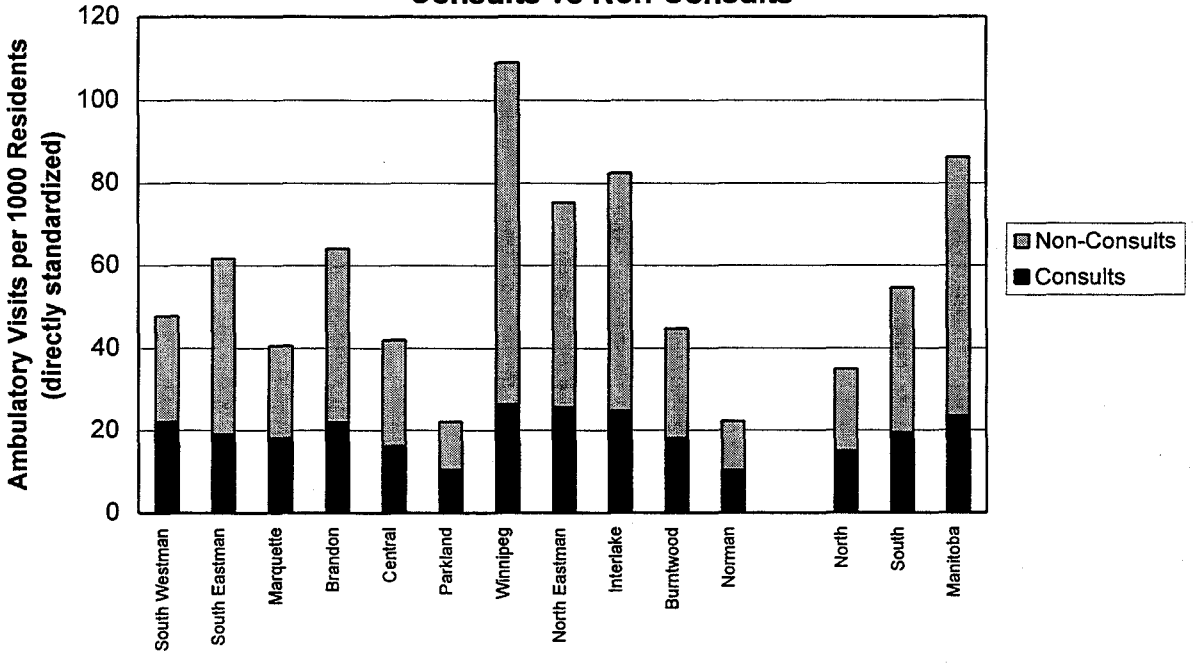


Figure 57: Ambulatory Visits to Obstetricians & Gynaecologists: Consults vs Non-Consults



General Surgery. General surgeons are one of the specialist groups with members practising in several rural locations. Judging by ambulatory contact rates, residents of most regions of the rural South have contacts with general surgeons at a rate similar to that of Winnipeg residents (both consultations and other visits). Brandon residents have twice as many contacts with general surgeons as residents of any other region of the province, while residents of the high need regions of the North have particularly low rates of contact (Figure 58). However, low rates of contact with general surgeons do not necessarily translate into low rates of access to surgical treatment. In rural areas, general surgeons perform many of the same procedures (e.g. tonsillectomy, D&C, hysterectomy, C-section and ovary and tubal surgeries) done by surgical specialists in Winnipeg (e.g. otolaryngologists and gynaecologists). Also, in rural Manitoba, non-certified specialist physicians are approved to perform some general surgical procedures even though they are listed as general practitioners on official registries. Nineteen percent of the common procedures performed by rural general surgeons are performed in Manitoba's rural south by general practitioners (Roos et al. 1996); an even higher percentage of these procedures are performed by general practitioners in Northern Manitoba.

Surgical Specialties. Although almost all surgical specialists are located in Winnipeg (112 of the 119 FTEs), and the rest are in Brandon, residents of most regions of the rural South have rates of contact which suggest reasonable access to their services (Figure 59). Residents of Parkland and Norman, however, have rates which are one-quarter that of Winnipeg residents. Contact rates to most subspecialists (not shown) are markedly higher than average for Winnipeg residents, and for Brandon residents to some subspecialties (particularly for the groups located there, including ophthalmology, orthopaedics and urology). Subspecialist contact rates are also somewhat higher than average for North Eastman and Interlake residents, probably based on proximity to Winnipeg.

Figure 58: Ambulatory Visits to General Surgeons: Consults vs Non-Consults

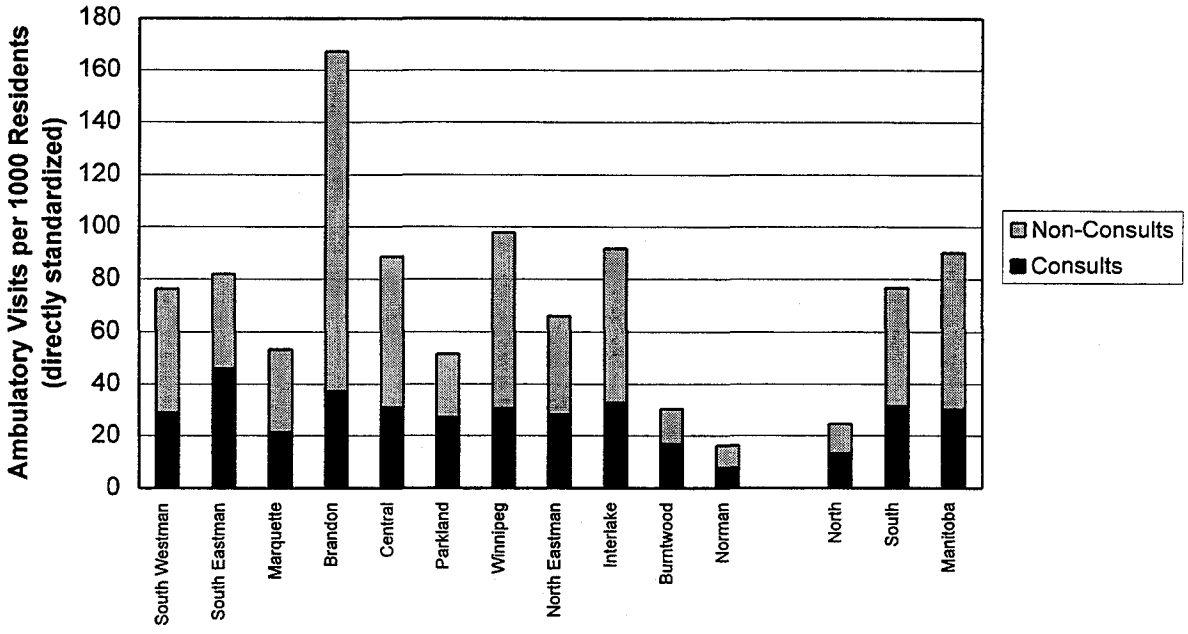
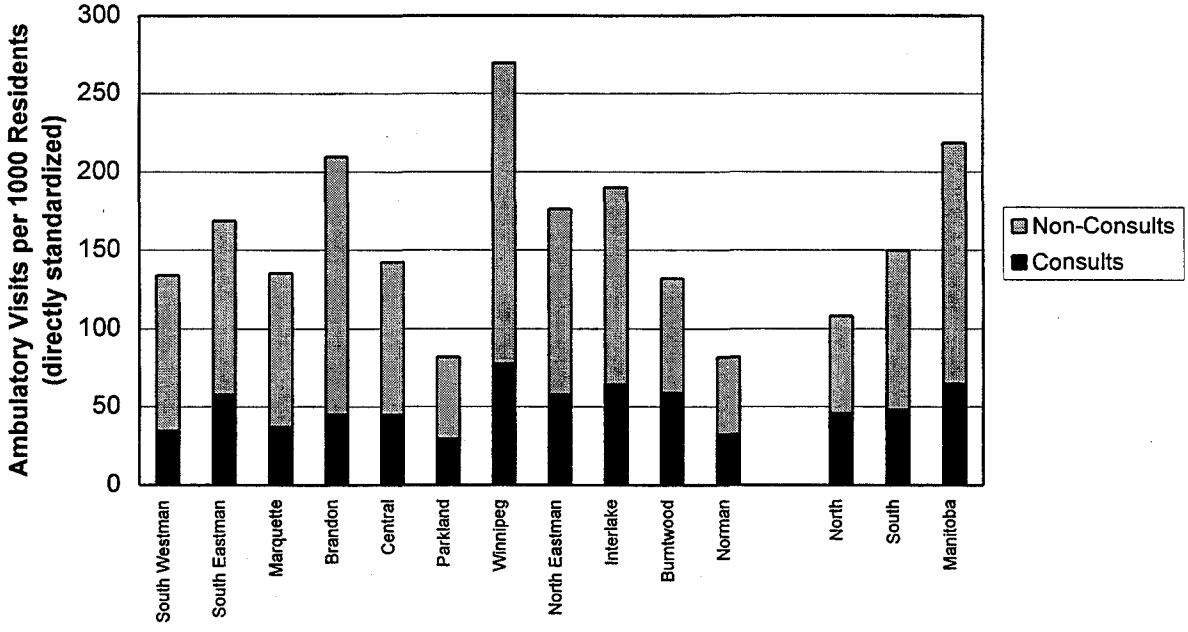


Figure 59: Ambulatory Visits to Surgical Specialists: Consults vs Non-Consults

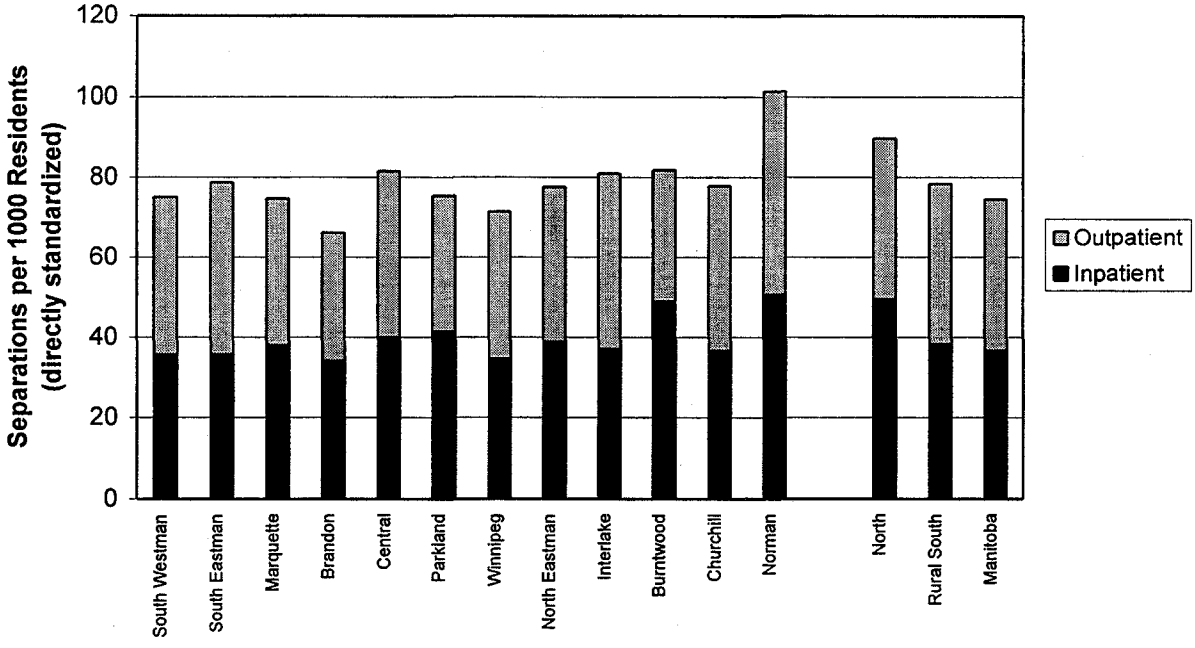


While visits rates are useful for understanding Manitobans' access to most non-surgical specialists, they are more limited as indicators of access to surgeons and surgery. As we have mentioned, in rural Manitoba non-surgeons perform a significant amount of surgery. Also, since many procedures are performed by more than one specialty group (for example, breast surgery is performed by general surgeons and plastic surgeons; gastroscopies and colonoscopies are performed by internists and general surgeons, etc.), it is important to directly examine regional access to the procedures, independent of the specialty of the provider.

2.14 Access to Surgery by Region of Residence

Previous reports from MCHPE have documented the somewhat surprising finding that despite the concentration of surgical specialists in Winnipeg and Brandon, the surgical rates experienced by rural residents appear to be at least as high as those experienced by Winnipeg and Brandon residents. Figure 60 illustrates the accuracy of this finding for residents of the new regional health authorities, using 5 years of data to ensure stability of the rates. Residents of every region experience surgery at a higher rate than residents of Winnipeg. Norman residents experience a substantially higher rate of surgery than residents of any of the other regions, perhaps associated with the high health needs which we have found among residents of this region. However, other regions with surgical rates higher than those of Winnipeg residents are among some of the healthiest regions of the province. One might conclude that the low surgical rates for Winnipeg residents reflect restricted access to hospitals in Winnipeg. However, Winnipeg bed closures are not a likely explanation because the surgical rates for Winnipeg residents in 1994/95 were higher than at any time in the last 5 years.

Figure 60: Inpatient and Outpatient Surgical Care
5 year average: 1990/91 through 1994/95



To gain more understanding of the higher rates of surgery for rural residents, we distinguish procedures performed only in Winnipeg teaching hospitals and Brandon from those also performed in rural and urban community hospitals.

Access to Procedures Performed in Rural and Urban Hospitals

We first identified the procedures performed by general surgeons in hospitals outside Winnipeg and Brandon. The following procedures accounted for almost half of rural general surgeons' caseload: appendectomy, breast surgery, caesarean section, cholecystectomy, dilation and curettage, groin hernia repair, other types of hernia repair, hand procedures, hemorrhoidectomy, hysterectomy, ovary and tubal surgery, and tonsillectomy. In rural Manitoba non-certified specialist physicians are also approved to perform some general surgical procedures. Among residents of the rural South (whose health need characteristics are similar to Winnipeg and Brandon residents), we found rates of surgery for procedures

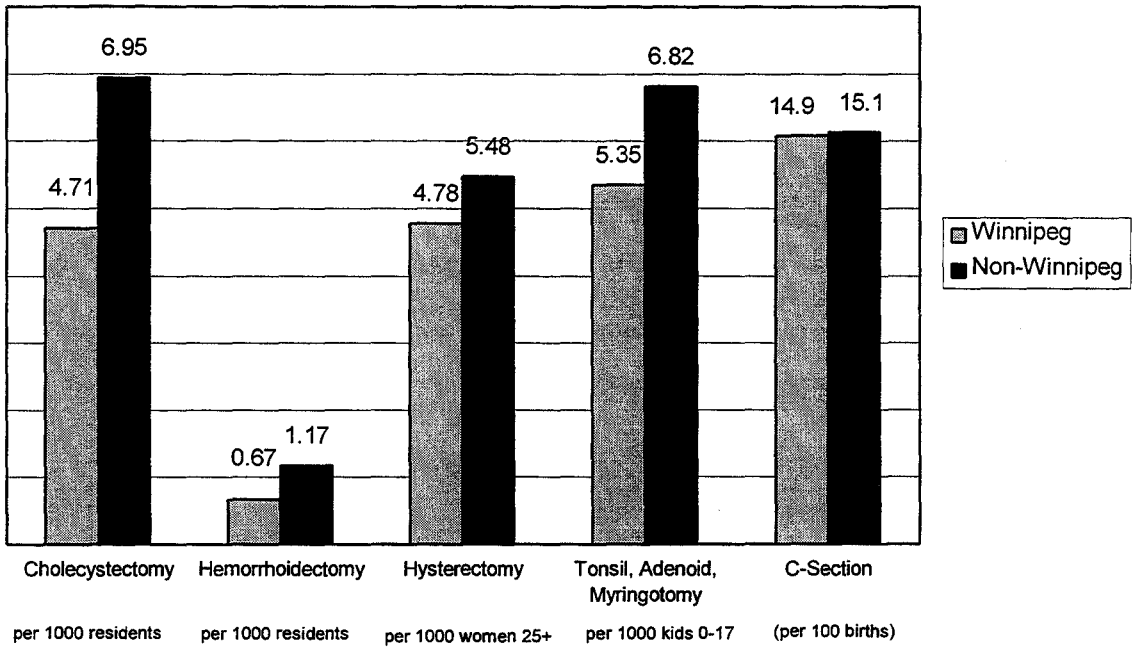
commonly performed by general surgeons to be significantly higher[36] (23.4 per 1000 residents) than the rate for Winnipeg or Westman residents (19.4 and 20.5 respectively; see Roos et al. 1996).

