Surgical Waiting Times in Manitoba

June 1998

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Health Policy and Evaluation
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ACKNOWLEDGMENTS

The authors would like to acknowledge the efforts and expertise that many individuals contributed in completing this project and producing this report. We thank the following, and apologize in advance for anybody that we might have overlooked:

- The study Working Group:
  - Wilmar Chopyk, CEO, Bethesda Hospital, Steinbach
  - Nancy Craven, MD, Associate Professor, Department of Family Medicine, University of Manitoba
  - Sean Drain, (then) Executive Director, Winnipeg Operations, Manitoba Health
  - Luis Oppenheimer, MD, Head, Department of Surgery, University of Manitoba, Health Sciences Centre
  - Ed Pascoe, MD, Head, Cardiac Surgery, St. Boniface General Hospital
  - Laurie Potovsky Beachell, Board Member, Consumers' Association of Canada (Manitoba)
  - Ted Roxburgh, Past President, Manitoba Society of Seniors
  - Verna Tribula, RN, Utilization Analyst, St. Boniface General Hospital
- Randy Locht and Lorne Bellan who gave advice on orthopaedic and ophthalmic surgery respectively;
- Debbie Nowicki who conducted detailed analyses on the Appropriate Access Review Group Registry data for hip and knee replacement;
- Colleagues who provided feedback on earlier drafts of this report: Charlyn Black, Marni Brownell, Michael Farnworth, Randy Fransoo, Norm Frohlich, Noralou Roos, Donna Turner and Evelyn Shapiro;
- David Elliott and Claudia Sanmartin, for their detailed and insightful external reviews;
- Althea Coughlan and Shannon Lussier who provided secretarial support

We acknowledge the financial support of the Department of Health of the Province of Manitoba. The results and conclusions are those of the authors and no official endorsement by Manitoba Health was intended or should be inferred. This report was prepared at the request of Manitoba Health as part of the contract between the University of Manitoba and Manitoba Health.

The Manitoba Centre for Health Policy and Evaluation

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.

Manitoba has one of the most complete, well-organized and useful health data bases in North America. The data base provides a comprehensive, longitudinal, population-based administrative record of health care use in the province.

Members of MCHPE consult extensively with government officials, health care administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards and its exceptional data base, uniquely position MCHPE to contribute to improvements in the health policy process.

MCHPE undertakes several major research projects every year, such as this one, under contract to Manitoba Health. 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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The Issue

Long waits for treatment are frequently viewed as a failure of the Canadian health care system. Because of the ongoing concerns about waiting times, Manitoba Health asked the Manitoba Centre for Health Policy and Evaluation (MCHPE) to investigate the issue. This paper explores some of the conceptual issues with respect to waiting times; analyzes administrative data to estimate the wait for specific surgical procedures in Manitoba; and explores criteria to consider in establishing a centralized registry to monitor waiting times.

Despite the frequently-expressed concerns about waiting times and access to necessary treatment, waiting time data are not generally collected in Canada. One reason that data on waiting times are not collected is the complexity of what on the surface seems to be a fairly straightforward issue. Waiting lists can be compared to a pool of water whose inflow and outflow are not only uneven but also influenced by differing factors. Literature from other jurisdictions that do attempt to monitor waiting time reveals that:

- Increasing the rate of surgery may increase, rather than decrease, the size of the waiting list. This may be due to a perception that surgery has become more readily available, or to other factors like changing indicators.

- There are several different ways of viewing queuing data: number of people waiting, average waiting time and clearance time to name a few. For any measure of waiting time, an important factor to consider is how one defines the beginning of the waiting period.

- Practice patterns vary from physician to physician. For the large majority of illnesses, criteria for surgery are not well-defined, and some physicians will offer surgery while others would not. Even for conditions where there is agreement that surgical intervention is required, for example cataracts, the point at which surgery is decided upon varies. These discretionary factors will affect the number of patients waiting to have surgery.

- Patient factors—such as patient preferences for postponing vacations, taking time off work, or the presence of chronic conditions—affect the length of the wait.

- Priority-setting is made difficult because of the many factors to consider. These include but are not limited to: length of time in the queue, degree of pain and functional disability, expected progression of the disease, patient preference, social and employment considerations, and benefits of the surgical procedure.

- Waiting list management is tedious and challenging. Double-booking, patient unavailability and improvement in patients' symptoms can make waiting lists inaccurate.

Methods and Results

A Working Group was established to advise on the project. The role of the Working Group was to review and suggest improvements to the project methodology; provide feedback on the analysis and interpretation of findings; and review and comment on draft reports, including any recommendations to be made to Manitoba Health.

Except for cardiac surgery, there is no centralized registry in Manitoba. We used administrative data to estimate the wait for surgical procedures. Since there is no field in the administrative data that indicates when the patient and physician made a decision to proceed with surgery, a marker had to be found that flagged the beginning of the wait for surgery. The marker had to be present in a high proportion of cases, and it had to make sense to clinicians. We chose the pre-operative visit to the operating surgeon as the marker for when waiting time began. That is, we defined the waiting time as the time between the surgery date and the date of the patient's visit to the surgeon beforehand.

The underlying assumption for the elective procedures we studied is that the family physician refers the patient to a surgeon, the decision is made to have surgery, after which the patient is not seen again by the surgeon until the date of surgery. Any problems that arise in the meantime are handled by the family physician. Chronic conditions, which require several pre-operative visits to the surgeon, can not be studied using this method.

We studied eleven surgical procedures. We selected eight common elective procedures: excision of breast lesions (excluding biopsy), cholecystectomy (gallbladder removal), hernia repair, tonsillectomy, stripping/ligation of varicose veins, carpal tunnel release, transurethral prostatectomy (TURP), and carotid endarterectomy. We studied cataract surgery separately, because we wanted to make comparisons between the public sector and privately-operated clinics. We also examined two coronary procedures: bypass surgery and angioplasty. For the cardiac procedures, we used an angiogram as an additional marker for waiting times for surgery.

In addition to examining waiting times from year to year, we looked for differences according to the patients' region of residence, neighbourhood income, gender and age. We report the median, the length of time half the people over a given time period had to wait for surgery. The median has the advantage of being uninfluenced by outliers, unlike the mean.

Results for eight elective surgical procedures

Median waits changed very little from 92/93 to 96/97. The low, 16 days, was for breast surgery and the high, 51 days, was for tonsillectomy. For most of the procedures, median waits remained stable (hernia repair, excision breast lesions and carotid endarterectomy) or fell (cholecystectomy, TURP and tonsillectomy) over the five years. For two procedures, varicose veins and carpal tunnel release, median waits increased.

The analyses by region of residence, neighbourhood income and age showed few marked differences. Although most of the surgical specialists practice in Winnipeg or Brandon, residents of Winnipeg and the West, where Brandon is situated, frequently had longer waiting times than the provincial median. Generally there were no differences in waiting times for surgery based on neighbourhood income status or gender. Patients who were under 65 years had longer waiting times than those aged 65 or older. For every year except 92/93, the waiting time for patients aged 65 or older was statistically significantly shorter than the provincial median. Because the procedures that we selected were elective in nature, it may be that people who are in the workforce delayed surgery until a more convenient time.

Cataract Surgery

During the period of this study, cataract surgery was available in two cities in Manitoba, Winnipeg and Brandon. Both cities had private as well as public cataract surgery. In both public hospitals and private clinics, the surgeon's fee was paid by Manitoba Health; however patients who opted to attend a privately-run clinic paid a "facility" or "tray" fee of about $1,000 for overhead and support services.

One of the arguments in favour of permitting private surgery along the publicly-funded system is that the private system can offer faster service. We found that indeed, waiting times were shorter for patients who had cataract surgery in a private clinic compared to the public hospital. The median wait for surgery in a private clinic was about four weeks, and this remained stable from 92/93 through 96/97. The median wait for surgery in the public system was 16 weeks in 92/93, fell to 11 weeks in 94/95, then rose to 18 weeks in 96/97.

When we categorized patients according to where their surgeons' practiced, a different picture emerged. We separated surgeons into those who operated publicly only, and those who operated both publicly and privately. (None of the surgeons operated privately only.) The median wait for surgery in the public sector was different depending on the surgeon's practice: patients could expect to wait up to 13 weeks longer for surgery in the public sector if their surgeon also had a private practice. For surgeons who operated only in the public sector, the wait was around 7 weeks for 93/94, 94/95 and 95/96, increasing to 10 weeks in 96/97. For surgeons who operated in both the public and private sector, the waits ranged from 14 weeks in 93/94 and 94/95 to 23 weeks in 96/97. It must be noted that the surgeons who operate both publicly and privately performed over 50% of the cataract surgery provided in the public sector; it is possible that their longer waits for public sector surgery reflect the limits of available resources. Furthermore, at least in Winnipeg, no additional operating room time is available at the hospital. Thus surgeons cannot expand the amount of time they operate in the public sector to try to decrease the wait.

Cardiac Procedures: Coronary Artery Bypass Surgery and Percutaneous Transluminal Coronary Angioplasty

We examined seven years of data for bypass surgery and angioplasty (90/91 through 96/97). We looked first at the waits for all patients, divided by whether they were coded as urgent/emergent or elective. Then we excluded the urgent/emergent patients, as well as the elective patients who waited three days or less. We compared waits from year to year, by region of residence, by gender and by neighbourhood income status.

Coronary Artery Bypass Surgery (CABS)

In every year, roughly half of patients having CABS were coded as urgent or emergent on admission. For these patients, the median waiting time was from three to five days. For patients coded as elective, or scheduled, the median wait for all seven years combined was 31 days. The median waiting times for each year were approximately one month, except for 91/92 for which the median wait was significantly longer at 48 days.

When we focused on scheduled patients, excluding those who waited three days or less, it appeared that median waits decreased over time; the wait was 60 days in 90/91 and 40 days in 96/97. We found no differences in the median waits by gender, by region of residence, or by neighbourhood income quintile. These findings suggest that all groups were served equally for CABS.

The literature suggests that bypass surgery may be considered “delayed” when patients wait more than three months. Over time there was a decrease in the proportion of patients waiting more than three months for CABS. In 90/91 and 91/92, 39% to 40% of the patients waited three months or more for surgery, while by 96/97, the proportion of patients that waited longer than three months fell to 24%.

Percutaneous Transluminal Coronary Angioplasty (PTCA)

For patients who were coded as urgent or emergent, the median waits were from 4 to 7 days; for scheduled inpatient and day patients, the median wait fluctuated, ranging from a low of 19 days in 92/93 and 95/96 to a high of 36 days in 91/92.

When we focused on scheduled patients, excluding those who waited three days or less, median waits changed from year to year with no clear pattern emerging. The overall median for the seven years was 32 days; the wait in 92/93 was significantly shorter and the wait in 96/97 was significantly longer than the overall wait. The proportion of patients who waited more than 90 days fluctuated from year to year, but has remained under 20%. We found no differences in the median waits by gender, by region of residence, or by neighbourhood income quintile. These findings suggest that all groups were served equally for PTCA.

Comparison with Fraser Institute Reports

The Fraser Institute is an independent Canadian economic and social research and educational organization. It is philosophically in favour of free enterprise and opposed to government intervention. Every year, the Institute conducts a survey of physicians to assess how long patients must wait for medical treatment, including among other items, waiting for surgery after seeing a specialist.

The Institute's method differs from the MCHPE method since the Institute reports the median estimate of the physicians who respond, whereas our method reports the median of all patients. To make the two methods more similar, we recalculated our medians as follows: we calculated the median for each surgeon in a given year (excluding surgeons with fewer than 5 cases in a year), then took the median of the medians. Thus, we had three types of results for comparison: the Fraser Institute, MCHPE's median of *surgeons'* median waits, and MCHPE's median of *patients'* waiting time. We compared results for 1994 through 1996.

Why the three methods yield different results can be illustrated by the following: If we used administrative data to calculate the median length of hospital stay for all patients with a hip fracture, that would be the patient median. If we then calculated the median stay for each

physician, but excluded those who had fewer than five cases per year, that would be similar to the surgeon-median method. It will differ from the patient-median method because some patients have been excluded. If we then surveyed individual physicians and asked what they thought the average hospital stay was for those patients, and only one-third replied, that would be like the Fraser Institute method.

For most procedures, the median waits for the Fraser Institute and MCHPE were very similar. The biggest discrepancies were for cataract surgery and coronary artery bypass surgery. For cataract surgery, the median wait reported by the Fraser Institute ranged from 12 to 37 weeks from 1994 to 1996; MCHPE found much shorter waits: 9 to 12 weeks using the surgeon-median method, and 11 to 18 weeks using the patient-median method. Since the Fraser Institute only heard from 32% to 40% of the ophthalmologists and the MCHPE methods look at actual waiting times, such discrepancies are not surprising. The wait for scheduled CABS reported by the Fraser Institute was remarkably distorted, based on the response of 2 of the 6 cardiovascular surgeons in 1994: the Fraser Institute reported 120 weeks as the median wait while our examination of actual waits suggests 11 weeks for the surgeons' median. In 1995 and 1996, the Fraser Institute reported waits for elective CABS of 10 and 14 weeks, while MCHPE data showed a wait of 7 and 5 weeks respectively.

Developing a surgical registry for Manitoba

Setting up, maintaining and managing a registry is complex. If a registry is to be established for Manitoba, it will be necessary at the outset to consider what the registry is to accomplish. A registry that retrospectively tracks waiting times could be established quite simply and with little expense by including a field on physicians' claims that would indicate when a decision was made to proceed with surgery. But the registry becomes much more complicated if the purpose is to monitor waiting times on an ongoing basis, redistribute resources to even out long waits, and/or assign operating time to surgeons based on a prioritization process.

Potential pitfalls in establishing a registry

1. *Non-compliance*: A registry that does not include all elective patients will yield unreliable information. How can compliance be ensured? Mandating that physicians or hospitals comply will be insufficient unless there is some benefit to doing so. Discussions with surgeons and hospitals might help to find out what they would view as ideal characteristics of a registry. Possibilities are ease of use, extended hours of access, variety of ways of accessing (phone, voice mail, fax, email), consequences for using or not using (e.g. could affect OR scheduling).

2. *Meaning of "Date On"*: At what point will patients' names be submitted to the registry? One of the difficulties in other waiting list registries is the variability with which patients' names are submitted to the registry. Some surgeons submit names in anticipation of a long wait, even before the patient is actually ready for surgery. The entry of a patient's name to the registry should indicate that the patient has agreed to surgery, has completed all necessary diagnostic tests and consults and is available for the procedure. There should be a means of indicating the reason for any delay.

3. *Concurrent vs. retrospective*: A concurrent registry which is updated on a regular basis would be the most useful for monitoring and management of health care resources. Manitoba is fortunate to have technological expertise and capability in place, as well as a window of opportunity with the development of the Health Information Network. Manitoba Health collects and maintains data on all insured hospital and medical interactions. Currently, all hospitals submit hospital abstracts to Manitoba Health; for approximately 80% of the hospitals, weekly or bi-weekly submissions are made in an electronic format (tape or diskette). Much of physician billing is also accomplished by computer. Therefore, Manitoba Health already functions as a provincial data centre for receiving and managing a great deal of health information.

   Another possibility to explore is the Health Information Network (HIN), which is coming on-line over the next two to three years, and will have real-time data entry capability. Therefore, it should be possible for booking requests to be submitted by each hospital to a

central registry, and for surgical slates to be submitted to the registry on a daily basis for up-to-date waiting time information.

4. *Data to be included*: Consideration must be given to the extent of data to be included in the registry: the more data that must be separately collected, the less likely is compliance. However, if the data can be included as part of the HIN, this will considerably reduce the need for additional data collection or submission. Some data that should be available include: patient demographics and identifying information, contact information, scheduled procedure, priority (within one month, one month to three months, more than three months), date that surgery was decided, functional status, and other measures relevant for prioritization and monitoring.

5. *Prioritization*: There is some evidence that physicians do prioritize patients appropriately in the presence of queues (Naylor 1992). Since surgical and prioritization criteria are not available for many procedures, clinical judgement must continue to be the guide, as it is now. Where acceptable prioritization criteria exist e.g. hip and knee replacement, bypass surgery, cataract surgery, they should be incorporated so feedback and monitoring are possible. When prioritization criteria become available for other procedures, they should be incorporated into the registry. In the absence of prioritization criteria, the priority assigned by surgeons should be assessed regularly, since there will be a tendency to assign higher priorities if that is seen as a way to bring patients to surgery earlier.

