A Project to Investigate Provincial Expenditures on Health Care to Manitobans

A POPULIS Project

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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, such as this one, every year 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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EXECUTIVE SUMMARY

Introduction

For more than 20 years, researchers at the Manitoba Centre for Health Policy and Evaluation (MCHPE) have been working with health services data to try to understand the relationship between health of a specific population and their use of health services. Lacking a common metric for measuring use across the health care system, this work has primarily been done one sector at a time. Converting expenditures in each of these sectors to dollars per capita allows us to summarize across sectors. This report represents our first attempt at estimating how health care dollars were spent for residents of different regions. With this project we have moved the capabilities of MCHPE's Population-Based Health Information System (POPULIS) one step closer to understanding how populations use resources across the whole health care system.

Using 1993/94 data, we began with the knowledge that the Manitoba government spent $1.8 billion annually on health care. We also knew the sectors (hospitals, physicians, etc.) in which the expenditures occurred, but we did not know how those dollars were spent on individual Manitobans, whether they lived in the far north, the rural south or Winnipeg's central core. This project attempts to fill in that missing piece by estimating expenditures for people who live in different areas of the province.

Two reports being released by MCHPE have different mandates, but are similar in some respects. They are the current report, *A Project to Investigate Expenditures on Health Care to Manitobans* (Shanahan et al.) and *Needs-Based Funding for Regional Health Authorities: A Proposed Framework* (Mustard et al.). At the conclusion of this report, a section called *An Interface* highlights some of the key differences in methods and assumptions between these two reports.

Methods

We used several approaches to attribute health services expenditures to residents in each of the newly-defined Regional Health Authorities (RHAs) and the 9 areas of the city of Winnipeg that reflect the city's socio-economic diversity.

- *Sectors included* – hospitals, physicians, other health professionals, personal care homes (PCHs), long-term care hospitals, mental health hospitals and home care. Within each of these sectors there are exclusions. For example, hospital and PCH capital costs and depreciation were excluded, as were some physician salaries and sessional remuneration. In total, the project captured 79% of Manitoba Health expenditures.

- *Sectors excluded* – public health, community health centres, Pharmacare, Red Cross, Manitoba Cancer Treatment and Research Foundation, and northern and rural transportation. The sectors were excluded due to lack of data.

Some of the methods of allocating costs are fairly common: for example, the use of case weights for allocating inpatient hospital expenditures and the use of fee-for-service from physicians data. In other areas we had to devise methodologies for allocating costs to populations and, in many instances, work with limited data. Despite substantial data limitations, we forged ahead to try to complete the picture, aware that major distortions might occur if large sectors were not considered.

As in other MCHPE population-based studies, health care expenditures were attributed to an individual's area of residence, not the region where care was provided. This allowed us to estimate costs for providing care to an area's residents no matter where they received care. Similarly we removed expenditures attributed to non-Manitoba residents and added expenditures for insured care received by Manitoba residents outside of the province.

The results are presented in dollars per capita for each of the new RHAs and the nine areas of Winnipeg. Results presented here are *directly adjusted* for age and sex to permit comparisons across areas with considerably different mixes of age and sex. Tables and figures in the main

report also present crude rates of expenditures, allowing administrators to examine estimates of expenditures within their own RHA.

Findings

- Per capita hospital expenditures on Winnipeg residents ($694), were 3% higher than on non-Winnipeg residents ($673).
- Per capita Personal Care Home (PCH) and chronic care hospital expenditures on Winnipeg residents ($252) were 24% higher than for non-Winnipeg residents ($203). When only PCH expenditures are considered per capita expenditures for non-Winnipeg residents are 5% more than Winnipeg residents.
- There was a considerable difference – 33% – in the amount which the province spent on physicians and other professionals for delivery of care to Winnipeg residents ($305 per capita) in comparison to non-Winnipeg residents ($230).
- Expenditures on mental health hospitals were essentially used by people who now reside in Brandon or other rural RHAs. Winnipeg residents receive their inpatient mental health services primarily in acute care hospitals and the expenditures are therefore captured in the hospital sector.
- Added together, the expenditures allocated to Winnipeg residents were estimated to be $1,254 per capita, 6% higher than non-Winnipeg residents at $1,182.
- Individuals do not necessarily receive care in their area of residence, in fact many often travel a considerable distance to receive care. Some areas such as Interlake, South and North Eastman provide less than half of the inpatient hospital care that their residents receive.
- There were considerable differences in expenditures on health care across the regions of the province. Estimated expenditures for all health services included in this project, ranged from $1,014 per capita spent for residents of South Eastman to $2,035 per capita for residents of Winnipeg's Inner Core.

- Premature mortality rates (PMR) were chosen as an indicator of relative need for health services. Areas which have the higher PMR were found to have higher expenditures for their residents suggesting that expenditures are higher in areas having higher needs. There is a strong correlation between expenditures and PMR at $r= 0.90$ ($p < .001$).

  However, this does not necessarily mean that the individuals within each area who most need the services are the ones actually receiving the services, nor does it mean they are receiving the most appropriate services. At this time we have no way of resolving these issues.

  Different approaches to allocating expenditures produce different results. In particular, two different assumptions on inpatient expenditures are worth noting. If the assumption was made that the cost per average case was the same across all hospitals the results were very different than when hospital-specific costs were used. We concluded that hospital specific costs provide a more complete picture of actual expenditures in each area than do the provincial average cost per weighted case.

- However, in spite of differences in total expenditures when different approaches were used, the general patterns of regional differences in expenditures remain the same. That is, those areas which had lower per capita expenditures using the original method continued to be lower, no matter which of the alternative methods were used. Likewise, those areas with high expenditures and high premature mortality rates had the highest expenditures regardless of the approach used.

Discussion

As indicated earlier, the purpose of this project is to improve our understanding of population-based differences in overall expenditures in the health care system. Since this was first and foremost, a feasibility study, one must ask if the methodology developed for this project works. Are there biases? If there are, are they large enough to render the results misleading?

Considerable work went into attempting to get inside what have previously been black boxes of expenditure data. Developing approaches to deal with outpatient hospital expenditures, physician salaries for which there were no claims filed, and personal care home costs was time consuming and resource intensive. Some approaches appear to have more validity than others, but our results indicate that no matter which method was used, the result was much the same: individuals residing in areas with the worst premature mortality rates - and by extension the worst health status - have higher expenditures on health care once age and sex adjustments are made.

There are several sectors where missing data makes the study less than complete. Public health and community health centre data are missing, as are Pharmacare data and some physician remuneration data. However, before discounting the study as being incomplete or the methods as lacking legitimacy, it is worth considering whether the additional data would have substantively changed the results. We think not. Nevertheless, we believe addition of these data in the future is important, especially since they represent important areas to monitor as health reform initiatives proceed.

Many lessons were learned in this project, some of which may prove useful for those involved in the move to Regional Health Authorities in Manitoba.

- The data in this report will likely be useful for policy makers and managers in understanding current patterns of expenditures. For example, the report makes it clear that reliance on hospital care varies significantly from one area of the province to another. In Winnipeg, 55% of estimated expenditures are on acute hospital and inpatient mental health care, and 24% are on medical remuneration. By comparison, in the Interlake 65% of health care expenditures are for acute hospital and inpatient mental health care and 20% for medical remuneration. In the northern areas of Norman and Burntwood, the differences are even greater - 69% and 77% respectively are spent on hospital care and 16% and 17% on medical remuneration.

- At the individual sector level there were few surprises. Information gained from previous POPULIS reports was reinforced. Winnipeg residents use more physician resources and

people living in higher need areas use more hospital resources. What was surprising was that when we added costs across all sectors, the per capita expenditure on Winnipeg residents was not that different from non-Winnipeg residents, despite differences in expenditure patterns for the individual sectors.

- One important finding concerned the amount of care that is provided for Manitobans outside of their region of residence. It became very clear that funding allocation methodologies must consider how areas can be compensated for providing care to residents of another area.

- Another important finding was that there were large mental health expenditures in two RHAs which have mental health facilities. This suggests that over the years people have moved into these areas to be near or reside in these facilities and this must be considered when considering funding for the RHAs. This may well be an argument for treating the mental health sector separately, but consideration must be given to the fact that Winnipeg residents receive their mental health care primarily in acute facilities. Funding for this care must be found within acute care hospital funding.

One issue raised by this report is the availability and quality of the data to conduct additional analyses and more importantly to monitor the system into the future. Currently Manitoba Health is attempting to shift the focus from institutional inpatient care to outpatient and community care. Without adequate data on home care, public health activities, community health centres and the use of emergency departments, health reform activities that rely on these sectors can not be monitored with any certainty.

A consistent theme throughout the recently-published book *Why Are Some People Healthy and Others Not*? (Eds. Evans, Barer and Marmor, 1996) is the need for better information in order to address the question posed by the title. In one of the book's concluding chapters, Michael Wolfson points out that "without proper information health policy is blind and stumbling; quite literally we do not know what we are doing." In this study we have gone some distance, perhaps farther than any other jurisdiction in North America, in providing an accounting of how one government spends its health care dollars on residents of various

regions. We hope that this will provide an understanding of how dollars are currently spent, but more importantly, will provide an important basis for studying spending patterns in relation to health in the population.

1. INTRODUCTION

Manitoba Government expenditures on health care for 1997/98 are projected to be $1,825.6 million which is 34% of the total expenditures by the Manitoba Government (Manitoba Estimates of Expenditure, 1997/98). Manitoba Heath accounts for these dollars in terms of programs (such as home care or provincial dialysis), global funding for hospitals, physician expenditures, and community-based health programs. However, there is a growing interest in population health and how funding relates to the population health needs (Eyles and Birch, 1993; Rana, 1996). In order to address these issues, it is useful to describe the current patterns of health care utilization and expenditures by Manitobans.

MCHPE has previously examined utilization of hospitals, personal care homes (PCHs), physicians, and mental health hospitals (Black et al., 1993; DeCoster, 1993; Roos et al., 1996; Frohlich et al., 1994; Tataryn et al., 1994). These projects compared how residents of different regions used these resources – whether use was high relative to other regions or whether it was low. However, to date we have not been able to sum use across sectors, a prerequisite to determining if there is substitution or complementary use of resources. For example, if regions invest more in home care, do they spend less on acute hospital care and personal care homes (PCHs)?

This project represents a first step towards developing an ability to sum use across sectors by developing estimates of how much is spent by the province supporting use of each sector for each area's residents. Dollars are used as the metric. In this project we have used a variety of data sources, not all of which are well suited for this purpose, to estimate how 79% of Manitoba Health dollars were spent in 1993/94 according to the area of the recipient's residence. This enables us to answer the question, how much money did Manitoba Health spend to provide care to Winnipeg residents compared to how much was spent on delivering care to residents of each of the Regional Health Authorities (RHAs)?

In this project, costs of care were attributed to each Manitoban who received hospital, physician, inpatient mental health care or PCH care regardless of whether the care was

received in their region of residence, elsewhere in the province or out of province. This application of expenditures to individuals makes it possible to examine on a per capita basis how the dollar value of health care resources were utilized by residents of different areas of the province. In this analysis the costs for such care are 'charged' to the home region of the resident. For example, a significant amount of care for rural residents is provided in Winnipeg and, to a lesser degree, in Brandon.

The totalling of expenditures allows us to compare just that, expenditures. Expenditures on health services are comprised of utilization and price. Before differences in expenditures are interpreted as differences in utilization, any differences in costs of providing a given service must be explored otherwise higher expenditures may be interpreted as higher utilization whereas they may reflect a higher cost of providing the service for reasons not related to the recipient.

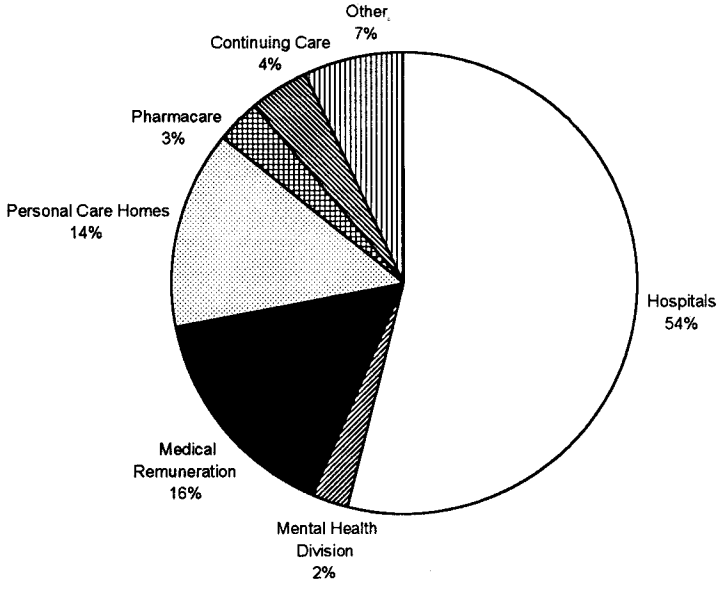
This project focuses on describing the expenditures and the methodologies used. We are interested in having the methods critiqued and discussed therefore we have not yet focussed on determining why patterns exist or in answering many of the interesting questions which such data raise.

Developing an ability to determine how much the province spends delivering health care to residents of various regions is also important given the interest in Manitoba as well as across the country in needs-based funding (Eyles et al., 1993; Birch, 1993; Mustard, 1997, forthcoming). While historically governments have funded institutions regardless of how they came to exist in a particular location and have paid the claims submitted by physicians regardless of where they were located, there is increasing concern that the health needs of the population should determine how funds are allocated. This report which is designed to help us understand how funds were actually spent in the recent past represents an important step in getting better information in this critical area.

The fiscal year 1993/94 was used for this analysis. These data should still be relevant. The total health care budget for 1993/94 was $1,858.8 million while the 1997/98 estimate for health is $1,825.6 million, a 2% decrease. As well as the decrease there were some shifts

from institutional to non-institutional care but these were small shifts with respect to the overall budget.[1] This suggests few systemic changes and the conclusions will be valid despite the year of data used for this project. Health care expenditures in 1993/94 accounted for 34.2% of the total provincial budget compared to 34% of the total budget estimates for 1997/98. (Budget estimates, Manitoba Government, 1993/94 & 1997/98). Moreover, previous MCHPE analyses on utilization have shown a marked stability in utilization patterns over time (Frohlich et al., 1994; Brownell and Roos, 1996), which suggest that current utilization patterns are not substantially different from utilization patterns in 1993/94.

Figure 1: Manitoba Health Expenditures 1993/94



[1] The 1997/98 budget estimates for hospitals appear to have declined by more than 2.5% but medical payments under insured services appeaer to have increased by 12%. What has actually happened is that salaried and sessional medical payments which were previously recorded under hospital budgets are now reported in medical payments so the actual change in hospital budgets is much less than it appears in the budget estimates.

Figure 1 summarizes Manitoba Health expenditures into seven categories. Hospitals accounted for 54% of expenditures (including capital projects), personal care homes for 14% (including pharmaceutical costs), and medical remuneration for 16%. Medical remuneration as defined here *excludes* medical salaries and sessional payments which are included in hospital budgets (in our work these payments are included in medical remuneration). The Other category (7% of the total budget) is comprised of the Minister's office and staff, Information Systems, Health and Wellness, Lotteries Funded Programs, Northern Transportation Program and others. Provincial Mental Health Services (2%), Pharmacare (3%) and Continuing Care (4%) make up the rest of the expenditures (Annual Report, Manitoba Health, 1993/94).

It was not possible to examine all expenditures within the health care system for the following reasons: a lack of access to the data; data which did not exist in a computerised format, or expenditures which were not directly applicable to providing patient care (i.e. research).

The following sectors of health care budget **were** included in this project:

1. *Hospital expenditures* – Inpatient and outpatient expenditures and laboratory and imaging costs (Laboratory and Imaging Services) were included. Excluded were capital costs, depreciation, non-patient costs such as research, plant costs for non-hospital buildings, and physician salaries and sessional payments.[2]

2. *Physician remuneration* – Fee for service, salaried where evaluation claims were available, salary and sessional anaesthetist, emergency room, and intensive care unit physician payments were included. Excluded were other salaried and sessional physicians for whom there were no evaluation claims (7 % of total physician remuneration).