Figure 61 illustrates the rates of surgery experienced by Winnipeg and non-Winnipeg residents for some of the most common surgical procedures. For 4 of the 5 procedures examined (cholecystectomy, hemorrhoidectomy, hysterectomy and tonsillectomy), rural residents were more likely to undergo the procedure than Winnipeggers. The caesarean section rate was the same in the two populations.

High rates of these procedures do not necessarily represent more benefits to the local population. While many patients benefit from these procedures, controversies about their appropriateness and indications continue to swirl. For example, see Bernstein et al. 1993, regarding the appropriateness of cholecystectomy, Roos et al. 1977 for a review of the extent to which tonsillectomies in Manitoba met standards recommended by the American Society of Paediatrics, and the classic editorial in the Lancet (1975) on hemorrhoidectomy entitled, "To tie, to stab, to stretch, perchance to freeze."

[36] Significance was judged using 95% confidence intervals.

Figure 61: Rates of Common Surgical Procedures



Access to Procedures Performed only in Urban Areas

While rural Manitobans may have good access to procedures delivered close to home, how accessible are procedures performed only in Winnipeg or Brandon? Access to specialist care may be at least as important an issue in specialist resource planning as the number of specialists.

In this section we analyze several procedures provided by different specialist groups in the urban centres because they are common, high profile, and frequently the source of press coverage concerning access to care. We present one year rates based on 1994/95 data as well as 3 year rates (1992/93 through 1994/95) and 5 year rates (1990/91 through 1994/95) to see if there are changing patterns in the delivery of care, and to ensure that observed differences are not due to random fluctuations. Regional rates which are significantly higher or lower than the provincial average (using 95% confidence intervals) are marked with an asterisk*.

The regions are presented in order of their scores on our best indicator of population health: the premature mortality rate for the region. Regions on the left of the graph have populations which are healthier than average and one would expect lower than average need for interventions, while those on the right have poorer than average health and we would expect higher than average need. The provincial rates are presented in the rightmost column.

Coronary Artery Bypass Surgery. Cardiovascular surgeons operating at the Winnipeg teaching hospitals serve as a provincial resource for providing this procedure to all Manitobans. Winnipeg residents had somewhat higher than average access to this procedure, at least judging by the 5 year rate (Figure 62). The low rates for Northern residents are quite concerning: Burntwood rates were much lower than the provincial average, as were the Churchill[37] rates. The trends over time are generally positive for Rural South residents, with rates increasing in more recent periods. In 1994/95 there was a substantial increase in the rate of surgery performed on Winnipeg residents, while the rate for Northern residents was falling.

Angioplasty. Cardiologists (a subspecialty group in internal medicine) working at the Winnipeg teaching hospitals serve as the provincial resource for this important corrective procedure. As can be seen in Figure 63, the rate at which Winnipeg residents are provided angioplasty is much higher than for residents of all other regions. The rates are low in most of the rural south, and even lower for Northern residents, although there has been substantial growth in 1994/95 for Burntwood and Norman residents.

[37] Rates at which Churchill residents undergo surgical procedures are included because these data are taken from hospital discharge files which numerous validity checks have found to be highly reliable (unlike ambulatory visits, from which analyses Churchill was excluded).

Figure 62: Coronary Artery Bypass Procedure Rate by RHA

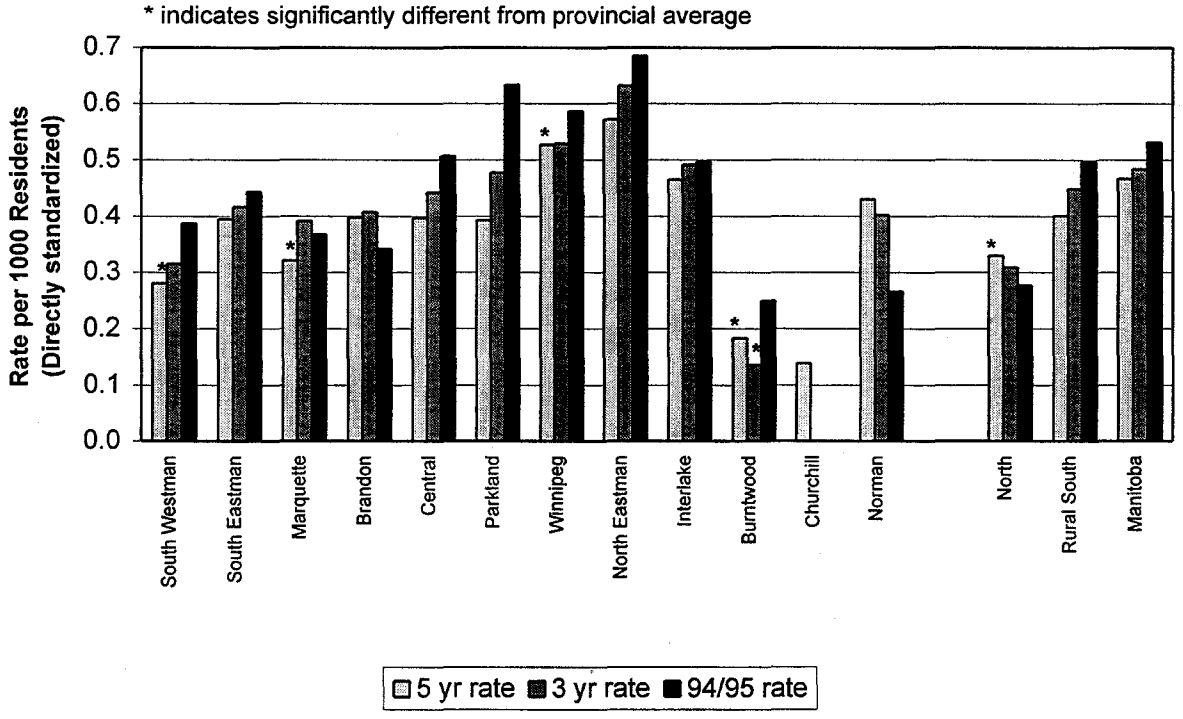
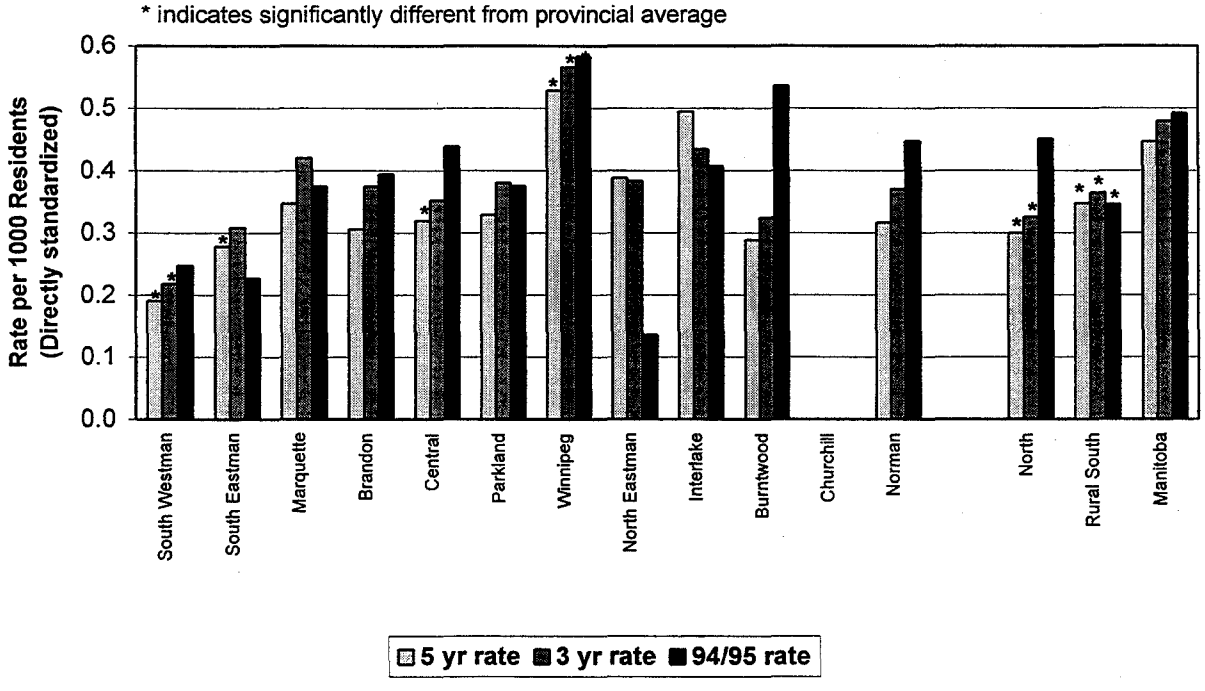


Figure 63: Angioplasty Rate by RHA



As a senior physician at the Medical Faculty notes, there are inherent difficulties in providing access to certain types of procedures for patients who are remote from the delivery site: "*there are certain individuals who will benefit from an angioplasty only if it is done within a certain number of hours of myocardial ischemia.*" It is noted that for others this will be an elective procedure.

Cardiac Catheterization. Winnipeg-based cardiologists also serve as the provincial resource for cardiac catheterization, a diagnostic procedure for heart patients. Figure 64 shows that rural residents also had much lower rates of this procedure than Winnipeg residents. The 1994/95 data reveals an increase in the rate for Winnipeg residents and a slight decrease in the rate for rural south residents. In contrast, the data we reported on the prevalence of hypertension (Table 18) suggests a higher rate of heart disease among residents of several rural southern regions (particularly Marquette, North Eastman and Interlake) compared to Winnipeg. Furthermore, the low rates of catheterization among Burntwood residents are particularly concerning given their generally poor health status[38].

Total Hip Replacement. Although most of these procedures are performed by orthopaedic surgeons based in Winnipeg, sixteen percent of all hip replacements in 1994/95 were performed in Brandon and Morden hospitals. The pattern of rates of this procedure is quite different from the other procedures examined: most rural residents have rates equal to or higher than Winnipeg residents (Figure 65). Burntwood residents' rate for this procedure is

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[38] Although we found the overall rate of hypertension among Northern residents to be similar to the provincial average, the Manitoba Heart Health Survey (Gelsky et al. 1994) found the prevalence of hypertension in individuals younger than 35 years and in females older than 65 years to be higher in the Northern regions. (Patients were classed as hypertensive based on their mean diastolic blood pressure and/or their being treated with medications, salt restricted diet, or a weight reduction program.) Residents of the two Northern regions were also found more likely to be obese using height/weight ratios, and more likely to be diabetic, measured using fasting plasma glucose levels. As is reported in the discussion, research in England (Payne, Saul, 1997)has also found angina rates to be higher in less affluent populations, and others have found ischemic heart disease to be most common in the lowest income groups (Wilkins et al. 1989). This research would lead us to expect higher rates of disease which should benefit from the services of intervention cardiologists in residents of the Northern regions.

much lower than the provincial average, and falling in the more recent periods (recall that these rates have been age and sex adjusted, so the low rate in Burntwood is not explained by its younger population). We have no direct evidence that conditions leading to the need for hip replacement are more prevalent among Burntwood residents, but given their generally poorer health status, it would seem a reasonable hypothesis[39]. Churchill residents, on the other hand, appear to have improving access to this procedure.

Total Knee Replacement. Orthopaedic surgeons based in Winnipeg and Brandon perform all total knee replacements. Rates of this procedure are reasonably similar across the province, with somewhat higher rates among residents of Parkland region and the rural south as a whole (Figure 66). In most regions of the province, rates have been increasing steadily over the 5 year period shown.

Access to knee replacement in Manitoba is much more equitable than in Ontario, suggesting the referral networks in Manitoba for orthopaedic surgery appear to work well. Naylor and DeBoer (1996, p. 60) found residents of some Ontario areas had knee replacement rates twice that of other areas. They found no relationship between self reports of musculo-skeletal disability and observed variations in hip and knee replacement rates, and concluded that it was unlikely that variations in underlying population disease rates explained the varying surgical rates (Naylor, DeBoer 1996, p. 56).

Prostatectomy. Urologists based in Winnipeg and Brandon perform all prostatectomies. Rates of this procedure are similar and decreasing somewhat across the province as alternative procedures and drug therapy become available (Figure 67). Based on 5 years of data, Winnipeg residents had higher than average surgical rates, while Brandon residents had a significantly lower rate.

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[39] In Ontario they report no obvious relationship between rates of hip and knee arthroplasty and self-reported musculoskeletal disability on the Ontario Health Survey (Naylor, DeBoer, 1996).