6. *Guaranteed maximum wait*: It is not recommended that "a guaranteed maximum wait" is employed as it is in the United Kingdom (Smith 1994; Edwards 1997). The guaranteed maximum wait applies to all patients, thus encouraging surgeons and hospitals to operate on patients who may have lower clinical need, but are nearer to the expiry of the guaranteed maximum. Rather than focussing on overall waiting times, the focus should be on optimizing the benefits to the patient, and take into consideration factors like patients' preferences, time already spent waiting, expected clinical deterioration, health status, functional status and social factors.

Other recommendations

7. *Cardiac procedures*: In monitoring the waiting times for cardiac surgery, consideration should be given to monitoring not only the wait for open heart surgery, but also waits for angiography and angioplasty. Software has been developed that can follow patients from referral for angiogram through angiography and follow-up care. One example is the APPROACH (Alberta Provincial Project on Outcome Assessment in Coronary Heart Disease) system, developed at the University of Calgary. This system has been adopted by British Columbia, and was discussed by health care providers and government representatives at an all day session in December 1997. Other systems may also be available that can track patients along the continuum of care for heart disease.

8. *Physician claims*: Waiting times are an issue that continually garner a great deal of attention, and yet there is a dearth of concrete information to monitor actual waiting times. Given this gap, it is recommended that a field be included on the physician claims that would indicate a date when a decision was made to proceed with surgery.

9. *Cataract surgery*: There are some indications that resources for cataract surgery may need to be increased. The waiting times in the public sector increased from 11 weeks in 94/95 to 18 weeks in 96/97. Manitoba Health has indicated that it intends to ban extra-billing at private clinics, and to negotiate a mechanism of financing the procedure at private clinics so that these procedures can continue to be offered there. If the cataract surgery rate does increase, it will be important to use the data from the registry to be implemented at Misericordia Hospital in October 1998, not only to monitor waiting times, but also to assess whether patients are being accepted for surgery and prioritized appropriately.

1. INTRODUCTION

"Heart patients wait, die." "Need surgery, medical tests? Go to the end of the line."

Do these headlines sound familiar? They capture one of the major complaints levelled at the Canadian health care system: that constraints on resources force long waits for service. The Canadian Medical Association reported that a 1997 opinion poll found nearly two-thirds of Canadians felt waiting times for emergency room treatment and for surgery had worsened over the past few years (Inter-Com 1997). Yet this is not a recent phenomenon. The first of the above headlines comes from the *Winnipeg Free Press*, February 26, 1997. The second was written almost ten years ago, in *The Globe and Mail* on May 24, 1989.

Because of the ongoing concerns about waiting times, Manitoba Health asked the Manitoba Centre for Health Policy and Evaluation (MCHPE) to investigate the issue. This paper explores some of the conceptual issues with respect to waiting times; analyzes administrative data to estimate the wait for specific surgical procedures in Manitoba and explores criteria to consider in establishing a centralized registry to monitor waiting times.

1.1 The Issue

Long waits for treatment are frequently viewed as a failure of the health care system. But it is an area where there is far more rhetoric than reality. Powerful anecdotes form the basis of media reports on the issue. Few data exist on actual waits in Canada because this information is not routinely collected. Much of the research literature comes from other countries with publicly-funded health care, especially the United Kingdom.

Perhaps Canadians' perceptions of the unduly long waits for surgery are influenced by the rhetoric from south of the border. American critics of a publicly-funded health care system are quick to point out the long waits in Canada and label it as rationing. What they often fail to point out is that health care is rationed in the United States too, based on price. Uwe Reinhardt (1996), James Madison Professor of Political Economy at Princeton University, stated that the United States Congress has officially embraced "an income-based health system

that will ration health care quite severely for Americans assigned to the bottom tier and not at all for Americans in the upper tier." Health care is readily available for those who can pay; excess capacity guarantees rapid service.

Typical of the reality behind the waiting list issue is the story of Mr. Albert Mueller, the Canadian patient profiled by Walter Cronkite on the widely-watched 1990 documentary *Borderline Medicine.* Mr. Mueller was followed as he underwent cardiac catheterization; his physician, Dr. Huckell, informed him that his condition was very serious and that bypass surgery was urgently needed. In comparing experiences of several Canadian and American patients, Mr. Cronkite announced, "Five months later, Albert Mueller is still waiting for surgery, despite the fact that 25 percent of patients with left main coronary artery disease die within a year." Rachlis and Kushner (1994) tracked down Dr. Huckell in Vancouver, and report that the only problem with the story is that "it wasn't true." Mr. Mueller did not have to wait five months for his surgery. He could have had the operation almost right away and was in fact contacted several times by the hospital and the surgeon. He simply did not want it.[1]

Queues in and of themselves are not necessarily a bad thing. In a discussion of waiting times in the United Kingdom (UK), Edwards (1997) notes that some surgeons argue that waiting lists and waiting times can serve a useful purpose. A period of delay allows some conditions to improve spontaneously, and some patients to take time to consider whether they really want an elective procedure, which is never without at least some risk. Waiting lists also enable the optimum scheduling of surgical resources for a mix of long, complex cases with shorter ones. Thus waiting lists and waiting times can serve a useful purpose as part of patient management.

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[1] Dr. Huckell told Rachlis that the patient simply refused to have surgery or even see a surgeon to discuss it. Dr. Huckell advised the patient several times that he needed the surgery, but Mr. Mueller remained adamant. As far as he was concerned, the drugs he was taking for his angina were working. He was feeling so much better that he spent the spring and summer driving around the western United States and Canada. Eventually his condition did grow worse and he had surgery.

1.2 What does the literature say?

Despite the concerns expressed in newspaper headlines about waiting times and access to necessary treatment, waiting time data are not generally collected in Canada, although a few initiatives have been undertaken, especially to monitor the wait for cardiac surgery. To obtain a more accurate perspective on this issue, Health Canada in November 1997, commissioned a report to synthesize information about the nature, extent, scope and effect of waiting lists, including a literature review as well as a list of currently used waiting lists.

One reason that data on waiting times are not collected is the complexity of what on the surface seems to be a fairly straightforward issue. The waiting list for surgery is like a pool of water where the inflow and outflow are unrelated, and moreover, each is affected by different factors. People suppose that more money for surgery will clear up the long waits; however, it is difficult to determine the effect of an increased rate of surgery on the size of the waiting list. A study in the United Kingdom found that as more patients were admitted from the waiting list for surgery, the size of the waiting list paradoxically increased (Goldacre 1987). In Ontario, despite a 15% increase in the number of coronary bypass procedures from 92/93 to 95/96, the median waiting time to have surgery increased from 17 to 23 days (Naylor et al. 1997).

Reasons for this paradoxical finding are uncertain. It may be that some patients and physicians do not seek surgical treatment if they believe that the waits are impossibly long. Availability affects the therapy the physician prescribes. Comparisons between England and the United States have found higher thresholds for treatment in England, presumably because resources are not as readily available for some therapies. For example, British physicians advised elderly patients, who would be dialysis candidates in the US, that nothing could be done to help them (Schwartz and Aaron 1984). Similarly, when asked to assess hypothetical case histories for appropriateness for angiography or bypass surgery, US physicians judged more indications to be appropriate than UK physicians (Brook et al. 1988). Also, the development of new technology, for instance hip replacement and cardiac surgery, permits surgical intervention where none had been possible before, thus increasing the total number of people waiting for surgery. These procedures and many others are more commonly

performed on the older population; as that portion of the population increases, so might the demand for surgery. Also criteria for surgery change as experience and technical safety increases, so that people who were not previously surgical candidates may now be accepted for surgery. This may be the case for coronary artery surgery in the 1980s in Ontario; the proportion of bypass procedures in the over-sixty-five population rose from 12.8% in 1979 to 27.4% by 1985, despite a falling incidence of coronary artery disease (Naylor 1991).

Waiting lists vs. waiting times

One must also point out here the different ways of viewing queuing data. The number of patients on a waiting list is not very helpful except perhaps to monitor changes over time. Whether a waiting list contains 100 or 1,000 names tells us little about the wait, or patients' experiences during the wait. More helpful is knowing the average waiting time: how long after entry to a waiting list did patients wait for their surgery? Other measures of waiting time are clearance time: the length of time it would take for all of the patients on the list at a point in time to receive surgery if the operating rate remained constant; and patient-years of waiting: the sum of all patients' waiting times for a particular procedure. For any measure of waiting time, an important factor to consider is how one defines the beginning of the waiting period. Also important is the mix of surgical procedures contained in a report on average waiting times. If the mean is for a big number of procedures, then it will include some more urgent procedures for which waiting time should be shorter, and some highly discretionary procedures for which surgery can safely be delayed. More useful is an analysis of waits for specific procedures.

Surgical variations

It is well-established that surgical rates vary from physician to physician, and from country to country. Variations in rates of surgery in populations that are similar to each other suggest that criteria for surgery are not standardized (Keller and Soule 1990; Roos et al. 1995; Cohen and Hall 1994; Maine Medical Assessment Foundation 1993; Ugnat and Naylor 1994; Roos and Sharp 1989). Some surgeons and some patients are more eager for a surgical solution than others. The threshold for surgical intervention varies, thus affecting the size of the

waiting list. Not only does the rate of surgical intervention vary, but also the rate of diagnostic testing, which influences the rate of surgery. Wennberg et al. (1996) found that there was a strong and direct relationship between the degree of stress testing, angiography and coronary artery bypass surgery. This is not an inconsequential finding, since higher rates of cardiac surgery are related to higher rates of morbidity and mortality; the level of surgical complications and deaths is dependent not only on the quality of care the patient receives, but also the number of surgical procedures performed. Roos and colleagues (1995) found that more deaths might be averted in high-rate surgical areas by reducing the rate of surgery as opposed to improving the quality of hospital care

Patient factors

Yet another factor to consider is the effect of patient preference, particularly for elective surgical procedures. Anecdotal evidence abounds of patients postponing their surgery until a time that is more convenient for them: students wait until the end of the semester to have their hernia repaired, working people wait until vacation for their varicose vein stripping (or perhaps until their vacation is over depending on their sick benefits and how much they like their job!), and seniors, especially in Manitoba, postpone their cataract surgery until after they return from spending the winter months in a warmer climate.

Another patient factor affecting waiting time is the presence of chronic conditions. Patients with heart or renal disease might have to have those conditions stabilized before surgery can proceed. At the very least, these concurrent conditions might add to the overall wait simply because the surgeon wants a referral to another specialist to assess the condition prior to going ahead.

Patients' acceptance of waiting for surgery may be greater than we imagine. Persons who had been placed on waiting lists for cataract surgery in Manitoba, Barcelona, Spain and Denmark were interviewed to determine their willingness to pay to shorten the wait (Anderson et al. 1997). There was limited support when asked if they were willing to pay higher income taxes to eliminate waiting times: 12.3% in Barcelona, 23.9% in Denmark and 14.9% in Manitoba. When asked if patients should be permitted to pay physicians directly to shorten waiting times,

25.7% in Barcelona, 9.4% in Denmark and 44.8% in Manitoba agreed; all three jurisdictions have private cataract surgery in addition to the public system. In fact, only 1.7% of the patients interviewed actually decided to have surgery privately. (The out-of-pocket expense to have cataract surgery done privately in all three locations is approximately $1,000.) In this study, patients' actual waits were 0.2 to 0.9 months longer than their expected wait. Four months after the procedure, when asked if the wait was reasonable, 2/3 or more agreed it was. Only 31.4% in Barcelona, 37.2% in Denmark and 25.7% in Manitoba said the wait was longer or much longer than they would have preferred. Thus, the majority did not express dissatisfaction with the actual waiting time.

Trigger point

Another complexity is determining the "trigger point" for entry to the waiting list. Waiting lists are kept in the United Kingdom and Australia for elective patients. Entry to the list is made by the surgeon who submits the patient's name to a hospital when the decision to have surgery is made. But prior to that point, patients may have seen their family practitioners one or more times for the problem, undergone diagnostic tests and procedures, and then received their referral to a surgeon. The surgeon may order more tests, or monitor the problem for a time (e.g. a gynaecologist will often monitor a woman with heavy or frequent non-malignant bleeding for a period of time before performing hysterectomy), or send the patient to another specialist to stabilize a chronic condition prior to surgery. Meanwhile, patients wait between each of these steps, and may feel that they have been waiting much longer than the time period officially recorded.

Once a patient is on a waiting list—whatever the trigger point—what criteria should be used to determine priority for surgery? Is length of time in the queue the only factor? One can immediately see a big problem if that were the only criterion: surely patients who are more urgent should take priority over someone who is in less need. But how does one define need? In Ontario, prioritization criteria for coronary bypass surgery (Naylor et al. 1990), and hip and knee replacement (Naylor, Williams et al. 1996) have been developed, but for the vast majority of procedures, no such formal priority-assignment model exists.

When one is put on a waiting list—and bear in mind that formalized waiting lists do not generally exist in Manitoba—depends not only on the surgical threshold, but also the way in which surgeons submit names for the list. In the United Kingdom, some ophthalmic surgeons entered their patients onto the waiting list for cataract surgery at an earlier stage of impairment than others, in anticipation of a long wait. Thus they had very long lists and very long waits. Others waited until the patient's vision had deteriorated further before placement on the list; therefore they had shorter lists and waiting times. In fact, patients of both types of surgeons came to surgery with about the same level of symptoms and impairment (Sanderson 1982).

Waiting list management

Managing waiting lists is challenging. There is little incentive for surgeons or hospitals to "clean up" their lists, since it is tedious work and long waiting lists can be used to put pressure on governments to provide more resources. Reviews of patients on waiting lists have demonstrated substantial inaccuracies. Reasons that patients should be removed from waiting lists include improvement in symptoms, having already had the surgery, inability to locate, out-migration or death. In one UK study in the Oxford area, comparisons of two data sources over a period of ten years revealed that 28% of patients on the waiting list never came to surgery at hospitals in the region (Lee et al. 1987). In New Zealand, after a questionnaire and clinical reassessment, of 142 patients on an orthopedic waiting list, only 69 remained on the list; some had already had surgery, some no longer wanted surgery, some no longer needed surgery (Tomlinson and Cullen 1992). An audit of surgical waiting lists at Dunedin Hospital in New Zealand found that nearly one-quarter of patients should be removed from the list (Fraser 1991). In the Dunedin audit, 6% of the patients on the list felt that they no longer needed or wanted the surgery. At one British hospital, a reassessment of 107 patients waiting for trans-urethral prostatectomy (TURP) for benign disease found that 51 (48%) could be removed from follow-up; 19 were found to have normal urinary flow rates, and 32 with minimal symptoms decided against surgery themselves after reassurance about the course of their disease (Barham et al. 1993).

The only way to eliminate queues is to have health care resources idly waiting for patients to arrive. To avoid any patient waiting means having equipped operating rooms and suitably-trained staff standing by as well as vacant hospital beds for post-operative care. Excess capacity encourages higher rates of surgery, which increases the rate of unnecessary surgery, as well as the rate of post-surgical complications and deaths. In a review of the appropriateness of coronary bypass surgery in areas with different surgical rates, there were more low-benefit cases performed in higher-rate areas (Hux and Naylor 1995). In the waiting list reviews noted above, a percentage of patients did not require surgery (16% in the orthopaedic review, 6% in the Dunedin audit, 48% in the TURP review).

Unquestionably, excessive waits for necessary surgery increase pain, suffering, disability and perhaps even the risk of death. Yet there are also indications that high rates of surgery can lead to a higher level of unnecessary surgery, and more surgical complications and deaths. Finding the balance is a challenging task, especially since patient preferences and medical decision-making are variable.

2. METHODS AND RESULTS

2.1 Working Group

A Working Group was established to advise on the project. The role of the Working Group is to review and suggest improvements to the project methodology; provide feedback on the analysis and interpretation of findings; and review and comment on draft reports including recommendations to be made to Manitoba Health based on the study findings. The members of the Working Group for the Waiting Times study were:

- Wilmar Chopyk, (then) CEO, Bethesda Hospital, Steinbach
- Nancy Craven, MD, Associate Professor, Department of Family Medicine, University of Manitoba
- Sean Drain, (then) Executive Director, Winnipeg Operations, Manitoba Health
- Luis Oppenheimer, MD, Head, Department of Surgery, University of Manitoba, Health Sciences Centre
- Ed Pascoe, MD, Head, Cardiac Surgery, St. Boniface General Hospital
- Laurie Potovsky Beachell, Board Member, Consumers' Association of Canada (Manitoba)
- Ted Roxburgh, Past President, Manitoba Society of Seniors
- Verna Tribula, RN, Utilization Analyst, St. Boniface General Hospital

2.2 Elective Surgical Procedures

Lacking a real-time registry in Manitoba, we used administrative data to estimate the wait for surgical procedures. The Manitoba Health Research Data Repository contains a longitudinal record of hospital, medical and nursing home care in Manitoba. All names and addresses are removed from the data to preserve confidentiality. Records of surgical procedures are included in the hospital abstract that is filed for every patient with Manitoba Health. Visits to physicians are also captured by the system, since most physicians are remunerated on a fee-for-service basis, and therefore file a claim with Manitoba Health following every office visit. Tataryn, Roos and Black (1994) estimated that between 90% and 98% of ambulatory care is captured by the claims system.