3. *Personal Care Homes (PCHs)* - All proprietary and non-proprietary provincial PCHs were included. Capital costs were excluded.

[2] Where possible these payments were included in the physician remuneration section.

4. *Long term care hospitals* - Included were Deer Lodge, Riverview, Hartney, and Cartwright Hospitals. The latter two were previously excluded from MCHPE analyses of the acute hospital sector as it was felt that their operations more closely approached long-term care than acute care.

5. *Mental Health Hospitals* - Interprovincial per diems were used to capture inpatient costs.

6. *Home Care* - Computerized records of home care utilization did not exist. Therefore, dollars were allocated to the RHAs. Unlike other areas of utilization, home care is primarily provided within an RHA for its residents and unlikely to generate large expenditures on out-of-region residents.

In total, 79% of the $1,848 million[3] spent by Manitoba Health in 1993/94 was captured. Key areas not captured include Pharmacare, capital costs for hospitals and PCHs, Public Health, Red Cross, and Cancer Treatment Centre expenditures. These areas should be included to completely document expenditures on health care but were beyond the scope of this project. There is no reason to suspect that the distribution of utilization of services not included would be significantly different from those which were included.

[3] Excludes Alcoholism Foundation of Manitoba.

2. BACKGROUND

Estimated expenditures on health care can vary across geographic areas for any of a number of reasons. These reasons can be arranged into three main categories. The first category relates to the provider of the health services; this provider could be a facility such as a hospital, an individual such as a physician or the RHA. The second category includes those factors which pertain to the characteristics of the population and the third category refers to factors which have to do with the quality of the data. The third category has to do with estimation difficulties whereas the first two reflect expenditure differences.

1) The first category may include such factors as variations in practice patterns of health care professionals; costliness of facilities related to geographically-dependent expenses, tertiary or teaching costs or operating efficiency; the existence of a given facility such as a mental health hospital in an area, and the use of specialists. Each of these factors could lead to per capita health care expenditures in one area which are significantly different from the provincial norm.

For example, the long standing existence of a mental health hospital in an area may lead to higher per capita expenditures on mental health for that area's population if over the long term people move closer to an existing facility for easier access.

Another factor which may affect a populations' expenditures on health care is the proximity to specialists. In 1994/95 Winnipeg residents received 35.5% more consultations[4] than did Manitobans who resided in the rural south (Roos et al., 1997). All else being equal, the differential in fees between specialists and general practitioners may lead to higher physician payments for those who use more specialists.

If residents of an area receive most of their hospital care from facilities which are more expensive to operate than average, this may result in higher expenditures on health services for that population. Higher facility costs were found in particular at northern facilities and

[4] Phone consults from one physician to another not being an insured service are not captured in these data. This may be an important factor for rural access to specialists.

tertiary facilities (Shanahan et al., 1996). The opposite might be true if a population tends to use facilities which are less expensive than the average.

Some of these potential differences are dealt with in this report by using different approaches to costing care. For example, the effect on an area's overall expenditures when a population used more expensive hospitals was estimated using an average provincial cost per weighted case versus the specific hospital costs. Other issues, such as variations in the use of specialists, were not explored in this project.

2) A population's attributes will affect its need for health care. Healthier people use less health care than do unhealthy people. Factors which are related to health status and hence likely affect health care utilization are differences in socio-economic factors, age and sex, and the home and workplace environment (Evans and Stoddart, 1990; Hertzman et al., 1994).

Populations which differ demographically in age and sex may require different types and quantities of health services. In general, elderly populations use more health services than younger ones, and women of childbearing years tend to use more health services than men at the same age. As these different patterns of use lead to different expenditures, for this study the per capita rates of expenditures were adjusted (directly standardized) for age and sex differences. In most instances throughout the paper and in the Appendix both the adjusted and crude rates (actual dollars spent) are provided. Crude rates were included to permit both the comparison of the crude to adjusted rates, and to facilitate the understanding of actual expenditures within each RHA.

A single measure to identify an area's need for health services has not yet been developed. If such a measure existed, the examination of the relationship between expenditures *on* and the need *for* health services would be a simple exercise. Premature mortality (death before age 75) is widely recognized as the single best indicator of the general health of a population (Carstairs and Morris, 1991; Eyles et al., 1993). It is currently used in the British formula for allocation of funds from the Department of Health to regional health authorities. It has been shown to be strongly associated with most of the self reported health status indicators and

Figure 2: Map of Manitoba Identifying Regional Health Authorities

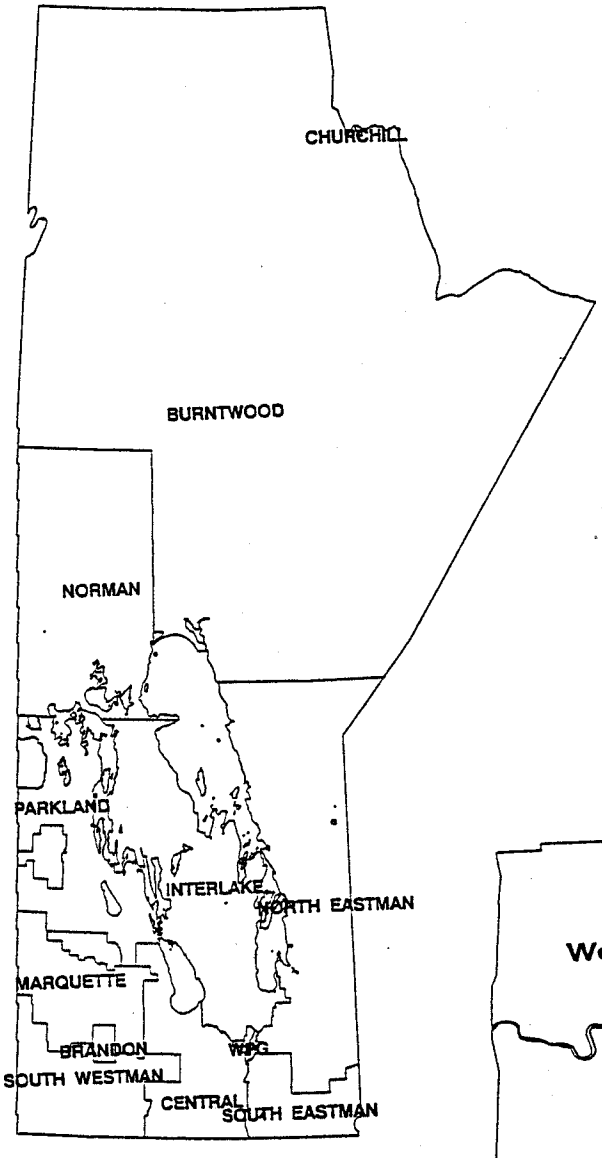
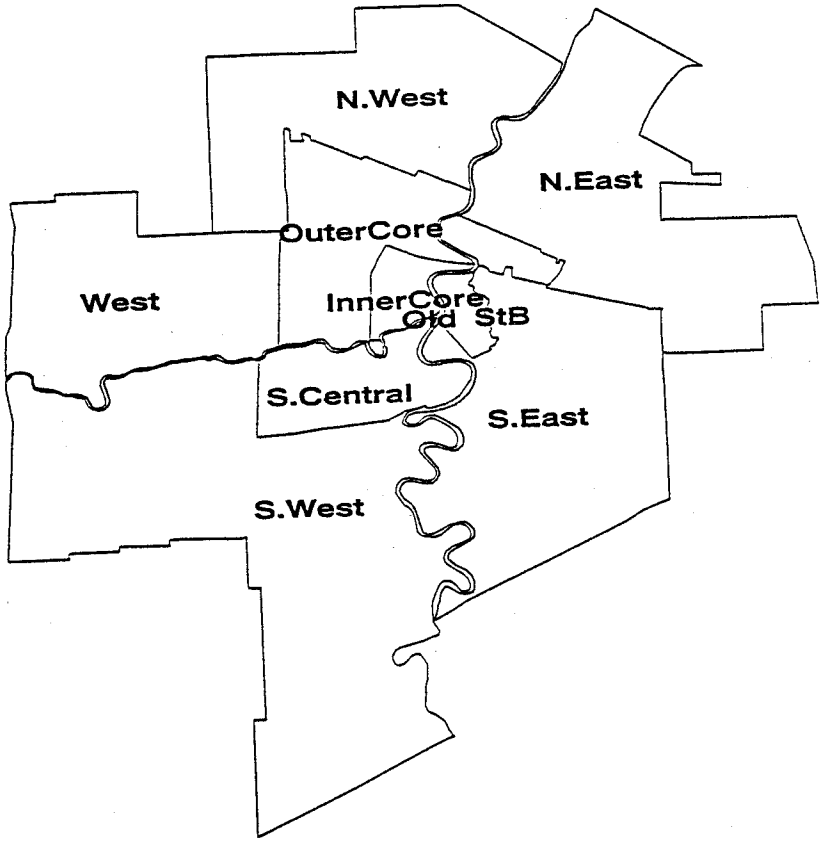


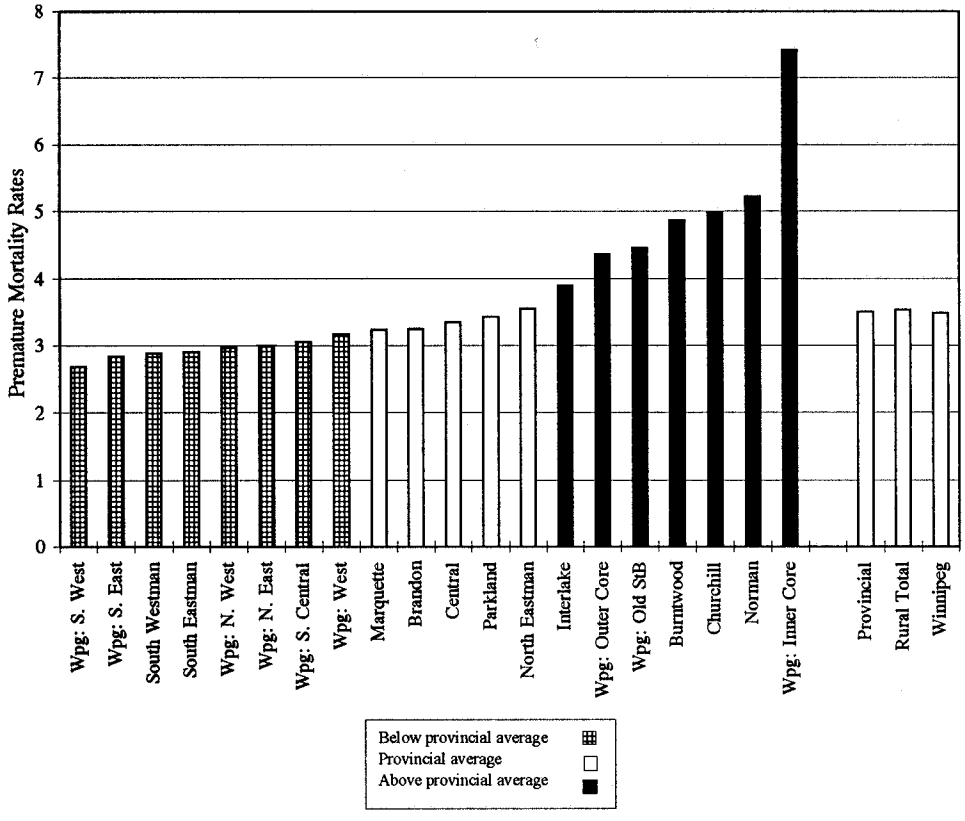
Figure 3: Map of Winnipeg Sub-Regions



physical measures used in the Health and Lifestyle Survey, including self-assessed health, number of symptoms, self-reported rheumatism and temporary sickness (Mays et al., 1992).

This project used the newly formed RHAs and Winnipeg divided into 9 areas as our units of analysis (see Figures 2 and 3). The decision to divide Winnipeg into nine areas reflects criticisms of previous MCHPE reports which treated Winnipeg as a single area, thereby masking socio-economic diversity within the city. This diversity has been related to health characteristics of residents (Roos and Mustard, 1997). Therefore, for this study, Winnipeg was divided into nine areas reflecting logical groupings of area residents according to socio-economic characteristics obtained using public census data. Unlike previous reports by MCHPE, areas adjacent to Winnipeg but were included in the appropriate RHAs.

Figure 4: Five-Year Premature Mortality Rates (Age and Sex Adjusted)



Roos et al. (1996) demonstrated that premature mortality rates varied across the 54 physician service areas of Manitoba. Figure 4 shows premature mortality rates as annual averages calculated using 5 years of data (1990-1994); clearly, considerable variation exists across the RHAs in this key indicator of population health status.

Premature mortality rates in the Winnipeg areas of South West, South East, North West, North East, South Central and West as well as South Eastman and South Westman (left, shaded grey) were significantly lower (at 95% confidence levels) than the provincial average, reflecting the good health status of their area residents. Norman, Churchill,[5] Burntwood, Interlake, as well as the Winnipeg areas of Inner Core, Old St. Boniface, and Outer Core (right, shaded black) had higher premature mortality rates, implying poorer health. Overall however, the rates for Winnipeg and non-Winnipeg residents were not significantly different from the provincial mean or from each other.

Within Winnipeg, there was considerable variation in premature mortality rates. The PMR for Winnipeg Inner Core was 2.77 times higher than Winnipeg South West. This means an individual in the Inner Core was over two-and-a-half times more likely to die before the age of 75 than someone who lived in Winnipeg South West. This variation in health status (as indicated by PMR) could be a key factor in understanding variation in need for health services and thus variation in health care expenditures if those who have poorer health status use more health services than those with better health status, as MCHPE has previously demonstrated. (Frohlich et al., 1995).

3) The third and final category of factors which may lead to observed differences in expenditures on health services across areas is the data which were used to estimate costs. Lack of true case cost information, inconsistent outpatient data and missing data all created difficulties which had to be overcome. Throughout the report these issues are discussed at some length. Where it was felt there may be biases relating to the methods, various approaches were sensitivity tested and the results reported.

[5] Churchill's population is so small that even with five years of data its rates are unstable, and although higher, the rate is not significantly different than the provincial mean.

General Methods

> *This project's mandate was to develop a method for estimating resource use by various populations, not to explain the relationship between need and utilization. All figures in the paper, unless otherwise indicated, are sorted in order of premature mortality rates, best to worst, followed by the provincial rate and then the rates for Non-Winnipeg and Winnipeg. The data are sorted in this manner for two reasons. Although no attempt was made to quantify differences in the need for health care in this report, it is incumbent on the reader to keep in mind, that underlying some of the differences in expenditures on health care across populations, are very different needs in each region. Sorting the data in this manner reminds the reader of some of the differences in need. The second reason is an aesthetic reason – it is easier for the reader if the data on the graphs are always presented in the same order.*

The methods used to compile the costs and results for each specific sector (hospital, physician, etc.) are discussed in individual sections, while the final section provides overall totals.

Expenditures per capita were calculated for each of the new Regional Health Authorities, the nine areas of Winnipeg, the province, non-Winnipeg, and Winnipeg as a whole.

The population for each area was obtained from the Manitoba registry as of December 1993 and includes all residents of Manitoba, whether or not any health service claim was made during the year (see Frohlich et al., 1994, page 99 for a more complete description).

For each section, age and sex adjusted (directly standardized) per capita rates, with 95% confidence intervals are reported first. Next, crude rates are compared to the adjusted rates. The crude rates reflect how expenditures were allocated to a region's residents while the adjusted rates allow for comparison across areas once the influence of age and sex differences

are removed. The unadjusted estimates of expenditure will likely be more useful for decision-making within the RHA.