Figure 64: Cardiac Catheterization Rate by RHA

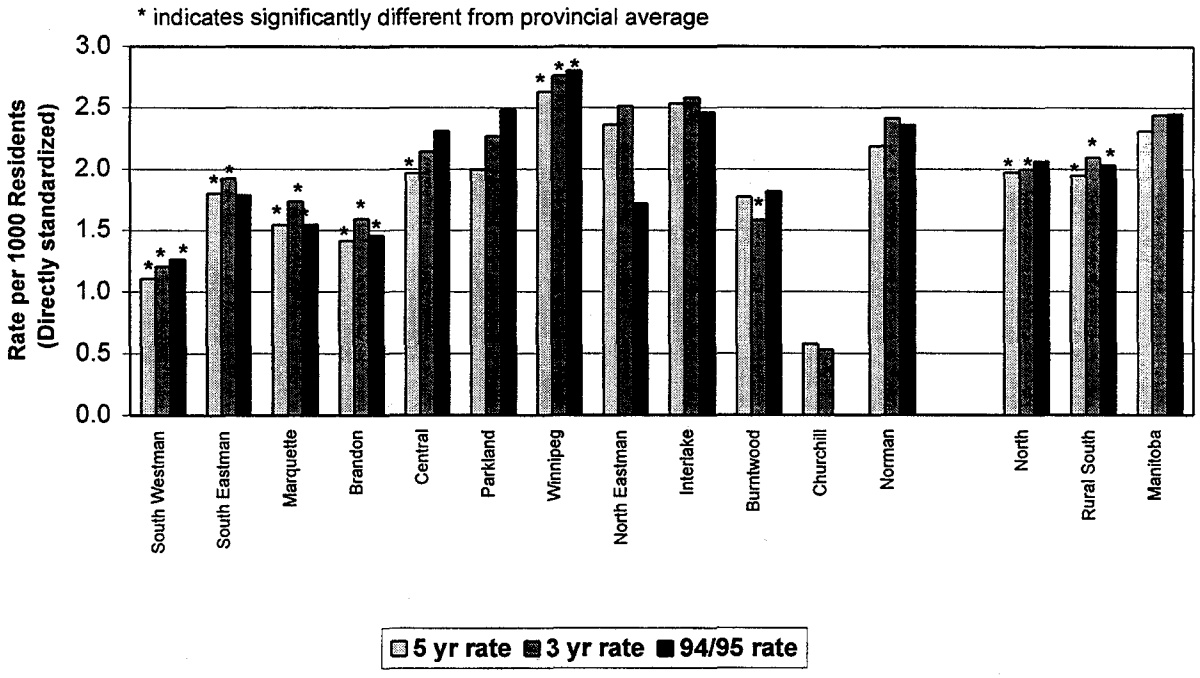


Figure 65: Hip Replacement Rate by RHA

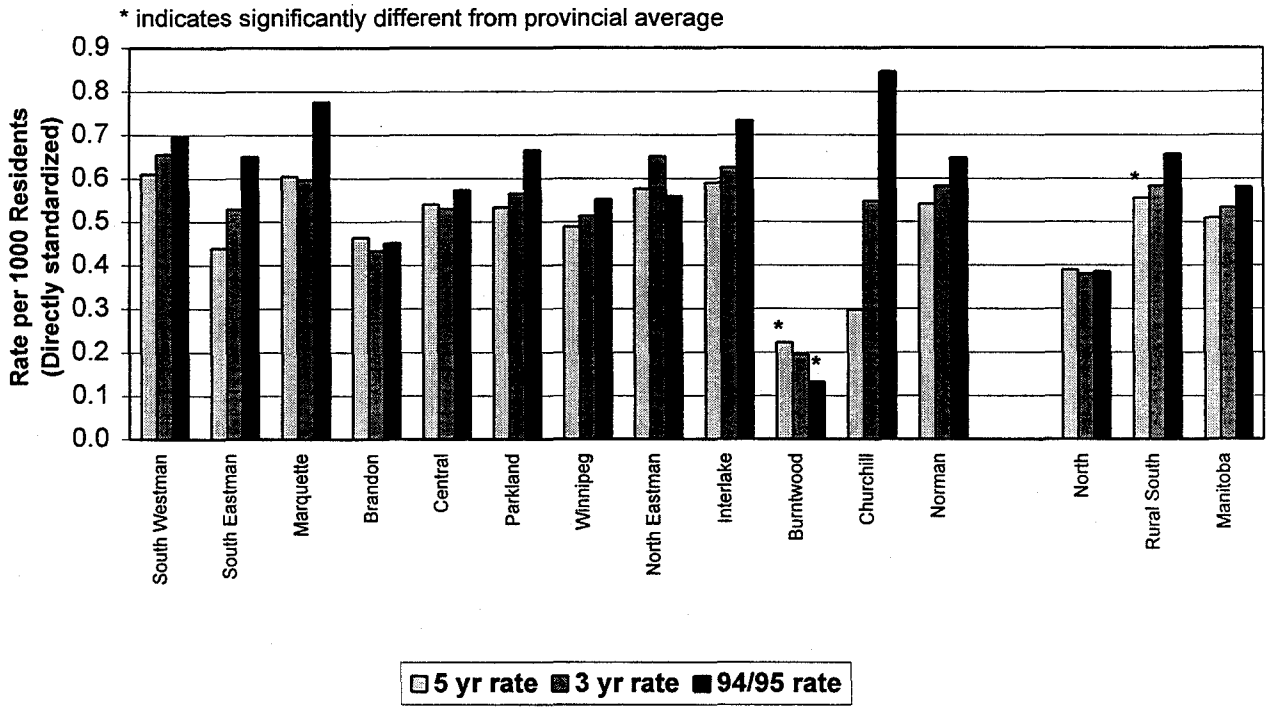


Figure 66: Knee Replacement Rate by RHA

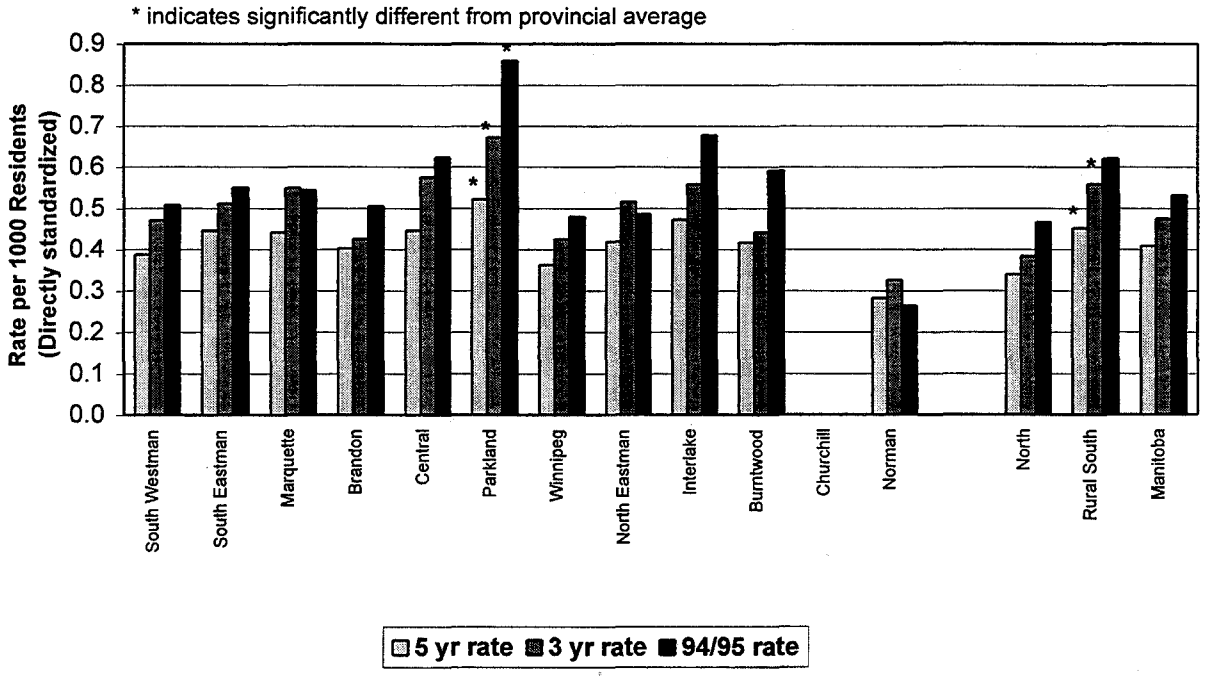
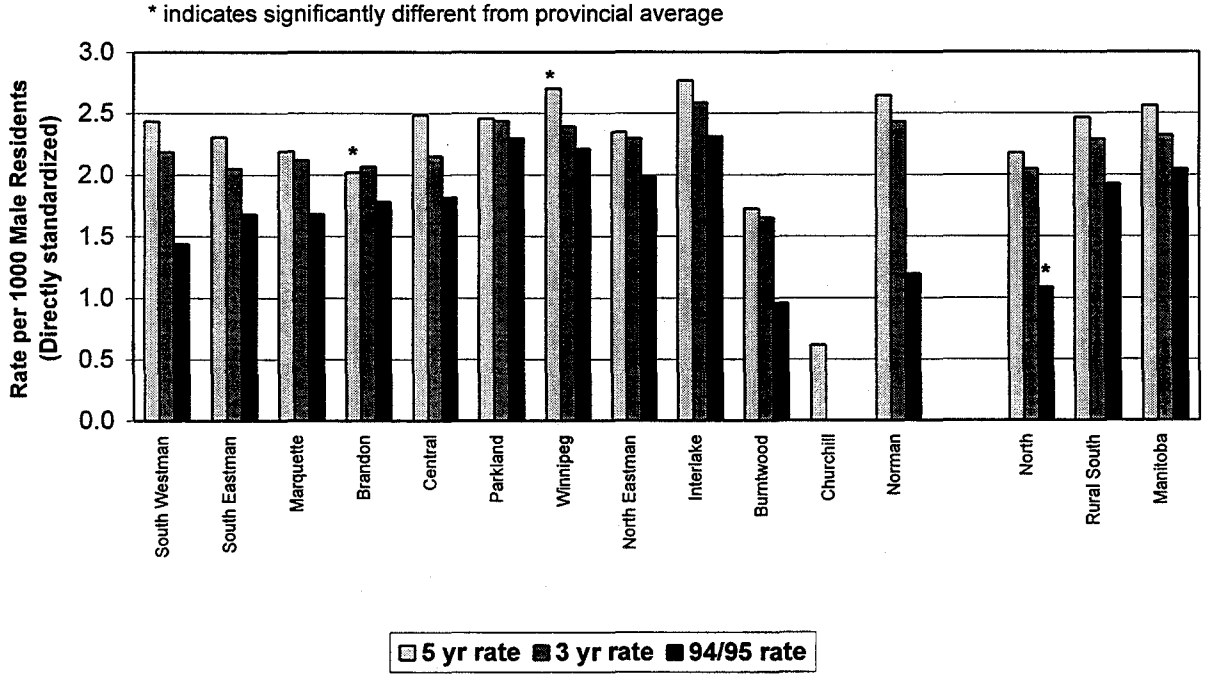


Figure 67: Prostatectomy Rate by RHA



2.15 Access to Procedures Performed in Public and Private Clinics: Cataracts

There has been much discussion in the press about allowing those who can afford to pay for their medical care to do so, to combat the perceived under-funding of the health care system. Cataract surgery is one of the areas where private clinics have been used: two in Winnipeg, one in Brandon, and one in Alberta which served some Manitoba residents. The additional fees which patients must pay varies among these clinics, up to $1270. Public sector cataract procedures are performed only in Winnipeg and Brandon hospitals.

Figure 68 shows the rate at which residents of each region underwent this procedure within the public sector. Winnipeg residents had higher than average rates of cataract surgery, and several of the rural regions including South Westman, Parkland, Marquette and Brandon had lower than average rates. To illustrate how this translates into actual numbers of procedures, there were 227 procedures performed on Parkland residents in 1994/95; it would have taken 67 more to bring this rate up to the provincial average.

In the past 6 years there has been a 77% increase in the number of cataract procedures performed in the public sector: from 3,556 in 1990/91 to 6,297 procedures in 1995/96. Residents of every region have benefited from this growth.

However, during this time of rapid public sector growth, private sector activity was also increasing. In private clinics in Manitoba, the number grew from 284 procedures in 1990/91 to 660 in 1995/96. Manitobans also paid for private operations in Alberta clinics: 312 procedures in 1994/95, and 178 in 1995/96.

Figure 68: Cataract Rates in Manitoba Public Facilities

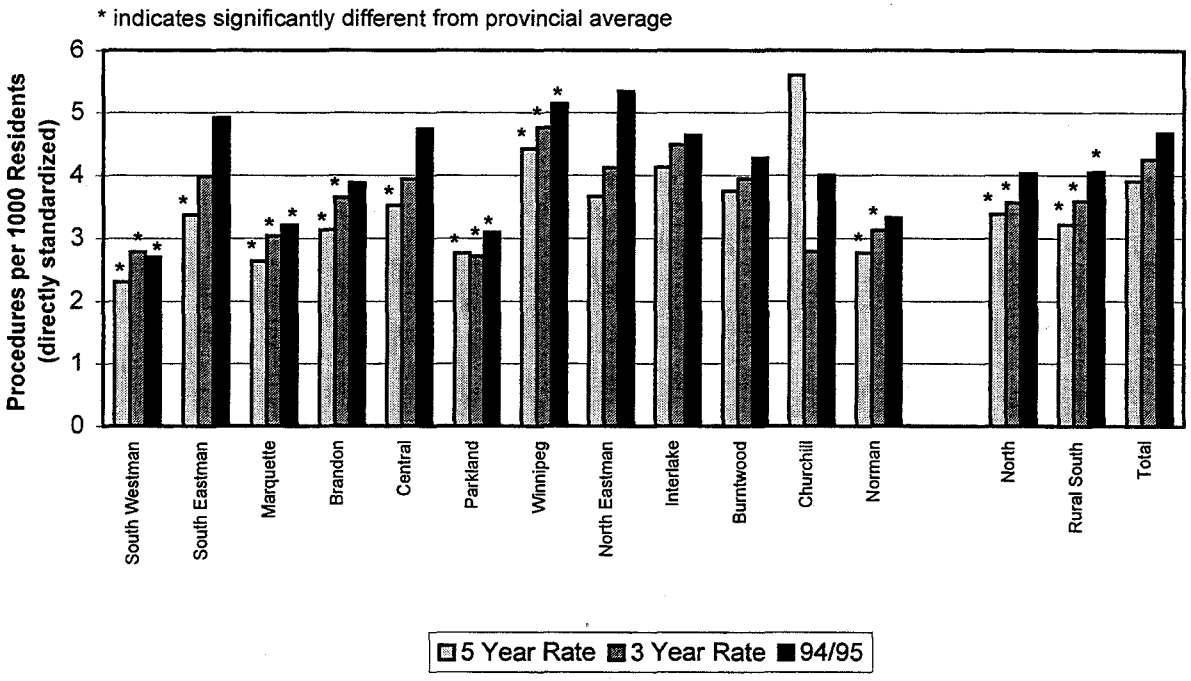
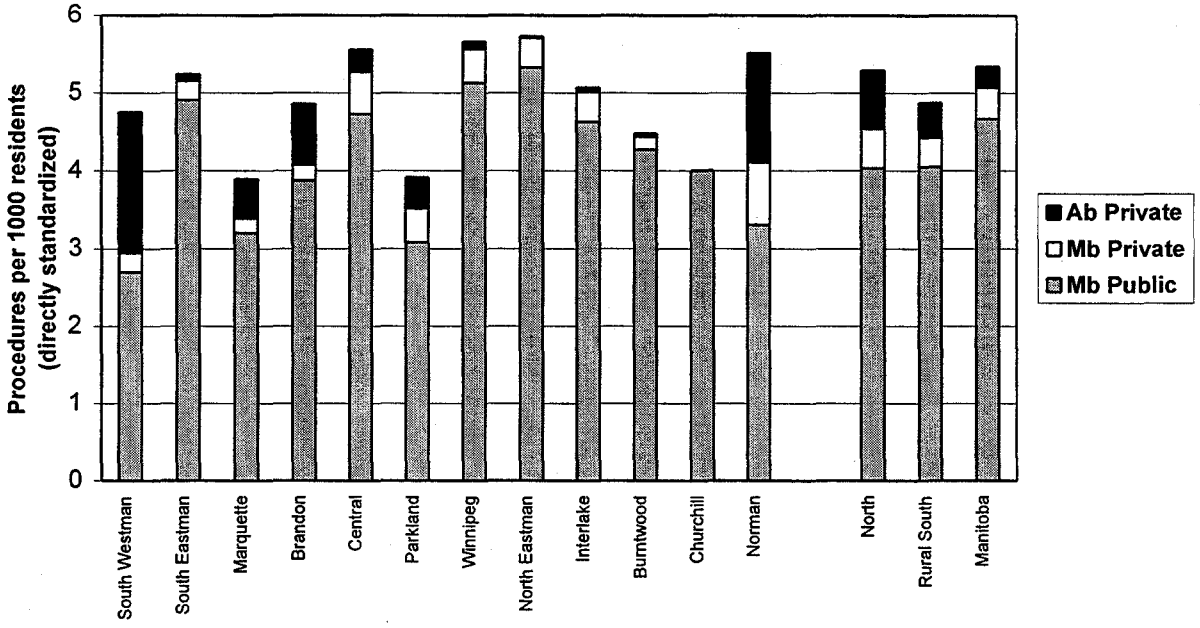


Figure 69 illustrates the proportion of 1994/95 cataract surgeries performed in Manitoba public facilities compared to private clinics in Manitoba and Alberta. A significant proportion of South Westman and Norman residents paid to have their cataract surgery performed in private clinics. South Eastman, North Eastman and Winnipeg residents made little use of the private clinics, even though two of the clinics are located in Winnipeg. However, our review of the socio-economic status of Winnipeg residents using private clinics suggested that it wasn't just the wealthy who were paying. Using public-use census data on neighbourhood income levels, we divided Winnipeg residents into five groups based on income. Of the 348 private clinic cataract procedures on Winnipeg residents in 1994/95, 122 (35%) were performed on residents in the lowest two income categories. These findings suggest the need for an examination of referral patterns for public surgery among residents of the low use regions and low-income neighbourhoods. Also, a cataract surgery priority list should be

established to ensure that residents of remote areas of Manitoba have good access to publicly funded health care. Preliminary work on such a system is underway as of the printing of this report.