There is no field in the administrative data that indicates when the patient and physician made a decision to proceed with surgery and hence, began to wait for a surgical booking. A marker had to be found that flagged the beginning of the wait for surgery. The marker had to be present in a high proportion of cases, and it had to make sense to clinicians. We chose the pre-operative visit to the operating surgeon as the marker for when waiting time began. Our method is similar to one used by the Nova Scotia Department of Health (1996).

It is important to remember that we are using administrative data: computerized files of interactions with the health care system that have already occurred. One advantage to this is that we have data on the entire population of Manitoba, on all surgical procedures. However, we are by definition examining what has happened in the past, not at what is ongoing. We can only estimate waiting times for patients who had the procedure; persons who were going to have the surgery but did not—because they left the province, died, changed their minds or are still waiting—are not in our data.

When we began this project, we intended to use the administrative data to explore the waits for coronary artery bypass surgery (CABS), percutaneous transluminal coronary angioplasty (PTCA) and hip fracture. We also believed that data from a provincial registry for hip/knee replacement maintained at St. Boniface General Hospital might be a useful tool. After our initial analyses and on the advice of the Working Group, we analyzed selected elective

surgical procedures and coronary procedures. A brief description of the hip-knee replacement registry follows.

Experience with a provincial hip/knee replacement registry

Manitoba Health funded a provincial registry for knee and hip replacement surgery, which was maintained at St. Boniface General Hospital (SBGH) from 1994/95 to 1996/97. It had two components: patient information sent to SBGH by the surgeon, and questionnaires that patients were asked to complete when they were being admitted. The patient questionnaire had no identifying information, so there was no connection between the two components.

Manitoba Health was to provide data to SBGH about patients who had had their surgery so that they could be removed from the registry. However, there was a delay in doing this, so that a large number of patients had accumulated on the registry, some who had had their surgery and some who were still waiting. MCHPE became involved at the request of St. Boniface General Hospital and the permission of Manitoba Health. The registry file was merged with MCHPE data using identifiers such as birth date and gender. Using the date of the procedure and the date the patient was placed on the registry, we calculated the waiting time for surgery. We also did some analyses according to hospital and surgeon.

There were 1402 registry records for 1257 individuals. After excluding some patients (21), for example if they lived out-of-province and had died before surgery, there were 789 (63%) procedures for analysis and 447 patients (36%) who had not yet had surgery and remained on the registry. We used only the first appearance on the registry; 36 of the 789 patients had two or more procedures. For 94/95 and 95/96, patients having a total hip replacement waited 19.3 weeks and a total knee replacement 23.6 weeks. Using similar exclusion criteria for non-registry patients, (i.e. out-of-province patients, first procedure only), there were 2095 individuals who had hip or knee replacement surgery in 94/95 or 95/96 that were not on the registry. In other words, there were 2,884 patients who had hip or knee replacement in 94/95 and 95/96; 789 (27%) were in the registry and 2095 (73%) were not.

Eight hospitals accounted for 97% of all hip and knee replacement procedures (five others accounted for the remainder). The proportion of patients on the registry at six of these eight hospitals was about 20% to 35%; except one hospital had 1% and one had 40%. Surgeon compliance was erratic. Most of the physicians complied some of the time, yet the highest compliance rate for putting patients on the registry was 56%.

Low compliance was one of the problems with the registry. Another was the absence of a place on the registry form to indicate what date the decision was made to have surgery. In the absence of this information, the date used was when the form was received at St. Boniface Hospital. These flaws were instructive in terms of developing criteria for setting up a registry, but limited the registry's usefulness as a standard against which administrative data could be compared.

Methods for elective surgical procedures

To estimate the waiting time for elective surgical procedures, we used a pre-operative visit to the operating surgeon as the marker for when waiting time began. The underlying assumption for the procedures we are discussing in this section is that the family physician refers the patient to a surgeon, the decision is made to have surgery, after which the patient is not seen again by the surgeon until the date of surgery. Any problems that arise in the meantime are handled by the family physician. The wait between seeing the family physician and the surgeon, while an important component of the patient's experience, was beyond the scope of the study.

Procedures investigated

We selected nine surgical procedures, which are commonly performed and represent a variety of conditions. We applied certain diagnostic limitations, as described below.

- *Cholecystectomy (removal of gallbladder)*: We excluded patients who had surgery for malignancies or pancreatitis. The main diagnoses that we included were gallstones, cholecystitis or abdominal pain.

- *Hernia repair*: We included inguinal and femoral hernia without gangrene.
- *Excision of breast lesions:* The diagnostic codes included benign and malignant tumours of the breast. We excluded breast biopsies and included lumpectomies and mastectomies.
- *Stripping/Ligation of Varicose Veins*: Only lower extremities, not oesophageal or gastric.
- *Carpal Tunnel Release*: For carpal tunnel syndrome
- *Transurethral Prostatectomy (TURP)*: For benign hyperplasia. Excludes all malignancies.
- *Tonsillectomy*: For tonsillitis or hypertrophy; not for middle ear infections.
- *Carotid endarterectomy*: No diagnostic restrictions.
- *Cataract extraction*: No diagnostic restrictions.

Rates of procedures

We looked at the rate of the above procedures over five years of data. This was relevant because if the number or rate of a particular procedure changed substantially, then we might expect the waiting times to change also. If more procedures are done, then the waiting time might be shorter. On the other hand, even if more procedures are done to compensate for increased demand, it is possible that demand still exceeds supply, so that waiting times might in fact increase. Table 1 gives the rates of eight surgical procedures from 92/93 to 96/97, adjusted for age and sex to the 1992 Manitoba population. Procedure rates were fairly stable for cholecystectomy, excision of breast lesions and varicose veins, fell for hernia repair, TURP and tonsillectomy, and increased for carpal tunnel release, carotid endarterectomy and cataract surgery. Although the rate of carotid endarterectomy more than doubled, it is still an infrequently performed procedure at only 0.3 procedures per 1,000 population.

Table 1: Rates of surgical procedures per 1,000 population, age and sex adjusted to the 1992 Manitoba population

	92/93	93/94	94/95	95/96	96/97	Change 92/93 to 96/97
Cholecystectomy	2.61	2.60	2.58	2.55	2.47	-5.4%
Hernia Repair	2.29	2.30	2.16	2.17	2.03	-11.6%
Excision Breast Lesions	2.19	2.17	2.30	2.42	2.30	5.0%
Varicose Veins	0.35	0.31	0.40	0.37	0.36	5.5%
Carpal Tunnel Release	.94	1.06	1.22	1.08	1.10	17.4%
TURP	2.18	1.58	1.38	1.52	1.53	-29.7%
Tonsillectomy	2.08	1.99	2.13	2.02	1.56	-24.8%
Carotid Endarterectomy	0.14	0.12	0.19	0.28	0.33	140.0%
Cataract	3.74	4.03	4.50	5.29	4.74	26.8%

Method for estimating waiting times for elective surgery

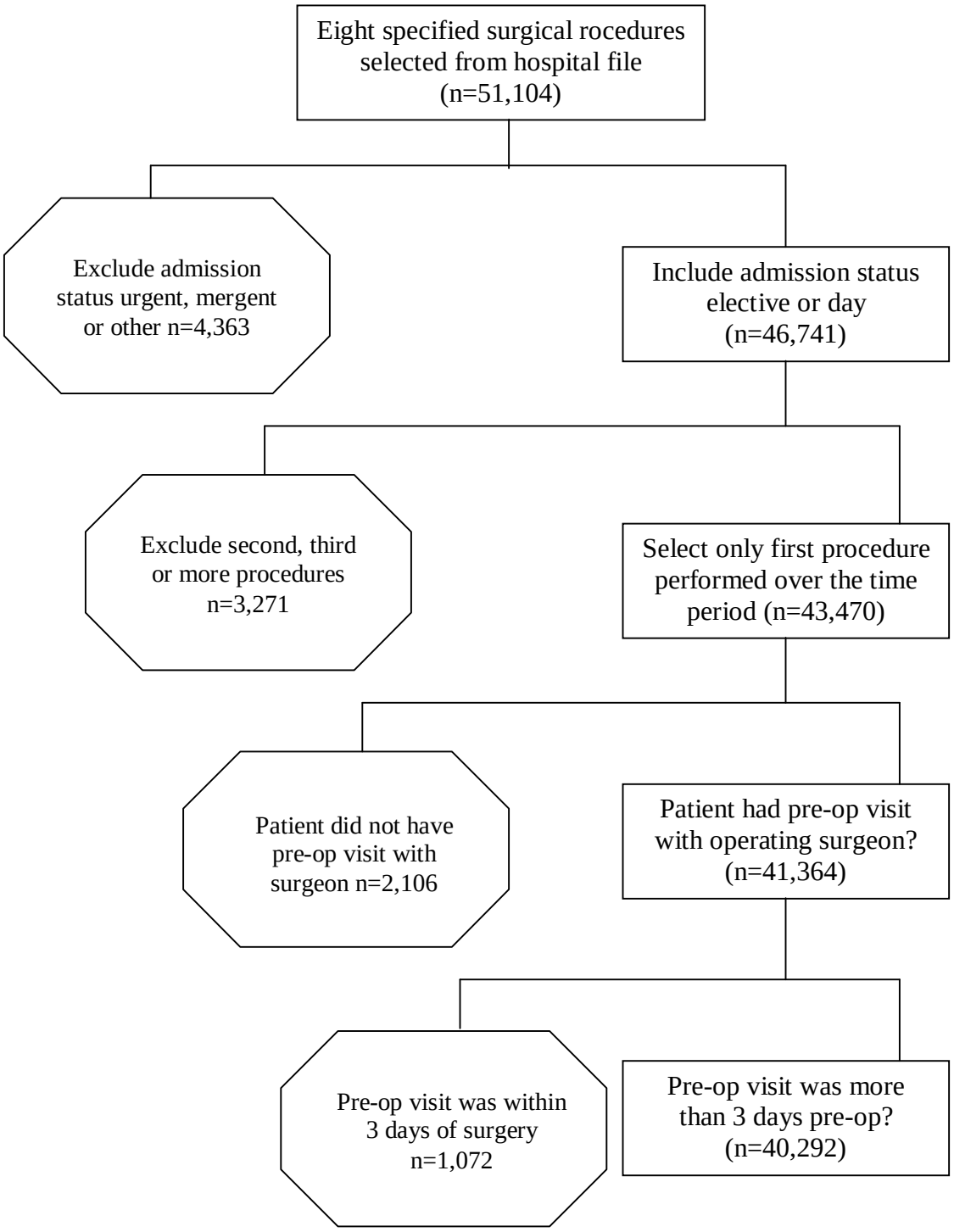
Cataract surgery was offered in both the public sector and in privately-operated clinics. Because of this distinction, we chose to examine it separately, and it will be discussed in the next section of this report (beginning on page 34). This section will discuss the eight other elective surgical procedures.

1. As stated previously, we applied diagnostic restrictions to the eight surgical procedures under consideration. Hospital abstracts permit up to 12 procedure codes and 16 diagnoses; the procedures and diagnostic codes that we included had to be in the first position, indicating that they were the primary reason the patient came to hospital. We searched the Data Repository for the eight procedures defined above, from 92/93 to 96/97. After this step there were 51,104 records. (see Figure 1).

2. The hospital abstract includes an admission status code: urgent, emergent, elective or day. We included only elective or day procedures for this analysis.[2] After this step there were 46,741 records (- 4,363 records or 8.5% of 51,104).

[2] Including cases coded as urgent or emergent had the effect of lowering the median waits for cholecystectomy and TURP, but the other procedures were unaffected.

Figure 1: Records used to estimate elective surgery waiting times



If an individual had more than one of the procedures over the time span, we included only the first procedure. Also, we searched the three years prior to 92/93 to exclude patients who had had any of the procedures prior to the study period. We included only the first procedure to simplify the analysis. [3] **After this step, there were 43,470 records (-3,271 records or 7.0% of 46,741).**

3. We merged hospital records with physician claims and looked for a pre-operative visit to the operating surgeon. Patients who did not have a pre-operative visit with the operating surgeon were excluded. If there was more than one pre-op visit, we used the last pre-op visit prior to surgery. Most patients (67.3%) have one pre-operative visit with the surgeon, 17.8% have two visits, 5.7% have three visits and 9.2% have four or more visits.[4] After this step, there were 41,364 records (-2,106 records or 4.8% of 43,470).

4. We excluded visits within three days of surgery, assuming that these patients were more urgent. In other words, if a patient had only one visit recorded with the operating surgeon and it was within three-days of surgery, then we excluded that case. However, if the patient had more than one visit, but the last visit was within three days of surgery, we counted the visit prior to that as the beginning of the wait. Like the exclusion of urgent and emergent patients, the three-day rule was used to give us a more conservative estimate; when we removed this restriction, the mean and median waiting times were from 5 to 20 days shorter. After this step, there were 40,292 records (-1,072 records or 2.6% of 41,364).

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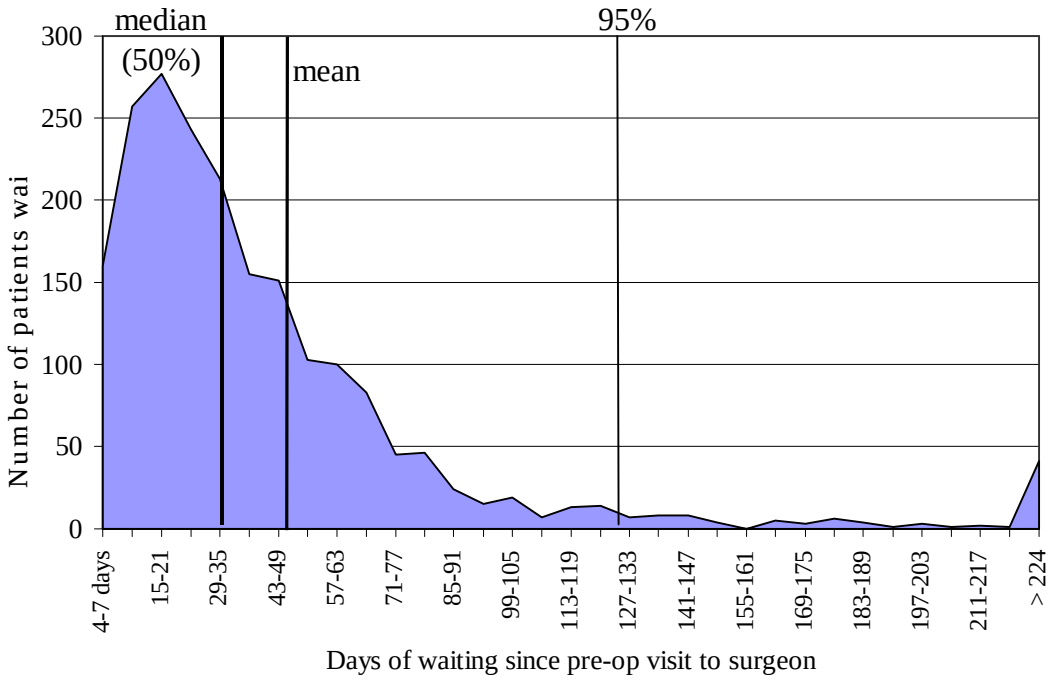
[3] We found that for the patients with more than one procedure, many of them (65%) were potentially bilateral procedures: carpal tunnel, varicose veins, hernia repair, carotid endarterectomy. A post-operative visit is included in the surgical fee and is not billed separately, meaning that there is no record in the administrative data of when that visit took place. Possibly the post-op visit for the first procedure is when the discussion of the second procedure occurred, since patients often had no other visit to the operating surgeon between procedures. Therefore we had no trigger point to flag the beginning of the wait for the second procedure.

[4] In the Nova Scotia study, more than 75% of cases had only a single visit prior to surgery.

We analyzed the results for each year, by gender, by region of residence and by neighbourhood income level. We report the median in all tables. The median is the mid-point, the length of time half the people over a given time period had to wait for surgery. The median has the advantage of being uninfluenced by outliers, unlike the mean.

Figure 2 illustrates the distribution of waiting times for gallbladder surgery for one year, 96/97. The data are skewed to the left, and over 75% of patients were operated on within eight weeks of the pre-operative visit to their surgeon. However, about 5% of patients waited longer than six months, and these very long waits push the mean waiting time up.