3. SECTORS

3.1 Hospital

Dollars assigned to hospitals accounted for 54% of total Manitoba Health Expenditures in 1993/94 (Figure 1). This portion of the report deals with the hospital costs incurred by inpatient care, day procedures, and outpatient care, which together comprise 85% of the total hospital budget. Physician salaries paid by hospitals, which accounted for about 5% of the total hospital budget, were shifted from the hospital section to the physician section. Excluded from this analysis were expenditures for activities such as plant costs for non-patient activities (e.g., costs related to heating the University of Manitoba Medical School), research expenditures, capital costs, and depreciation, approximately 10% of the total hospital budget.

Table 1: Distribution of hospital budgets

Areas of allocation	Percent of total
Inpatient expenditures	59%
Day Surgery expenditures	4%
Outpatient expenditures	22%
Physician salaries	5%
Other excluded	10%
Total	100%

Manitoba has very good information on who is admitted to its hospitals for inpatient care and who gets surgery on an outpatient basis. Because each admission generates a patient specific computerized record it is possible to accurately count the hospital use of each area's residents regardless of where it takes place. However, no such system exists to describe who receives non-surgical outpatient care at Manitoba's hospitals. This is true even of such high cost services such as chemotherapy and dialysis. It was estimated that 22% of total hospital budgets were attributed to outpatient use (Shanahan et al., 1996). Since this was a significant

proportion of health care expenditures, we felt it necessary to find a way to allocate these dollars to the population rather than excluding the dollars from the project. This decision led to many challenges as is evident in the subsequent section on outpatient expenditures.

Inpatient and Day Surgery - Methods

Inpatient costs were estimated for inpatient cases in all 76 acute care facilities in Manitoba for 1993/94. As hospitals are funded using a global mechanism rather than on a case-by-case basis, a method was needed to attribute costs. The allocation of inpatient costs used the methodology developed for the Hospital Case Mix Costing Project 1991/92 (Shanahan et al., 1994). This methodology, initially used on 1991/92 and then 1993/94 fiscal year data, resulted in diagnosis-specific cost weights.

Below is a brief summary of the methodology used. A complete discussion can be found in the Hospital Case Mix Costing Project 1991/92, Appendix 1991/92 and Update 1993/94. First, two years (1991 and 1992) of hospital charge data from the Maryland Health Services Cost Review Commission were used to develop relative weights that represent the actual cost of providing care in Maryland. The relative weights were then applied to Manitoba cases with an adjustment for length of stay (which tends to be longer in Manitoba than in Maryland). Using these weights, the assumption was made that relative costs in Maryland are, on average, similar to relative costs in Manitoba.

Since there are numerous diagnoses, it was not reasonable to determine cost estimates for each one. Therefore, we used a case-mix classification system known as Refined Diagnostic Related Groups (RDRG Version 7.0/11.0, Health Systems Management Group, 1993). This system groups patients together who are similar clinically in terms of diagnosis and in consumption of resources during treatment. The RDRGs allow for differing levels of severity based on complications and co-morbidities within similar diagnostic groupings.

In addition, the methodology adjusted for cases that were classified as non-acute (using service codes found on patient abstracts[6]), long-stay outliers, deaths, and transfers. Every case that was in the hospital during 1993/94 had a case weight that reflected diagnosis, complications or co-morbidities, length of stay, non-acute status, and whether or not a transfer was involved or if the hospitalization ended in death. The hospital specific cost per weighted case (CWC) was determined by summing all case weights at each hospital and dividing the sum into the hospital's total inpatient budget. Specific case costs were estimated by multiplying a given case weight by the CWC in the hospital where the care was provided.

Day surgery costs were estimated using the CIHI Day Procedure Grouper (DPG) to classify cases and apply appropriate weights (CIHI 1994). The DPG weight was then multiplied by the CWC for the hospital providing the care to obtain an estimated cost per case.

Currently, hospitals are not required to file abstracts for outpatient encounters or day procedures that do not involve an anaesthetic or an operating room, although some hospitals choose to do so for their own purposes. For consistency, we used only those day procedures that were filed consistently by all hospitals. Of the 26% allocated to outpatient services, $39 million (4% of the total hospital budget or 15% of outpatient expenditures[7]) was allocated to outpatient surgery for which hospital abstracts were routinely available.

For each area, the costs for day procedures were combined with the inpatient costs. Per capita expenditures were calculated using the totals and population as of December 1993.

All costs that could be attributed to non-residents were removed so these costs would not be inappropriately attributed to Manitoba residents. This is important when the use by non-residents varies from one RHA to another; in Churchill and Norman, for example, considerable care is provided to non-residents. Payments for care provided to Manitoba residents in out-of-province settings were included[8] so that total costs for residents of

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[6] Not all hospitals use these codes. For hospitals which did not use them consistently, an algorithm was used to designate cases as non-acute based on hospital's reports of long-term care days. This is documented in the Update to Hospital Case Mix Costing 1993/94.

[7] The other 85% is discussed in the section on outpatient expenditures.

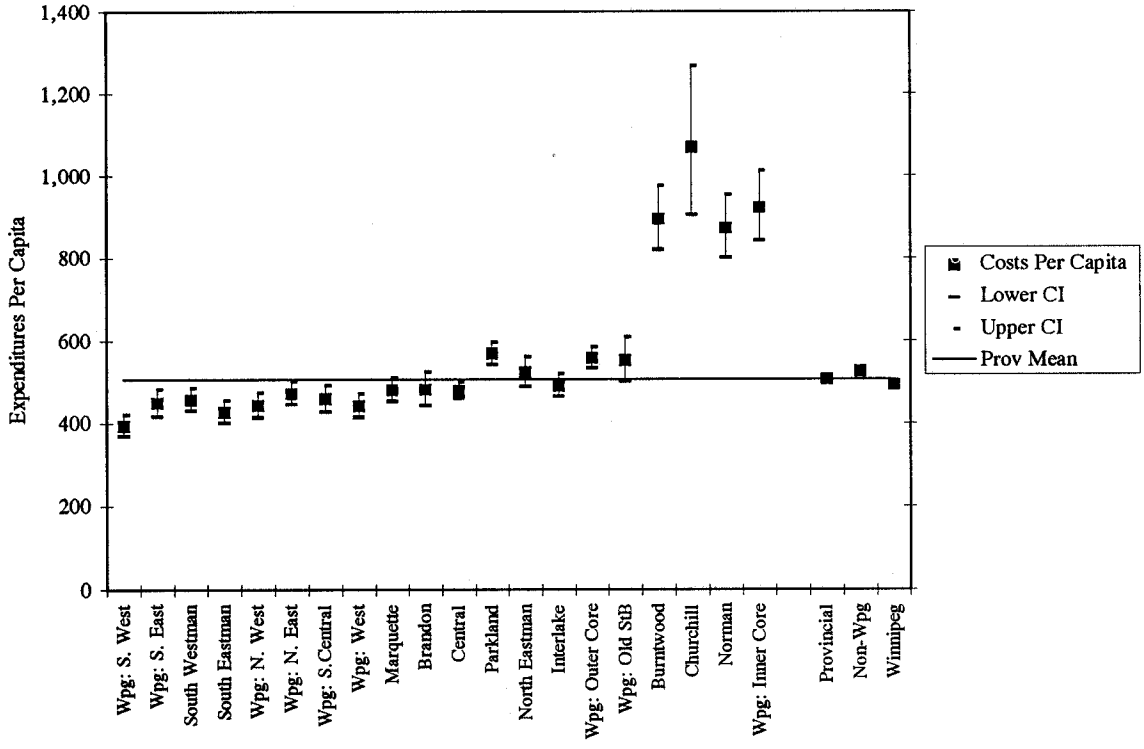
[8] This was done using total payments to provinces and the claims for these services.

Manitoba could be calculated. This is important when the use of out-of-province care varies across RHAs.

Results - Hospitals: Inpatient and Day Procedures

After age and sex adjustments, per capita expenditures on inpatient care for Winnipeg residents were, on average, 3% lower than the provincial average. For non-Winnipeg residents expenditures averaged 4% higher (Figure 5 and Table A1). A confidence interval for any area which overlaps the horizontal line indicates the area is not significantly different than the provincial average.[9]

Figure 5: Inpatient Hospital Expenditures Per Capita, Hospital CWC, Adjusted Rates, 1993/94



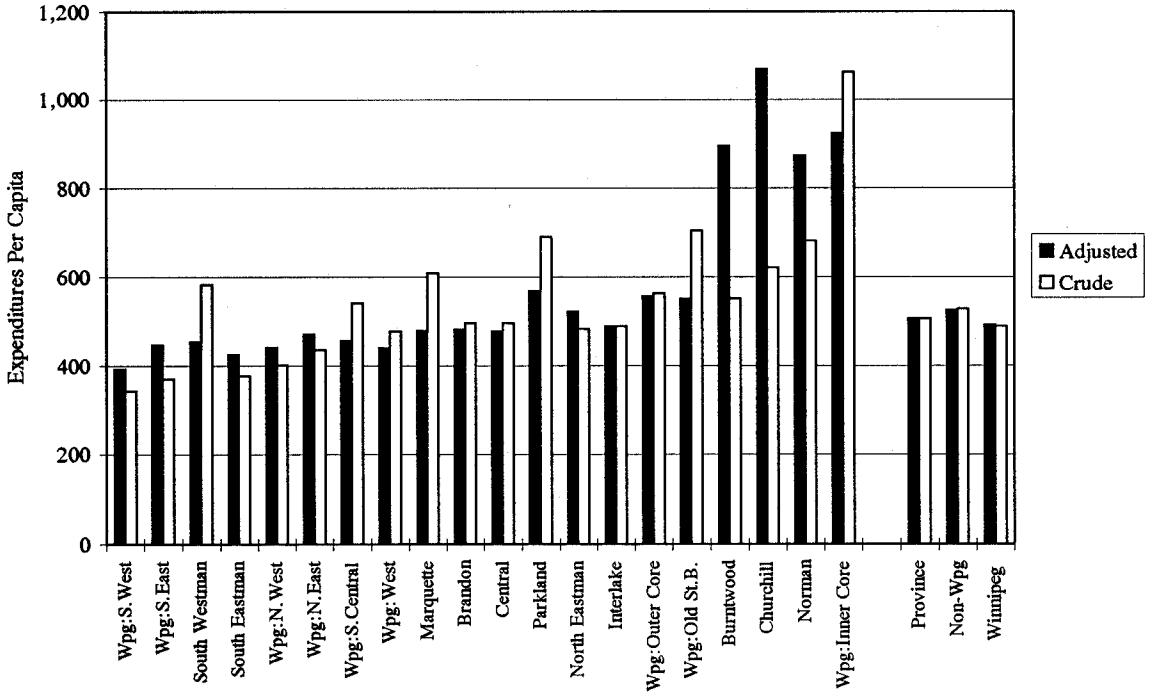
Variations within Winnipeg were considerable: Winnipeg South West had 22% less expenditures per person on inpatient hospital care per capita than the provincial average, while Winnipeg Inner Core had 82% more than the provincial average. The rural areas varied from

[9] A 95% confidence interval level modified to account for multiple comparisons was used.

16% below the provincial average in South Eastman to 112% above the provincial average in Churchill.[10]

There were 6 areas (two in Winnipeg: Winnipeg Outer Core and Winnipeg Inner Core and four rural RHAs: Parkland, Norman, Churchill and Burntwood) where the costs were statistically significantly greater than the provincial average, and nine areas (six in Winnipeg: South West, South East, North West, North East, South Central, and West and three RHAs: South Eastman, South Westman, and Central) that fell below the provincial average.

Figure 6: Inpatient Hospital Expenditures Per Capita, Hospital CWC, Adjusted and Crude Rates, 1993/94



As the intent of this project was also to explore the distribution of expenditures across Manitoba for the year 1993/94, crude rates are also shown. This will allow understanding at the regional level as to how residents are utilizing health services. Figure 6 (Table A1) contains crude and adjusted rates. It is clear from this figure why the adjustment for age and

[10] Churchill's small population, unique geographical location and the fact that a considerable portion of the care provided in its only hospital leads to both data and interpretation difficulties. We endeavoured to remove all costs attributed to non-Manitoban's use of the Churchill hospital, but this was difficult to do. This should be considered when examining any data for Churchill.

sex is necessary when comparing regions. We see the same pattern evident in previous MCHPE work: (Black, 1993; Frohlich, 1994) when areas with younger populations (Burntwood, Norman, and Churchill) are adjusted to remove age and sex differences, the costs per capita increase; in areas with older populations (Marquette, Parkland, South Westman, and the Inner Core area of Winnipeg), the per capita costs decline.

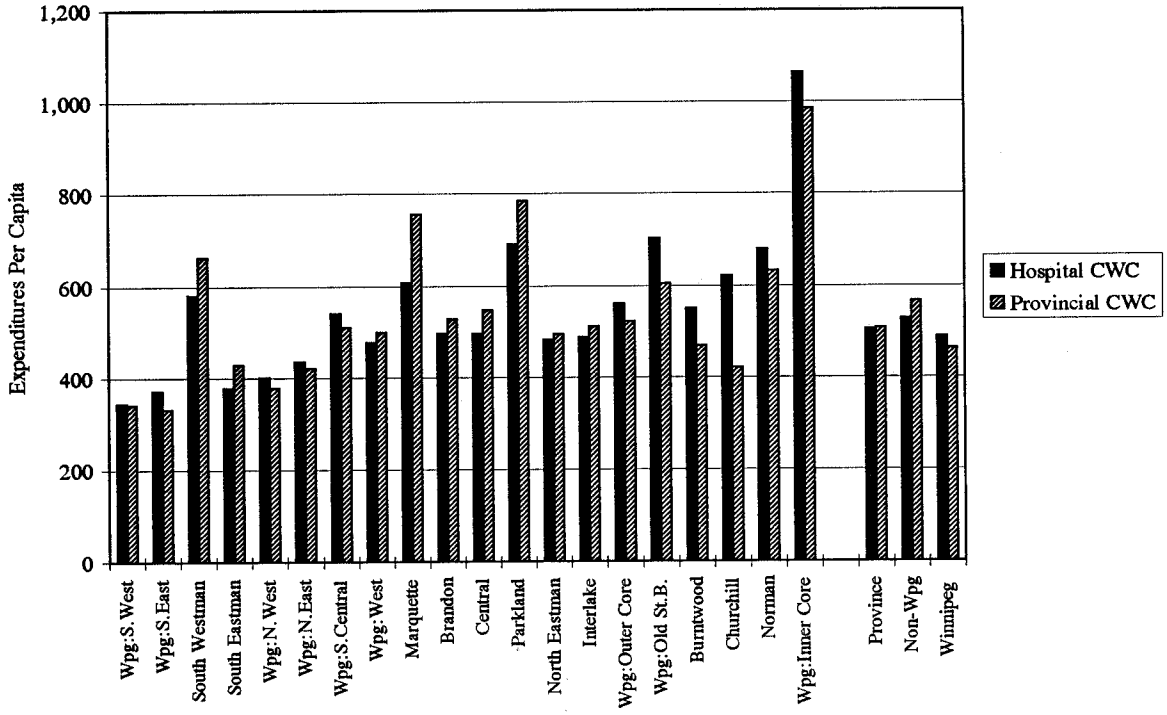
Comparison of Methods: Provincial Average Versus Hospital-Specific CWC

Shanahan et al. 1994 found after adjusting for types of cases treated, some hospitals appeared to provide more costly care, reflecting differences between hospitals' average CWC of up to 180% above and 83% below the provincial average. Some of these differences may be attributed to teaching or tertiary costs, costs of delivering care in northern locations, possible differences in resource use between Manitoba and Maryland locations, as well as any efficiency differences. In order to provide some insight as to the impact of these differences on the overall distribution of hospital dollars, we calculated an overall provincial average cost per weighted case. This provincial average CWC, which was calculated by summing all provincial inpatient dollars and dividing by total provincial case weights. Comparisons could then be made between the two methods where hospital specific costs were factored out and the only thing which mattered was the type of case.