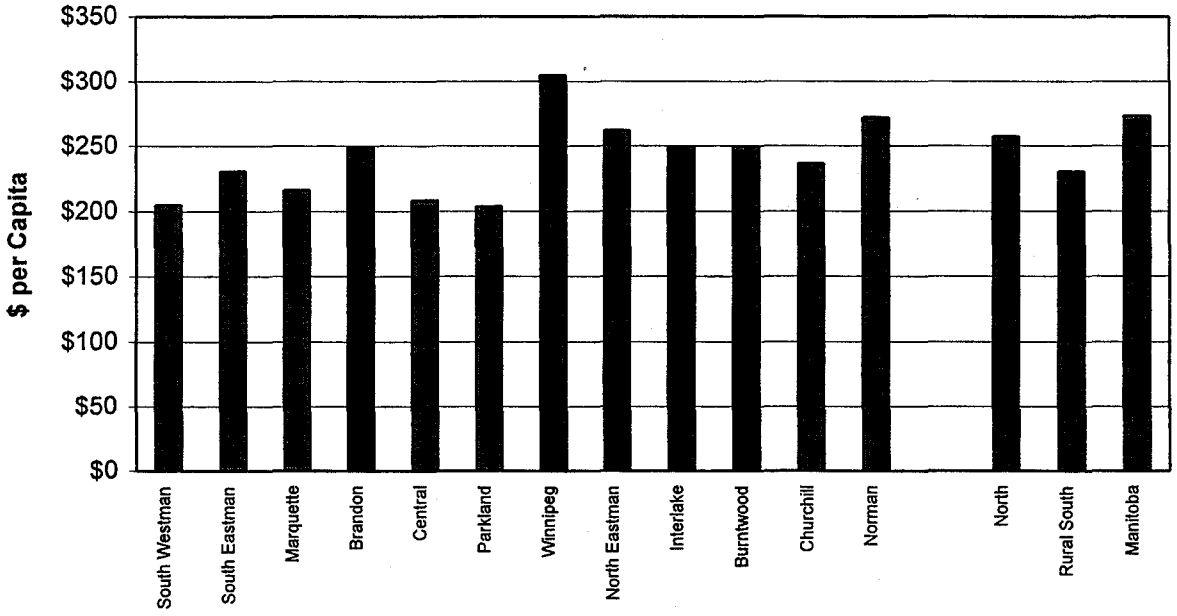
Figure 69: 1994/95 Cataract Rates by RHA, Public and Private Sector



2.16 Total Provincial Expenditures on Physician Services By Region

One way of summarizing the data reviewed on residents' receipt of physician services is to compare provincial expenditures on physician services by region. Figure 70 includes expenditures on specialists and general practitioners (since in rural Manitoba GPs deliver much of the care which would be delivered by specialists in Winnipeg and Brandon). We include as many of the expenditures on physician services as we could capture with some degree of certainty (we estimate that we capture 93%).[40]

Figure 70: 1993/94 Expenditures on All Physician Services by RHA



[40] We include not just ambulatory visits, but also hospital visits, surgery, expenditures on anaesthetists and other hospital based physicians (including Interns and Residents) not usually included in these analyses, as well as Optometrists, Dental Surgeons and Chiropractors. However, there were some exclusions, notably Pathologists and Rural Radiologists. Expenditures were allocated to the patient receiving the service and counted according to where the patient resides, not where services were received. Finally, the data were age and sex adjusted to ensure comparability. This piece of analysis is being conducted as part of an upcoming MCHPE report, 'A Project to Investigate Expenditures on Health Care.'

Figure 70 ranks the regions by increasing premature mortality rate. These data confirm previous analyses that (1) much higher expenditures are made delivering physician services to Winnipeg residents than to residents of other regions, and (2) there is some targeting of physician expenditures towards populations with demonstrated high health needs, although considerably less than their poor health indicators might suggest. For example, life expectancy for residents of Northern Manitoba is 3.8 years less than the provincial average, and Northern residents are hospitalized more than twice as often as other Manitobans for conditions which should be avoidable with good ambulatory care. However, less is spent per capita delivering physician services to Northern residents than Winnipeg residents.

2.17 Do Specialists Serve High Need Populations Well?

The preceding analyses suggest that specialist care is not well organized to serve the high need populations of the North; contact rates with specialists by Northern residents are low, as are rates for surgical procedures which are associated with improvements in the quality of life. This analysis is complicated by the remoteness of Northern residents from Winnipeg and Brandon, the location of most of Manitoba's specialists. However, it is also possible to analyze the access of high need Winnipeg populations to specialists (Roos, Mustard 1997). The results suggest that even in Winnipeg, high need populations are not getting adequate access to specialist services.

This analysis compares the health and health care use patterns of Winnipeg residents according to the average household income in their neighbourhood of residence. As can be seen in Table 19 there was a marked difference in health status as measured by age/sex standardized death rates across the Winnipeg population. Individuals in middle-income neighbourhoods (Quintile 3) have poorer health status than individuals in the highest income neighbourhoods (Quintile 5); those in the poorest neighbourhoods demonstrated the worst health status. These patterns remained unchanged using the prior year's data. These patterns also held across gender-specific mortality rates, among only those age 0-74, by disease groups, and for five of the eight specific diseases examined. Life expectancy for males and females showed the same trend, ranging from 65.3 years among male residents of the lowest income neighbourhoods to 76.6 years for those in the highest income neighbourhoods, with a similar range for females, 74.4 to 82.1 years.

Table 19. Ill-Health Characteristics of the Population of Winnipeg by Relative Affluence of Neighbourhood of Residence; 1992 (directly standardized)

	Q1 (Poorest)	Q2	Q3	Q4	Q5 (Wealthiest)	Ratio Q1/Q5
Age Standardized Death Rates						
Males	13.7	10.2	8.7	7.8	6.2***	2.2
Females	9.4	8.0	7.3	6.7	6.6***	1.4
Ages 0-74	6.7	4.5	3.9	3.1	2.7***	3.4
Life Expectancy[a]						
Males	65.3	70.5	72.8	74.3	76.6	.85
Females	74.4	77.8	79.5	80.0	82.1	.91
Death by Type of Disease						
Chronic Disease[b]	4.0	3.1	2.9	2.5	2.3***	1.7
All Cancer	2.9	2.3	2.2	1.9	1.8***	1.6
All Injuries[c]	0.8	0.5	0.4	0.3	0.2***	4.0
Deaths from Specific Diseases:						
Ischemic Heart Disease	2.53	1.90	1.81	1.82	1.45***	1.7
Hypertension	0.11	0.05	0.04	0.04	0.02**	5.5
Vascular Complications	0.88	0.67	0.59	0.59	0.60**	1.5
Diabetes	0.22	0.16	0.18	0.15	0.10*	2.2
Pneumonia	0.42	0.34	0.25	0.38	0.31	1.3
Colon Cancer	0.35	0.26	0.32	0.20	0.25	1.4
Lung Cancer	0.93	0.69	0.63	0.51	0.37**	2.5
Breast Cancer	0.011	0.031	0.031	0.021	0.041	0.2

Asterisks indicate p-values from the chi-square test of no linear trend in rates across income groups.
* $p < .05$; ** $p < .01$ and *** $p < .001$

a Life expectancy is based on 5 years of mortality data 1989 - 1993.

b Chronic Diseases includes deaths from the following: ischemic heart disease, diabetes, asthma, hypertension, vascular complications and emphysema.

c All Injuries includes deaths from the following: motor vehicle, falls, vehicular non-traffic, drowning, poisoning, fire and flames and suicide

We found rates of hospitalization to parallel the health status gradient shown in Table 19. Across most measures including the rate at which individuals are hospitalized, the number of days spent in hospital, rates of hospitalization for chronic diseases in general and for specific diseases including hypertension, diabetes and pneumonia, residents of low-income neighbourhoods had a much higher rate of hospitalization than residents of middle-income neighbourhoods, who are in turn hospitalized much more frequently than residents of high-income neighbourhoods (not presented here). However, when we examined rates of contacts with specialists (Table 20) we found that specialist physicians provide no more care to residents of low-income neighbourhoods than to residents of high-income neighbourhoods. We also examined contact rates by specialty across the income quintiles and found that only paediatricians showed a slight tendency for providing more care to those in the highest risk (low-income) groups. Residents in the lowest quintile averaged 4.4 paediatric visits per year, while those in the highest quintile averaged 4.2 visits. Internists and surgical subspecialists showed a distinct reverse gradient in the provision of their services: approximately 15 percent more visits were provided to members of the highest income households. General practitioners, on the other hand, provided more care to low income residents (those at highest risk).

Table 20. Physician Contact Rates Across the Winnipeg Population by Relative Affluence of Neighbourhood of Residence; 1992 (directly standardized)

	Q1 (Poorest)	Q2	Q3	Q4	Q5 (Wealthiest)	Ratio Q1/Q5
Mean Visits per Resident to:						
All Physicians	5.8	5.2	5.0	4.8	4.7***	1.2
General Practitioner	4.2	3.6	3.4	3.3	3.0***	1.4
Specialist						
Referred	0.2	0.2	0.2	0.2	0.2	1.0
Unreferred	1.4	1.4	1.4	1.3	1.5	0.9
Percent with 1 or More Contact:						
Any Physician						
General Practitioner	76.2	75.6	75.6	75.0	73.1	1.0
Specialist						
Referred	18.0	17.9	18.0	18.0	18.0	1.0
Unreferred	36.5	37.9	37.7	37.4	40.3	0.9

Asterisk indicates p-values from the chi-square test of no linear trend in rates across income groups.

*** $p < .001$

Previous work focusing on those with mental disorders reinforces this finding, that specialists, in this case psychiatrists, provide fewer services to residents of middle-income and low-income neighbourhoods than they do to residents of upper income neighbourhoods (Tataryn et al. 1994). Among all adult urban residents, ambulatory psychiatric care is most accessible to residents of middle and upper income neighbourhoods. Among adult urban residents with non-psychotic disorder, male residents of the wealthiest neighbourhoods received three times (and female residents two times) the number of ambulatory psychiatric visits as residents of the poorest neighbourhoods (Table 21). Of the total number of ambulatory visits provided to adults with non-psychotic disorder, 35% were to those in the poorest neighbourhoods, while 60% went to residents of the wealthiest neighbourhoods.

Similar patterns of differential access were evident across income groups among adults with psychotic disorder. These observations raise serious concerns about the equity of access to specialist mental health care. It is not plausible that these treatment patterns are explained by more severe disease amoung residents of middle and upper income neighbourhoods. However, psychiatrists may be preferentially treating individuals in whom they assess an optimistic prognosis. While it is possible that residents of poor neighbourhoods may be less compliant with therapy, and therefore more difficult to reach, this argument is not supported by evidence from non-psychiatric physicians, who provide equivalent levels of care to residents of high, median and low-income neighbourhoods. It is possible that unmeasured care, provided by community-based non-physician providers, is substituting for psychiatric care in low-income neighbourhoods, but not likely for middle-income residents.

While it may be suggested that these patterns of unequal access indicate a deficit of psychiatrists in the province, there is no obvious evidence that Manitoba is under-supplied relative to other jurisdictions. On a per capita basis, the supply of psychiatrists in the province is higher than several Canadian provinces, and Manitobans receive substantially more contacts with psychiatrists than Americans.

As one physician puts it: *"As an individual, I continue to be frustrated that despite our supposed surplus of psychiatrists, one cannot get psychiatrically ill patients cared for adequately. This may also plague other specialty disciplines. What can we do to insure that all disciplines care for the patients who are the most ill and sometimes the most unrewarding? As you are aware there is much that we do in all specialty areas that is not evidence based and likely is a waste of resources."*

Table 21. Comparison of Use of Psychiatric and Non-Psychiatric Ambulatory Physician Services by Income Quintile, Adult (18-64) Urban Residents (1991/92)

Rate per 100 Patients (directly standardized)

		Q1 Poorest	Q2	Q3	Q4	Q5 Wealthiest	Ratio Q5/Q1
Non-Psychotic Disoder							
Males in Treatment	N	5,646	3,448	3,334	3,398	3,148	
Psychiatrist Visits	/100	85	145	150	158	259	3.05
Other Physician Visits	/100	162	218	190	180	162	1.00
Psychiatrist Visits as Percent of Total	%	34.5	39.9	44.1	46.8	61.6	
Females in Treatment	N	6,754	6,484	6,351	6,276	5,694	
Psychiatrist Visits	/100	121	156	145	189	258	2.13
Other Physician Visits	/100	219	199	184	184	173	0.79
Psychiatrist Visits as Percent of Total	%	35.5	43.9	55.9	50.7	59.8	
Psychotic Disorder							
Males in Treatment	N	1,191	650	529	391	395	
Psychiatrist Visits	/100	386	545	518	486	687	1.77
Other Physician Visits	/100	322	333	324	279	238	0.73
Psychiatirst Vists as Percent of Total	%	54.5	62.1	61.5	63.5	74.3	
Females in Treatment	N	994	810	660	607	560	
Psychiatrist Visits	/100	525	582	637	642	762	1.45
Other Physician Visits	/100	409	338	306	305	300	0.73
Psychiatrist Visits as Percent of Total	%	56.2	63.2	67.5	67.8	71.2	

Table 22. Rates of Surgical Procedures in the Winnipeg Population by Relative Affluence of Neighbourhood of Residence (1992)

	Q1 Poorest	Q2	Q3	Q4	Q5 Wealthiest	Ratio Q1/Q5
Procedure[a]						
Total Hip Replacement	4.8	4.9	5.7	4.9	5.2	0.9
Total Knee Replacement	2.3	3.5	3.5	4.0	3.5	0.7
Coronary Artery Bypass Surgery	3.4	4.8	6.3	5.3	5.3*	0.6
PTCA	5.0	4.4	5.0	4.0	4.4	1.1
Pacemaker Implant	5.4	5.3	3.8	4.4	4.4	1.2
Tympanotomy	49.4	68.7	60.7	53.7	44.0*	1.1
Tonsillectomy/ Adenoidectomy	45.0	68.4	56.0	59.5	50.0	0.9
Hysterectomy	33.5	32.1	35.3	34.5	37.1	0.9
Cholecystectomy	24.7	22.9	21.0	24.9	22.4	1.1
Back Surgery	3.3	4.7	3.4	4.0	3.6	0.9
Hemorrhoidectomy	5.1	5.6	5.0	6.0	4.7	1.1
Breast Surgery	13.0	14.3	15.7	16.0	14.0	0.9

Asterisk Indicates p-values from the chi-square test of no linear trend in rates across income groups.
* $p < .05$

[a] Rates are age/sex standardized per 10,000 residents

This apparent tendency for specialist physicians to under-serve high need populations is also illustrated by an examination of surgical rates across Winnipeg residents grouped by income quintile.[41] Table 22 reports rates of 12 common surgical procedures across the income groups. Orthopedic procedures do not appear to vary linearly with socio-economic status. Knee surgery rates in both 1991 and 1992 appear to show a reverse gradient (although not statistically significant). The higher rates were found in residents of high-income neighbourhoods. No relationship between cardiovascular surgery rates and socio-economic status was observed in 1991, although in 1992 there were somewhat higher rates of bypass surgery among residents of highest income neighbourhoods ($p<0.05$). Only tympanotomy/myringotomy showed some tendency towards higher rates in patients of low-income neighbourhoods. Finally, rates for six other common procedures are presented; none of these procedure rates were among high-need residents residents of low-income neighbourhoods (whose health status is demonstrably poorer).