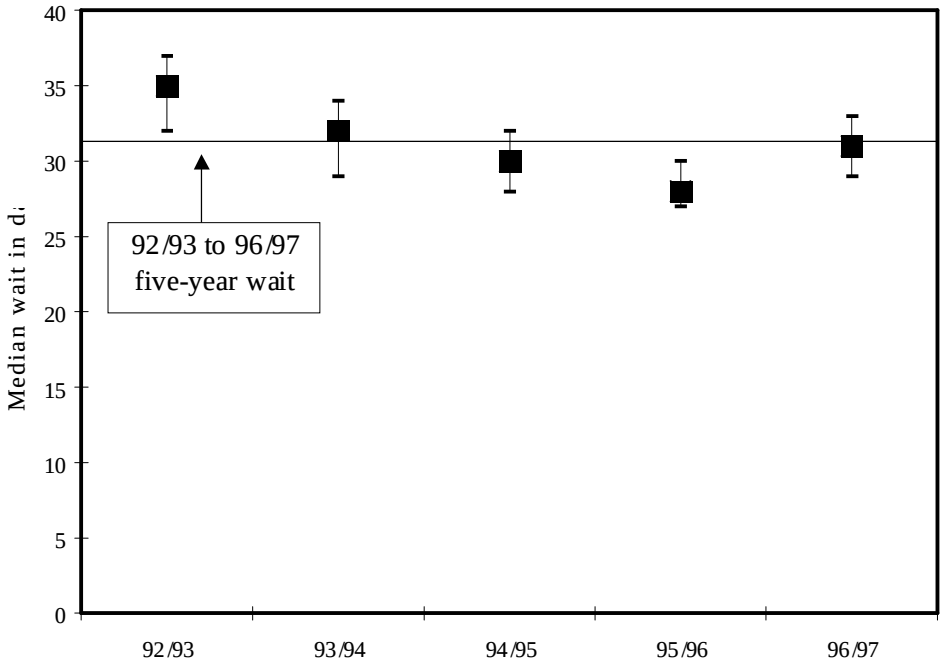
Figure 2: Waiting time for cholecystectomy 96/97



We calculated 95% confidence intervals, adjusting for multiple comparisons. The confidence interval is a statistical measure, giving us a range within which we are 95% confident the true value lies. If for example, the median waiting time for cholecystectomy in 94/95 is 30 days with a 95% confidence interval (CI) of 29, 32, we can say that we are 95% confident that the

true median wait for cholecystectomy in 94/95 was between 29 and 32 days. In these analyses, the median wait for surgery in a particular year, region etc, is statistically significantly different from the overall median waiting time when the CI does not cover the overall value. To illustrate, in Figure 3, the median waits for cholecystectomy in 92/93 and 95/96 do not cover the five-year median of 31 days (as shown by the horizontal line), therefore they are significantly different from 31 days. For ease of presentation we have not included all of the interval values in the tables, but denoted with an asterisk the significant differences.

Figure 3: Median wait (days), cholecystectomy, Manitoba, 92/93 to 96/97



Results for elective surgical procedures

Waiting times by year

Table 2 gives the median waits by procedure for each year. Values which were significantly different from the five-year median are indicated with an asterisk. Note that even where there was a statistically significant difference, it may not be clinically significant. We assumed that a

difference of three or fewer days was not clinically relevant. For instance, although the 28-day median wait for cholecystectomy was found to be statistically different from the five-year median of 31 days, it is doubtful whether a three-day difference is clinically meaningful.

Table 2: Median waiting times (days) between pre-operative visit to surgeon and surgery date, Manitoba

	92/93	93/94	94/95	95/96	96/97	92/93 to 96/97
Cholecystectomy	35*	32	30	28*	31	31
Hernia Repair	29	29	28	30	31	29
Excision Breast Lesions	16	14*	16	16	17	16
Varicose Veins	35	34	43	39	48*	40
Carpal Tunnel Release	29*	29*	38	42*	37	35
TURP	30	24	25	24	23	25
Tonsillectomy	55*	49	51	57*	48*	51
Carotid Endarterectomy	24	23	24	29	27	26

Median waits changed very little from 92/93 to 96/97. For most of the procedures, median waits remained stable (hernia repair, excision breast lesions and carotid endarterectomy) or fell (cholecystectomy, TURP and tonsillectomy). For two procedures, varicose veins and carpal tunnel release, median waits increased. Between 91/92 and 93/94, there was a big shift from abdominal cholecystectomy to laparoscopic cholecystectomy, a procedure which is less invasive and requires shorter post-operative stays; many of these procedures are now performed on an outpatient basis. This shift in the way cholecystectomy is managed might account for the higher volumes and shorter waiting times for this procedure. Carpal tunnel syndrome is a computer-related illness and, not surprisingly, the rate of performing this procedure increased 17.4% from 92/93 to 96/97. The increase in waiting times suggests that the rate of performing the procedure did not keep pace with the demand for it.

Waiting times by region of residence

Are there differences in the wait for surgery depending on where people live? Do residents of Winnipeg or Brandon—where most of the surgical specialists live—wait a shorter period of time than residents of other regions of the province?

Manitoba is divided into ten rural Regional Health Authorities (RHAs), Brandon Regional Health Authority and two Authorities in Winnipeg. To compare waiting times for all procedures for each RHA was not feasible because of the small number of some procedures in some regions. Therefore, for this analysis, we grouped RHAs according to two criteria: geographic proximity and where their residents received most of their surgery. The five areas are:

- Winnipeg
- West: South Westman, Marquette and Brandon
- South: South Eastman and Central
- Mid-North: Parkland, Interlake and North Eastman
- Far North: Norman, Burntwood and Churchill

Table 3 shows median waits for each of the eight procedures, all five years combined, according to where the person lived. The asterisked values are significantly different from the provincial median for that procedure. For instance, for cholecystectomy, the South median of 26 days was significantly shorter than the Manitoba median of 31 days.

Table 3: Median waits by region of residence for each procedure, 91/92 to 95/96

	Winnipeg	West	South	Mid-North	Far North	Manitoba
Cholecystectomy	33	37*	26*	29	26*	31
Hernia Repair	30	35*	26*	28	25	29
Excision Breast Lesions	17	15	14	15	13	16
Varicose Veins	41	42	36	42	28	40
Carpal Tunnel	41*	33	27*	31	33	35
TURP	23	47*	25	27	27	25
Tonsillectomy	61*	38*	42*	48	39*	51
Carotid Endarterectomy	27	35	22	25	26	26

Surprisingly, residents of Winnipeg and the West, where Brandon is situated, frequently had longer waiting times than the provincial median, even though one would think that these

residents would have had easier access to specialists.[5] For Winnipeg residents for most procedures, the median wait was within three days of the provincial median, and not clinically or statistically relevant. However for carpal tunnel and tonsillectomy, the median waits were 6 and 10 days longer respectively. Residents of the West had longer waits (statistically and clinically) than the provincial median for three procedures: cholecystectomy, hernia repair, and TURP. For four of the procedures, cholecystectomy, hernia repair, carpal tunnel release and tonsillectomy, the South had statistically significant shorter median waits. The Mid-North had waiting times similar to the provincial median. The Far North had waiting times that were similar to the provincial median for most procedures, but are significantly shorter for cholecystectomy and tonsillectomy.

Waiting times by average neighbourhood income

The 1991 Canadian census has information on average household income in each enumeration area. We used these data to rank Winnipeg neighbourhoods into five income quintiles. An urban enumeration area is defined by Statistics Canada as having a population density greater than 400 persons per square kilometre. Average income is less applicable in rural areas, therefore only Winnipeg residents were included in this analysis.

Table 4 demonstrates the median waiting times for each procedure for residents from neighbourhoods with different levels of income; Q1 represents the poorest neighbourhoods and Q5 the wealthiest neighbourhoods. The asterisks indicate statistically significant differences from the overall Winnipeg median.

[5] Rates of surgery were compared between regions; no region consistently had higher or lower rates of surgery.

Table 4: Median waits by average neighbourhood income for each procedure, 92/93 to 96/97

	Q1 lowest	Q2	Q3	Q4	Q5 Highest	Winnipeg
Cholecystectomy	30	32	35	33	32	33
Hernia Repair	29	29	31	31	32	30
Excision Breast Lesions	17	18	16	17	16	17
Varicose Veins	40	43	39	39	45	41
Carpal Tunnel	38	35	37	44	52*	41
TURP	21	22	25	29	22	23
Tonsillectomy	56	59	60	64	62	61
Carotid Endarterectomy	26	25	24	26	26	27

Table 4 shows that generally there were no differences in waiting times for surgery based on neighbourhood income status. Patients living in lowest-income neighbourhoods tended to have slightly shorter waits for surgery than patients from the wealthiest neighbourhoods, especially for varicose veins, carpal tunnel release and tonsillectomy. For carpal tunnel release, patients from the wealthiest neighbourhoods waited 52 days, significantly longer (statistically and clinically) than the Winnipeg median of 41 days.

Waiting times by gender

There were no differences in the median waits based on gender.

Waiting times by age

We examined whether people who were younger came to surgery more quickly. Our hypothesis was that people under the age of 65 were more likely to be in the workforce and would perhaps receive surgical treatment more quickly so that they would be subject to fewer interruptions at work. We therefore divided patients into two categories: younger than 65 years and 65 years or older. Because there were almost no tonsillectomies performed on older adults, that procedure was excluded from this analysis. Contrary to expectations, for every year except 92/93, patients who were under 65 years had longer waiting times than those 65 years or older (see Figure 4). It may be that because the procedures that we selected were elective in nature, people who were in the workforce delayed surgery until a convenient time. This hypothesis was supported by the findings when we looked at each procedure; the

two age groups were significantly different for varicose veins, carpal tunnel release and TURP, all procedures which can often be delayed (Table 5).

Figure 4: Median wait by age category, seven elective procedures, 92/93 to 96/97
(tonsillectomies excluded)

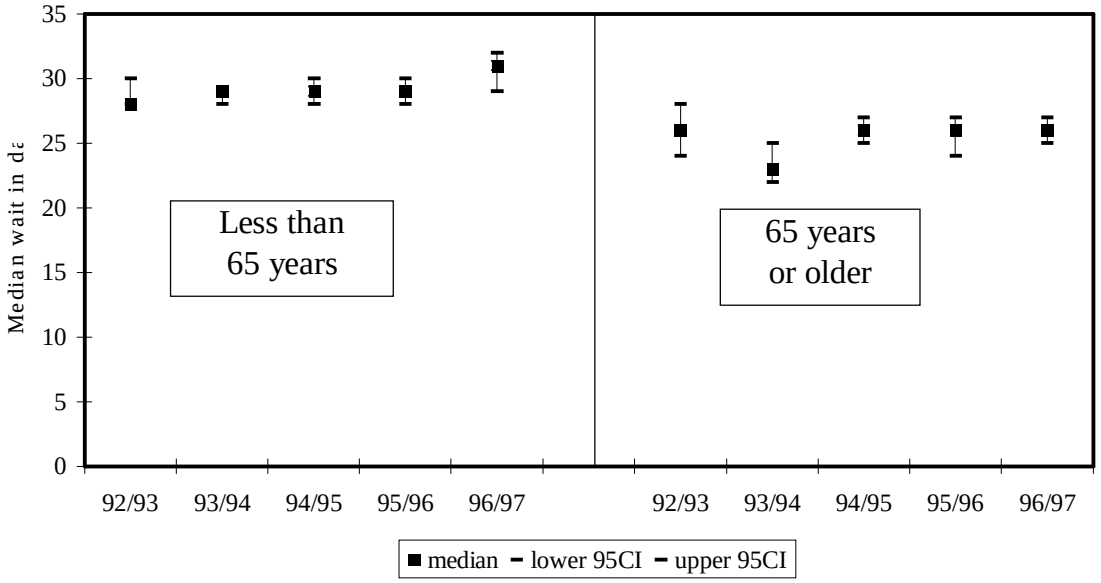


Table 5: Median waits by age group, Manitoba, 92/93 to 96/97

MEDIAN waiting times	Patients younger than 65 years	Patients 65 years or older	Manitoba median, 92/93 to 96/97
Cholecystectomy	30	31	31
Hernia Repair	30	28	29
Excision Breast Lesions	16	15	16
Varicose Veins	42	30*	40
Carpal Tunnel	38*	28*	35
TURP	31*	24	25
Carotid endarterectomy	28	26	26

Analysis of mean waiting times

One notable limitation of median analyses is that we could not adjust for multiple factors in making comparisons. Analyses using means resolves this practical difficulty and is more

powerful and sensitive statistically. Therefore, we explored mean waiting times to consider the face values of waiting times beyond the mid-point and their variations of observed data (see Appendix A). The objection to using the mean is that it is sensitive to outliers, thus it was necessary to separate a few extremely long waiting times for this analysis. The comparison of means showed more statistically different values than the comparison of medians, however the general patterns were similar.

2.3 Cataract Surgery

In recent years, the growth in cataract surgery rates has been remarkable. Previously requiring strict bed rest for several days and thick distorting glasses that limited patients' mobility, technological improvements have made it possible to perform cataract surgery quickly and safely on an outpatient basis. Lens replacement allows vast improvements in vision, hence in quality of life. The volume of cataract surgery increased 32% in Manitoba from 92/93 to 96/97, from 4,249 to 5,610 procedures, and the rate increased 27% from 3.74 to 4.74 per 1,000 population.

During the period of this study, cataract surgery was available privately as well as publicly in Manitoba. Cataract surgery was offered in two hospitals—in Winnipeg and Brandon—as well as two private clinics, in the same two cities. In both public hospitals and private clinics, the surgeon's fee was paid by Manitoba Health; however patients who opted to attend a privately-run clinic paid a "facility" or "tray" fee for overhead and support services. The fee in 1997 was $1,000 in the Winnipeg clinic and $1,200 in Brandon. (In 1994, the fee ranged from a low of $510 plus the price of the lens in one clinic, to a high $1,273, including the lens; at that time there were three clinics.)

One of the arguments used to support the need for private surgery is expediency: rather than wait many months with impaired vision, it is argued that a private clinic can offer surgery in a matter of weeks. In 1994, the Consumers' Association of Canada, Alberta branch, conducted a telephone survey to assess the waiting time for cataract surgery (Consumers' Association of Canada 1994). The Association found intriguing differences in the waiting times depending on whether the surgeon operated both publicly and privately or only publicly. The wait for

surgery in a private clinic was from one day to four weeks. To receive surgery in the public system, the wait was from two to eight weeks if the surgeon's practice was entirely in the public system. However, if the surgeon operated both publicly and privately, the wait for surgery in the public system was up to a year. We wanted to know if this was true in Manitoba also.

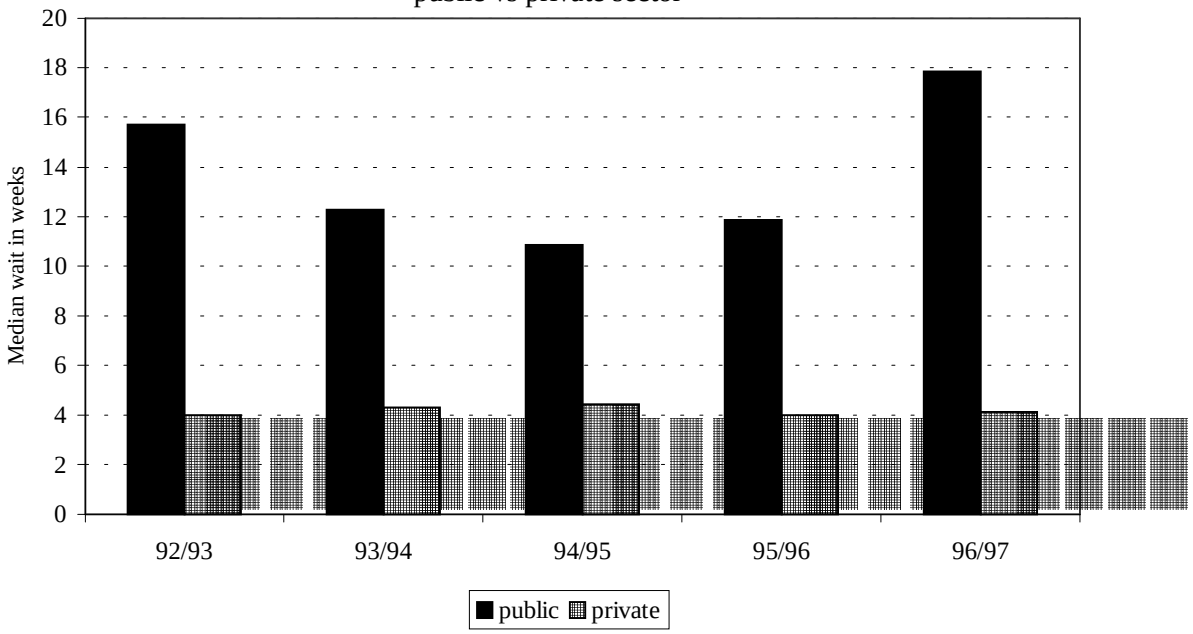
Methods

We identified cataract surgery in hospital claims, including only patients who were coded as elective or day surgery patients. Patients who received surgery in private clinics were identified using physician claims (for this we look for a tariff or billing number, since we do not have procedure codes in the physician claims). We included only the first cataract procedure for each patient. Thus, if a patient had one eye operated on in a private clinic and one in the public hospital, we only looked at the first procedure. As before, we used a visit to the operating surgeon as the marker for when waiting time began. However, we did not use the "three-day" rule for this comparison, since private clinics are supposed to offer faster service, and also, cataract surgery is only rarely urgent.