The provincial and hospital CWCs were used to explore whether hospital specific costs affected per capita distribution. In other words, was a higher-than-average per capita expenditure in an area a reflection of elevated hospitals costs in the area? Or did this higher-than-average per capita expenditure result from increased acuity or increased use of the system?

The results in Figures 5 and 6 (Table A1) used the CWC of the hospital where the care was provided, multiplied by the case weight, to determine the costs. One would assume that if an area received most of its care from a more expensive facility, this would be reflected in overall per capita costs.

Figure 7: Inpatient Hospital Expenditures Per Capita, Comparing Hospital and Provincial CWC, Crude Rates, 1993/94



When the provincial average CWC was used to allocate expenditures (Figure 7, Table A2), the distribution of dollars was altered. Many Winnipeg areas, especially those located closer to the teaching hospitals, and the northern areas of the province had lower per capita expenditures when the provincial average rather than the actual hospital CWC was used. When the assumption was made that the cost of providing care for an average patient (case weight equal to 1) was the same across all hospitals, the per capita expenditures decreased by 10% in Winnipeg South East, 14% in Old St. Boniface, 17% in Burntwood, and 35% in Churchill (see Table 2). The use of the provincial CWC decreased expenditures attributed to the Inner Core by 9%. The use of this provincial average CWC explains 22% of the difference between the Inner Core and the Provincial average per capita expenditure, consistent with earlier findings that the hospitals used by these individuals are indeed more expensive than average. It is also important to remember that the expenditures in the Inner Core are still 66% higher than the average even if the provincial CWC is used, suggesting that

higher utilization and increased acuity[11] of illness are also key factors in driving these higher expenditures. This is the area which has been demonstrated as having the highest need as indicated by the PMR.

Expenditures in several RHAs would increase if all care was provided at the provincial average cost (i.e. hospital care received by these residents was on average at a cost lower than the provincial average). For example, costs would increase by 13% in South Westman and Parkland, 15% in South Eastman and by 23% in Marquette using the provincial average CWC.

Table 2: Comparison of different methods of determining costs, adjusted rates

Areas	Adjusted per capita, hospital CWC ($)	Adjusted per capita, provincial average CWC ($)	% difference between hospital and provincial CWC
Wpg: South West	394	393	0%
Wpg: South East	448	401	-10%
South Westman	456	516	13%
South Eastman	426	492	15%
Wpg: North West	442	419	-5%
Wpg: North East	471	460	-2%
Wpg: South Central	458	430	-6%
Wpg. West	441	460	4%
Marquette	480	592	23%
Brandon	481	512	6%
Central	479	527	10%
Parkland	569	643	13%
North Eastman	523	543	4%
Interlake	490	514	5%
Wpg: Outer Core	558	519	-7%
Wpg: Old St. Boniface	552	476	-14%
Burntwood	894	744	-17%
Churchill	1,071	696	-35%
Norman	873	809	-7%
Wpg: Inner Core	923	844	-9%
Provincial	506	508	0%
Non-Winnipeg	525	563	7%
Winnipeg	492	467	-5%

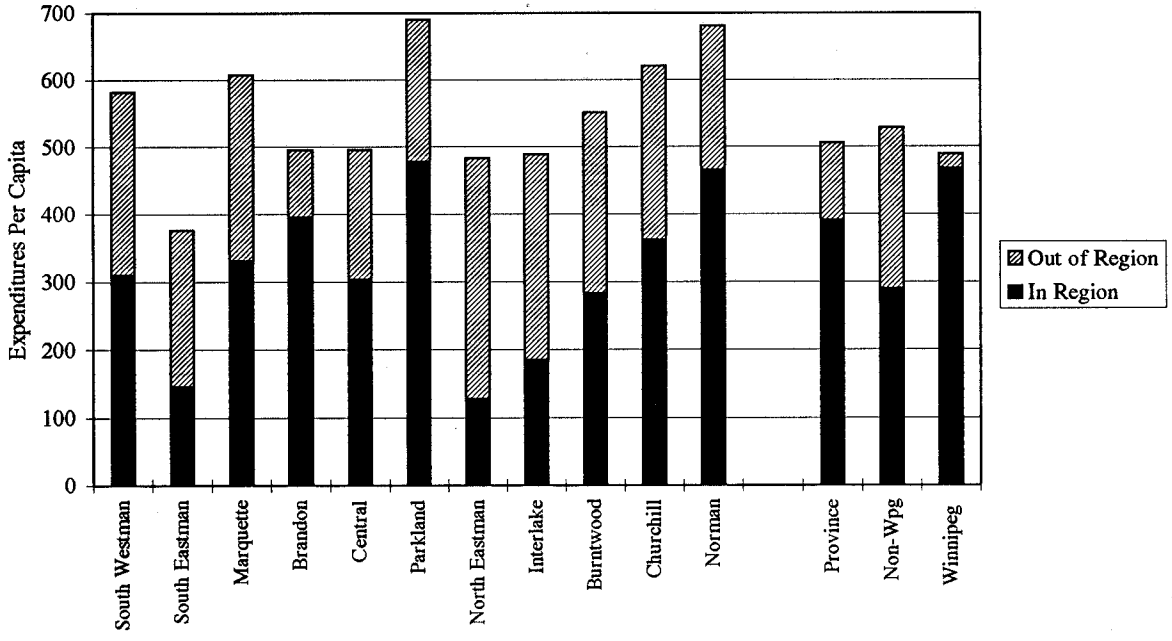
[11] Increased acuity means higher case weights attributed to the case and therefore higher costs.

Overall, costs for rural areas would increase by 7% while Winnipeg costs would decrease by 5%. The costs in the table are adjusted rates.

Where is care provided?

For planning purposes, decision makers in RHAs must understand not only the amount of care provided to their residents, but whether or not that care was provided within the RHA or elsewhere. Figure 8 shows that some areas (Brandon, Norman, Parkland and Winnipeg) provide the majority of care for their residents, while others (North Eastman, Interlake, Burntwood and South Eastman) depend heavily on other RHAs for care. Most of this care was provided in Winnipeg, although Brandon provides a substantial amount for several rural areas.

Figure 8: Where Do Residents Get Their Care?
In and Out of Region Expenditures on Inpatient Care,
Hospital CWC, Crude Rates, 1993/94



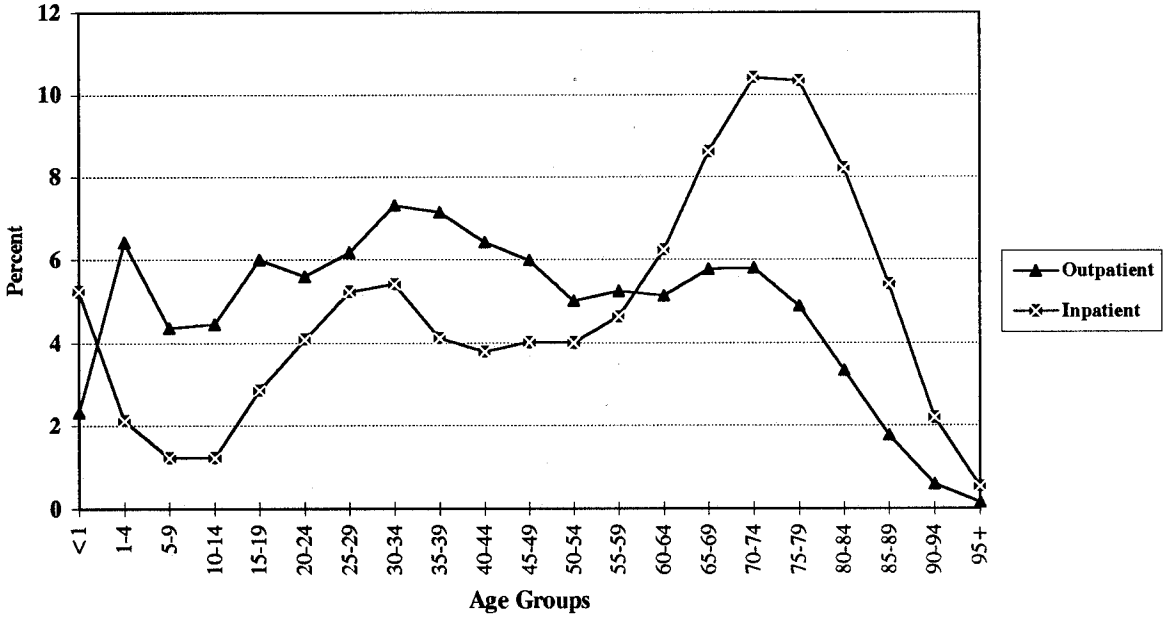
Outpatient Expenditures - Methods

As previously indicated, there are *no* consistent or comprehensive claims data identifying who receives what type of service in emergency departments or outpatient clinics. Since outpatient

expenditures, excluding day surgery, account for 22% of total hospital expenditures, we felt it was imperative to make an effort to include these in our estimates of population expenditure patterns.

Two different methods were used. The first allocated outpatient dollars for each hospital based on inpatient discharges from the hospital (referred to as the *inpatient proxy)*. If a population in a RHA had 60% of a given hospital's inpatient cases, that RHA was allocated 60% of the hospital's outpatient costs. This method has been used by other jurisdictions such as Saskatchewan Health in developing their provincial funding formula because of lack of consistent outpatient data.

Figure 9: Distribution of Outpatient Expenditures Using Inpatient Cases versus Outpatient Visits at Selected Manitoba Hospitals



To test whether the inpatient proxy method was accurate, we used physician claims for outpatient care that were available for 33 hospitals. This allowed us to more accurately identify the individuals who received care in a given hospital. We were then able to identify and therefore allocate outpatient expenditures to individuals who actually visited the outpatient department rather than estimating this allocation based on those who received inpatient care. Figure 9 compares the results, for selected hospitals, of allocating expenditures

using inpatient proxy or outpatient claims by age of the patient. It appears that the use of inpatient data alone overestimates the resources used by the elderly population and underestimates the resources used by those under the age of 45. This information combined with an *a priori* belief that individuals are more likely to get their outpatient care within an RHA led us to try to develop a methodology which would more closely proximate the actual use of resources by a given population.

In addition to our concern that the inpatient proxy methodology would lead to a higher allocation of dollars being attributed to older populations, thus underestimating expenditures for areas with younger populations, another concern focused on outside use of major hospitals. The residents of some RHAs may use Winnipeg or Brandon hospitals for a considerable amount of inpatient care, but not necessarily for outpatient care; if this indeed is the case there could be an overallocation of urban hospital resources to rural populations using the inpatient proxy.

To attempt to overcome these difficulties a second method (referred to as the *combined method*) was used to incorporate the best information available from each hospital. For the 33 hospitals for which we had outpatient claims we used the method outlined in the previous paragraph; dollars were distributed proportionately based on claims for services submitted by physicians who worked in the hospitals' ambulatory care setting. This group included the two tertiary hospitals. Sixty-nine percent of total hospital outpatient dollars fell into this group (see Table 3).

Table 3: Distribution of outpatient expenditures by source for the combined outpatient allocation method

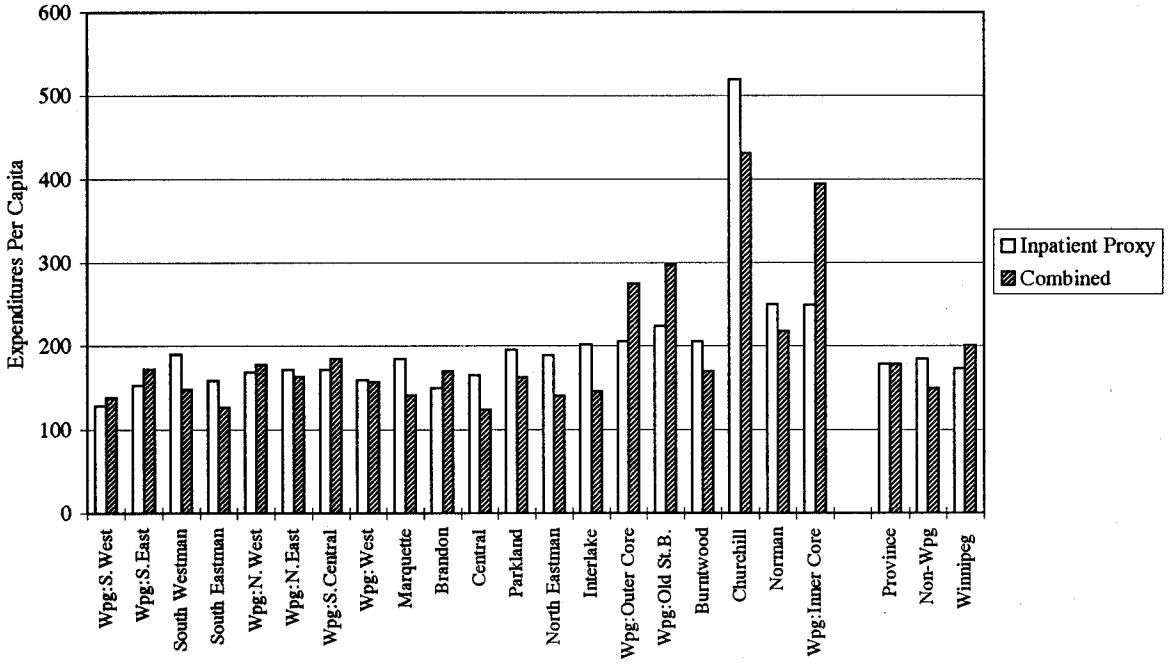
Source of data	Percent of total outpatient dollars	Number of hospitals
1. Outpatient claims	69%	33
2. Urban community emergency room study	19%	5
3. Inpatient and day surgery claims	12%	38

Hospitals where physicians did not file claims data were dealt with in one of two ways. For the five Winnipeg community hospitals, data from the Emergency Room Use in Winnipeg Hospitals 1991/92 Study (Barer et al., 1994) was used to assign outpatient expenditures. Sample chart data from 55 days during the year were collected and weighted to reflect the total emergency use in a year. Dollars were distributed throughout the areas in our study based on the utilization found in the Emergency Room Study. For example, if 5% of Hospital X's sample was female, aged 64 to 75, from Winnipeg South Central, then 5% of the outpatient expenditures from that hospital were allocated to that population.

For the remaining 38 hospitals (representing 12% of outpatient dollars), inpatient and day surgery[12] cases were used to allocate expenditures, since no other reliable data were available.

The combined method is the preferred method, as it allowed allocation to what we felt more closely represented the actual users of the outpatient departments. This, therefore, is the method used throughout the paper, although there are comparisons between the two methods (Figure 10 and Tables A3, A4).

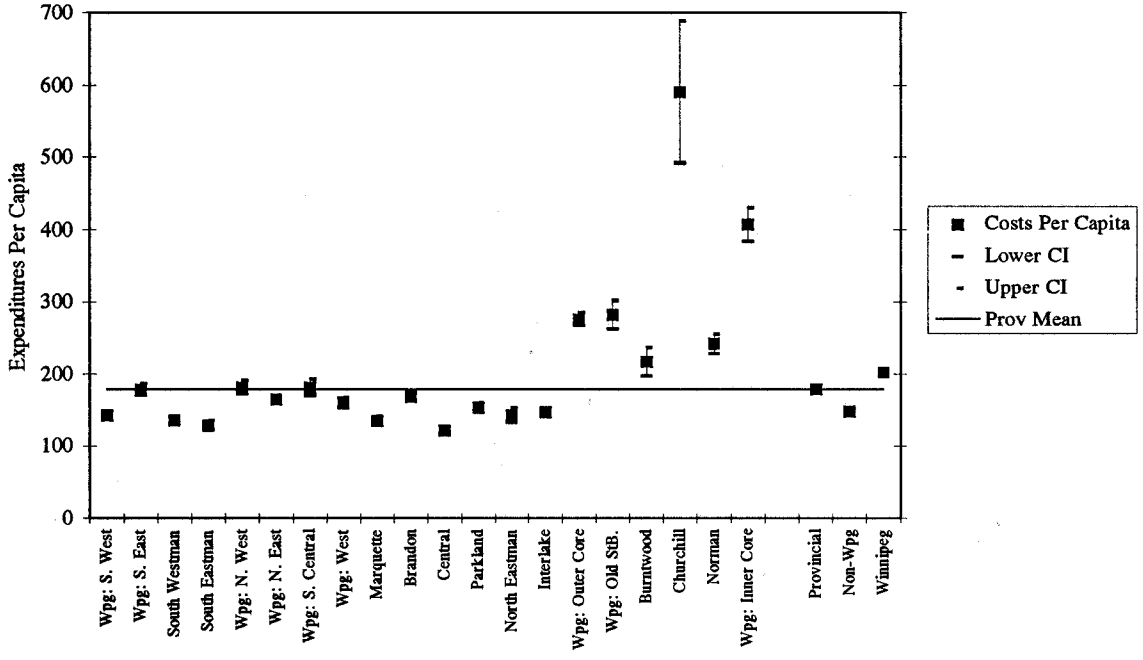
Figure 10: Outpatient Hospital Expenditures Per Capita, Two Methods of Allocating: Inpatient Proxy and Combined, Crude Rates, 1993/94



[12] Day surgery was used although not included in Figure 9.