[41] Rates of urgent and emergent surgery (approximately 10% of all surgery, identified by hospital discharge abstracts) are also substantially higher among residents of low and middle-income neighbourhoods (14.3 and 9.4 discharges per 1000 residents, respectively) than among high-income residents (7.9 per 1000). The most common procedures identified in this group included open reduction of fracture, appendectomy and cholecystectomy.

3. DISCUSSION

This report is the second focusing on issues related to needs-based planning for physicians in Manitoba. The first report, released in June 1996, focused on generalist physicians, estimating the need for generalist physicians across the province based on the characteristics of each region and its residents. Age, gender, socioeconomic and health characteristics of area residents were used to estimate how many physician contacts area residents needed. This was compared with how many contacts they actually received, and then combined with information on physician workloads to assess whether there was a deficit or surplus of generalist physicians serving a given area. This second report focuses on specialist physicians. Major parts of the analyses for both reports were carried out in support of the PRC, a committee established when the province and the Manitoba Medical Association signed a 5-year contract and agreed to co-manage the insured medical services program.

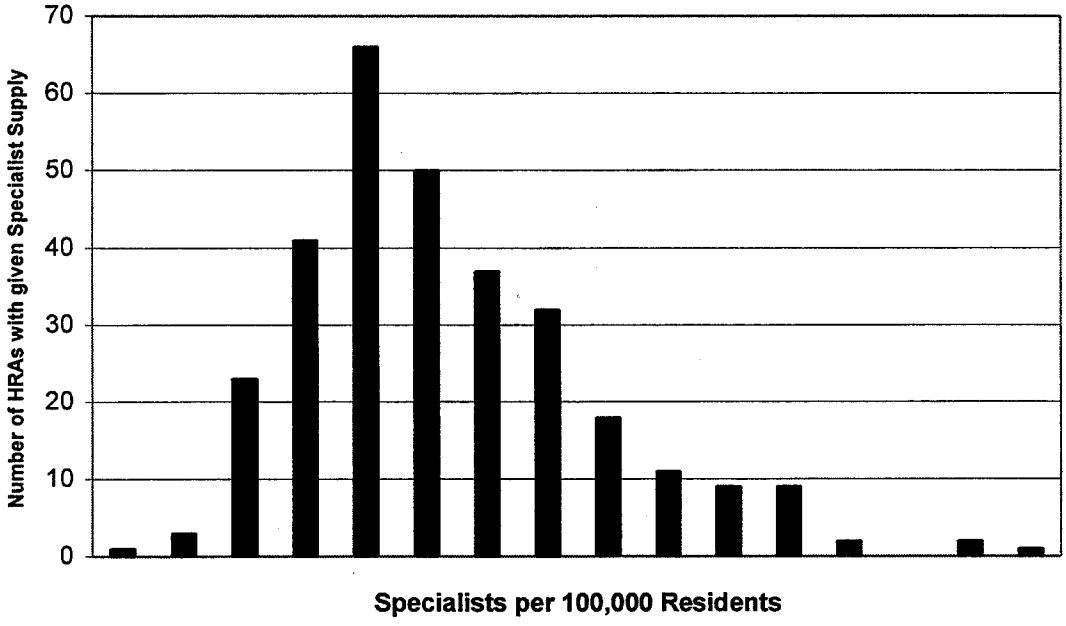
Needs-based planning for specialist physicians represents a special challenge in a province like Manitoba because of the concentration of population and specialist physicians in Winnipeg and Brandon. Since there are many factors in addition to patient need which influence how specialist services are delivered, we used a variety of approaches to assess Manitoba's supply. There is no agreed upon approach to planning for the number of specialists needed in any region, and no evidence which makes it easy to decide when there are too few and when there are too many.

This problem is illustrated by evidence on the availability of specialists in the United States. As Figure 71 illustrates, there is a remarkable range in the relative supply of specialists[42] across hospital referral areas (Wennberg et al. 1996). Cities on the right hand side like White

[42] The US definition of specialist physicians is used here and does not include those in family practice, general practice, internal medicine or paediatrics. Comparisons with Canadian data are problematic because in the US, board eligible physicians will be counted as specialists, while in Canada, only those who have passed their specialty exams are so identified.

Plains, New York and San Francisco have more than twice as many specialists per capita as do cities such as Wichita, Kansas or Des Moines, Iowa. The same researchers reported that the range in supply of some specialists, such as psychiatrists, varies five- or six-fold across major referral regions, with no corresponding differences in health characteristics (Wennberg et al. 1996).

Figure 71: Range in Availability of Specialist Physicians Across US Hospital Referral Areas



As one physician notes: "*There is another concern about certain surgeons who refer all patients over a certain age to an internist or cardiologist (usually within the same clinic) prior to surgery even though the patient may have a family doctor and may not need the consultation. Understandably, it would be difficult to do physician resource planning in an environment where this current utilization may not be entirely appropriate.*"

Therefore, this report reviews various types of evidence which help inform us about the adequacy of the specialist supply in Manitoba. We also review how well specialists of various types serve Manitobans across the province. As the PRC struggled with issues of needs-based planning it became clear that the number of physicians in the province was not always the most critical area of concern. A question of perhaps equal importance, particularly for specialists located in Winnipeg and Brandon, was how well is the delivery of specialist care organized to serve residents of the province who live outside these two cities, particularly residents of the high need regions of the North? Also, within Winnipeg, how accessible is specialist care to high need populations? This approach broadens the usual focus of physician resource planning and considers additional alternatives to recruitment and training for improving the delivery of specialist care in the province.

The report addresses three major questions:

1) Is the current supply of specialists in Manitoba low (suggesting a deficit), adequate, or high (suggesting a surplus)?

2) Given the aging of the population and patterns of entry to and exit from the physician supply, how well has the specialist supply kept up, and what are Manitoba's needs for specialist physicians for the next 10-20 years?

3) Do all Manitobans have good access to specialist care regardless of where they live, and are high need populations well served?

3.1 Adequacy of Manitoba's current Specialist Supply

Overall, Manitoba is well supplied with most specialists.

Manitoba has more paediatricians per capita than any other province, and the supply of psychiatrists and medical specialists is somewhat higher than several other provinces. In the recent past, the number of paediatricians and psychiatrists in Manitoba have grown more rapidly than the populations they serve. There are also relatively few older practitioners in these specialty groups nearing retirement. For most of the medical and paediatric subspecialists, we lack the data to draw conclusions about adequacy of supply.

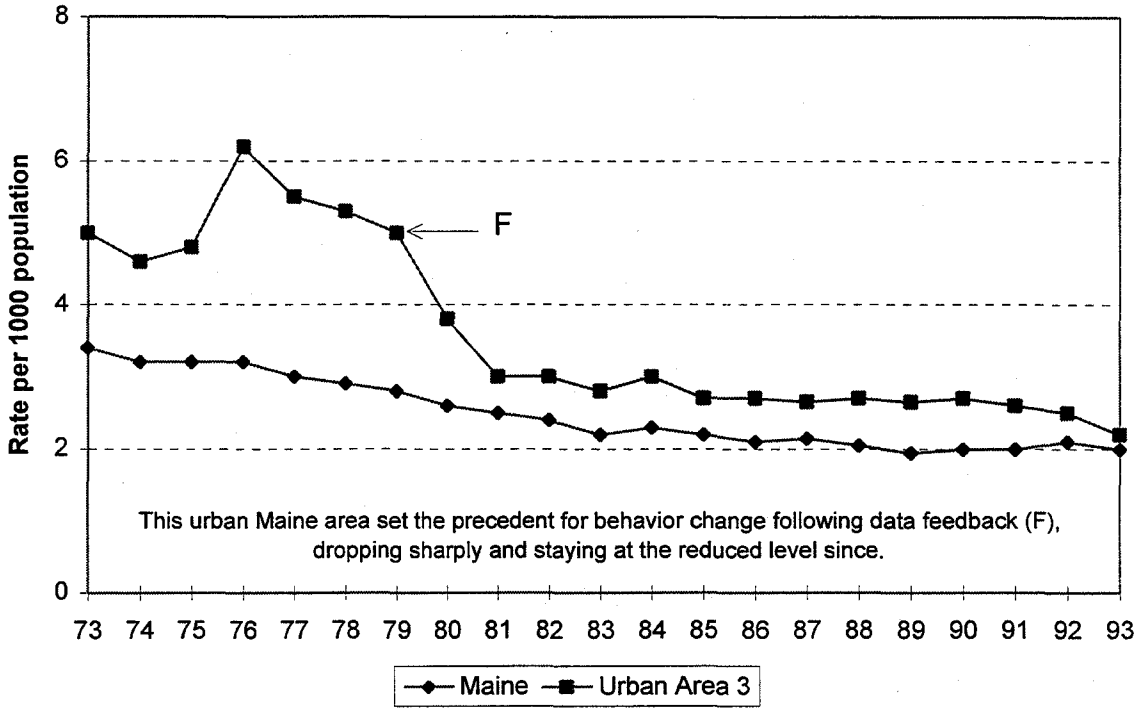
Conclusions regarding Manitoba's supply of surgeons are less obvious. The supply of surgeons, at least for some of the surgical subspecialties, is somewhat lower than that of other provinces, and the rates of some surgical procedures are also somewhat lower. The age profiles of the specialists is also mixed: while our cardiovascular / thoracic surgeons and plastic surgeons are a reasonably young group, the opposite is true for Manitoba's neurosurgeons, orthopaedic surgeons and otolaryngologists, among whom we expect higher than average retirements. Watanabe (1994) found that the number of neurosurgeons in Canada has grown faster than the need for their services, resulting in decreased workloads, whereas the opposite is true for specialists in ophthalmology, otolaryngology, orthopaedics, general surgery and obstetrics and gynaecology, where increased workloads and potential shortages exist.

It should be kept in mind, however, that recruiting or training more surgeons is not necessarily the only or best way to ensure that an adequate/appropriate amount of surgery is available to Manitobans over the next decade. For example, in ophthalmology and orthopaedics, we found little or no relationship between the supply of surgical specialists and the rate at which residents underwent core procedures performed by the group. Also, rates of many high profile surgical procedures (cataract surgery, knee replacements, angioplasty) are

increasing much more rapidly than the supply of specialists. This suggests that the supply of specialists may not be as much a limiting factor to procedure growth as other factors such as operating room time or prosthesis budgets. Better organization to enable surgeons to spend more time in the operating room is a method widely used in health maintenance organizations to more effectively use surgical resources.

It should also be kept in mind that more surgery is not necessarily always better. We have documented the higher rates of elective procedures including hysterectomy, cholecystectomy and tonsil surgery in rural Manitoba. MCHPE worked with the College of Physicians and Surgeons to review the delivery of tonsillectomy procedures across the province. A Tonsillectomy Review Panel was established which reviewed evidence about management of tonsillar disease in children. As well, the panel reviewed data on practice patterns across the province to support the guideline development process. Such a process, with clinical panels reviewing literature on best practice and data on surgical rate variations, has been well developed in the Maine Medical Assessment Foundation. Figure 72 illustrates their experience reviewing hysterectomy rates. After a study group was established to review evidence on indications for surgery, and practising physicians in one urban area were shown data that revealed a significantly higher rate of hysterectomy (two to three times the state average), the number of hysterectomies in the area decreased dramatically (Conway et al. 1995).

Figure 72: Hysterectomy
1973 - 1993 Classic Feedback Precedent



Source: Jt Comm J. Qual Improv 21(11). Oakbrook Terrace, Il: Joint Commission on Accreditation of Healthcare Organizations, 1995, p. 621. Reprinted with permission.

Wennberg (1996, p.2), the physician who pioneered the study of surgical rate variations noted recently:

> *"The existence of variation raises a number of important issues. Foremost is the question "Which rate is right?" ... In the case of variations in rates of individual procedures, such as tonsillectomy and hysterectomy, the explanation is* ***not*** *that patients in areas with low procedure rates are going without treatment; they are, instead, being treated differently, often with more conservative medical management. Learning which rate is right requires learning what informed patients want. The right rate must be the one that reflects the choices of patients who have been adequately informed and empowered to choose among the available options."*

3.2 How will the Aging of the Population Affect our Need for Specialists?

Predicting population change is very difficult. Part of the reason that the Canadian specialist supply has increased so dramatically since the 1960's is that the Hall Commission report, which became the basis for increasing medical school enrolments, based its estimates of future physician need on national population projections of 35 million for 1991; this projection exceeded the actual 1991 population of 27.3 million by 28 percent (Sullivan, Watanabe 1996). Between 1970 and 1992 growth in the Manitoba specialist supply exceeded population growth by 49%; over the same period growth in the supply of general practitioners exceeded population growth by 59% (Sullivan, Watanabe 1996).

Although we continually read about how the aging of the population will swamp our health care systems, most attempts to study the actual effects suggest that the aging of the population per se is having only a limited effect (Demers 1996). We therefore looked back at what has happened in Manitoba in the recent past. Between 1986 and 1994 there was a 23 percent increase in the number of elderly Manitobans. By looking at the age characteristics of patients served by each specialty, we were able to estimate how many more physicians were needed to keep up with population growth and aging. Overall, the increase in the number of specialists in the province kept pace with population changes over this period, though the growth in some specialty groups exceeded that required. Using population projections from Statistics Canada for the next 20 years, we estimate Manitoba will need a 12 percent increase in its specialist supply; growth of less than 1 percent per year. Therefore, to keep up with the increase in the elderly population, Manitoba would need to add approximately 4 specialists per year (in addition to replacing those who retire or leave the province). This calculation assumes that the supply in 1994 was "just right" which of course is a big assumption. However, since the overall supply of specialists in Manitoba at that point in time was neither very high nor very low, we have no reason to think the projections are markedly off overall.

As we have shown, some specialist groups will be more affected by an increasing number of elderly than others. Ophthalmologists will be most affected, as they provide the highest proportion of their services to those age 65 and over. The number of specialists in otolaryngology and orthopaedic surgery should also expand somewhat over the next 20 years. However, this should be achieved within the estimated 4 additional specialists per year (the total for all types of specialists plus surgeons). Tables 16 and 17 summarize our findings for each of the specialty groups.

Although many focus just on the aging of the population, there are also other factors including changes in technology and physician practice patterns which have the potential for affecting our estimates of need for specialists. For example, the CMA (1997) reports that there has been a 10% decrease in hours worked by physicians between 1982 and 1995. Such gradual changes would not seem to pose a major challenge to future supply projections, given the marked differences in specialist service delivery patterns we have documented. Planning exercises in the US have assumed that "increasing competition among delivery systems will reduce discretionary services and at least balance increased demand for specialists resulting from new technology" (COGME, 1996). While Manitoba physicians have not had the same pressures from managed care that US physicians are experiencing, the focus on evidence based medicine and the move to regional authorities should exert similar pressures here.

Our conclusion that there has been no recent exodus of physicians from Manitoba is congruent with data reported by the Manitoba College of Physicians and Surgeons (1996). In their review of changes in the number of Manitoba physicians between 1995 and 1996, they report that "the number considered in 'active practice' actually remains the same. They report changes in the physician supply including a drop in the number of residents who hold a full licence as well as a drop in the number of physicians coming to Manitoba to undertake locum tenens, a temporary practice arrangement which has been very important for providing rural physicians with a holiday break. This again suggests that the number of physicians in Manitoba is not the problem, but that incentives and programs for providing more rural and Northern coverage by Winnipeg and Brandon physicians are needed.

3.3 How Well Do Specialists Serve as a Provincial Resource?

Manitoba's specialists are generally concentrated in Winnipeg and Brandon and contribute little to the supply of physicians anywhere else in the province.