When we used the visit immediately preceding surgery, we calculated median waiting times for patients in the public sector ranging from 6 to 9 weeks. Feedback from one of Winnipeg's ophthalmologists was that these waits did not square with his experience or that of his colleagues; his experience was that waits were longer than that. He also noted that some ophthalmologists call patients back to their office just prior to surgery if they have had a long wait, for ultrasound to measure the axial length of the eye. Using this advice, we re-examined our data. We found that for patients with more than one pre-op visit, the visit closest to surgery was coded for ultrasound measurement in 52% of the patients. Therefore, we modified our method. For patients with one pre-op visit, we used that visit to calculate the waiting time. For patients with more than one pre-op visit, if the visit closest to surgery was coded as an ultrasound measurement, we used the visit prior to that for calculating the waiting time.

Figure 5: Median wait for cataract surgery

public vs private sector



Results

As anticipated, patients who received their cataract surgery in a private clinic had shorter median waiting times than those who received surgery in the public hospital. The median wait for surgery in a private clinic was about four weeks, and this remained stable from 92/93 through 96/97 (Figure 5). The median wait for surgery in the public system was 15.7 weeks in 92/93, fell to 10.9 weeks in 94/95, then rose to 17.9 weeks in 96/97. Consolidation of ophthalmology surgery in Winnipeg at the Misericordia hospital took place in 93/94.

When we categorized patients according to their surgeons' practice, a different picture emerged. We separated surgeons into those who operated publicly only, and those who operated both publicly and privately.[6] Table 6 shows for each of the three types of surgical

[6] We defined private surgery as those surgeons who performed at least 100 procedures privately over the five-year period. Using this limitation, we excluded 220 or 8.6% of private clinic patients over the period.

practice, the number of patients who received cataract surgery.[7] By far the majority of cases (85% to 90%) were performed in the public hospital, and the group of surgeons who operated both publicly and privately consistently used the public system for more than 75% of their patients.

Table 6: Number of patients receiving cataract surgery in private clinics and public hospitals, according to surgeon's practice type[8] (% of annual total)

	92/93	93/94	94/95	95/96	96/97
Surgeon operates in public hospital only	1,207 (36.0%)	1,190 (35.6%)	1,365 (40.6%)	1,578 (39.4%)	1,471 (38.1%)
Public hospital, surgeon operates both publicly and privately	1,671 (49.9%)	1,705 (51.0%)	1,689 (50.2%)	2,043 (50.9%)	1,722 (44.6%)
Private clinic, surgeon operates both publicly and privately	471 (14.1%)	448 (13.4%)	312 (9.3%)	389 (9.7%)	672 (17.4%)
Total procedures	3,349	3,343	3,366	4,010	3,865

Figure 6 illustrates the different median waiting times for public sector patients according to whether their surgeon also operated privately or not. The median wait for surgery in the public sector was different depending on the surgeon's practice. For surgeons who operated only in the public sector, the wait was around 7 weeks for 93/94, 94/95 and 95/96, increasing to 10 weeks in 96/97. For surgeons who operated in both the public and private sector, the waits ranged from 14 weeks in 93/94 and 94/95 to 23 weeks in 96/97. In 92/93, the difference between these two groups of patients was about 4 weeks, in 93/94 and 94/95, the difference was about 7 weeks, and in 95/96 and 96/97, the difference was about 13 weeks or 3 months. As the Consumers' Association discovered in Alberta, the longest waits for public hospital surgery in Manitoba were for the surgeons who had both public and private patients.

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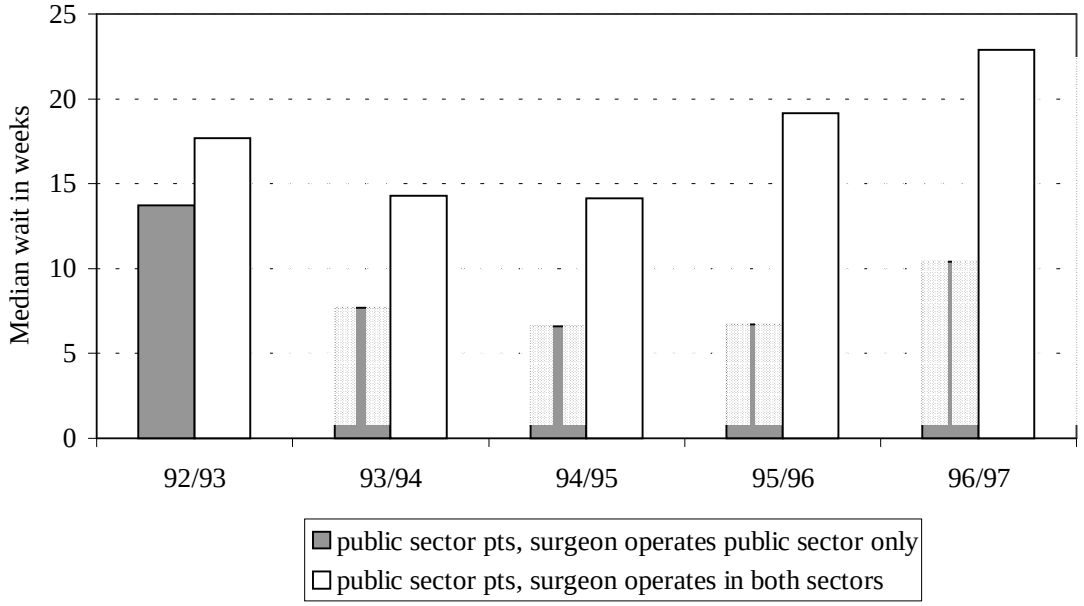
[7] There are no Manitoba ophthalmic surgeons who perform cataract surgery entirely in the private sector.

[8] These numbers will not compare with other MCHPE reports, because for this study, if the patient had more than one cataract procedure over the study period, we included only the first procedure.

Figure 6: Waiting times for cataract surgery in public sector
by whether surgeon also operates in private sector



Results by income category

We found no difference in the median waits (in either the public or private sector) for patients living in different income neighbourhoods. The age-sex adjusted rate of cataract surgery was 36% higher for people living in the lowest-income versus highest-income neighbourhoods. Research from British Columbia suggests that cataract formation is an indicator of generalized tissue aging, and that formation of cataract at an earlier age (50-65 years) may be related to the poor health of those in lower income groups (Meddings et al 1998).

Although it is sometimes argued that a two-tiered system would benefit everyone, allowing the rich to come to surgery earlier and conserve publicly-funded care for those less able to pay, a partially private system does not seem to work this way. That is, not all of the Winnipeg patients who had surgery in a private clinic came from the wealthier

neighbourhoods. In fact, over the period of the study, 40% of private clinic patients lived in the two lowest-income neighbourhoods.

2.4 Cardiac Procedures: Coronary Artery Bypass Surgery and Percutaneous Transluminal Coronary Angioplasty

Methods for cardiac procedures

Isolated coronary artery bypass surgery (CABS), that is, CABS without a valve replacement or other heart procedure, was identified in the hospital file. We looked at only the first procedure in the time period. The hospital file was merged with medical claims, and a search was made for an angiogram—a definitive diagnostic procedure performed prior to all bypass surgery—and a surgical consult. We excluded out-of-province patients.

Both an angiogram and a surgical consult are routinely required prior to CABS. Therefore, our marker for calculating the wait for CABS included both an angiogram and surgical consult. The waiting time is the time between the angiogram *or* the surgical consult, whichever occurs second, and the surgical procedure date. If there was more than one consult/angio association, (about 10% of patients) we used the pair closest to surgery for the calculation of the waiting time, again using the second of the two events in the pair.[9]

Percutaneous transluminal coronary angioplasty (PTCA), is a procedure that is undertaken in the angiography suite, not the operating room and there is usually a surgical consult prior to the procedure. Therefore, the marker for waiting time for PTCA was the date of the last angiogram prior to angioplasty.

Because much of the literature on coronary procedures includes the waiting times for urgent or emergent cases, we did not initially exclude these patients from the analysis. So, we first looked at waiting times by whether a patient was coded as urgent/emergent or elective at

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[9] Using the earliest angio/consult made no difference to the median waits for urgent/emergent patients, but increased the median waits for scheduled patients by about ten days in each year. We chose however to use the latest angio/consult because it was more relevant from a clinical perspective.

admission.[10] Then, as for the elective surgery analysis, we excluded patients who were coded as urgent/emergent, and also patients who had waits of three days or less. We used seven years of data for these analyses, 1990/91 to 1996/97.

Results

Coronary Artery Bypass Surgery

In Manitoba, the rates of bypass surgery procedures have increased substantially over the last seven years. In 90/91, the rate of CABS per 1,000 population was 0.404, while in 96/97, the rate was 0.657, an increase of 62.6%.[11, 12] Manitoba appears to be well served in this area, relative to other provinces. Data from Statistics Canada show that Manitoba's rate of CABS is equal to or higher than most other provinces; the only province with a substantially higher rate is Nova Scotia (Roos et al. 1997). These rates however may still be lower than the optimum. An estimate of the benefits of CABS in Ontario found that up to a rate of 0.9 CABS per 1,000 population, patients continue to benefit; beyond that rate more patients receive surgery inappropriately (Hux, Naylor et al. 1995).

The number of cases analyzed rose from year to year, from 391 cases in 90/91 to 630 in 96/97. Over the seven-year period, the median waiting times for all patients fell slightly, from a median wait of 11 days (95% CI: 9, 15) in 90/91 to a median wait of 8.5 days (95% CI: 7, 10) in 96/97. In each year, approximately two-thirds of patients had surgery within one month of having an angiogram and consult (range 63.3% to 74.7%). The picture changes when one separates patients coded as urgent/emergent from non-urgent.

In every year, roughly half of patients having CABS were coded as urgent or emergent on admission. For these patients, the median waiting time was from three to five days. For

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[10] The term "elective" is commonly accepted to mean scheduled surgery. However, since nobody "elects" to have open heart surgery, the terms "non-urgent" or "scheduled" are used instead of "elective".

[11] The rates for CABS include all procedures, whether isolated or performed with another procedure, for example valve replacement.

[12] Rates are directly adjusted to a standard Manitoba population.

patients coded as elective, i.e. scheduled, the median wait for all seven years combined was 31 days. The median waiting times for each year were approximately one month, except for 91/92 for which the median wait was significantly longer at 48 days (Table 7).

Table 7: Median waits in days for CABS, all patients

	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Urgent/Emergent	5	5	5	4	4	3	5
Scheduled	35	48*	26	24	31	32	26

Did the waits for scheduled surgery increase in the years when there was a higher proportion of urgent/emergent surgery? One might guess that the use of additional resources for urgent patients would mean that non-urgent patients would have to wait longer. Yet this was not found to be the case. The median waits for scheduled surgery were actually shorter in the years during which there was a higher proportion of urgent cases. Possibly urgent/emergent patients were operated on outside of normally scheduled operating room hours, and were discharged from Intensive Care or Recovery Room soon enough to permit scheduled cases to continue.

We looked at patients who had a heart attack—or Acute Myocardial Infarction (AMI)—prior to CABS, thinking that these patients might have shorter waiting times than those who did not infarct. We searched hospital claims for one year prior to the surgery date; we did not include any patients who had an AMI during the same admission as their CABS. Twenty-five per cent of the patients in our dataset had an AMI in the year prior to surgery. Most of these (95%) had the AMI prior to being put on the waiting list. That is, if they had an AMI in the year prior to CABS—and not during the same admission as the surgery—the usual pattern was to have the AMI, then be put on the waiting list for CABS, then have the CABS. Very few had an AMI after the wait list date or both before and after. There was no difference in the waiting times for these two groups of patients, as can be seen in Table 8. For both groups of patients, 49% had surgery within 7 days.

Table 8: Proportion of patients who had CABS within various time periods, those who had an AMI and those who did not

	0-3 days	4-7 days	8-29 days	30-89 days	90-179 days	180+ days
AMI	29.5%	19.4%	24.8%	12.8%	7.8%	5.7%
No AMI	32.5%	16.0%	21.3%	14.5%	8.9%	6.8%

Scheduled CABS

As described, we next focused on scheduled patients, excluding those who waited three days or less. Waiting times for the remaining patients were analyzed with respect to year, gender, region of residence and neighbourhood income quintile. Surgery may be defined as "delayed" when patients wait more than three months (Carroll et al. 1995). Figure 7 illustrates the proportion of elective patients who had a median wait of three months or less. Over time there has been some decrease in the proportion of patients waiting more than three months for Coronary Artery Bypass Surgery. In 90/91 and 91/92, 39% to 40% of the patients waited three months or more for surgery, while by 96/97, the proportion of patients that waited longer than three months fell to 24%.

Figure 7: Scheduled CABS: Proportion of patients waiting 90 days or less
(excluding waits of 3 days or less)

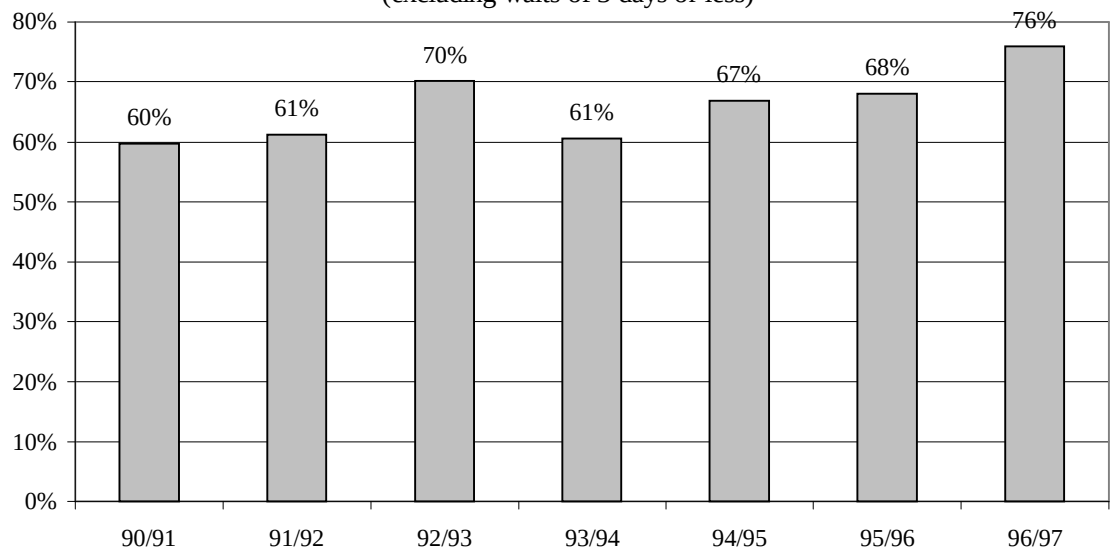


Table 9 shows the median waiting times for CABS for scheduled patients, excluding patients who waited three or fewer days. The overall seven-year median wait was 50 days. In general, it appears that median waits decreased over time, although the decrease was not statistically significant. We found no differences in the median waits by gender, by region of residence, or by neighbourhood income quintile. These findings suggest that once the decision was made to have CABS, all groups were served similarly.

Table 9: Median waiting times in days for scheduled CABS, excluding patients who waited three days or less

	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Median	63	60*	39	56	48	50	40

Percutaneous Transluminal Coronary Angioplasty

The rate of PTCA in Manitoba increased 53.9% from 0.395 per 1,000 population in 90/91 to 0.608 per 1,000 in 96/97. The number of PTCA cases for analysis in each year increased from 326 cases in 90/91 to 494 in 96/97. Over the seven year period, the median waiting times for all patients have fallen, from 13 days (95% CI: 11, 16) in 90/91 to 6 days (95% CI: 6, 7) in 96/97.