A comparison of the results from the two methods show that dollars were indeed distributed differently. When allocation was based on physician claims data, residents of Winnipeg and Brandon were attributed more expenditures, while residents of rural Manitoba were attributed fewer expenditures.[13] Because this represents a significant amount of health expenditures obtaining more consistent outpatient data is essential.

Figure 11: Outpatient Hospital Expenditures Per Capita, Combined Method, Adjusted Rates, 1993/94



Results - Outpatient Hospital Expenditures

Per capita expenditures on outpatient care were greater for residents of Churchill,[14] Inner Core, Outer Core, Old St. Boniface, Norman and Burntwood than the provincial average (Figure 11). The per capita expenditure on Winnipeg residents was 36% greater than for non-Winnipeg residents. This may be due to higher staffing levels and higher general availability of

[13] Outpatient expenditures attributed to residents of the Inner Core, Outer Core and Old St. Boniface all increase by more than 20% using the Combined Method, while outpatient expenditures decrease by 20% in South Westman, South Eastman, Marquette, Interlake and Parkland. The effect on the total expenditures of each of these methods is demonstrated in the Summary.

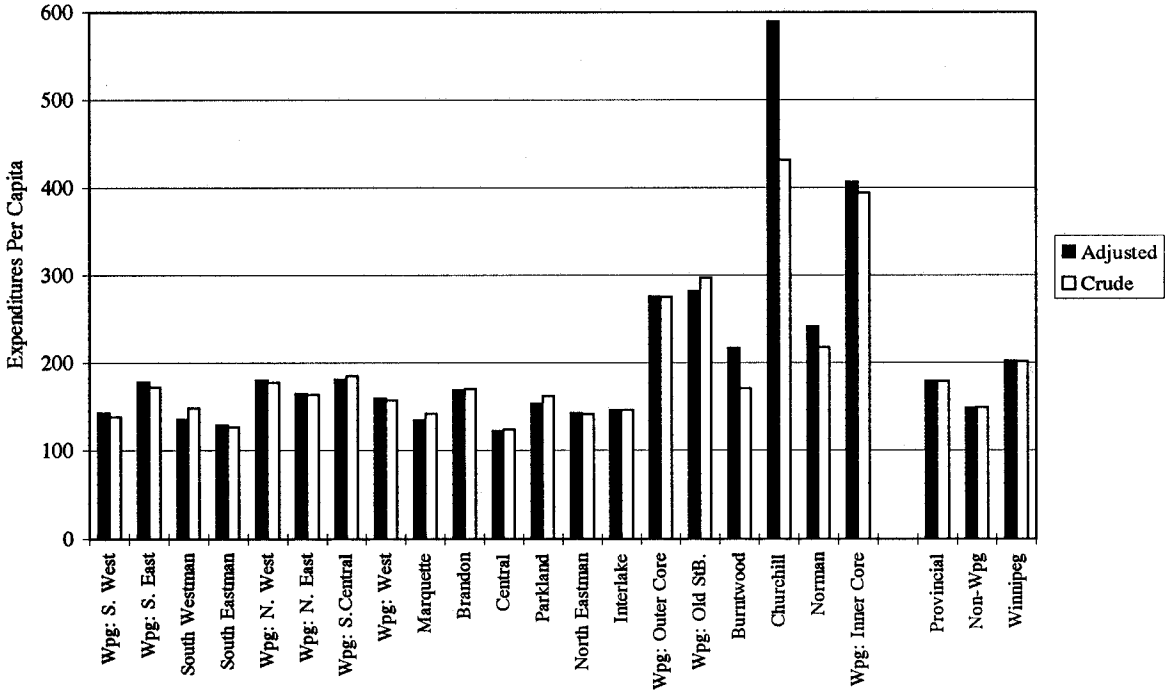
[14] An effort was made to extract costs which could be attributed to non-residents use of the outpatient and emergency departments of Churchill hospital, but the possibility remains that not all costs attributable to non-residents were excluded.

technology in the larger hospitals. While not all cases treated as outpatients require this additional technology or skill level, it is necessary when the hospital functions as a provincial or regional resource.

The variation across areas may also be due to the different demands for health services or use of outpatient department in hospitals for primary care by some high need populations such as the Inner Core residents. Unfortunately, these speculations cannot be fully addressed without more complete outpatient data.

A comparison of crude and adjusted rates for outpatient expenditures (Figure 12) shows a similar but less dramatic pattern than for inpatient expenditures. Once again we see that areas with younger populations our estimates of expenditures are very different depending whether we use crude or adjusted expenditures.

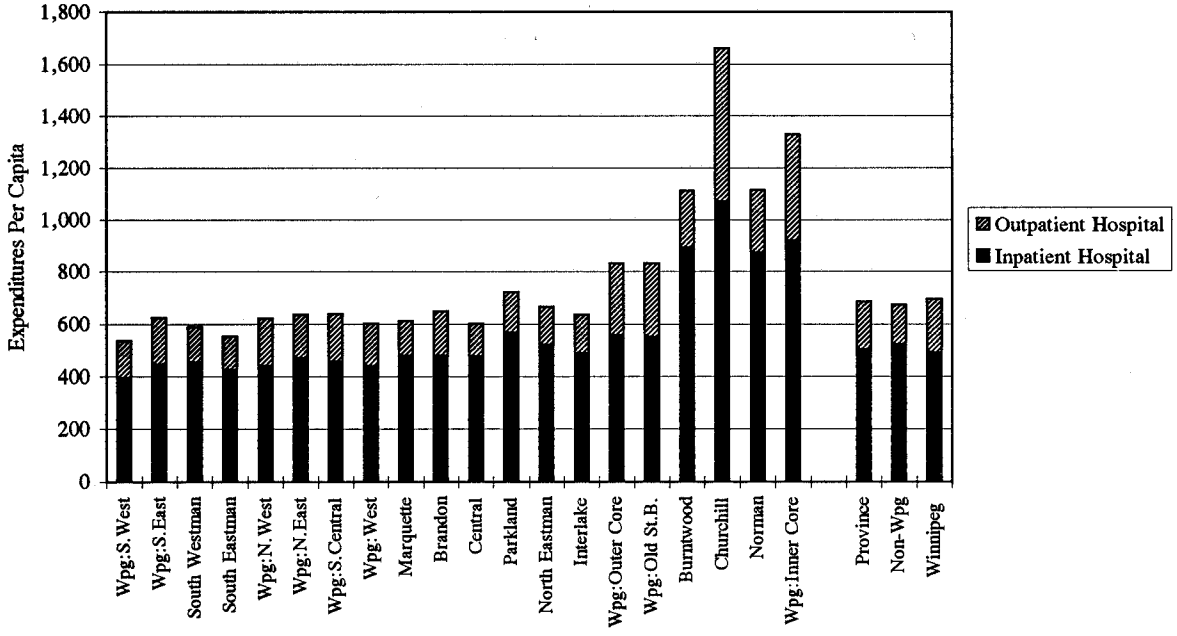
Figure 12: Outpatient Hospital Expenditures Per Capita, Combined Method, Adjusted and Crude Rates, 1993/94



Hospitals: Total Expenditures

When inpatient and outpatient expenditures were combined and adjusted for age and sex differences, the per capita expenditure for Winnipeg residents at $694 was 1% above the provincial average of $685 (Figure 13 and Table A5). By comparison, per capita expenditure on non-Winnipeg residents at $673 was 2% below the provincial average. Again, a wide range across the areas of Winnipeg was evident. Winnipeg South West was 22% below the provincial average and Inner Core was 94% above the provincial average. Non-Winnipeg areas ranged between South Eastman at 19% below and Churchill at 137% above the provincial average.

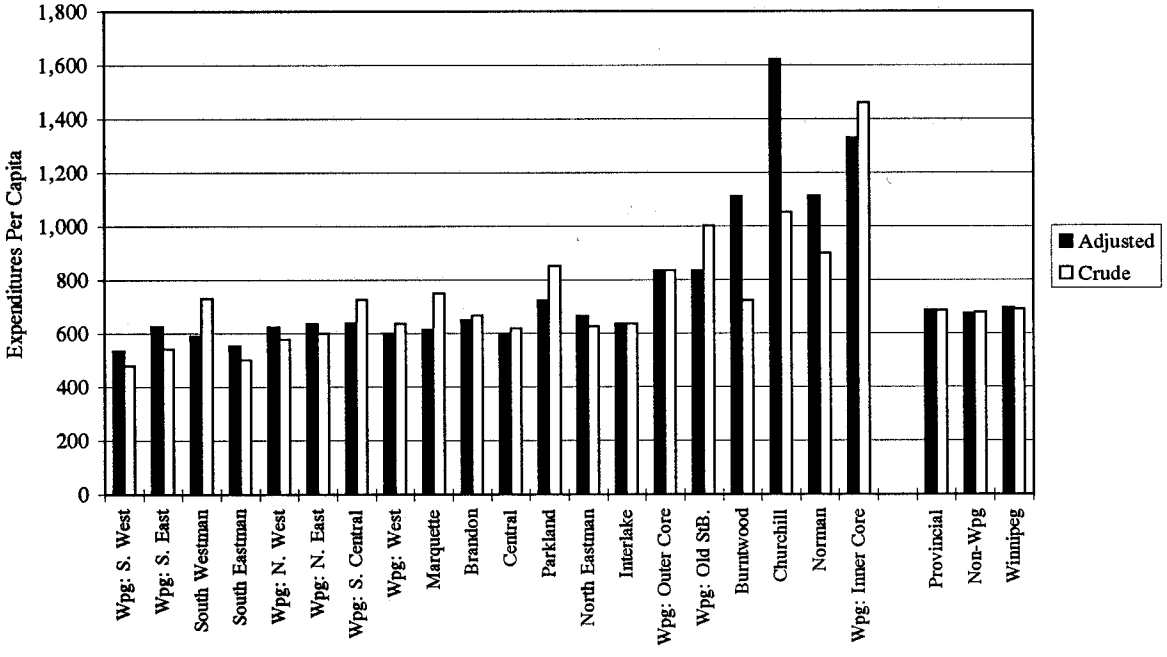
Figure 13: Total Hospital Expenditures Per Capita, Inpatient and Outpatient, Hospital CWC and Combined Outpatient Method, Adjusted Rates, 1993/94



The distribution between inpatient and outpatient use of acute care hospitals varied. Winnipeg Inner Core, the Outer Core, and Old St. Boniface consumed 31% to 34% of hospital expenditures as outpatient care, while Burntwood and Central used only 20%.

Figure 14 and Table A5 provide the comparison between the adjusted and crude expenditures, demonstrating the now-familiar relationship between crude and adjusted rates. The crude rates of expenditures, in the white bars, are the best estimate of what was actually spent per resident of the various areas in 1993/94 for the provision of care in acute hospitals.[15] It is important to remember that this includes all hospital care received by residents, whether it occurred within the region or outside. The adjusted rate is the best estimate of what would have been spent if each region had the same population structure as the provincial average.

Figure 14: Total Hospital Expenditures Per Capita, Adjusted and Crude Rates



Clearly, the areas which had higher premature mortality rates (Inner Core, Norman, Churchill, Old St. Boniface, Burntwood, and Outer Core) had higher per adjusted capita expenditures on hospital care. Alternatively, the eight areas which had premature mortality rates significantly lower than the provincial average were 7% to 22% below the provincial average. This suggests that, on average, for areas with higher needs as measured by premature mortality rates, the province spent more per capita providing hospital care.

[15] This excludes capital and depreciation and non-patient activities.

This is a notable finding, but it's important to note that it does not rule out other reasons for differences in expenditures. For example, other factors such as tertiary and teaching costs, geographical isolation or other provider-related factors may have influenced these patterns. It is also important to note that the need for health care is expected to vary within an area; this report does not address whether those in an area who need more care are actually the ones receiving the care.

3.2 Personal Care Home (PCH) and Long Term Care (LTC)

Personal Care Home

There were 8,924 personal care beds (4,944 beds in Winnipeg and 3,980 outside of Winnipeg) at 122 licensed PCHs in Manitoba in 1993/94 (Annual Report, Manitoba Health, 1993/94). The budget for PCHs in 1993/94 was $252 million or 14% of the Manitoba Health expenditures (Figure 1).

Methods

The budget for Deer Lodge Centre, which contains a PCH and a long-term care hospital (LTC), was split between the two areas. The budget for the hospital portion of Deer Lodge Centre[16] was included under Institutional Long Term Care (see discussion later in this section) and the remainder attributed to the PCH sector. Community Therapy Services and South Central Therapy Services costs were added to the PCH budget where applicable. Once capital costs and Deer Lodge Hospital costs were excluded, $213.2 million or 84.6% of the total PCH budget remained to be allocated to the population. (See Table 4).

Table 4: PCH expenditures

	Expenditures (in millions of dollars)	Percent
Capital costs	$22.2	8.8%
Deer Lodge Hospital	$16.6	6.6%
Allocated by study	$213.2	84.6%
Total	$252.00	100.0%

[16] The total budget for the hospital portion was obtained from the HS-1 form for Deer Lodge hospital.

Net Manitoba Health payments to each PCH, minus capital and debt repayment, were allocated across days of care. The net payments include sessional physician payments totalling $185,000, and pharmaceutical costs. Premiums paid by residents and federal payments for Status Natives were not included in these payments as we are allocating expenditures by Manitoba Health.

When allocating PCH costs to facility residents, it was important to ensure that costs were allocated based on the level of care received by each individual. Three levels of care were used in this project: Level 1, the lightest level of care; Level 2; and a combined Level 3 and 4, the heaviest levels of care. Levels 3 and 4 were combined because during the study year provincial payments for the two levels were the same.

Utilization data and expenditure data were combined to allocate expenditures to the residents. Utilization data were obtained from computerized Manitoba Health records on 1993/94 PCH residency.[17] These data were used to determine the bed days for each level of care for each PCH. Financial information was obtained from the LTC division at Manitoba Health and the Manitoba Health 1993/94 Annual Report.

An average cost per day was developed for each level of care for every PCH. These average costs were applied to appropriate days and attributed to the individuals based on residence (PCH location). Analyses conducted using the admission location to allocate expenditures is provided later in this section.

The steps for the calculation of the average cost per day are as follows:

1. Total budgets for all non-proprietary free-standing PCHs[18] were divided into expenditures that were deemed to be 'variable', those which increase as the level of care required increases and 'fixed' expenditures, those which are constant across all levels of care. Variable costs include nursing department and activity staff costs. Fixed expenditures

[17] Unlike hospital records, PCH data are not separation-based data, but include information at year end on all individuals who have been in a PCH during the year.
[18] Total budgets were not available for all PCHs. Therefore, the total budgets were only used to determine distribution of variable and fixed costs.

include supplies, food, plant operations, administration and housekeeping.[19] On average, the variable expenditures at non-proprietary free-standing PCHs were 57.53% of total costs with fixed costs comprising the remainder.