As one rural physician commented: *"I find I can agree with most of the findings in the report especially those that outline the lack of specialist involvement in the medical care that rural people and their primary care physicians endure (I can't say "enjoy"). What is missing from this report as well as the report on primary care is recognition of the considerable amount of specialist services substitution that is provided by family physicians and, to a lesser degree, by such allied personnel as public health nurses and mental health workers. Surgical services provided by rural general practitioners are easier to quantify but the largest disparities between urban and rural specialist utilization is in the medical specialties particularly those not requiring high technology such as psychiatry and dermatology. These folks have always been the most poorly distributed specialists in the province and the argument that they need to be located close to special technology and equipment for them does not wash. Basically, all they need to practice is their brain, a small office and, sometimes, a prescription pad. Unfortunately, they don't think we can provide such amenities in the country!"*

As another physician notes: *"Every large community needs general internists. One sees the difference in care that occurs because of competent general internists in communities like Kenora, Dauphin, from time to time, Thompson and elsewhere. We have as a Department not done an adequate job of providing a network of general internists throughout the province who can set standards of adult care, insure that moderately sick patients are kept in the community, and provide continuity of care for complex illness. This should be identified as a major task of the University Department with a goal to have at least 15 general internists outside of Winnipeg and Brandon by 2000."*

Judging by frequency of contact (the rate of physician visits), Manitoba's specialists provide much more of their care to residents who live nearby - typically Winnipeg and Brandon residents. They also provide more care to residents of North Eastman and Interlake than residents of other regions. Residents of Norman and Burntwood, who tend to have the poorest health of all Manitobans, have quite low rates of contact. The limited data we have on the practices of paediatric subspecialists suggest they do provide significant levels of service to Burntwood children, but this primarily occurs when they are hospitalized in Winnipeg. The Department of Paediatrics has initiated links including the delivery of paediatric clinics in many small Northern communities as well as some areas of the rural South; such initiatives should be encouraged by the province and should be emulated by other specialty groups.

As one physician observed: "*Providing incentives for specialties to travel, using rural OR time and making other equipment available to them in rural facilities needs to be reinforced even more than it has been in the Report.*"

Ambulatory consultations are probably the best measure of access to specialists. There are fewer differences across the province in the delivery of consultations than total ambulatory contacts with specialists. However the differences are still often in the range of 100% or more.

Some procedural specialists provide reasonably good access to residents from all regions of the province. Orthopaedic surgeons, although concentrated in Winnipeg and Brandon, serve most of the province quite well: rates of hip replacement provided to Winnipeg residents are very similar to those provided to most rural residents. (Burntwood residents are the exception with markedly lower rates of this procedure.) Prostatectomy rates are reasonably similar across the province, while coronary artery bypass surgery rates are somewhat higher for Winnipeg residents.

Cardiologists practicing in Winnipeg provide angioplasties to Winnipeg residents at almost twice the rate of non-Winnipeg residents; non-Winnipeggers also have much lower rates of cardiac catheterization (a diagnostic procedure). The rate at which residents undergo diagnostic testing has been shown to strongly affect the rate at which patients come to coronary artery bypass surgery and angioplasty (Wennberg et al., 1996); therefore improving access to the diagnostic services of cardiologists is a critical link in providing more equitable access to coronary revascularization across the province and within the Winnipeg population.[43]

An important part of providing more access for rural patients to Winnipeg-based specialists may be to persuade rural physicians that such access is beneficial. As a senior physician at the medical faculty reports, "*when I specifically asked physicians in ... whether they felt they had adequate access to invasive cardiology procedures in Winnipeg they stated that they were happy with the service available.*"

[43] Determining the right rate of diagnostic testing and hence treatment is of course the art of medicine. Wennberg et al (1996 p. 1163) note: "it is more likely that the relationship between testing and subsequent therapeutic procedures reflects underlying uncertainties about when to test for and treat ischemic heart disease in a population...as more testing is done, more disease is found, and as more disease is found, more treatment is prescribed. This cascade is particularly likely to happen where differences in opinion occur about what interventions are appropriate, as is the case for coronary procedures."

3.4 How Well do Specialists Serve High Need Populations?

Specialist services do not appear well organized to provide care to those who have the poorest health and highest need. Residents of the North, who have been shown to be among the least healthy, highest need populations in the province, have low access to specialists, whether judged by contact rates or procedure rates. The same is true, at least in relative terms, for high need groups within Winnipeg, despite the concentration of specialists in the city.

Given that we have used mortality rates to demonstrate differing health states, rather than measuring the prevalence of conditions which indicate a need for specialist contact or surgery, are our conclusions justified? We think not. In a recent National Population Health Survey, 78% of Manitoba women in the highest income households reported their health to be excellent or very good, compared to 64% of those in the upper middle-income groups, and 42% in the lowest income groups. There was a similar pattern for males. The 1991 Canadian General Social Survey of 10,000 households (Statistics Canada 1994) provides additional evidence of a strong and consistent gradient across income categories in relation to indicators of need for specialist health care. Across 10 of the 13 types of problems assessed (including "do you have" arthritis, rheumatism or bursitis, and "have you ever had trouble with your heart, such as heart attack, angina, heart failure or rheumatic heart disease?"), the lowest income groups reported the most health problems while the upper income groups reported the fewest. Fully 37 percent of those in the lowest income category reported arthritis disorders compared with 12 percent in the highest income group, suggesting that conditions which indicate a need for hip and knee replacements may also be distributed across the population in an income gradient fashion. Similarly, 15 percent of those in the lowest income group reported that they have had a heart problem compared with 4 percent in the highest income group. These and other data showing that ischemic heart disease is most common in the lowest income groups (Wilkins et al. 1989; NCHS 1990) also strongly suggest that need for coronary artery bypass surgery and percutaneous transluminal coronary angioplasty is higher in low-income groups. A recent British study (Payne, Saul 1997) directly addressed this

issue, demonstrating that there was a strong positive relationship between the age standardized prevalence of symptoms of angina and high scores on a regional deprivation index (something similar to our socio-economic risk index). They also found that residents of affluent areas had twice as many revascularizations (per population estimated to have angina symptoms) than residents of deprived areas ($p < .001$).

Self-reports of pain in the General Social Survey also showed marked gradients with 65 percent of low-income individuals reporting no pain compared with 85 percent of those with high-income. Thirteen percent of those with low income reported severe pain, compared to 3 percent in the highest income group. Finally, reports of activity limitation ranged from 25 percent of those in the lowest income group to 7 percent of those in the highest.

One might optimistically point to the small differences in surgical rates across socio-economic groups in this study as evidence that universal access works, especially when compared with U.S. data. Carlisle et al (1995) show that the lower the income of the Los Angeles County area, the lower the rate for five of the eight surgical procedures studied. In a cross-border study, Anderson et al (1993) showed that in the non-elderly population, CABS rates steadily increased from the lowest to the highest income quintile in both California and New York, while in Canada those living in the lowest income areas had the highest CABS rate. For the elderly this pattern was less clear. While the Canadian national health insurance system may go farther than the U.S. system in delivering surgical care to those who need it, it doesn't go much farther. The delivery of care by surgeons and specialist physicians remains remarkably untargeted towards those groups with the highest medical needs.

Why does surgical practice appear to respond so differently to health needs than medical admissions? At this point we don't know. However, given the patterns we have documented (and which have been observed by others) one might speculate as follows. Physicians are trained to treat sick people, to try to make them better. Medical admissions represent an acute phenomenon; very sick people are unconscious, in pain, vomiting or running high fevers. These are symptoms which are difficult or impossible for patients and their families to live

with, and difficult for physicians to dismiss or disagree about. The major caveat is bed supply, but within this capacity constraint, the acute crises which medical admissions (and emergency surgery) represent will be dealt with, and triage will ensure that the sickest get treated first. Since more of the sickest people are likely to be in the low and middle-income groups, they will receive more medical care.

Elective surgery is perhaps different. Most common conditions which lend themselves to surgical treatment are less acute: joint pain, abdominal discomfort, and coronary artery disease are chronic conditions with which people can cope with at some level. It is likely that the higher the socio-economic group, the more able one is to negotiate the health care system: to better communicate, or to be more likely to be believed, that there is a problem for which surgical treatment may be beneficial, to be aware of surgical treatments, to ask for a referral to a specialist, or simply to make and keep appointments.

Does this mean that individuals whose economic status is poor care less about their health than others? Since individuals in the poorer neighbourhoods make more contacts with physicians than others, any suggestion that they present at a more advanced stage of disease would appear to be a problem of the medical care they receive, not likely their failure to seek care early enough for treatment to be beneficial. A more likely explanation is that the problems associated with living in poverty obstruct individuals' ability to use the system of care offered by medical and surgical specialists. In a study of prenatal care we found that for the first birth, the number of prenatal visits made by women in the lowest income groups was very similar to those in the highest income groups. By the second birth, however, almost two prenatal visits on average separated the highest income mothers from the lowest, and by the fourth birth, the difference was almost three visits (Mustard, Roos 1994). It is not hard to imagine the difficulties arranging childcare, coping with children on public transportation, and other problems which would make it more difficult for the low-income mother with several children to keep appointments than for a women with greater socio-economic supports. Family practitioners, often located in walk-in clinics and community health centres and available for unscheduled visits, are likely more accessible to individuals with less

control over their lives. Public health nurses also have a long tradition of contributing to well-baby and well-woman care for inner city residents.

Davis et al's (1995) research on changes in knowledge of cardiovascular disease risk factors and risk-reduction strategies also suggests that the poor care just as much about their health as anyone else, but that they are less likely to know how to improve it. All socio-economic groups had a similarly high interest in cardiovascular risk modification (they measured socio-economic status by educational levels). However, high socio-economic groups had more knowledge of risk reduction strategies, and the gap in knowledge between socio-economic groups increased over the 10 year study period.

On the positive side, there is a proposal under development to create an integrated, needs-based waiting list management system for cataract surgery in Manitoba. Such a system could help ensure that surgery is performed on the basis of need, independent of which ophthalmologist the patient has been treated by.

3.5 Other Observations

- While discussions of physician resource planning typically focus on the number of specialists, our analysis suggests that issues such as allocation of operating room times are also important. Why do Winnipeg residents have lower rates of hip replacement surgery than many rural residents, but higher rates of bypass surgery, and much higher rates of procedures performed by cardiologists? With procedural specialists, resource planning should focus not only on the number of practitioners; attention needs to be directed to how much operating room time is available and who has access to it. Adding procedural specialists without ensuring access to operating facilities in the public sector will put intolerable pressure on the public system and likely undermine the development of a rational delivery system.

- For several high profile procedures, the total number of procedures performed has been increasing much more rapidly than the supply of surgeons. Such evidence supports the observation that the supply of surgeons is only a loose constraint on the availability of surgery to the population, and that substantial changes in Manitoba's supply of surgeons are not indicated.

- The evidence presented here also argues for closer monitoring of surgical practice. It suggests that the move towards organized priority lists is a rational way to ensure that those who truly need surgical interventions receive them (Coyte et al. 1994).

- Manitoba has a particular problem planning for its subspecialist supply. These by definition will be few in number; but if there are too few, there is a potential for too many nights and weekends on call and rapid burnout. However, to serve a population of just over one million, it is very easy to over-expand highly specialised groups. As in the case of neurologists, a relatively small increase in number can exceed the need one would project based on population growth in the next 20 years. It has been argued that such an

increase in subspecialists has a negative impact on the maintenance of the subspecialists' skills because they need to be exposed to serious and difficult problems, many of which are rare. When there are too many subspecialists, it is difficult to maintain diagnostic capabilities and they will tend to do more primary care, not what they have been trained for (Menken 1983). One alternative, particularly for specialties such as paediatrics and psychiatry where the number of generalists is more than adequate, might be to recruit internally for subspecialty training.

- There has been no recent exodus of specialists from Manitoba. In the recent past, growth in the supply of specialists has kept up with the aging of the population, with some specialty groups growing faster than needed, and others growing somewhat slower.

- Needs-based planning for specialists is complicated by the potential for substitution among different providers. For example, obstetricians & gynaecologists are a group whose number has dropped in the recent past, by 11 specialists (15%) from 1986 to 1994. While they are primarily a surgical specialty, they also deliver a substantial amount of obstetrical care and well-woman care to their female patients. Such care is also delivered by general and family practitioners, whose number increased by 47 (5%) over the same period. The province's commitment to midwifery and to nursing clinics will also provide potential substitution for some of the services provided by this specialty group. Therefore our estimates of the future need for specialists are likely generous because they ignore the potential substitution from other care givers.

- While there have been major concerns about the exodus of family physicians to the United States as that country tries to reconfigure its physician supply towards a less specialist-rich mix, there has been little discussion of how the projected large surplus of specialists in the United States, particularly surgical and intervention specialists, may affect Canada (Weiner 1994; Martin 1996). Canada generally and Manitoba in particularly have historically seen many of the specialists it trained seek employment

south of the border. Recently, some US specialty certification boards have or are considering withholding certification from Canadian trained specialists. (Bueckert 1996). The US Council on Graduate Medical Education (1996, p.3) has recently concluded:

> *"the nation's most significant workforce problem is an increasing surplus of physicians, primarily of specialists. In a setting of overall surplus, the issue of optimal requirement ranges becomes moot. The real issue becomes identifying where the system has the capacity to productively employ additional physicians. At present, this country has very limited capacity to absorb additional specialists while still being able to employ many additional generalists productively."*

It may well be that the flow of Canadian physicians, particularly specialists, to the United States will be substantially decreased and perhaps even reversed during the same period that we are projecting a small increased need for surgical specialists in Manitoba. Figure 42 suggests that Manitoba and other Canadian trained specialists are increasingly staying at home.

There is no indication that a rich supply of specialists results in better access to specialty care for Manitobans. The two specialty groups for which Manitoba has among the richest supply in Canada, paediatrics and psychiatry, are no more likely (and arguably somewhat less likely) to practice as a provincial resource than are other specialty groups. We know that some services delivered by Winnipeg-based specialists to rural residents either by phone or in clinics are missed in these analyses. However, the magnitude of the shift in delivery which would be necessary to put a real dent in the current imbalances suggest that our description of how care is delivered is not far off.

We illustrated in the previous report that the specialist-rich physician supplies serving Winnipeg and Brandon residents provide a more costly delivery of primary care than in other parts of the province (Roos et al. 1996). The analyses reported here (Figure 70) demonstrate that this is also true when total expenditures on physician services are examined. Welch et al

(1993) have documented a marked range in expenditures for the delivery of physicians' services to Medicare beneficiaries in the United States. They suggest that the practice style and hence the expenditure pattern is influenced by the mixture of primary care physicians and specialists; the richer the mix of specialists, the higher the expenditures delivering care to the population (both for in-hospital and out of hospital care.) There is also no indication that the much richer supply of specialists in the United States results in better access to specialist care than experienced by Canadians. Based on nation-wide telephone surveys of randomly selected adults (1,214 in the United States and 1,472 in Canada) Donelan et al (1996) reported that:

- 14% of Canadians, compared with 15% of Americans, report they are not able to see a specialist; among those with significant health problems, Canadians report fewer difficulties (18% compared with 23%)

- although Canadians were more likely to report having to wait a long time to get an appointment (34% versus 20%) the average wait for an appointment they reported was not very long (14 days versus 5 days)

- for those who argue consumers should be allowed to pay like Americans for part of their care, Americans reported paying on average $993 during the year in out of pocket expenses compared with $302 reported by Canadians; Americans were also much more likely to report they had serious problems having enough money to pay doctor or hospital bills (20% versus 6%). Americans with significant health problems were also more likely to have reported that they postponed getting needed medical care (34% versus 20%).

The overall effects of an ever increasing physician supply has been documented by Watanabe (1995). He found lower than average workloads among family practitioners, whose number is growing more rapidly than the population. He also found a trend towards increasing average workloads among physicians who practice in specialties which are decreasing in number relative to the population (such as general surgery).