Table 10: Proportion of patients coded urgent/emergent, scheduled inpatient or day

	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Urgent/Emergent	45.7%	43.6%	48.9%	60.0%	58.8%	60.8%	59.5%
Scheduled (inpatient)	52.8%	51.3%	36.0%	17.9%	17.4%	17.5%	22.5%
Day	1.5%	5.2%	15.0%	22.1%	23.7%	21.7%	18.0%

Table 10 shows the proportion of patients coded as urgent/emergent, scheduled (inpatient) and day admissions. The proportion of day patients increased over the period, from 1.5% in 90/91 to 18.0% in 96/97, possibly reflecting the move towards more day surgery as hospitals closed beds.[13] At the same time there was a move towards a higher proportion of urgent

[13] The first major bed closures were in 92/93, when hospital beds were reduced by 306, 279 of which were at teaching hospitals. In 93/94, 209 more beds were closed, 54 of them at teaching hospitals.

patients over time; the proportion of patients coded as urgent/emergent was 45% in 90/91 and nearly 60% for the last four years of analysis. It is not known if this increase in urgent procedures reflects a change in the criteria for performing urgent PTCA or perhaps insufficient resources to schedule patients electively.

For patients who were coded as urgent or emergent, the median waits were from 4 to 7 days (Table 11). For scheduled inpatient and day patients, the seven-year median was 23 days. The median wait in 91/92 was significantly different from the overall median. Waits exhibited a downward pattern between 90/91 and 95/96, dropping from 32 days in 90/91 to 19 days in 95/96, but increasing again to 27 days in 96/97.

Table 11: Median waits (days) for PTCA, all patients

	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Urgent/Emergent	5	7	6	5	4	4	5
Scheduled/Day	32	36*	19	22	20	19	27

Scheduled PTCA

As described, urgent/emergent patients and patients who waited three days or less were excluded from the analysis. Waiting times for the remaining patients were analyzed with respect to year, gender, region of residence and neighbourhood income quintile.

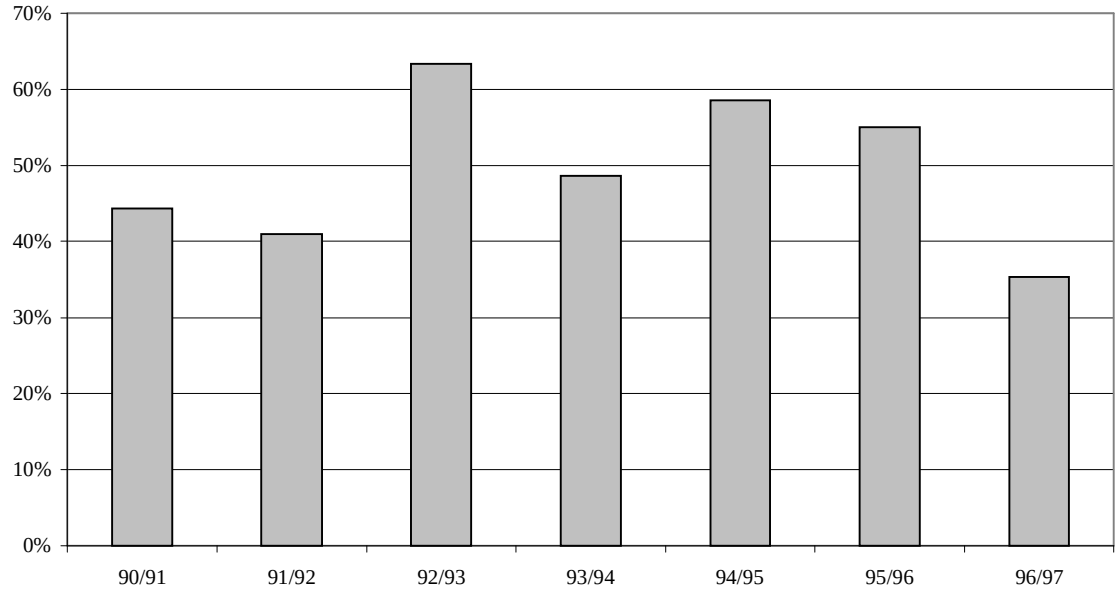
Table 12: Median waiting times in days for scheduled PTCA excluding waits of 3 days or less, inpatient and day patients combined

	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Median	35	39	21*	34	26	26	47*

Table 12 shows the median waiting times for scheduled patients, excluding patients who waited three or fewer days. The median waits fluctuated from year to year with no clear trend emerging. The overall median for the seven years was 32 days; the wait in 92/93 was significantly shorter and the wait in 96/97 was significantly longer than the overall wait. The proportion of patients who received the procedure within 30 days remained around 50% to

60% from 92/93 through 95/96, but fell to 35.3% in 96/97 (Figure 8). We found no differences in the median waits by gender, by region of residence, or by neighbourhood income quintile.

Figure 8: Scheduled PTCA: Proportion of patients waiting 30 days or less (excluding waits of 3 days or less)



2.5 Comparison with Fraser Institute Reports

The Fraser Institute is an independent Canadian economic and social research and educational organization. It has as its objective the redirection of public attention to the role of competitive markets in providing for the well-being of Canadians (Ramsay and Walker 1996). In other words, it is philosophically in favour of free enterprise and opposed to government intervention. Every year, the Institute conducts a survey of physicians to assess how long patients must wait for medical treatment, including waiting to see a specialist after referral by a general or family practitioner, waiting for surgery after seeing a specialist, and waiting for certain non-surgical interventions, like chemotherapy or high technology diagnostic tests. The Fraser Institute describes the survey as measuring "the extent of health care rationing in the provinces from year to year", a curious presumption of guilt in a publication which is presented as an objective assessment of the reality of the Canadian system.

The Institute's report often attracts media attention. Typical headlines in Winnipeg's daily newspapers are: " Cardiac patients on hold; 'Shocking' " says report author of two-year wait for surgery" (*Winnipeg Free Press,* June 28, 1995); "Hospital wait times increase" (*Winnipeg Sun,* August 1, 1996). Because it generates so much interest, we attempted to make a comparison between our results and theirs.

The Fraser Institute survey is mailed to almost all specialists across the country. Typically, about one-quarter to one-third of Manitoba specialists respond to the survey. In the earlier years of the survey, the Institute reported the mean of surgeons' responses for each province. Since the 1994 survey, it has reported the median of surgeons' responses for each province, at the suggestion of the Canadian Hospital Association, acknowledging that the mean was influenced by outliers (Ramsay and Walker 1995). The survey asks, "From today, how long (in weeks) would a new patient have to wait for the following types of elective surgery?" The Fraser Institute then calculates the median of the responses that it receives for each procedure. The Institute also reports on the number of surveys sent out, and the number of responses received.

The Institute's method differs from the MCHPE method since it reports the median estimate of the physicians who respond, whereas our method reports the median of all patients. We compared results only for 1994 through 1996, years during which the Fraser Institute reported the median. To make the two methods more similar, we recalculated our medians as follows: we calculated the median for each surgeon in a given year, then took the median of the medians.[14] Thus, we have three types of results for comparison: the Fraser Institute (FI), MCHPE's median of *surgeons'* median waits (MCHPE-S), and MCHPE's median of *patients'* waiting times (MCHPE-P). Why the three methods yield different results can be illustrated by the following: If we used administrative data to calculate the median length of hospital stay for all patients with a hip fracture, that would be the patient median. If we then calculated the median stay for each physician, but excluded those who had fewer than five cases per year,

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[14] We excluded surgeons who performed fewer than five procedures in a given year, since small numbers are unreliable and are probably not representative of the experience of most surgical specialists.

that would be similar to the surgeon-median method. It will differ from the patient-median method because some patients have been excluded. If we then surveyed individual physicians and asked what they thought the average hospital stay was for those patients, and only one-third replied, that would be like the Fraser Institute method.

Table 13: Comparison of methods to estimate waiting times

	Fraser Institute (FI)	MCHPE-S	MCHPE-P
How is wait calculated?	Median of surgeons' reported waiting times	Median of surgeons' median actual waits as documented by administrative data	Median of actual wait as documented by administrative data
Who is included?	Responding surgeons who conduct the procedures	All surgeons who conduct the procedures	All patients who receive the procedures
What is reported	Surgeons' perception of average wait	Actual wait as documented by existing data	Actual wait as documented by existing data
What does it mean?	More reflective of surgeons' perceptions	More reflective of surgeons' experience	More reflective of patients' experience
	Provider-based		Population-based

The three methods have some distinctive characteristics outlined in Table 13. Both FI and MCHPE-S use the median of surgeons' waiting times. However the FI method is a median of the surgeons who responded to the survey, whereas the MCHPE-S method calculates a median for all surgeons who performed the procedure in a given year. The FI method reports on surgeons' perceptions of the wait, their estimate of how long their patients wait on average for a specific procedure, whereas both MCHPE methods report actual waits as documented by existing administrative data. Finally, the MCHPE-P method (the method on which this report is based), is the only one that focuses on the patients, as opposed to surgeons' perceptions or experiences. Arguably the patients' experience of waiting for surgery is the most relevant to the issue.

Table 14 compares findings from the Fraser Institute with our findings at MCHPE for 1994, 1995 and 1996. The response rate for the Fraser Institute survey is shown in the first column for each year, followed by the median wait reported for each procedure by the Fraser

Institute. The third column gives the number of surgeons that were in the MCHPE analysis and the median of all surgeons' median waits. The fifth column shows the number of patients' whose waiting times were used to calculate the median for each procedure, and the last column is the median wait for these patients.

For most procedures, the median waits for the Fraser Institute and MCHPE are very similar. However, there are big discrepancies for two procedures: cataract surgery and coronary artery bypass surgery. For cataract surgery, the median wait reported by the Fraser Institute ranged from 12 to 37 weeks from 1994 to 1996; MCHPE found the median wait to be 9.1 to 11.7 weeks using the surgeon-median method (MCHPE-S) and 10.9 to 17.9 weeks using the patient-median method (MCHPE-P). Since the Fraser Institute only heard from 32% to 40% of the ophthalmologists and the MCHPE methods look at actual waiting times, such discrepancies are not surprising. Note the remarkably distorted wait for scheduled CABS which was reported by the Fraser Institute based on the response of 2 of the 6 cardiovascular surgeons in 1994: the Fraser Institute reported 120 weeks as the median wait while our examination of actual waits suggested 10.5 weeks for the surgeons' median. In 1995 and 1996, the Fraser Institute reported waits for elective CABS of 10 and 14 weeks, while MCHPE data showed a wait of 7 and 5 weeks respectively.

Table 14: Median waiting time in weeks reported by Fraser Institute survey and MCHPE

	1994					
	Fraser Institute		MCHPE-S[15]		MCHPE-P	
	Responses (%)	Median wait (weeks)	No. of Surgeons	Median of surgeons	No. of patients	Median of patients
Cholecystectomy	15 (23%)	4.5	48	4.0	2,071	4.3
Hernia Repair	15 (23%)	3.8	60	4.1	1,703	4.0
Mastectomy[16]	15 (23%)	2.0	49	2.0	830	2.3
Varicose Veins	15 (23%)	6.0	21	6.1	348	6.1
Tonsils	6 (40%)	11.5	42	4.9	1,989	7.3
Cataract[17]	11 (39%)	12.0	21	9.1	3,049	10.9
CABS-emergent[18]	2 (40%)	0.0	7	0.6	289	0.6
CABS- scheduled	2 (40%)	120.0 (sic)	6	10.5	190	6.9
	1995					
	Fraser Institute		MCHPE-S		MCHPE-P	
	Responses (%)	Median wait (weeks)	No. of Surgeons	Median of surgeons	No. of patients	Median of patients
Cholecystectomy	21 (32%)	4.0	51	3.9	2,085	4.0
Hernia Repair	21 (32%)	4.0	58	4.0	1,728	4.3
Mastectomy	21 (32%)	1.5	46	2.1	889	2.3
Varicose Veins	21 (32%)	4.0	20	5.8	309	5.7
Tonsils	5 (29%)	5.5	38	6.0	1,885	8.1
Cataract	8 (32%)	19.0	21	9.1	3,621	11.9
CABS- emergent	2[19]	3.0	7	0.4	320	0.4
CABS- scheduled	2	10.0	7	7.1	275	7.1
	1996					
	Fraser Institute		MCHPE-S		MCHPE-P	
	Responses (%)	Median wait (weeks)	No. of Surgeons	Median of surgeons	No. of patients	Median of patients
Cholecystectomy	17 (27%)	3.0	55	3.9	2,019	4.4
Hernia Repair	17 (27%)	4.0	59	4.3	1,652	4.4
Mastectomy	17 (27%)	2.0	44	2.3	844	2.4
Varicose Veins	17 (27%)	4.0	25	6.3	309	6.9
Tonsils	5 (29%)	4.0	32	5.2	1,418	6.9
Cataract	10 (38%)	37.0	20	11.7	3,193	17.9
CABS- emergent	1[19]	0.3	8	0.8	288	0.6
CABS- scheduled	1	14.0	8	5.3	282	5.7

[15] MCHPE-S refers to the median of surgeons' median waits; MCHPE-P refers to median of patients' waits.

[16] Fraser Institute reports on mastectomy; MCHPE combines lumpectomy and mastectomy.

[17] MCHPE data are for public sector patients only.

[18] MCHPE data combine urgent and emergent patients.

[19] Supplemented with data from the Manitoba Cardiac Sciences Program

3. DISCUSSION

3.1 Elective Surgery

Perhaps the most startling finding in the analysis of waiting times for elective surgery is the absence of startling findings. We analyzed certain elective procedures because one might expect them to be the most subject to long waits. People who need their varicose veins stripped or their hernias repaired are generally in some discomfort but able to carry out most of their daily tasks. United Kingdom literature documents very long waits—six months to two years—for some of these elective general surgical procedures (Donaldson et al. 1989; Frankel and West 1993), yet we found our median waits to be around four weeks for hernia repair and six to seven weeks for varicose veins.

The strength of our method is that it includes the entire population of patients, and measures the waiting time from the patients', rather than from a surgeon's or hospital's, perspective. Our measure for estimating waiting times—a pre-operative visit with the surgeon—while it lacks any indication of clinical factors that would affect the prioritization for surgery, can monitor changes and trends over time and point out areas that may need to be examined more closely. For most of the elective procedures examined, the waiting times were stable or falling slightly; however there might be cause for concern in a few areas. The waiting time for carpal tunnel release is increasing; it was 29 days in 92/93 and 93/94, but rose to 38 days in 94/95 and 42 days in 95/96, than back to 37 days in 96/97. Carpal tunnel release is a work-related injury and lengthy waits for surgery may translate to lost productivity in the work place.

It is somewhat surprising that the longest waits for elective surgery were found in Winnipeg and the West, where the supply of surgical specialists is highest. In general, the longer waits were not clinically significant; nevertheless they do suggest that residents of the urban areas were not getting preferential treatment. Despite a concentration of surgeons and surgical facilities in Winnipeg and Brandon, and the problems which distance poses to the delivery of health care across the province, the system worked well to provide good access to these surgical procedures across the province. The wait for TURP in the West may be of some

concern (although we restricted our analysis to surgery for benign disease); the median wait in the West was 47 days, compared to a provincial median of 25 days.

In each year, the waiting times for patients 65 years or older was shorter than for patients younger than 65 years. This age-difference was especially notable for varicose vein repair where the five-year median wait was 42 days for under-65s and 30 days for 65+ years; carpal tunnel release, where the median wait was 38 days and 28 days for under-65s and 65+ years respectively; and TURP where the wait was 31 days for under-65s and 24 days for 65+ years. Since these procedures are elective and can be delayed, the shorter waiting times for patients who were 65 years or older may be related to their being retired and therefore being more available for surgery.

We found only small differences in waiting times by residents of different income neighbourhoods in Winnipeg. If anything, residents of low income neighbourhoods tended to have shorter waiting times than those of high-income neighbourhoods. Residents of low income neighbourhoods have higher rates of premature mortality, death due to chronic disease, cancer and injuries, and hospital and physician use (Roos and Mustard 1997). Therefore, the pattern of shorter waiting times for residents of low-income neighbourhoods may be related to higher need in these patients.

We did not make surgeon-specific or hospital-specific comparisons. For some of these procedures there are only a few surgeons performing them so that comparing surgical waiting times by procedure risks revealing some individual surgeon's identities. We could not compare hospital waits for a similar reason: a preliminary analysis showed that one to three surgeons perform the bulk of each surgical procedure at each hospital, therefore comparing waiting times by hospitals would risk identifying individual surgeons. What our preliminary analysis did reveal though was that since there are only a few surgeons performing most of the surgery at each hospital, it would be difficult to know whether differences in waiting times between hospitals are due to surgeon factors or hospital factors.