2. These proportions were applied to the net Manitoba Health payment for each PCH. The variable expenditures in each PCH were then allocated based on the nursing staffing guidelines for various levels of care in place at the time.

   The following formula was used to allocate both fixed and variable expenditures:

   $VC_j = TVC_j/((.5*\text{level 1 days}_j) + (2*\text{ level 2 days}_j) + (3.5 * \text{ level 3\&4 days}_j))$

   $FC_j = TFCj / \text{total days}_j$

   where

   VC_j = variable cost at PCH_j where j is a specific PCH

   TVC_j = total variable costs[20] at PCH_j,

   PD_{ij} = average cost per day for level i at PCHj, where i is a specific level of care

   FC_j = fixed costs for PCHj

   TFC_j = total fixed costs for PCHj

   The average cost per day for each level of care at each PCH were then calculated as follows:

   PD_j Level 1 = $(0.5 * VC_j) + FC_j$

   PD_j Level 2 = $(2 * VC_j) + FC_j$

   PD_j Level 3&4 = $(3.5 * VC_j) + FC_j$

Results

The average costs were allocated to the appropriate days in each PCH and then summarized across regions. The ultimate goal of this project was to sum all expenditure data across the areas. Therefore, it was necessary to summarize the costs per 1,000 total population. Despite age and sex adjustments, there was considerable variation across the areas (see Figure 15 and

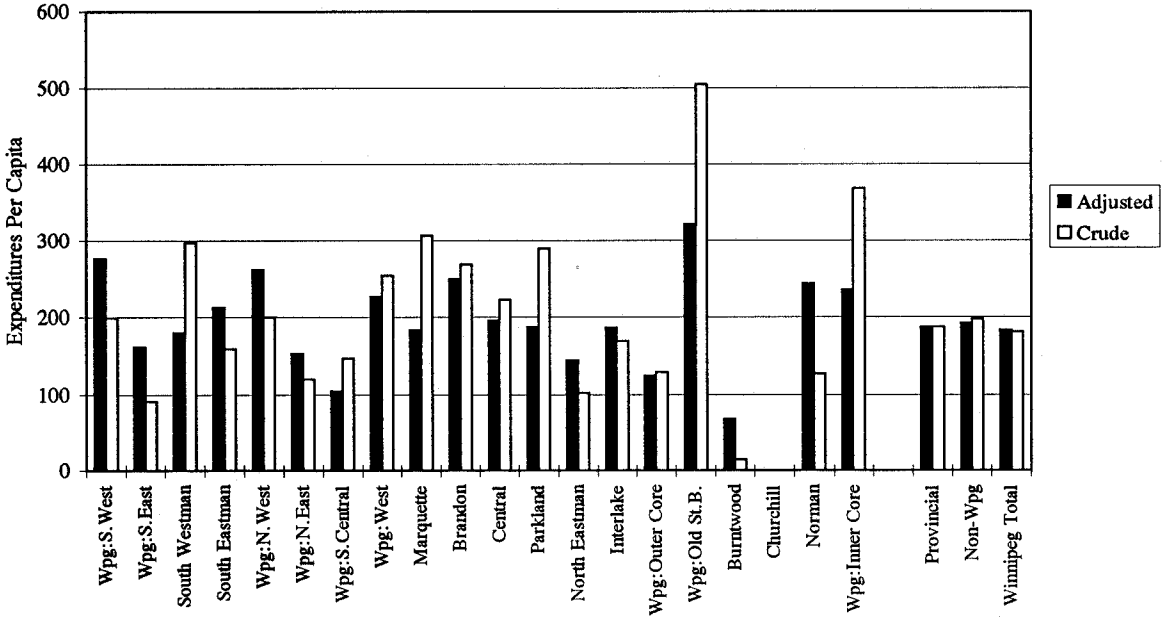
[19] This categorization of 'variable' and 'fixed' costs were similar to that used by the Long-Term Care Division of Manitoba Health in a recent examination of costs at PCHs.

[20] Expenditures and costs are used interchangeably here, even though budget information is being used.

Table A6) but less variation between Winnipeg and non-Winnipeg. The per capita expenditure was 5% lower in Winnipeg than non-Winnipeg.

In order to explore variation across the areas, we compared expenditures per 1,000 population aged 75 years and older, included federally-funded PCHs on Indian Reserves, and analyzed whether using individuals' location immediately prior to admission to PCH, as opposed to the PCH location, provided different results.

Figure 15: Personal Care Home Expenditures Per Capita, Adjusted and Crude Rates, 1993/94

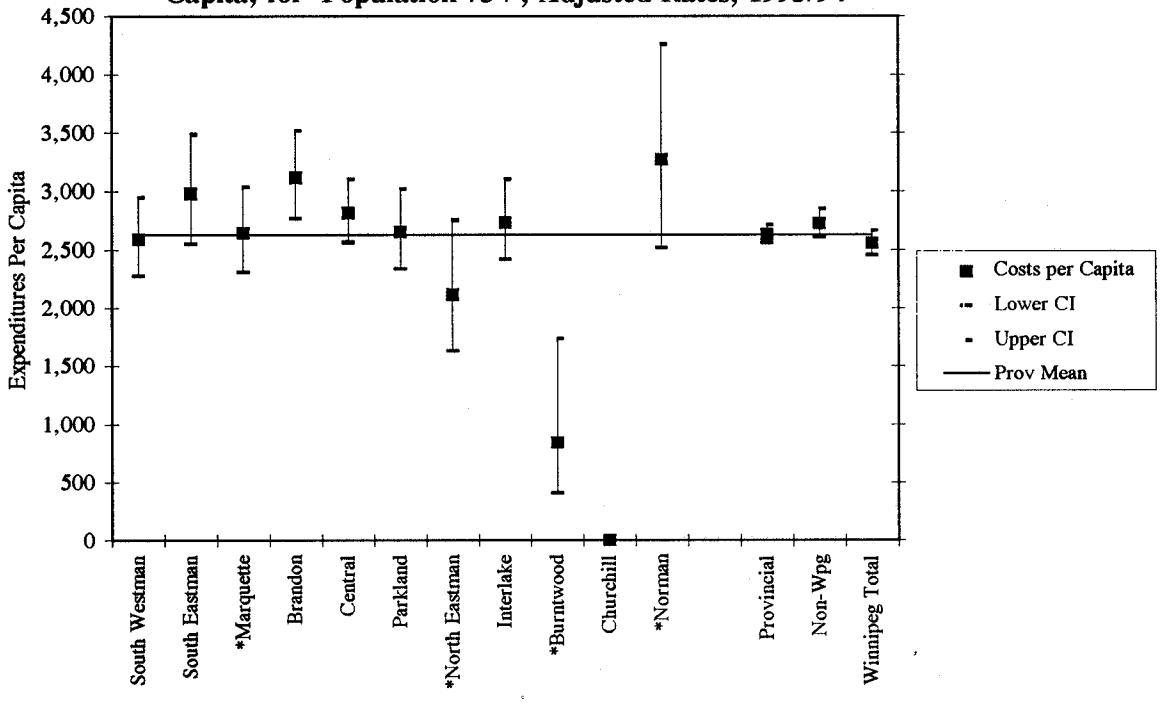


*Have federally funded PCH beds which were not included here

The variation between the various RHAs decreased when the per capita expenditure (Figure 16) was calculated using only the elderly population (age 75+). Winnipeg, non-Winnipeg, and all RHAs except Burntwood, North Eastman[21] and Brandon were statistically equivalent to the provincial average. Brandon was above the provincial average while the other two were below.

[21] Churchill has no Personal Care home beds and, as will be shown later, Burntwood, North Eastman, Marquette, and Norman all have some federal PCH beds.

Figure 16: Personal Care Home Expenditures Per Capita, for Population 75+, Adjusted Rates, 1993/94



*Have federally funded PCH beds which are not included here

This suggests that the historically-strong emphasis on population-based planning when funding PCH beds has provided a relatively even distribution of PCH beds in the province for the elderly. In this analysis, Winnipeg was treated as a single area because the elderly have access to all PCHs within the city.

The data under analysis in this project were provincial expenditures for the total population of Manitoba. As an aside, it is useful in the analysis of PCH expenditures to examine the effect of including federally-funded PCH beds on Indian Reserves.[22] This is a useful exercise because the aboriginal population is in the denominator of the rates calculations and the result provides a truer picture of expenditures in the north. There were 184 federal PCH beds in 1993/94 not included in the Manitoba database. Nine were occupied by non-Manitoba residents and were excluded from the analysis.

[22] For the other sections such as hospital and physician utilization, all utilization by MB residents is captured in the provincial databases. This is not the case for federally-funded PCHs.

Detailed information on individuals residing at the federal PCHs, occupancy rates, and expenditures related to each facility were not available. Costs of federal PCHs were estimated to see what effect the inclusion of these beds have on the picture. An occupancy rate of 95% was assumed and the mean Level 2 per diem was applied to all days. As a sensitivity test, a Level 2 per diem was applied to 50% of days and Level 3 to the remainder.

Figure 17: PCH Expenditures Per Capita (all population) with an Adjustment for Federal PCH, Crude Rates, 1993/94

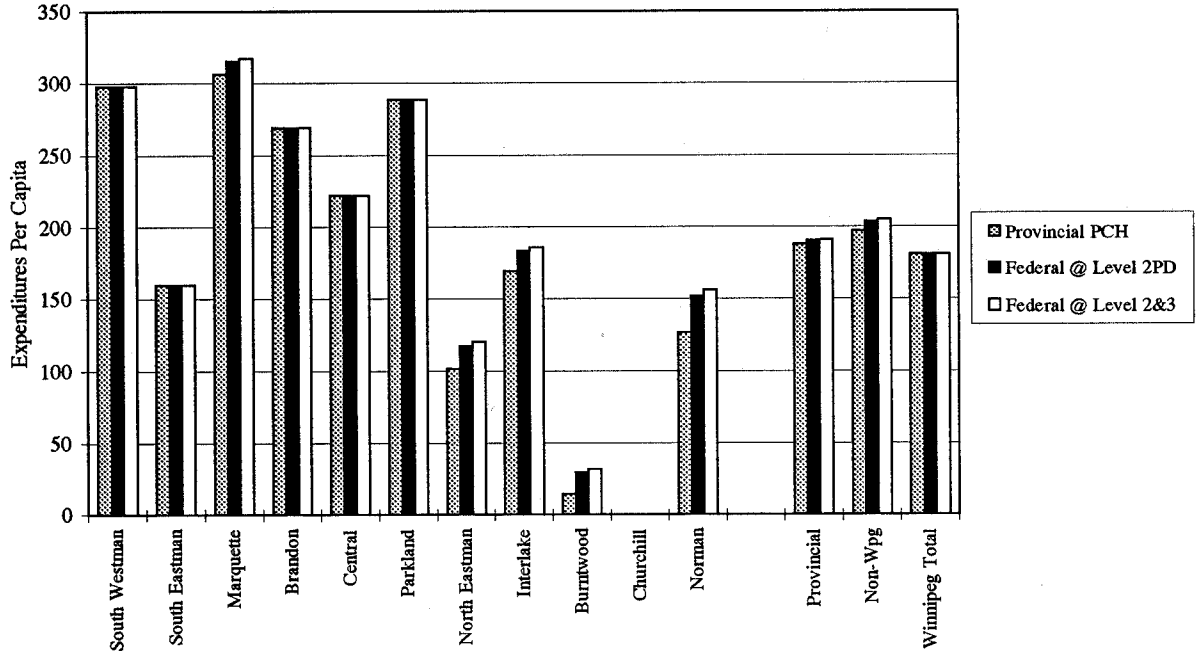


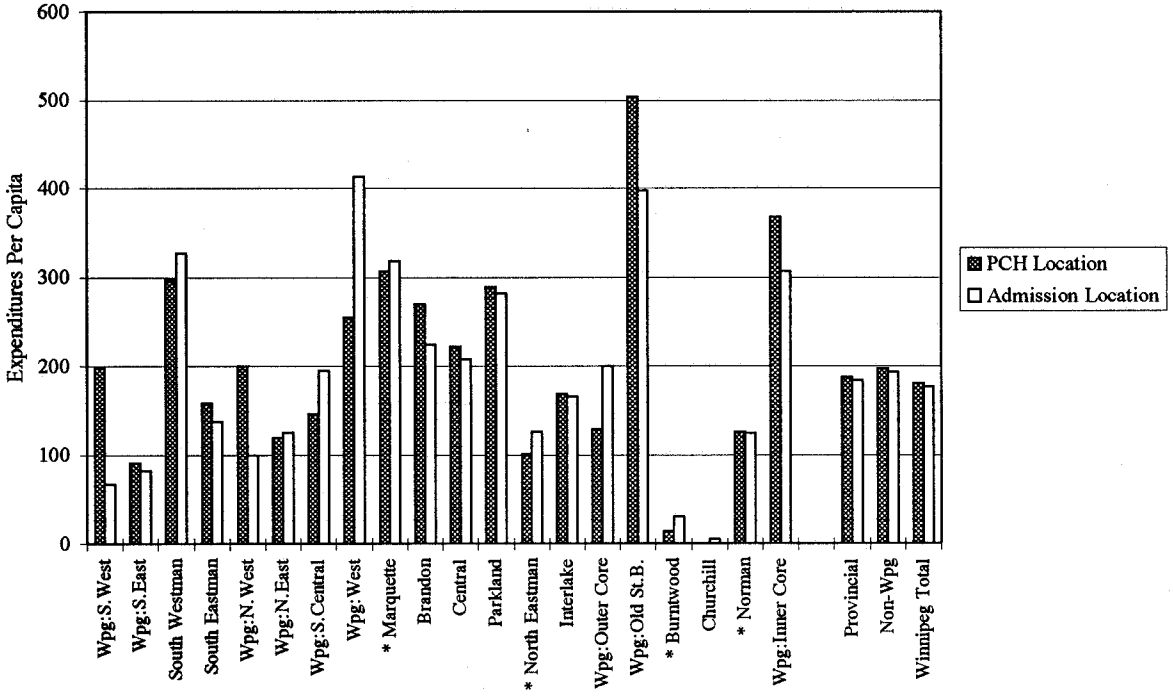
Figure 17 illustrates the results. When federal PCH costs were included the per capita expenditure doubled in Burntwood but was still below the provincial average. There was a 20% increase in Norman and a 15% increase in North Eastman with an overall 2% increase in the provincial average. This underscores the importance of including *all resources* available to a region when planning for its population.

An issue which may be contentious as regionalization progresses is the responsibility for residents. In other words, how long is an RHA responsible for its residents after they move from an area? This is particularly important with respect to long-term care. The movement of individuals who require significant health services for a prolonged period could cause a

financial strain on any region receiving more of these individuals than it loses. In order to address this issue we undertook the following analysis.

As previously indicated, the PCH address was used for allocation purposes. However, in order to deal with the issue of movement between areas, the Manitoba Health Registry was used to determine an individual's postal code before admission to a PCH. If someone became a resident of a PCH prior to 1974 (the earliest date data were available), they were given the address of the PCH. We were unable to determine original postal codes for a small number of people and thus, the per capita expenditure varies slightly at the provincial level.

Figure 18: PCH Expenditures Per Capita, A Comparison Using Admission and PCH Location, Crude Rates, 1993/94



What is clear is that there were some areas from which people moved and others to which people moved (Figure 18) and Table 5. Earlier MCHPE work determined that there was no significant movement to Winnipeg from rural areas (DeCoster, 1993) and this work confirms that finding. There was however significant movement into Brandon from the rural areas. South Westman, Marquette, North Eastman and Burntwood all had movement out. Parkland,

Central and South Eastman, as well as Brandon all had movement in; in other words these areas would have had lower per capita expenditures if the admission postal code was used to allocate expenditures rather than the PCH address.