Our checks suggest that the fee-for-service and evaluation claims data are quite accurate for analyses of physician resources in Manitoba. Careful comparisons with medical faculty data suggests that we underestimate specialist supply and activity by no more than 4%. Given the patterns identified, the biases from unreported data would be to somewhat underestimate residents' contacts with psychiatrists, and to underestimate quite markedly contact with paediatric specialists, oncologists and intensivists. We strongly recommend that these few gaps in the Manitoba Health reporting system be corrected to ensure these data are available for future planning exercises.

4.0 POLICY DIRECTIONS SUGGESTED BY THESE FINDINGS

The Physician Resource Committee made many constructive suggestions for improving the delivery of specialist care in the province. We were part of those discussions and we endorse the recommendations. Policy directions which are suggested by our analyses include:

- The Medical School has reduced the number of residency positions in paediatrics, consistent with their rich supply, and projections of a decrease in the number of children in Manitoba over the next 10-20 years. However, the Medical School and the government should continue monitoring the situation periodically to assess whether the current number should be maintained, increased, or further reduced.

  Such regular monitoring and the actions taken as a result should also apply to other specialties in which the number of practitioners has grown faster than the populations they serve (e.g., psychiatrists, neurologists) as well as for specialists where we may develop a shortage (ophthalmologists).

- No increase in fee-for-service psychiatry in Winnipeg is needed; alternatives for increasing access for high need groups in Winnipeg and rural Manitoba should be considered without expanding the existing supply. Ontario has had similar problems in matching psychiatric services to need under fee-for-service arrangements. Psychiatrists in that province had the second largest increase in number of any specialty. However, despite a net increase of 259 active fee-for-service psychiatrists, only one was added to Northern Ontario, a very under-supplied area (Chan, Anderson 1996 p. 262).

- The new regional structure for administering Manitoba's health care system offers the possibility for creating a new and better system for the delivery of specialist care. Needs-based planning for specialist care is particularly important to ensure that high need residents of the Northern regions, and high need residents of Winnipeg, are well served.

The recent review of the Health of Manitoba's Children (Postl et al. 1995) has made several recommendations for improving health services for children including urging the Manitoba Paediatric Society to make efforts to expand its outreach activities, an effort which should be reviewed and supported in the context of the joint management initiatives of the Manitoba Medical Association and Manitoba Health. We urge close review and consideration of these recommendations.

Community clinic settings have been shown to make a difference in access to care in low-income neighbourhoods. This is likely related to their ability to provide translation services to reduce ethnic barriers to care, to offer after hours care or phone advice etc. (Brellochs, Carter 1990). A policy to provide more specialist services in such settings would appear indicated.

- Province-wide access on the basis of need to procedures such as knee replacement, angioplasty and bypass surgery should be guaranteed via the use of organized waiting lists. Ontario, Alberta and British Columbia have all made much more progress in this area than Manitoba. Perhaps it will be timely for the new regional authorities to work with the Winnipeg specialists to organize a system which will guarantee their residents good access to care. Ontario has approved a plan for increasing the rate of coronary artery bypass surgery (CABG) in the province based on evidence that waiting times as judged by the central registry have increased significantly in recent years. The plan adopted will preferentially allocate CABG caseload to regions whose surgical rate is currently below the provincial average, thus reducing long-standing regional variations in access to this procedure (Naylor, DeBoer 1996b). Detailed discussions with cardiologists in England suggested that initiatives for increasing access of low-income patients to revascularization procedures should focus on education of patients and of general practitioners about the potential treatment benefits for those with angina (Payne, Saul 1997).

- Hospitals should review the potential for expanding the group purchase of hip and knee prostheses. This strategy is being recommended in the US (Zuckerman et al. 1994; Healy et al. 1995) and Britain (Nuffield Institute for Health, 1996). It was observed in Britain that 62 different hip replacement joints, ranging in cost from £250-£2000, were being used, most with no proper evaluation. Two of the cheapest were judged to be among the best performing (Nuffield Institute for Health, 1996).

- For cataract surgery, there should be an examination of referral patterns to the public system for residents of the low use regions, combined with the establishment of cataract priority lists in the public sector which ensure that residents of outlying areas have good access to publicly-funded care.

- Future attempts at planning for specialists should use conservative targets and rely upon comparative analyses of actual use rates of specialists services at least as much as upon specialist per capita ratios. There are at least twofold variations in the availability of most specialists across the provinces, yet availability bears little relationship to the amount of service delivered.

In our assessments of the adequacy of specialist resources in Manitoba, have we ignored or undervalued the role which specialists play in delivering ambulatory care to Winnipeg residents? That is, is the much higher level of care delivered to Winnipeg residents the right level, implying a huge deficit in the rest of the province for all specialty groups? First of all, as we have demonstrated for paediatricians and psychiatrists (the most generously staffed specialist groups, judging by a variety of standards), there is no guarantee that increasing the number of specialists in Manitoba will do anything other than further widen the gap in the delivery of specialist care between rural and urban areas. Secondly, while we are continuing to investigate this issue, to date we have identified no evidence to suggest that Winnipeg residents derive significant benefits from having a higher proportion of their care delivered by specialists. For example, elderly residents of Winnipeg score no better than their non-

Winnipeg peers on interview based measures of health status ("In general would you say your health is...") or functional status (Shapiro et al. 1996). The same pattern is true for mortality-based measures such as life expectancy. Residents of South Westman and Marquette are much less likely to see a specialist than are Winnipeg residents, and yet they are in equal or better health.

In conclusion, Manitobans and their specialist physicians have a unique opportunity for improving the delivery of specialist care in the province. Never before have we had groups with the responsibility for organizing the delivery of specialist care nor the data to identify the access problems. With the joint management contract signed between the medical profession and the province, and the new regional authorities moving to needs-based funding, there are real opportunities to deliver specialist care better. The major challenge in planning for specialists in Manitoba is not one of supply nor expenditures, but how to organize and deliver specialist services so as to maximize their usefulness to all Manitobans.

APPENDIX I: METHODS

Study Period

Most of the analyses in this report were based on data from fiscal year 1994/95 (April 1, 1994 through March 31, 1995). Data from 1995/96 was used to update selected analyses, while data from previous years was used to ensure stability of rates of infrequent procedures and diagnoses.

Level of Aggregation

All analyses were carried out using the boundaries of the new Regional Health Authorities, with Brandon and Winnipeg forming their own areas. For purposes of comparison, most graphs also show the average for the 7 RHAs in the Rural South, and for the 3 in the North. The rightmost column on most Manitoba-only graphs shows the provincial average.

Region of Residence

Location of residence was determined by the municipal code of the resident, except in the case of Status Indians, who were assigned on the basis of postal code (to accurately locate individuals living off-reserve). Most analyses present population-based rates which reflect the use of all residents in each region, regardless of where the services were delivered. For example, if a resident of South Westman undergoes a procedure in Winnipeg, that procedure is counted in the rate for South Westman residents.

Age and Sex Standardization

All Manitoba-only analyses in this report used the direct method of standardization to account for differences in the age and gender composition of regional populations, thereby allowing valid comparison among all regions of the province. Data for cross-provincial comparisons (Figures 1 - 17 and Figures 18 - 30) were not standardized, and are presented as per capita rates only.

Identifying Specialists

We identified practitioners in each specialty from the Physician Register of the Manitoba Health Research Database, using the most recently certified specialty. Unfortunately, Manitoba Health's coding system does not uniquely identify all specialties, eg neonatology, haematology. Therefore, we were limited by the categories contained in the database. We used the following categories: (major specialty groups in bold; subspecialty groups listed below each)

1.0 Medical Specialties
- 1.1 Neurology
- 1.2 Dermatology
- 1.3 Other Medical Specialties

2.0 Paediatrics
- 2.1 General Paediatrics
- 2.2 Paediatric Subspecialties

3.0 Psychiatry

4.0 Obstetrics & Gynaecology

5.0 General Surgery

6.0 Surgical Subspecialties
- 6.1 Cardio-Vascular and Thoracic
- 6.2 Neurosurgery
- 6.3 Ophthalmology
- 6.4 Otolaryngology
- 6.5 Orthopaedic
- 6.6 Plastic
- 6.7 Urological

Some analyses were based on the 6 major specialty groups (bold) , others distinguished all 15 subspecialties.

Full Time Equivalents (FTEs)

There are many analyses where the use of FTEs is more enlightening than the number of individual practitioners. FTEs can account for workload differences, and more accurately represent the level of visits and services provided. We used the Health Canada FTE methodology to count physicians based on annual payment benchmarks within specialties.

The lower and upper benchmarks corresponded to the 40th and 60th percentiles of physician payments by specialty:

	40th Percentile	60th Percentile
General Practitioners	$ 96,941	$ 131,408
Medical Specialists	$ 103,827	$ 167,717
Paediatricians (Generalists only)	$ 134,455	$ 173,741
Psychiatrists	$ 92,805	$ 117,565
Obstetricians & Gynaecologists	$ 168,957	$ 205,808
General Surgeons	$ 140,044	$ 200,575
Surgical Specialists	$ 180,785	$ 228,866

Only physicians with at least one claim in each fiscal quarter were included in the determination of the benchmark values. Physicians with total payments below the lower benchmark were counted as a fraction of one FTE, equal to the ratio of total payments to the lower benchmark. For example, a physician earning $25,000 in a specialty in which 40% of physicians earned at least $50,000 would be counted as 0.5 FTE. Physicians with total payments between the lower and upper benchmark values are counted as 1.0 FTE. Physicians with payments above the upper benchmark are counted as 1 FTE plus the natural logarithm of the ratio of payments to the upper bound. Thus a physician earning $200,000 in a specialty in which 60% earned at least $150,000 was counted as 1.0 + ln (200,000/150,000), or 1.287. Since there are different earning levels among specialties, benchmarks were developed for each major specialty group, though there were not enough practitioners in Manitoba to create separate benchmarks for each sub-specialty. Unfortunately, this results in some problems with the FTE counts, particularly where some highly-paid subspecialists are in major specialty groups with lower averages incomes (e.g. invasive cardiologists among Medical Specialists; CVT surgeons among Surgical Specialists). Also, not all practitioners are accurately represented in the claims database from which payment values were generated: these include salaried physicians (who don't file evaluation claims) working at the Manitoba Cancer Treatment and Research Foundation, some Psychiatrists in mental health facilities, and some ICU and emergency physicians. In Paediatrics, we decided to calculate FTEs for generalists and subspecialists separately - using the Health Canada method for generalists but not subspecialists (see below).

Paediatric Specialists

The database did not distinguish generalist from subspecialist paediatricians, so we created an operational definition with the assistance of the Dean of Medicine and the Head of Paediatrics and Child Health. After assessing a variety of schemes, we settled on the following definition: Paediatricians were classified as subspecialists if:

1. the Dean indicated they were subspecialist paediatricians, or
2. they were certified in another specialty, but also certified in paediatrics

We further analyzed those not yet categorized as subspecialists, and if:

3. their most frequently billed tariff was not 'Office visit', or
4. consultations comprised more than 30% of their ambulatory visits

then they were classified as subspecialists. Finally, the Head of Paediatrics and Child Health advised us to classify as subspecialists four paediatricians who had not been classified as subspecialists by the above methods.

This process identified 37 paediatric subspecialists and 67 paediatric generalists. Most (27) of the subspecialists were Geographic Full Time (GFT) members of the Medical Faculty. The total billings for all but one were very low (though quite variable), indicating that the claims data do not accurately reflect the activity of these practitioners. Therefore, we could not create reliable benchmarks for FTE calculations, prompting us to attempt several variations on the Health Canada FTE methodology. However, none of those attempts provided accurate and robust results, so we decided to assign each specialist an FTE value of 1.0.

The substantial under-reporting of the activities of paediatric subspecialists affected all analyses dependent on fees or visits, so paediatric specialists were removed from the following analyses: Table 12, Figure 33, and the ambulatory visit/consult analyses (no figure presented). In addition, several analyses were performed for all paediatricians combined, and so will be somewhat biased because of specialist under-reporting: Tables 4, 5, and 15, and Figures 32, 37, 48. Note, however, that several key analyses used data from outside sources,

or did not rely on the claims, and so were not affected by the under-reporting problem; most notably: Figures 4, 25, 31, and Tables 7 and 8.

Even though we had no other information on the delivery of care by paediatric subspecialists, we did analyze the (limited) available data. Since these specialists are primarily a hospital based group, we included inpatient as well as ambulatory visits. Their care was delivered at much higher rates to residents of Winnipeg and surrounding areas than to other residents of the province. The one exception to this pattern was a high rate of contacts delivered to residents of Burntwood. It is likely that this reflects the high rate of hospitalization of these residents at Children's Hospital.

Checking the accuracy of the claims-based estimates of specialist activity in Manitoba

Many of the analyses in this report rely on the billing and evaluation claims filed by physicians with Manitoba Health. The validity of these analyses rests on how accurately the claims data describe the amount of care delivered by specialists. As we have reported before, we estimate that over 90% of all ambulatory visits are documented through the claims system (Tataryn et al. 1994). One area of concern has been the degree to which the patient services provided by subspecialists who are geographic full-time physicians (GFT) at the medical faculty (meaning they have no outside private practice) are accurately described in the billings data. For example, we had noted above that the services of oncologists at the Manitoba Cancer Treatment and Research Foundation were not included in the billings data, and we knew that some intensive care physicians at the teaching hospitals were paid completely by salary and therefore were unrepresented in the billings data. As part of the Physician Resource Committee's work, the Chair of the Specialist Sub-committee (the Dean of the Medical Faculty) worked closely with us to verify our specialty-specific FTE estimates, identifying where our estimates were low because of missing billings data, and where they were high because of limitations in the FTE methodology (described above). While the missing data may result in an underestimate of services delivered to rural residents by these specialists, it would be unlikely to change the patterns reported. The missing specialists have largely hospital-based practices and it is inevitable that most of their care will

be delivered to residents who use the Winnipeg hospitals. It should be noted that while most of their "earnings profiles" as captured in the billings data are substantially lower than the profiles of fee-for-service physicians in their specialties, the activities of many individual geographic full time physicians are sufficiently captured in the billings data to place them in the mid to upper-income ranges. That is, 32% of the GFT medical specialists, 22% of the GFT paediatricians, 46% of the GFT psychiatrists, 55% of the GFT general surgeons and 40% of the GFT subspecialist surgeons file claims sufficient to classify them in the mid to upper earnings groups among their peers.

We consulted the provincial psychiatrist to identify how many rural psychiatrists were employed by the province, and to what extent their practices were under-represented in the claims data. It was estimated that 10 Winnipeg-based psychiatrists provided 2-3 FTE of service via clinics to rural Manitoba, and that the services of approximately 12 psychiatrists (or 10% of the provincial supply) were under-reported in the claims data. While some of these psychiatrists practice in provincial institutions treating inpatients, others provide outpatient care in rural settings. Detailed assessments of these services suggest that psychiatry is still the specialty group which provides relatively the least service to rural Manitobans (although it may be a 4 to 1 ratio rather than 6 to 1 as suggested by the billings data). Finally, we worked with the Manitoba Medical Association, lists available from the College of Physicians and Surgeons of Manitoba, and Manitoba Health, to ensure that we accurately described the supply of specialist physicians.

Table 23 shows a comparison of the FTE estimates based solely on the claims data and the Adjusted FTE values which incorporated the Dean's enhancements. Overall, the two sets of estimates provide results within 5% of each other (631.6 from claims data only; 657.1 after the Dean's adjustments), but the difference varies by specialty.