3.2 Cataract Surgery

The case of cataract surgery affords a unique opportunity to compare waiting times between publicly-available hospital surgery and private clinic surgery. One of the most pervasive arguments in favour of private health care for those who can afford it is that the private system can provide faster service. In the case of cataract surgery in Manitoba, during this study period, patients may have been advised by their surgeon that if they opted to pay $1,000 they could shorten the wait for surgery significantly. (This may be changing soon: on May 13, 1998, Health Minister Darren Praznik proposed legislative changes which would prohibit surgical facilities from charging extra fees to their patients.) Our data showed that indeed, when public and private cataract surgery were compared, the median waits were shorter in the private clinics: from three to four weeks compared to a median wait of twelve to eighteen weeks in the public sector. But that is not the whole picture.

When we divided patients into three different categories according to where their surgeon practiced, an intriguing picture emerged, one that parallels the telephone survey results by the Consumers Association of Canada in Alberta (see page 34). Median waits for public-sector surgery were quite different depending on whether the surgeon also had a private practice. For 94/95 through 96/97, waiting times were consistently two to three months longer for surgery in the public sector if the surgeon also had a private practice. The median waits if the surgeon operated only in the public sector were 7 to 10 weeks, whereas if the surgeon also performed private-sector surgery, the waits for public-sector surgery were 14 to 23 weeks.

It is not clear what accounts for these differences. Ophthalmologists who operate both publicly and privately performed 75% of their surgery in the public system. In fact, they did a higher volume of public-sector surgery than did the surgeons who operated in the public sector only. At least in Winnipeg, operating room time has gradually been reallocated over the last three years so that every surgeon has an equivalent amount of O.R. time. Therefore, the longer waits are likely not associated with less available operating room time. It is possible that these surgeons (those that operated in both sectors) simply had more demand for their services. It is also possible that they manage their practices differently, accepting patients for surgery earlier, knowing that by the time the patients came to surgery, their cataracts would

be "ripe." Recall that a study in the UK demonstrated that ophthalmologists submitted their names for surgery with different degrees of impairment; some had longer lists of less-impaired patients and some had shorter lists of more-impaired patients. Yet patients of both types of surgeons come to surgery with about the same level of symptoms and impairment.

There may be a need for more resources to perform cataract surgery, as indicated by the growing median waiting times in the public sector from 94/95 to 96/97. The increase in median waits was true for all surgeons. However, nobody knows what is the "correct" rate of performing cataract surgery, and to what extent resources for this procedure should be increased. Manitoba's rate of performing cataract surgery in 96/97 at 225 per 1,000 population aged 50 or older was similar to the rate in Alberta (233), higher than Nova Scotia (159), Quebec (161), and New Brunswick (191), and much lower than Saskatchewan (357).[20] Adding further confusion to the conundrum is the fact that Saskatchewan's high rates of performing surgery have not eliminated waiting lists.

There is some indication that the public sector in Manitoba can accommodate more cataract surgery. In 95/96, 6,211 cataract procedures were performed in the public sector, but this exceeded the budgeted amount. When Manitoba Health cautioned the hospitals that they must live within their budget, the number of hospital procedures fell to 5,619 in 96/97. Thus, at least 600 more procedures can be done in the public system. The clinics seem also to be able to expand their capacity. With the decline in public-sector procedures in 96/97, there was a compensating increase in private-sector surgery so that the total number of cataract procedures remained constant (7,049 and 7,011 in 95/96 and 96/97 respectively).

Effects of Private Health Care

The United Kingdom can serve as a model for the effects of private health care on the public system (Richmond 1996). There have always been a few private clinics and user-pay beds in the UK since the National Health Service (NHS) began in 1948. Since the 1970s though there

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[20] Data reported by Ministries of Health in each province.

has been a boom in private practice; from 1981 to 1995, the number of private beds increased 66% to 11,681.

If governments in Canada condone private clinics to ease pressure on the public system, it will likely be at the expense of the public system. Evidence suggests the public system will be left with the sickest, heaviest care patients while the private sector will skim off the low-risk patients. In the UK, private hospitals have no Intensive Care Units, few diagnostic capabilities, no 24-hour in-house doctor; if there are complications, patients must be transferred to an NHS facility. Coincidentally, most private facilities are conveniently located within one mile of an NHS facility. People with expensive long-term chronic illness rely on the NHS; private clinics are said to depend on "the three h's"—hips, hernias and haemorrhoids.

There seems to be a lesson in the experience of the United Kingdom, Alberta and Manitoba. If surgeons are allowed to operate in both sectors, there is an incentive for them to encourage long waits in the public sector; the longer the wait for surgery in the public sector, the more likely is the patient to seek private care. In the UK, areas with the longest waits for NHS surgery are those with the most private beds, and the long-wait procedures are those where there is the most private practice (Richmond 1996; Light 1996). Light also reported that the average waiting time for orthopaedic appointments in the private sector was two weeks and in the NHS 25 weeks. Our research on cataract surgery demonstrates what can happen when surgeons have two options: their public patients waited two to three months longer than did patients whose physicians operated only in the public sector.

It is prudent in the discussion of private versus public health care to remember that it is not only the wealthy, the people who can afford it, who pay for private surgery. As demonstrated in Table 7, 40% of patients who had their cataract surgery in a private clinic lived in the two lowest income neighbourhoods. One wonders if these patients were fully informed when they made their choice to have surgery in the private sector. If they had gone to a different ophthalmologist who only operated publicly, the wait for public sector surgery might have been shorter and hence more tolerable to them.

3.3 Cardiac Procedures

Patients waiting for coronary artery bypass surgery are frequently headlined in the local newspapers, as the following selection from the *Winnipeg Free Press* demonstrates:

- "Cardiac patients on hold" (June 28, 1995)
- "No bed for HSC heart patient" (August 20, 1996)
- "Heart patients wait, die" (February 26, 1997)

Concerns about the availability of open heart surgery are common across Canada. Many provinces have set up a registry for open heart surgery in the absence of any other waiting time registry. Since November 1996, Manitoba has collected data on waiting times for elective open heart surgery. Surgeons are asked to submit a patient information form, that includes demographic and clinical data, as well as the planned procedure, date placed on waiting list and priority scale (2 to 6 weeks; >6 weeks); all data are captured by the cardiac surgery utilization analyst. Completion of these forms is said to be mandatory, but there are no consequences for failure to comply, and some initial reluctance was experienced. Although data are not available for this analysis, in November 1997, the mean wait for all open heart surgical procedures was 14 to 15 weeks (Tribula 1997). In our study, the mean wait for CABS in 1995/96, the most recent year available, was 13.3 weeks for elective surgery excluding waits of three days or less.

About 50% of CABS procedures were coded as elective. This proportion may seem quite low, but is similar to reports from British Columbia (British Columbia Ministry of Health 1997), Nova Scotia (Cox et al. 1996) and Ontario (Cardiac Care Network of Ontario 1997). Our results indicated stable—perhaps slightly decreasing—waiting times for CABS. The proportion of non-urgent patients who received their CABS surgery within three months seemed to be increasing; it was 60% in 90/91 and 76% in 96/97. There were still some patients, 10% in 96/97, who waited more than six months for non-urgent CABS. According to one Finnish study, patients who were on sick leave for more than six months prior to bypass surgery were less likely to return to work (Konttinen 1990). However, given the limits of our data, we do not know the reason for these long waits: was the patient "bumped" by more urgent patients? did the patient's symptoms improve spontaneously for a period of time?

was there another health problem that required stabilization prior to cardiac surgery? did the patient delay for personal reasons? Further detailed investigation is required to answer these questions before it is assumed that such waits suggest major system flaws.

We note an increase in the proportion of PTCA patients having the procedure on an urgent or emergent basis; this may indicate either a change in indications, in coding practices, or a lack of resources to manage scheduled patients. However, between 80% and 90% of scheduled patients received their PTCA within three months.

As for the elective procedures that we reviewed, the system appears to be performing its public service function well, serving patients equally regardless of where they live in Manitoba. We found no difference in the waiting time for CABS or PTCA by region of residence. There was also no difference in waiting time by gender or by neighbourhood income quintile.

Our data lack information about the wait for angiography; verbal accounts suggest that there is a bottle-neck in the treatment of patients with coronary artery disease while they wait for coronary angiogram. Any program that is developed to monitor the wait for heart surgery should include a method of monitoring the wait for angiography and angioplasty as well as for surgery.

3.4 Comparison with the Fraser Institute Survey

Do we confirm the results of the widely-cited Fraser Institute report on waiting times in Canada? Yes, we find similar results for some of their shorter waiting times. And no, we find shorter waits for the procedures they have trumpeted as having shockingly long waits. It is not surprising that we find differences since only about one-third of the surgeons who operate on Manitoba patients respond to their survey, and we are reporting the experience of all Manitoba surgeons, and all Manitoba patients.

The Institute's response rate for Manitoba was around 30% from 1994 through 1996. Nationally the response rate for surgical specialities has been 30% to 40%. These response rates are too low for drawing firm conclusions (Bernard 1994). Low response rates are a

known drawback of mail questionnaires, but several techniques have been found to increase the response rates to a more acceptable rate of 70% to 80% (Miller 1991). Despite this problem with the findings of the Fraser Institute survey, we attempted to compare our findings to their report because it generates wide media interest.

Three methods were compared for measuring waiting times. Two of them were provider-based (FI and MCHPE-S) and one was patient-based (MCHPE-P). It is important to note the difference in understanding provided by a measure of patients' median waits as opposed to median waits perceived or experienced by surgeons. It seems clear that the measure of patients' medians offers a more valid indication of waiting times experienced in the health care system.

For most procedures where comparisons were possible, the findings were similar. The biggest discrepancies were found with the high-profile procedures—the ones that get the most media play. One has to wonder if the same disgruntled surgeons who go to the media with their complaints are the ones who respond to the Fraser Institute survey. For instance, in cataract surgery, the waits reported by the Fraser Institute are 12, 19 and 37 weeks for 1994 through 1996. These long waits are similar to those found for the public patients of surgeons who also have a private clinic practice (Figure 6). To the extent that surgeons who have a private practice disproportionately responded to the survey, the results of the Fraser Institute survey are not valid indicators of waiting times.

3.5 Strengths and Limitations

The benefit of using administrative data is that they include the entire population of relevant patients, and are therefore not dependent on the physician or the physician's office staff remembering to complete a form and submit it to a registry. The method we used is a relatively simple way to monitor patterns and trends over time. However, the lack of relevant clinical information that can be used for prioritization speaks to the need to collect valid data to further this work.

The major limitation of this analysis of waiting times is that of necessity, it must rely on proxy measures to calculate the waiting time. We do not have a registry of waiting times in Manitoba. There is no field in hospital abstracts or physician claims that indicate when a patient started to wait for surgery. We have chosen a pre-operative visit to the surgeon or, in the case of cardiac procedures, an angiogram, as the best available marker for the procedures that we studied. There is some evidence that administrative data are reliable for this purpose. This method was used previously by the province of Nova Scotia to provide an estimate of waiting times for a wide variety of procedures. In Ontario, records of 8,517 patients who had CABS and were registered in the Cardiac Care Network database were reviewed (Naylor et al.1995). The median time between angiography and submission of the patient's name to the registry was three days. Therefore, our method, which uses angiogram as a marker for the beginning of the waiting time, should be as accurate as a Registry approach.

We chose conditions that frequently require only one pre-operative visit to the surgeon. Our method is not appropriate for procedures performed for chronic conditions, like hysterectomy for benign tumours, hip replacement or knee replacement, for which several visits to the surgeon pre-operatively are customary. For instance, in analyzing pre-operative visits for knee and hip replacement patients we found that 31.2% of the patients had one pre-op claim, 27.5% had two, 13.7% had three, and 26.3% had four or more. We have no way of knowing at which of these visits the decision to undergo surgery was made. In comparison, for the elective procedures that we analyzed, two-thirds of the patients had only one pre-operative visit.

Using the pre-operative visit closest to surgery may understate the wait experienced by the patient. The episode of care will usually involve a visit to the family physician, diagnostic tests, and possibly more than one referral. The patient must wait at each of these points, and thus the patient's perception of the wait might be longer than our estimates. A personal anecdote illustrates. It took nearly six months between the time one of my family members first saw his doctor for abdominal pain until he had a cholecystectomy, yet our median waiting time is about four weeks—similar to the length of time my family member waited after his pre-operative visit to his surgeon. On the other hand, this method may overstate the actual wait if

the surgery has been delayed for personal reasons, such as vacation, school or work. In that case, the surgery may have been offered to a patient who put it off until it could be scheduled more conveniently.

Administrative data are always limited by their lack of clinical information. We have no data describing pain, functional limitation or severity of symptoms. These are factors which physicians must take into consideration when they prioritize patients for surgery. Having these data would be useful to determine if the sickest patients are operated on first. However, the focus of this study was not to determine if patients were appropriately prioritized, but to provide more general estimates of waiting times and to look for systematic differences in those waiting times. Given the constraints of administrative data, we have been successful in meeting our objective.

4. DEVELOPING A REGISTRY

4.1 Experience with a joint replacement Registry

When MCHPE began work on this project, a provincial hip and knee replacement registry was being maintained at St. Boniface General Hospital (SBGH) with funding from Manitoba Health (Page 21). Although we had thought we might be able to use the hip/knee replacement registry as a "gold standard" to guide our analyses, there were several flaws with the registry. These are discussed below since they were instructive in thinking about how to set up a registry for other procedures.

1. There was no date on the registration form, a major oversight; it was dated when it was received at SBGH, but there was no date to indicate when the patient and surgeon made the decision to proceed with surgery.

2. Compliance was voluntary. Despite appeals to surgeons to comply with the registry so that it could be used to demonstrate to the province that more resources were needed for joint replacement, compliance was low. Although we could not find any evidence to suggest that patients whose names were submitted to the registry were in any way

different from patients who were not submitted, it is possible that these 27% of patients are not representative of the total group of patients.

3. The process was awkward. Entry of waiting list data was undertaken by staff at St. Boniface General Hospital. However, there was no simple mechanism to remove patients who had had surgery from the list. Since the registry contained the names of many patients who had had the procedure, it did not meet its goals of providing up-to-date monitoring of the waiting times for joint replacement surgery. Another problem was the inability to check for double-entry of patients' names. Also, if patients were known to require bilateral procedures, some doctors sent in the form for both procedures at once—even though bilateral procedures would never be performed at the same time.

The experience with the knee/hip replacement registry highlights some of the important issues to consider in setting up a wait list registry. What is the method for entering a person to the registry? What is the meaning of the beginning of the waiting period? Will there be mechanisms to prevent double-entry? How will the list be managed and updated? These and other issues are discussed further in the next section.

4.2 Surgical registries elsewhere in Canada

British Columbia is the province that has come the furthest in collecting data to monitor waiting times for elective surgery. Thirty hospitals send data to the Ministry of Health for analysis and reporting. The hospitals are responsible for collecting and maintaining waiting time information based on bookings received from physicians; there are no standardized criteria for determining when a patient should be put on the waiting list. While BC is ahead of any other province in collecting these data, it still has the drawback of being retrospective; it is not a real-time interactive surgical registry.

Ontario established the Cardiac Care Network in 1990 in response to rising concerns about the backlog of patients waiting for bypass surgery. Each of the hospitals that perform angiography and/or bypass surgery in Ontario is a member of the Network. When a decision is made that surgery is required, patient information is submitted to a patient co-ordinator,

who acts as a liaison between the patient and the surgeon, and maintains a computerized database of all patients waiting for surgery. A prioritization system, developed by a consensus panel of experts based on a literature review and their own experience, uses seven clinical factors to determine an urgency rating score and Recommended Maximum Wait Time for surgery (Naylor et al. 1990; Cardiac Care Network of Ontario 1996). Dummy terminals at each hospital are networked, and the regional co-ordinators and data operators are able to accurately monitor the state of the waiting list. Data are downloaded centrally each night. The patient co-ordinator at each facility can print out a list of patients waiting for surgery in that facility and notify the surgeon if any patients have exceeded the recommended wait. There are nine hospitals in Ontario that perform over 9,000 bypass procedures annually, as well as four additional cardiac catheterization centres, hooked into the Network. The $500,000 annual budget for CCN covers the operation of the provincial office in Toronto, meeting expenses and information systems. The budget does not include the salaries of the regional care co-ordinators or data operators at each facility.