There was also considerable movement within Winnipeg (see Table 5). This factor is important when one is exploring total expenditures on health care across the city. Two areas may be identical in other utilization but different overall, because one has several PCHs and the other has none. Given the different rates of expenditure on PCH care across the city ($91 per capita in Winnipeg South East to $504 per capita in Old St. Boniface), it was important to understand what proportion of the variation was due to a net surplus (more in than out).

It is clear that in Winnipeg South East the demand for PCH was low as there was little difference between the per capita expenditure if the PCH address ($91) versus the admission postal code ($83 per capita) was used. In other areas, such as Winnipeg South West, there was almost three times the expenditure if the PCH address was used versus the admission postal code. Expenditures fell by about one-third in Winnipeg West and the Outer Core if the PCH address was used, suggesting more people moved out of the area then into it.

This analysis illustrates that while movement between Winnipeg and Non-Winnipeg was stable, movement between RHAs and within Winnipeg was considerable. Whether or not the RHA should be responsible for its residents once they move into an institution such as a PCH must be debated by the stakeholders. Further analysis should be conducted to allow an appropriate decision.

The ratio of PCHs to admissions tells us whether there was movement into or out of a region to enter a PCH (if the ratio was <1, then there was movement out of an area).

Table 5: Comparison of PCH per capita expenditures using the PCH address versus the individual's postal codes upon admission

Regions	PCH address per capita rate ($)	Admission location per capita rate ($)	*Ratio of PCH address to admission location
Wpg: South West	199	68	2.95
Wpg: South East	91	83	1.11
South Westman	297	327	0.91
South Eastman	159	138	1.15
Wpg: North West	200	100	2.01
Wpg: North East	120	126	0.95
Wpg: South Central	147	195	0.75
Wpg: West	254	413	0.61
Marquette	306	318	0.96
Brandon	269	224	1.20
Central	222	208	1.07
Parkland	289	282	1.02
North Eastman	102	126	0.80
Interlake	169	166	1.02
Wpg: Outer Core	129	200	0.65
Wpg: Old St. Boniface	504	397	1.27
Burntwood	14	31	0.46
Churchill	0	5	0.00
Norman	126	125	1.01
Wpg: Inner Core	368	307	1.20
Provincial	188	184	1.02
Non-Winnipeg	197	193	1.02
Winnipeg Total	181	177	1.02

* The first two columns have been rounded but the ratios were calculated prior to rounding therefore the ratios may not be exactly the same if calculated using printed numbers.

Institutional Long Term Care (LTC)

For this project, Deer Lodge Hospital, Riverview Health Centre, Cartwright and Hartney Hospitals (the last two are both located in South Westman) were classified as providing institutional long term care. The latter two hospitals were included in this category as they were excluded from previous work on acute care facilities. (Black et al., 1993; Shanahan et al., 1994).

Expenditures at Deer Lodge[23] and Riverview Hospitals are as reported on the HS-1 (Hospital Statistics Part 1) forms by the facilities. These data were used, and like hospitals, capital costs and depreciation excluded. Unlike the acute care hospitals, medical salaries were included. Total expenditures for Cartwright and Hartney hospitals were obtained from the Manitoba Health Annual Report 1993/94. Patterns were calculated using the expenditure data and total days, and used to allocate expenditures to the individuals who received care in these facilities (See Table A8).

The total expenditures from all of these facilities was $48.8 million; $44.5 million was spent on Winnipeg residents. The variation in the per capita rates was considerable and reflects the location of the facilities.

Figure 19: PCH and Long Term Care Hospital Expenditures Per Capita, Adjusted Rates, 1993/94

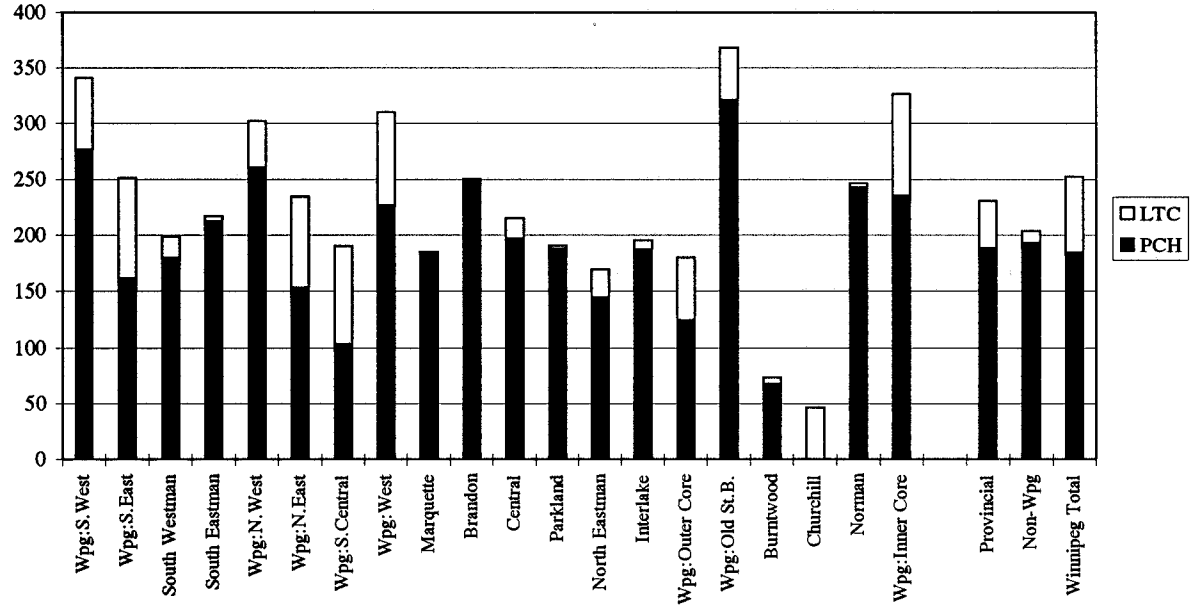


Figure 19 combined PCH and the institutional long term care per capita rates. Areas such as Inner Core and Old St. Boniface which had high PCH expenditures also had high LTC per capita expenditures.

[23] This amount was subtracted from the total budget as reported in the Manitoba Health Annual Report 1993/94 and the remainder attributed to the PCH portion of the facility.

3.3 Physician

Physician expenditures accounted for 16% of Manitoba Health's total expenditures in 1993/94 (see Figure 1). The amount changes to 17.5% of total expenditures when salary and sessional payments were shifted from the hospital budgets to the physician category.

Physician utilization and expenditures with respect to ambulatory care have been examined in other reports by the MCHPE (Roos et al., 1996; Tataryn et al., 1994). This report includes both inpatient and outpatient expenditures. Physicians who are paid on a fee-for-service basis file a claim for each service rendered and are responsible for their operating costs. Other physicians receive salary or sessional payments. Tataryn et al. (1994) estimated that between 90 and 98% of all ambulatory contacts and consequently expenditures were captured with claims data. The situation, however, is not as clear for inpatient contacts.

Sixty-two million dollars were spent on physician salaries and sessional payments in 1993/94 (source - Manitoba Health). These payments are for a variety of services such as total care in the community, public health, emergency rooms, intensive care units, pathology and radiology. Some of the physicians receiving payment in this manner, especially those in rural hospitals, file evaluation claims.[24] However, many do not, making analysis of total physician payments incomplete. We know that approximately $40 million of these salaries were reported on the hospitals' HS-1 forms (Hospital Statistics, Part 1). These expenditures were excluded from the previous hospital section and are included in this physician section.[25]

In order to capture as much of the physician expenditures as possible we have included the following:

- all fee-for-service physician payments by Manitoba Health for inpatient and ambulatory care (1994/95 radiology billings were used for Winnipeg hospitals as 1993/94 was an incomplete year of data for hospital radiology);

[24] They report services rendered to a patient but they are not paid according to these claims.
[25] There are exceptions to this - $4.3 million of physician payments were included in the sections on Mental Health Hospitals , Long -Term Care facilities, and PCHs.

- all available evaluation claims for inpatient and ambulatory care (tariffs were applied to provide an estimation of the costs[26]);
- salaries for emergency room physicians in the five Winnipeg community hospitals and four rural hospitals in Selkirk, The Pas, Flin Flon, and Thompson;
- salaries for intensive care physicians;
- salaries paid to physicians working at LTC facilities[27];
- salaries paid to physicians employed at mental health hospitals including Brandon Mental Health Hospital, Selkirk Mental Health Hospital, and Eden Health Centre (included in Mental Health section)[27];
- salaried anaesthetists.

These expenditures account for approximately 93% of all payments to physicians in the province. Payments not captured include those to pathologists, salaried rural radiologists, hospital administrators who are physicians, Manitoba Cancer Treatment and Research Foundation, Public Health, and some mental health physicians.

Methods

Fee-for-service and evaluation claims for ambulatory services have been used in previous MCHPE reports (Roos et al., 1996; Tataryn et al., 1994). The method for dealing with these claims was relatively straightforward, but the inclusion of salaried and sessional data was more complex.

The first step was to determine what salaries were not captured in the claims data.[28] We then decided how to allocate the salaries across the population using available data. A brief discussion of the decision-making process for each of the allocations can be found below. Further information on the methodology can be obtained from the researchers.

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[26] The sum of all services rendered may over- or underestimate the actual salary paid to a physician for the provision of those services.
[27] These payments are included in the Mental Health and LTC sections.
[28] It was possible to check whether evaluation claims were submitted for salaried and sessional work. Specific checks were made for salaried anaesthetists and emergency room physicians

Intensive Care Salaries

Salaries paid to physicians working in intensive care units (ICUs) were allocated to cases which spent days in the intensive care unit at the hospital that paid the salary. In the case of hospitals that had separate intensive care units for neonates, paediatrics and adults, the salaries were attributed to the appropriate populations (e.g., paediatric physician intensive care unit salaries were allocated to children who spent days in an intensive care unit). This methodology does not adjust for various levels of care received by patients in an intensive care unit but treats each day the same. Therefore over or under allocation may have occurred; however, we attempted to allocate dollars that would otherwise not be captured.

Anaesthetist Salaries

In Winnipeg and Brandon Hospitals, anaesthetists were paid by salary and sessional payments as well as fee-for-service. The total salaries and sessional payments were allocated to cases which most likely used their services. In some instances, the payment indicated whether it was for obstetrical or surgical anaesthesia. For hospitals with no indication, information from the 1992 Anaesthesia Report (Atkinson, 1992) was used to understand how anaesthetists were paid in each hospital at that time. The claims data were used to verify whether this information was still current.

Obstetrical anaesthesia salaries were allocated to all cases admitted for an obstetrical diagnosis, even though some may not have required the services of an anaesthetist and others required substantial services. When the salaries were for general anaesthesia, the dollars were allocated across all cases with a surgical diagnosis. This is clearly a simplification, as some individuals may have had more than one procedure requiring an anaesthesia during a given hospital admission and not all surgeries require an anaesthetist for the same length of time. Nevertheless, when combined with the fee-for-service payments, this information results in the capture of all anaesthesia payments in Manitoba.

Emergency Room Salaries

Salaries paid to emergency room physicians in the five urban community hospitals and the four rural hospitals were allocated to individuals in the same manner as outpatient hospital costs.

For urban community hospitals, emergency room sample data was used. For rural hospitals, costs were allocated based on all known utilization of the hospital - primarily inpatient and day surgery procedures. Prior to the allocation of dollars to the population, an estimated amount was attributed to out-of-province residents' use of the facility.[29]

Radiology

In 1993/94, Winnipeg hospitals began keeping computerized records of all radiology services, but not all hospitals began at the same time. In order to avoid bias, where records were unavailable early in the year, 1994/95 claims were used as a proxy for 1993/94 patterns. This provided a complete year for all urban hospitals and allowed the inclusion of salaries paid to radiologists. Non fee-for-service expenditures from rural radiology were not captured.

Interns and Residents

For completeness, the salaries of interns and residents were included. These were initially excluded from acute care hospital costs but, as they are a legitimate part of health care costs, they were included in this analysis. Although the primary payer for these services was the Health Sciences Centre, 60% of the total amount was allocated to cases treated at the Health Sciences Centre and 40% to cases treated at St. Boniface, based on information provided by the University of Manitoba Medical School. Other facilities reported small amounts which were allocated across cases at these facilities. The salaries were allocated on a case weighted basis to individual cases.

Results

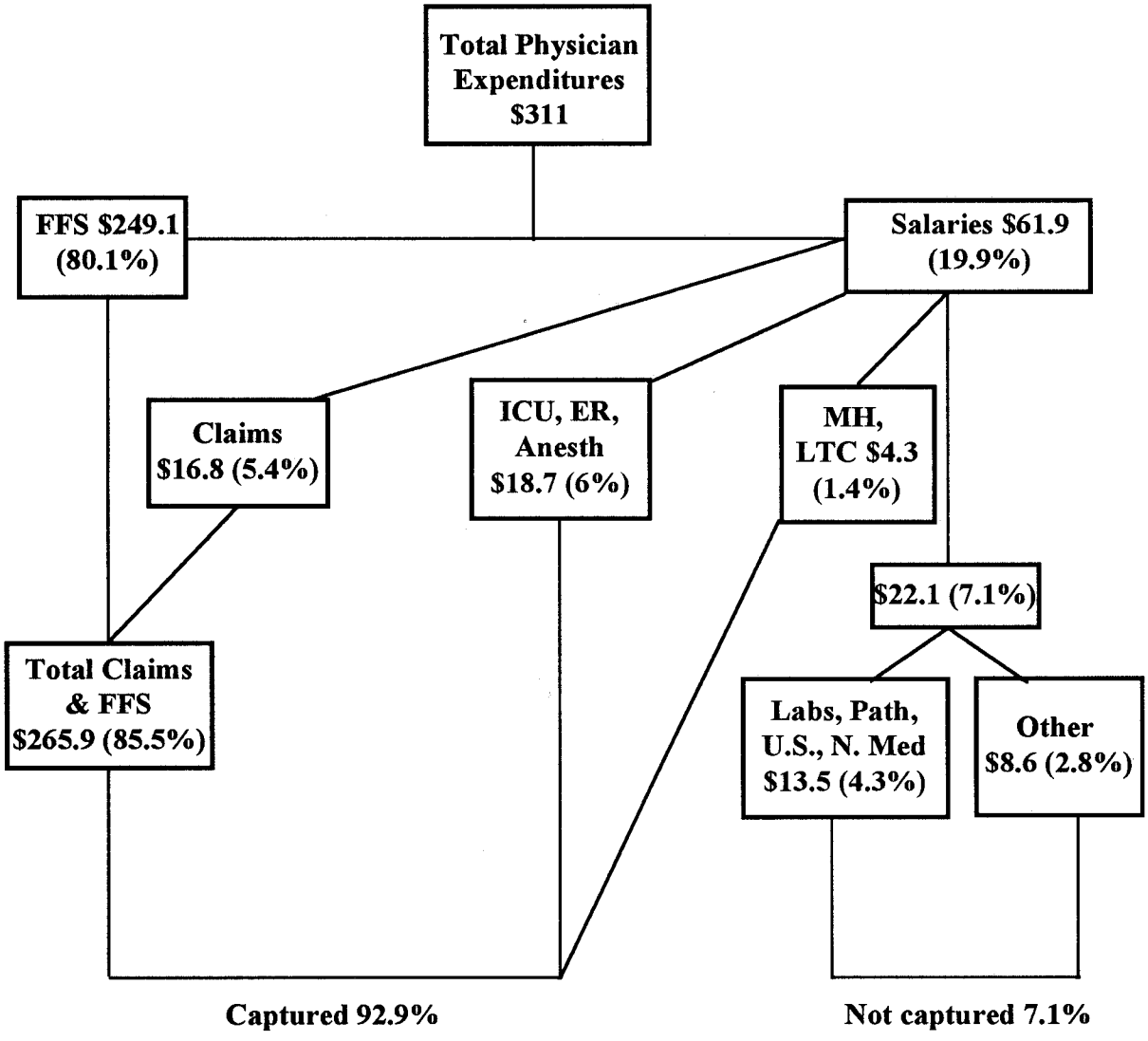
Figure 20 provides a breakdown of expenditures. Of the estimated $311 million physician payments (salaried, sessional, and fee-for-service[30], $266 million (85.5%) was fee-for-service and evaluation claims data and $18.7 million (6%) was for salaries allocated to physicians working in Emergency Rooms, Intensive Care Units, and as anaesthetists. This was not the total paid to physicians working in these areas. In many instances, there were also fee-for-

[29] The available outpatient data or inpatient case data was used to determine the proportion attributed to out-of-province residents.