Table 23. MCHPE and Adjusted FTEs

Specialty	MCHPE 1994/95	MCHPE 1993/94	Adjusted 1993/94	% Diff Adj vs. 93/94	% Diff Adj vs 94/95
Medical Specialties:	180.8	179.4	196.4	8.7%	8.7%
Neurology	16.6	15.9	19.6	18.9%	18.9%
Dermatology	14.5	14.9	13	-14.6%	-10.1%
Other Medical	149.6	148.6	163.8	9.3%	9.6%
Paediatrics:	92.7	98.2	90.9	-8.0%	-1.8%
Generalists	55.7	56.2	60	6.3%	7.7%
Specialists	37	41	30.9	-32.7%	-14.9%
Psychiatry	111.1	113.8	121.8	6.6%	9.4%
Obs & Gyn	58.2	55.6	56.4	1.4%	-3.2%
General Surgery	67.5	67.3	66	-2.0%	-2.2%
Surgical Specialties	119.3	116.9	125.6	6.9%	5.4%
CVT	10.2	9.9	12.9	23.3%	27.3%
Neurological	*	*	*		
Ophthalmological	33.2	34.3	36.8	6.8%	10.5%
Otolaryngological	14.3	13.4	14.3	6.3%	0.0%
Orthopaedic	28.6	26.7	27.6	3.3%	-3.7%
Plastic	12.2	11.6	12.3	5.7%	0.9%
Urological	17.1	17	16.7	-1.8%	-2.4%
All Specialists	630.6	631.2	657.1	3.9%	4.2%

* Too few to report

A discrepancy exists for Paediatric Subspecialists where our assigning of 1.0 FTE for each physician overestimates the supply compared to that estimated by the Dean [44]. The Dean's adjustments suggest that the billings data somewhat underestimate the services provided by medical specialists, although given their number, the overall underestimate is only 9 percent.

[44] Since the cross provincial comparisons are based on Southam data and reflect individual counts, they will not be affected by these analyses.

This reflects the impact of the missing oncologists and intensive care specialists, but suggests that the billings data accurately reflect the patient care activities of most of the remaining medical specialists. The dermatology difference is due to the high billings profile of this group relative to their parent group (all medical specialists). Note that this difference only affects our FTE estimates; the number and distribution of services are not over-estimated. Describing the activities and FTE level of Neurologists is more problematic, as several practitioners in this subspecialty are certified as Internists, and thus were not included in our 'Neurology' subgroup.

The activities of surgical specialists are very well captured in the billings data. Where there are discrepancies between the adjusted FTE counts and ours it is because some subgroups have lower or higher billings profiles than other surgical subspecialists.

A Comparison of Individuals (Headcounts) versus Full-Time Equivalents

Table 24 provides several different estimates of physician numbers. The Active Practitioners column shows the number of specialists who were active in 1994/95 (filing at least one claim with Manitoba Health during the year). The FTE columns show the estimates of full-time equivalent physicians obtained from the billings data alone, and from the billings data after adjusting for gaps identified in the billings data and problems resulting from fee schedule differences. The final column shows the ratio of the number of active practitioners to each of these FTE estimates, to discern where the discrepancies between individual counts and full-time equivalent estimates occur. Where there is a big difference between the number of individuals and FTEs, one should beware that if a similar pattern does not exist in other provinces, the cross provincial comparisons (Figures 1 - 17) may be misleading. For example, in General Surgery, there are 79 practitioners in Manitoba, but they comprise only 66-67.5 FTEs. Therefore, if a similar pattern does not hold in other provinces, Manitoba's relative supply may appear higher than it should, given the level of services provided.

Table 24. Comparison of Physician Numbers in Manitoba using FTE Estimates vs. Number of Practitioners

	# Active Practitioners*	Full Time Equivalent MCHPE	Adjusted	Ratio # Active/FTE
Paediatrics Total	104	94.0	90.9	1.14 -1.18
Generalist	67	55.7	60.0	1.20 - 1.11
Sub-specialists				
Report method	37	37.0	30.9	1.0 - 1.2
Method 2	37	8.3	30.9	4.5 - 1.2
Psychiatry	131	111.9	121.8	1.21 - 1.11
Medical Specialties		180.7	196.4	
Neurology	21	16.6	19.6	1.27 - 1.07
Dermatology	14	14.5	13.0	1.00 - 1.08
Other	192	149.6	163.8	1.30 - 1.18
General Surgery	79	67.5	66.0	1.20 - 1.23
Surgical Specialties				
CVT	10	10.2	12.9	0.98 - 0.78
Neurosurgery	**	**	**	**
Obs. & Gyn	61	58.2	56.4	1.10 - 1.13
Ophthalmology	34	33.2	36.8	1.05 - 0.95
Otolaryngology	21	14.3	14.3	1.61 - 1.61
Orthopaedics	31	28.6	27.6	1.12 - 1.16
Plastic	12	12.2	12.3	0.98
Urology	17	17.0	16.7	1.0
Total	732	631.6	657.1	1.14 - 1.19

* Active practitioners were individual physicians who billed Manitoba Health for at least one claim in fiscal year 1994/95. In most specialties, there were also practitioners who were registered but who did not file any claims, including some salaried and sessional physicians. For example, the province employs Psychiatrists in mental health facilities who do not file claims, and so are not counted as active. (The number of registered Psychiatrists is 147.) Their activity could not be included in the MCHPE estimate of FTEs, thus the Adjusted FTE value is higher.

** Too few to report

In Paediatrics, there is a 14-18% difference between the number of practitioners and FTEs, likely influenced by some women working less than full-time. Another portion of this difference is due to 'unclaimed' services provided by salaried and sessional paediatric subspecialists. (Note: services delivered by paediatricians providing itinerant clinics in Rural Manitoba contribute little to this discrepancy: such services are well documented in the claims data[45].)

For most surgical specialists there is reasonably close correspondence between number of practitioners and the FTE counts. Even for orthopaedic surgery, where we know procedures billed to the Worker's Compensation Board will not be included in the billings data, the discrepancy is only 12 - 16%. The one exception is otolaryngologists, where we identify 21 active practitioners who bill the equivalent of 14.3 FTEs. This discrepancy may reflect a number of factors including a less remunerative fee schedule relative to other surgical specialists, alternative activities assumed by these practitioners (e.g. administrative), or smaller practices due to age or personal preference. Because of these problems, Manitoba's supply of otolaryngologists relative to other provinces may be overstated in Figure 14, as the cross-provincial comparisons are based on individuals, not FTEs.

From another perspective, it can be seen in Table 24 that estimates made from the billings data alone (the MCHPE FTE values) and those after adjustments for data missing from billings are very similar and hence the Manitoba data on which this report is based can be considered comprehensive with a high degree of validity. For example if we use the adjusted data as the basis for making our projections of needs for additional specialists as the population ages, our estimates are almost identical: claims-based data (Table 10) suggests we

[45] Questions have been raised about the accuracy of the data describing specialist contacts with particularly Northern residents. Since most of these contacts are delivered by specialists who file "evaluation" not fee for service claims, there is a concern that they may be underreported. Because the department of paediatrics and the Northern medical unit organizes an extensive program to provide paediatric services in the North, they provided us with a list of the communities in which they ran paediatric clinics, and the dates of these clinics. We checked whether the billings data identified Winnipeg based paediatricians who were delivering services to Northern residents during the appropriate time periods. We found that 2/3 or more of these visits were recorded in the billings data. However, telephone consults will not be captured for any of the specialists.

need to add 4.0 specialists a year to the Manitoba supply, versus 4.2 per year had we used the adjusted FTE values.

Specialist Supply in Canada by Province

Data comparing the number of practitioners in each specialty by province (Figures 1 - 17) were supplied by the Canadian Institute for Health Information (CIHI), based on information from Southam Business Lists. These values were divided by 1995 provincial populations from Statistics Canada to determine specialist supply per capita. As we noted in the text, the CIHI data for Manitoba closely matched the values from the MCHPE database, but this is not necessarily true for all provinces and all specialties. The CIHI values represent all non-military MDs with active addresses, thereby including physicians in administrative roles, etc. However, CIHI data exclude physicians identified as retired or semi-retired. Differences can also arise when physicians move mid-year, and appear on two provinces' registries.

We found out through feedback on the first draft of this report that the CIHI data for New Brunswick are lower for many specialties than those kept by the Ministry of Health. As noted above, there are several reasons which may account for such differences. The Southam database is a well established source of physician manpower information, having been used widely in Canada for many years by the national and provincial governments, researchers and by those wishing to market to physicians. It is thought to be better at discerning changes and trends than at achieving perfect accuracy for every specialty in all provinces.

Rates of Key Surgical Procedures

For the key surgical procedures presented by province (Figures 18 - 30), we acquired data from Statistics Canada on the number of procedures performed for 4 fiscal years: 1990/91, 1991/92, 1992/93, and 1993/94. These were converted to rates by dividing by the provincial populations (for each year), then averaged over the four years. Note that these rates are not age and sex adjusted, but rather represent simple per capita procedure rates. Since these data reported inpatient procedures only, we only compared those performed primarily as inpatient procedures (90% or more in Manitoba in 1994/95). The following table lists these procedures

by name, along with ICD9-CM codes (used by MCHPE) and corresponding CCP codes (used by Statistics Canada):

Description	ICD9-CM	CCP
Thyroidectomy - Lobectomy	06.2	19.1
Partial Thyroidectomy - Lobectomy	06.3	19.2 & 19.42
Complete Thyroidectomy	06.4	19.3 & 19.43
Substernal Thyroidectomy	06.5	19.41
Lung Lobectomy	32.4	44.4
Partial Splenectomy	41.43	53.33
Total Splenectomy	41.5	53.34
Partial Gastrectomy	43.5-43.89	55.5-55.8
Total Gastrectomy	43.9	55.9
Resection of Large Bowel	45.7	57.5-57.6,57.3
Appendectomy	47.0-47.09	59.0
Cholecystectomy	51.2-51.29	63.1
Coronary Bypass	36.1-36.19	48.11-48.19
Carotid Endarterectomy	38.12	50.12
Excision of Aorta	38.45	50.54
Excision of Intervertebral Disc	80.5	92.31
Total Knee Replacement	81.54	93.41
Total Hip Replacement	81.51	93.5
Other Excision or Destruction of Brain and Meninges	01.59	14.4
Exploration of Spinal Canal	03.0-03.09	16.0
Spinal Fusion	81.0-81.09	93.0
Nephrectomy - Partial	55.4	67.3
Nephrectomy - Total	55.5	67.4
Kidney Transplant	55.6	67.5
Prostatectomy	60.2-60.69	72.1-72.5
Caesarean Section	74.0-74.09, 74.1-74.19	86.0-86.2, 86.8-86.9
Hysterectomy	68.2-68.79, 68.9-68.99	80.2-80.6

Data on Otolaryngological procedures (Tonsillectomy, Adenoidectomy & Myringotomy) were supplied by CIHI, and included only those provinces for which outpatient data was also available (since many such procedures were done as day surgery). Data on cataract surgery was taken from the Health Services Utilization Research Commission (HSURC) of Saskatchewan newsletter.

Whenever we used outside data sources, we checked results for Manitoba against those obtained from our own files, to confirm accuracy and consistency. Our previous work has documented that surgical procedures in particular are reported with a high level of accuracy (Roos et al. 1982; Roos et al. 1985).

Visits to physicians

Ambulatory physician visits include office visits, consultations, outpatient/emergency department visits, visits to patients in Personal Care Homes, and visits to patients in their own homes. Visits to hospital in-patients were excluded, except where noted for specific analyses. Ambulatory care delivered as part of a global tariff, such as for the six-week post-operative care period, are excluded from this analysis because we do not know how many such visits occur. The biggest exclusion under this rule is for prenatal visits. Since some prenatal visits are also billed fee for service, we excluded all prenatal visits from this analysis. We estimate that prenatal visits account for approximately 3% of all ambulatory visits (Tataryn et al. 1994).

Health Status Measures

Premature Mortality is an important indicator of the general health of a population; high premature mortality rates indicate poor health. The annual premature mortality rate is calculated as the number of deaths of people age 0-74 years, divided by the number of residents between 0 and 74 in the area. This value is standardized to account for age/sex differences in regional populations. Five years of data (1989-1993) were used to ensure stability of the rates (particularly important for regions with small populations).

Life Expectancy

Expected years of life from birth, based on the mortality experience of Manitobans from 1990 through 1994.

Ambulatory Sensitive Hospitalizations

A set of 28 medical conditions for which a group of physicians agreed hospital use might be reduced by timely and effective outpatient care prior to the need for hospitalization (Billings et al., 1993). Appropriate prior ambulatory care could:

1) prevent the onset of an illness or condition;
2) control an acute episodic illness or condition; or
3) manage a chronic disease or condition

Avoidable Hospitalizations

Conditions for which hospitalization can be avoided if ambulatory care is provided in a timely and effective manner. The conditions which are included in the grouping were those agreed upon by a panel of physicians and represent important health problems which would be affected by appropriate ambulatory care.

Amenable Hospitalizations

A list of medical conditions which a panel of physicians have agreed should not result in untimely death are identified as amenable to medical treatment. The conditions chosen were intended to be used not to provide a definitive evaluation, but rather to indicate where a problem may exist and to stimulate further inquiry. Age limits were imposed for some of the conditions.

Diabetes Prevalence: Prevalence rates (directly standardized) for diabetes in adult residents (age 20-79) were derived from administrative data. A case of diabetes was defined as two or more physician claims or 1 or more hospitalization in a three year observation period which reported a diagnosis of diabetes. Manitoba claims data have been found to offer a reasonably

reliable method for identifying individuals with diabetes, with claims data and data found in a diabetes educational registry providing quite similar information (Young et al., 1991).

Hypertension Prevalence: We identified individuals as having hypertension if they had at least one physician contact in both 1993/94 and 94/95 during which hypertension (ICD9-CM 401) was listed as the diagnosis on the claim submitted for visit payment. The overall agreement between hypertension identified using clinical measures as part of the heart health survey and that identified through claims data is high: 85% (kappa = 0.60) (Muhajarine et al., 1996).

Cancer Incidence: based on 3 years (1993 through 1995) of new cases reported to the Manitoba Cancer Treatment and Research Foundation, excluding skin cancers. This is a legally notifiable disease, and the registry is generally credited with having high quality data.

SocioEconomic Risk Index (SERI): The SERI is a composite index of six measures of socio-economic status that mark environmental, household, and individual conditions which put residents of a particular area at risk for poor health, and hence are associated with higher need for health care. The following six variables were chosen (from a pool of 23) for their strong relationship to health status and utilization of health care resources:

1. The percentage of people unemployed between the ages of 15 and 24,
2. The percentage of people unemployed between the ages of 45 and 54,
3. The percentage of single parent female households,
4. The percentage of high school graduates between the ages of 25 and 34,
5. The percentage of females participating in the labour force, and
6. The average dwelling value.

The first three variables are negatively related to health status (high values being associated with poor health), while the last three are positively related to health status. SERI values were calculated for each region on a standardized scale, with the provincial average corresponding to a SERI value of 0. Smaller (negative) values represent areas at lower risk, while higher

values represent areas at higher risk. For a thorough explanation and discussion of the SERI, see Mustard and Frohlich (1995).

In-area Supply

For each physician, an FTE value was determined based on total payments, using the Health Canada FTE methodology described above. Physicians were assigned to the region from which most of their patients were drawn, with each of the twelve months examined separately. The physician's total FTE value was then allocated among the regions in proportion to the *number of visits provided* while the specialist practised in each region. For example, a physician may be assigned to region A and region B for six months each, but if they provided twice as many visits while in region A, then region A will be credited with a greater proportion (2/3) of the total FTE value. This method was developed to account for the substantial mobility of many rural general practitioners, and was used here to accurately capture practice patterns of specialists who move during the year.

Expenditures on Physicians in Manitoba

Regional per capita expenditures on physicians were taken from an upcoming MCHPE report "A Project to Investigate Provincial Expenditures on Health Care to Manitobans. A POPULIS Project."

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