Nova Scotia also has a central registry for coronary artery bypass surgery. All cardiovascular surgery for both Nova Scotia and Prince Edward Island is provided at Victoria Hospital, a teaching hospital of Dalhousie University in Halifax. The patient's cardiologist arranges to have an angiogram performed. If surgery is the option of choice, the patient is referred to the Victoria Hospital (Elliot 1998). All patients requiring coronary revascularization are reviewed at a single weekly, centralized cardiovascular conference comprising cardiologists, angiographers and cardiac surgeons (Cox et al. 1996). The conference assigns patients according to symptom severity, coronary anatomy and functional status into one of four possible categories: urgent, semi-urgent A, semi-urgent B, elective. Target waiting times are within a week for urgent patients, 2 to 4 weeks for semi-urgent A, 4 to 10 weeks for semi-urgent B, and 10 to 16 weeks for elective patients. Patients are assigned to the first available surgeon. Requests for specific surgeons are accommodated if possible, but patients are advised that this may lengthen the waiting period.

4.3 Developing a surgical registry for Manitoba

The preceding discussion suggests that monitoring waiting times is quite complex. The issue is of sufficient concern that there have been frequent discussions about developing a registry for surgical procedures in Manitoba. Waiting list initiatives in Manitoba thus far have included hip/knee replacement as described above, open heart surgery, and the development of a cataract surgery registry at Misericordia General Hospital. The cataract surgery registry includes a prioritization process based on an 18-item questionnaire that measures functional impairment, as well as length of time in the queue. Although a method of prioritization has been developed, ophthalmologists will retain complete control for patient scheduling. It is intended that the cataract surgery registry will be mandatory and is to come into effect in October 1998.

If a surgical registry is to be established for Manitoba, it will be necessary at the outset to consider what the registry is to accomplish. A registry that retrospectively tracks waiting times could be established quite simply and with little expense by including a field on physicians' claims that would indicate when a decision was made to proceed with surgery. But the registry becomes much more complicated if the purpose is to monitor waiting times on an ongoing basis, or redistribute resources to even out long waits.

4.4 Potential pitfalls in establishing a registry

1. *Non-compliance*: A registry that does not include all elective patients will yield unreliable information. How can compliance be ensured? Mandating that physicians or hospitals comply will be insufficient unless there is some benefit in doing so. Discussions with surgeons and hospitals might help to find out what they would view as ideal characteristics of a registry. Possibilities are ease of use, extended hours of access, variety of ways of accessing (phone, voice mail, fax, email), consequences for using or not using (e.g. could affect OR scheduling).

2. *Meaning of "Date On"*: At what point will patients' names be submitted to the registry? One of the difficulties in other waiting list registries is the variability with which patients'

names are submitted to the registry. Some surgeons submit names in anticipation of a long wait, even before the patient is actually ready for surgery. The entry of a patient's name to the registry should indicate that the patient has agreed to surgery, has completed all necessary diagnostic tests and consults and is available for the procedure. There should be a means of indicating the reason for any delay.

3. *Concurrent vs. retrospective*: A concurrent registry which is updated on a regular basis would be the most useful for monitoring and management of health care resources. Manitoba is fortunate to have technological expertise and capability in place, as well as a window of opportunity with the development of the Health Information Network. Manitoba Health collects and maintains data on all insured hospital and medical interactions. Currently, all hospitals submit hospital abstracts to Manitoba Health; for approximately 80% of the hospitals, weekly or bi-weekly submissions are made in an electronic format (tape or diskette). Much of physician billing is also accomplished by computer. Therefore, Manitoba Health already functions as a provincial data centre for receiving and managing a great deal of health information.

   Another possibility to explore is the Health Information Network (HIN), which is coming on-line over the next two to three years, and will have real-time data entry capability. Therefore, it should be possible for booking requests to be submitted by each hospital to a central registry, and for surgical slates to be submitted to the registry on a daily basis for up-to-date waiting time information.

4. *Data to be included*: Consideration must be given to the extent of data to be included in the registry: the more data that must be separately collected, the less likely is compliance. However, if the data can be included as part of the HIN, this will considerably reduce the need for additional data collection or submission. Some data that should be available include: patient demographics and identifying information, contact information, scheduled procedure, priority (within one month, one month to three months, more than three months), date that surgery was decided on, functional status, and other measures relevant for prioritization and monitoring.

5. *Prioritization*: There is some evidence that physicians do prioritize patients appropriately in the presence of queues (Naylor 1992). Since surgical and prioritization criteria are not available for many procedures, clinical judgement must continue to be the guide, as it is now. Where acceptable prioritization criteria exist, e.g. hip and knee replacement, bypass surgery, cataract surgery, they should be incorporated so feedback and monitoring is possible. When prioritization criteria become available for other procedures, they should be incorporated into the registry. In the absence of prioritization criteria, the priority assigned by surgeons should be assessed regularly, since there will be a tendency to assign higher priorities if that is seen as a way to bring patients to surgery earlier.

6. *Guaranteed maximum wait*: It is not recommended that "a guaranteed maximum wait" is employed as it is in the United Kingdom (Smith 1994; Edwards 1997). The guaranteed maximum wait applies to all patients, thus encouraging surgeons and hospitals to operate on patients who may have lower clinical need, but are nearer to the expiry of the guaranteed maximum. Rather than focussing on overall waiting times, the focus should be on optimizing the benefits to the patient, and take into consideration factors like patients' preferences, time already spent waiting, expected clinical deterioration, health status, functional status and social factors.

4.5 Other recommendations

7. *Cardiac procedures*: In monitoring the waiting times for cardiac surgery, consideration should be given to monitoring not only the wait for open heart surgery, but also waits for angiography and angioplasty. Software has been developed that can follow patients from referral for angiogram through angiography and follow-up care. One example is the APPROACH (Alberta Provincial Project on Outcome Assessment in Coronary Heart Disease) system, developed at the University of Calgary. This system has been adopted by British Columbia, and was discussed by health care providers and government representatives at an all day session in December 1997. Other systems may also be available that can track patients along the continuum of care for heart disease.

8. *Physician claims*: Waiting times are an issue that continually garner a great deal of attention and yet there is a dearth of concrete information to monitor actual waiting times. Given this gap, it is recommended that a field be included on the physician claims that would indicate a date when a decision was made to proceed with surgery.

9. *Cataract surgery*: There are some indications that resources for cataract surgery may need to be increased. The waiting times in the public sector increased from 11 weeks in 94/95 to 18 weeks in 96/97. Manitoba Health has indicated that it intends to ban extra-billing at private clinics, and to negotiate a mechanism of financing the procedure at private clinics so that these procedures can continue to be offered there. If the cataract surgery rate does increase, it will be important to use the data from the registry to be implemented at Misericordia Hospital in October 1998, not only to monitor waiting times, but also to assess whether patients are being accepted for surgery and prioritized appropriately.

5. CONCLUSIONS

We measured waiting times for selected surgical procedures using the pre-operative visit to the surgeon as reported in administrative data. This method was suggested by other research, and was supported by clinicians for the procedures we studied. The strength of our method is that it includes the entire population and does not rely on patients' recall or surgeons' perceptions. It is relatively easy to use retrospectively, and can monitor trends and changes over time. Its weaknesses are: it involves a time lag, it measures only one component of patients' entire surgical experience, and it lacks clinical information that could be used for prioritization. Furthermore, it is not suitable for chronic conditions requiring a number of visits to a surgical specialist before deciding to proceed with surgery, for example, hysterectomy for benign disease or joint replacement surgery.

We found that median waiting times were stable or decreasing for most of the procedures studied, including cholecystectomy, hernia repair, excision of breast lesions, TURP, tonsillectomy, carotid endarterectomy and scheduled CABS. The proportion of non-urgent

patients who received bypass surgery within 90 days increased from 60% in 92/93 to 76% in 96/97. Waits for varicose vein surgery, carpal tunnel release and cataract surgery increased. The rate of performing carpal tunnel release and cataract surgery increased 17% and 27% respectively from 92/93 to 96/97; the increase in the median waiting time for these procedures suggests that supply has not kept up with increased demand. The median wait for PTCA increased in 96/97 and a smaller proportion of patients received the procedure within 30 days of angiogram; it will be important to assess whether this is the beginning of a trend or merely a random fluctuation.

We compared waiting times according to patient characteristics to see if particular groups of patients were waiting longer than others. We found that, contrary to expectations, non-urban residents were not penalized by having to wait longer compared to urban residents. People older than 65 years came to surgery faster than younger patients, possibly because they were more likely to be retired and thus readily available. Residents of high-income neighbourhoods did not receive preferential treatment compared to residents of low-income neighbourhoods. These findings suggest that the universal system works well in providing equitable access to all groups.

The weaknesses of our method as outlined above, coupled with the continuing concern about waiting times in Canada, suggest the need to routinely collect data that will be useful in monitoring waits and managing health care resources accordingly. In May 1998, government, health authority, research and physician representatives from the four Western provinces met in Regina to discuss the need for standardizing the collection of such data. A decision was made at that meeting to apply for a grant to that end. However, data from that project will not be available until at least 2000, and Manitoba may wish to proceed with establishing a surgical registry prior to that. It will be important at the outset to determine what the purposes of such a registry would be--measurement, monitoring or management--and to carefully consider the minimum data, human resource and system requirements necessary to meet those objectives.

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APPENDIX: Mean waits for elective surgical procedures

Our analysis of medians indicated that there were no large fluctuations in waiting times over the last five years in general. Furthermore, confidence intervals showed very little random variation around the median times.

One notable limitation of median analyses was that we could not adjust for other factors in making comparisons. Mean analysis resolves this practical difficulty and is more powerful and sensitive statistically. Therefore, we explored mean waiting times to assess waiting times beyond the median value, and the variations of observed data.

The major drawback of using the mean is that it is sensitive to outliers. It was necessary to consider separating a few extremely unusual waiting times based on Tukey's robust outlier detection method. Under this method, we calculated the difference between the 25^{th} and 75^{th} percentile, called the interquartile range (IQR). An outlier was defined as being longer than [3*IQR] + the 75^{th} percentile, or shorter than the 25^{th} percentile – [3*IQR]. Note that we used the conservative [3*IQR] instead of the conventional [1.5*IQR] to define outliers. We defined extreme values for each procedure at each year. This step assured us of robust comparisons of the mean waiting times, uninfluenced by a few extreme values.

Among the total of 40,292 observations for the eight elective procedures studied, 3.8% (1,512) were outliers, and most of these were found to be much longer than the mean. For example, in 95/96, there were 1,885 tonsillectomies for analysis; the mean wait for the 1,809 non-outliers was 68.3 days, while that for the 76 outliers was 635.4 days. With the remaining observations after outliers were excluded, we studied the yearly, regional, and age/sex differences simultaneously using the general linear model. Preliminary analysis indicated that logarithmic transformation was required to satisfy the statistical model assumptions. It was anticipated that this analytic technique would not be able to explain the variance in the waiting times. However, as our goal was to describe the waiting times with the main objective to compare variation in waiting times across years and also across regions, large unexplained variation was no cause for concern.

When comparing means, we decided to do a formal hypothesis testing between regions, years, age and gender differences. Based on the analysis of medians, and also from substantive considerations, we decided to take mean waiting times of longer than three days as a clinically significant characteristic; no average waiting times less than this were tested for statistical significance. Upon finding a statistical significance of yearly and regional differences, a simultaneous multiple comparison was done using Bonferroni adjustment while keeping the false negative error (Type I error) at 5%.

Results of analysis of means

The following tables indicate the mean waiting times excluding outliers. Statistically significant values are indicated with an asterisk. The comparison of means showed more statistically different values than the comparison of medians, however as Table A1 demonstrates, there is a similar pattern in the mean waiting times, excluding outliers, as we found in looking at the median values. Mean waiting times remained stable for three procedures (hernia repair, excision of breast lesions and carotid endarterectomy), fell for three procedures (cholecystectomy, TURP, and tonsillectomy) and increased for two (varicose veins and carpal tunnel release).

Table A1: Mean waiting time (in days) for eight elective surgical procedures

	92/93	93/94	94/95	95/96	96/97	92/93 to 96/97
Cholecystectomy	55.2*	41.7	37.7*	35.3*	36.9	41.3
Hernia Repair	41.8	37.3	35.7	37.1	38.2	38.1
Excision of Breast Lesions	19.1	18.0	20.4	20.5	21.6	20.0
Varicose Veins	47.1	46.2*	49.9	48.4	55.0	49.4
Carpal Tunnel Release	40.5*	43.1*	54.7	60.0	60.6	52.1
Transurethral Prostatectomy	50.8*	29.5	31.0	35.7	27.9	36.4
Tonsillectomy	66.0*	57.3*	59.9*	68.3	55.1*	61.7
Carotid Endarterectomy†	32.0	33.1	34.6	40.9	31.8	34.8

* Statistical tests were adjusted for regional differences.
† In 1993, there were no carotid endarterectomy procedures on residents of the Far North.

Table A2 shows mean waiting times, for each surgical procedure according to where the patient lived, excluding outliers. For most procedures, Winnipeg and Brandon had longer than average waits, though the differences were not marked for most procedures. The exceptions are tonsillectomies for Winnipeg patients and cholecystectomy, hernia repair and TURP for residents living in the West of the province. The mean waiting times for the majority of the procedures in the South and Far North were significantly shorter than the Manitoba mean. The average waits for breast surgery (which included both benign and malignant disease) were similar across the province.

Table A2: Mean waiting time (in days) for eight elective surgical procedures by region of residence, 92/93 to 96/97

	Winnipeg	West	South	Mid-North	Far North	Manitoba
Cholecystectomy	43.8*	47.9*	34.9*	37.0	35.6*	41.3
Hernia Repair	39.1	44.1*	33.0*	34.3*	35.5*	38.1
Excision of Breast Lesions	20.9	18.7	17.9	18.4	18.2*	20.0
Varicose Veins	49.6	55.8	44.8	53.9	40.5*	49.4
Carpal Tunnel Release	58.6	47.6	43.8*	46.2*	48.4*	52.1
Transurethral Prostatectomy	33.6	67.7*	35.3	37.1	32.1	36.4
Tonsillectomy	69.2*	48.9*	53.8*	58.1	54.2*	61.7
Carotid Endarterectomy†	35.1	41.1	32.1	33.5	35.8	34.9

* Statistical tests were adjusted for regional differences.
† In 1993, there were no carotid endarterectomy procedures on residents of the Far North.

Table A3 shows mean waiting times excluding outliers for Winnipeg residents, according to the income category of their neighbourhood. For most procedures, there was little difference in the waiting times by income category, but where there was a difference, the wait tended to be longer for those living in the highest-income neighbourhoods relative to the lowest-income neighbourhoods. This can be said of cholecystectomy, hernia repair, varicose veins and carpal tunnel release. These procedures are capable of being delayed for some time until it is more convenient for the patient and the delay may be at the patient's choice. It is encouraging to see that the wait for excision of breast lesions and for carotid endarterectomy showed no difference according to income category, since these procedures are potentially life saving.

Table A3: Mean waiting time (in days) by neighbourhood income quintile for Winnipeg patients, 92/93 to 96/97

	Q1-low	Q2	Q3	Q4	Q5-high	Winnipeg
Cholecystectomy	40.5*	43.9	46.9*	44.3	43.9	43.8
Hernia Repair	36.2	37.5	40.9	39.1	40.8	39.1
Excision of Breast Lesions	20.5	20.6	20.5	21.5	20.7	20.9
Varicose Veins	46.3	49.3	53.5	45.5	53.8	49.6
Carpal Tunnel Release	52.0	55.9	56.3	60.0	68.3	58.6
Transurethral Prostatectomy	31.7	30.6	36.7	35.2	33.3	33.6
Tonsillectomy	67.4	67.0	68.9	71.8	69.8	69.2
Carotid Endarterectomy	36.4	33.1	31.4	35.8	36.2	35.1

* Statistical tests were adjusted for regional differences.

Table A4 shows the differences in mean waiting time by two age categories: younger than 65 and 65 years or older. As with the medians, the younger population tended to have longer waiting times, though the differences were not clinically significant in most cases. However, the wait for varicose vein surgery and carpal tunnel release was about 10 days longer for patients under the age of 65 compared to those aged 65 or older. This might reflect the elective nature of these procedures: people who are younger and more likely to be part of the work force may delay surgery until it is a more suitable time to take time off work.

Table A4: Mean waiting time (in days) by age, seven elective surgical procedures, 92/93 to 96/97

	Under 65 years	Aged 65 or older
Cholecystectomy	41.2	41.5
Hernia Repair	38.7	36.7
Excision of Breast Lesions	20.3	19.2
Varicose Vein	50.85	38.8*
Carpal Tunnel Release	55.1	45.1*
Transurethral Prostatectomy	39.6*	35.6
Carotid Endarterectomy†	37.1	34.0

* Statistical tests were adjusted for regional differences.
† In 1993, there were no carotid endarterectomy procedures on residents of the Far North.