[30] This is different from the $255 million in the Manitoba Health 1993/94 Annual Report, because it includes medical payments recorded in the Hospital budgets as well as other medical salaries.

service payments which were captured in the fee-for-service section. In total, $22.1 million (7%) was not included in this study. Some of the key areas not captured were pathology, ultrasound, nuclear medicine, rural Laboratory and Imaging Services, the Manitoba Cancer Treatment and Research Foundation, some psychiatry, and hospital administration.

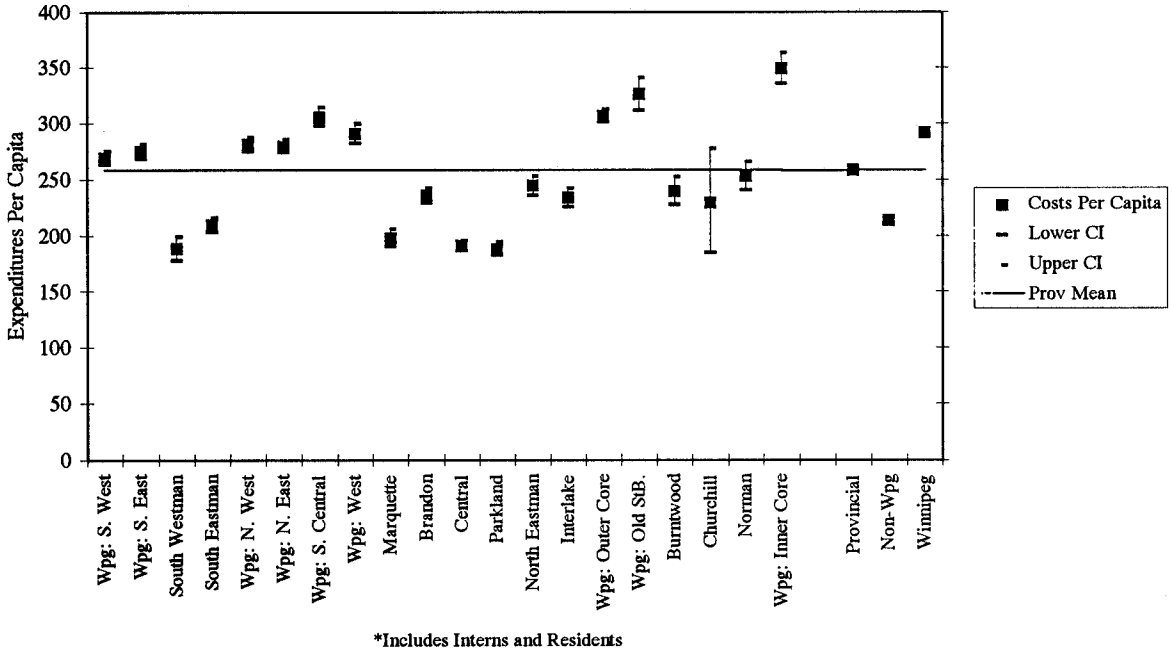
Figure 20: 1993/94 Physician Remuneration (in millions of $)



Fee-for-service and evaluation claims expenditure data and the information on salaried physician expenditures were combined to calculate the per capita expenditures for residents of each area. As in the other sections, we summed expenditures based on where the individual who received the care resided and not where the care was delivered.

The relative distribution for physician expenditures, which included payments to interns and residents, was different than hospital expenditures. Expenditures on Winnipeg residents were 13% above and non-Winnipeg residents 17% below the provincial average. The Winnipeg areas of Outer Core, Old St. Boniface and Inner Core were 19%, 26% and 35% respectively *above* the provincial average while South Westman, Parkland, and Central were 27%, 27% and 26% *below* the provincial average in per capita physician expenditures (see Figure 21, Table A8).

Figure 21: Total *Medical Expenditures Per Capita, Adjusted Rates, 1993/94

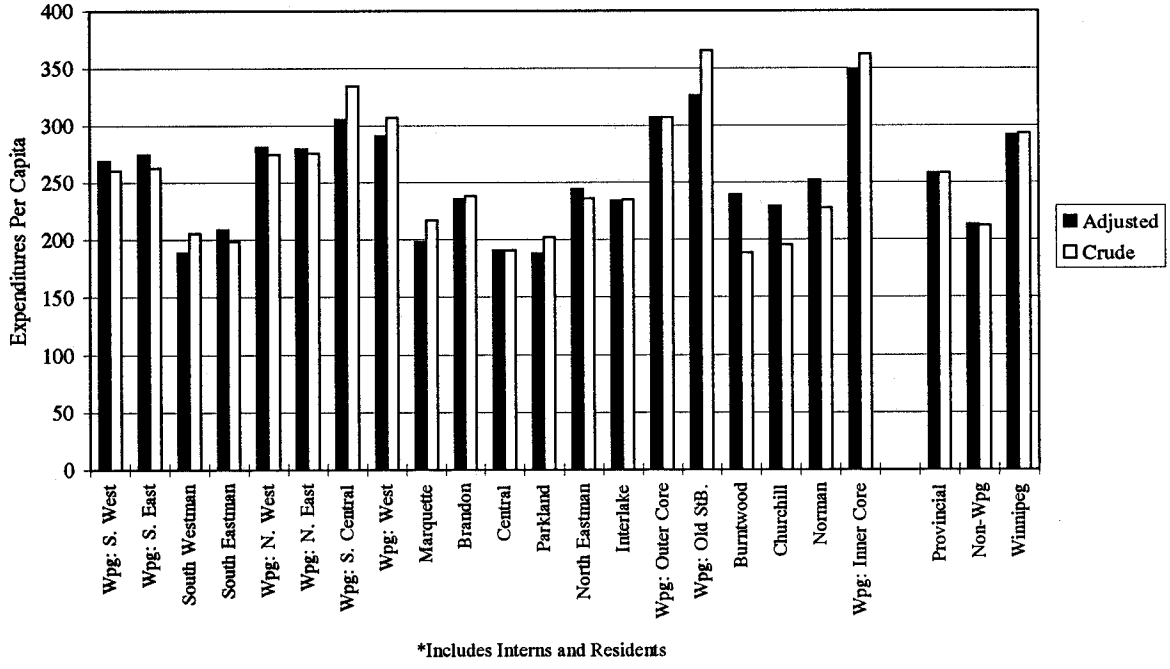


*Includes Interns and Residents

It's worth noting that although many areas of Winnipeg have the best health status as measured by premature mortality rates (they live longer), *all* areas of Winnipeg have higher than the provincial average expenditures on physicians. Figure 21 shows that all rural areas

were below the provincial average. An examination of Figure 22 illustrates the familiar pattern of increased adjusted rates relative to crude rates in the northern areas and a decrease in areas with older populations. There is, however, less of a difference between crude and adjusted rates compared to the hospital data suggesting there is not the difference in physician utilization across age categories that exists in hospital utilization.

Figure 22: Total *Medical Expenditures Per Capita, Adjusted and Crude Rates, 1993/94

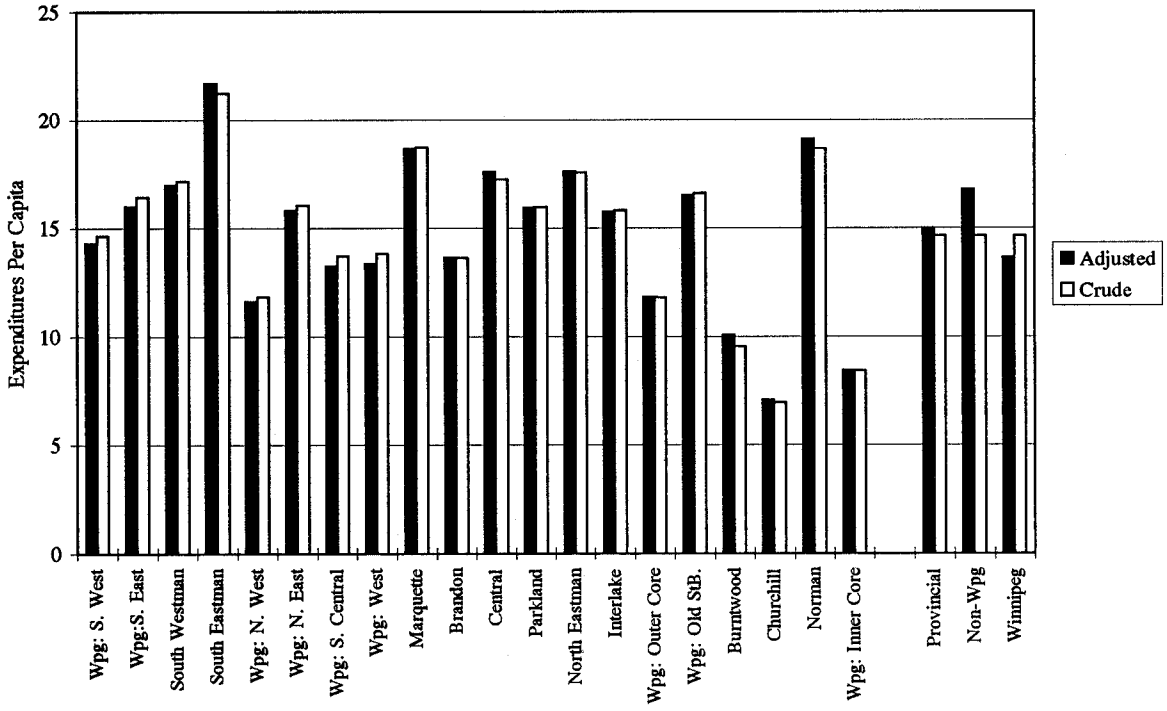


*Includes Interns and Residents

Other Professionals

Provincial expenditures on other professional services, including dental surgery, optometry, and chiropractic services are found on Figure 23 and Table A9. The distribution of these services varied; South Eastman, Marquette, and Norman had the highest per capita expenditures while Churchill, Inner Core, and Burntwood had the lowest. The range was from $7 per capita in Churchill to $22 per capita in South Eastman.

Figure 23: *Other Professional Expenditures Per Capita, Adjusted and Crude Rates, 1993/94

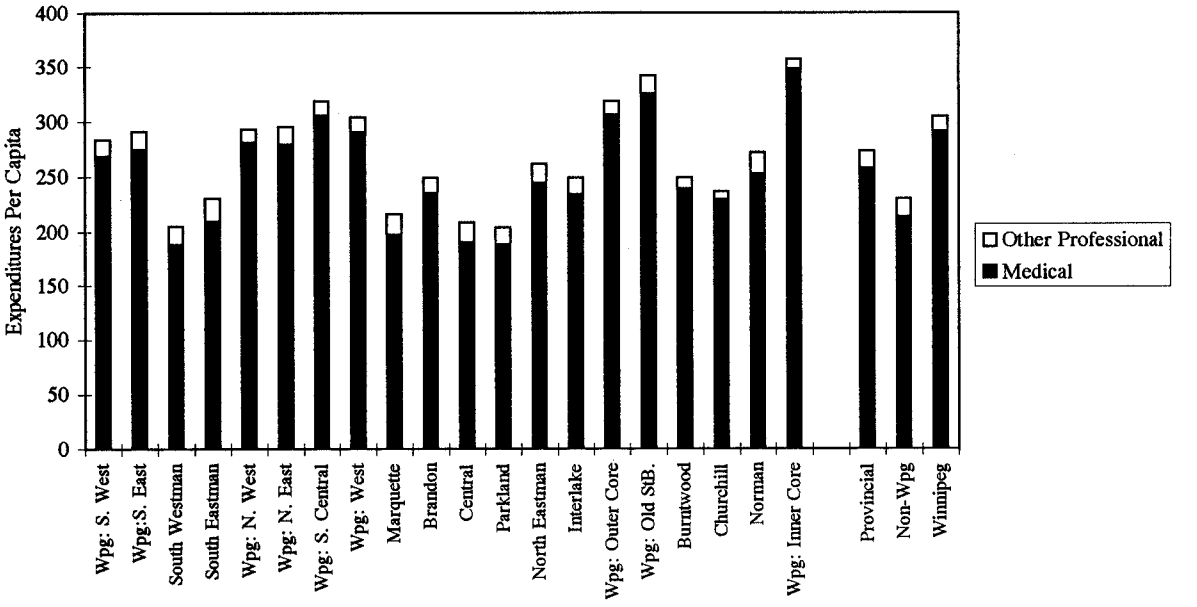


*Oral, Dental, Periodontal Surgery, Optometry and Chiropractic

The final figure in this section (Figure 24) provides the total for all expenditures covered including medical reimbursement, dental surgery, chiropractic, optometry, interns' and residents' salaries. The $7 to $22 per capita expenditures on other professional services account for only a small portion of the average $273 per capita expenditures on physician and other professional services. This indicates that the most significant factor in total per capita expenditures was medical reimbursement, with the other categories having little effect on the overall variation across areas.

With almost 93% of all expenditures on physicians included in this study, the per capita expenditure on Winnipeg residents was $291; for non-Winnipeg residents it was $213. At this time we do not know how the other 7% was spent.

Figure 24: Total Medical, Interns, Residents and *Other Professionals Expenditures Per Capita, Adjusted Rates, 1993/94



*Oral, Dental, Periodontal Surgery, Optometry and Chiropractic

3.4 Mental Health

Inpatient mental health care is provided in Manitoba in two settings: acute care hospitals and mental health hospitals. This section focuses on expenditures at the mental health hospitals (Brandon Mental Health Centre, Selkirk Mental Health Centre, and Eden Mental Health Centre) which account for 2% of the total Manitoba Health expenditure (Figure 1). Mental health care provided in acute hospitals is included in the acute hospital expenditures sector.

Methods

Utilization data were obtained from the Mental Health Management Information Systems (MHMIS) for 1993/94. Like the personal care home database but unlike the separation-based acute hospital database, MHMIS has year-to-date information. Therefore, it was not necessary for a patient to be discharged from the facility in order to obtain information.

The available mental health centre financial data were not readily separated into inpatient and outpatient expenditures even though a considerable amount of the expenditures are used to

provide outpatient care. This was especially true at Brandon Mental Health Centre. Rather than have the total hospital budgets attributed only to inpatients we chose to use the per diem which Manitoba Health uses for billing other provincial governments for inpatient care for non-Manitoba residents (often referred to as the inter-provincial per diem).

Using the per diems, the mental health expenditures were allocated to those who used the care. As in other sectors of the health care system, the data were summarized based on permanent residency (using postal code) as recorded on the MHMIS file. Salaries paid to physicians were also included.

In order to accurately allocate all psychiatrist salaries and fully document psychiatrists' activities, additional information would be required. The MHMIS database includes patient encounters with health care professionals but this information is primarily for outpatient cases. Therefore, physician salaries were allocated to inpatients on a per diem basis and to outpatients on a case basis (only the portion allocated to inpatients is included in this analysis). The method used may underallocate costs to those receiving intensive short-term therapy and overestimate costs for long-term patients as the day-to-day costs of managing these cases could be less than for acutely ill short-stay patients.

Outpatient use of Community Mental Health Centres was excluded from this project as we were unable to validate the MHMIS outpatient data.[31] It is important that all Community Mental Health Centres utilization data be improved and validated and be included in subsequent reports of this nature.

Results

Once dollars were allocated to individuals, the data were summarized into per capita expenditures by area. There was considerable variation in the use of inpatient mental health hospitals across the province in 1993/94. One reason for this variation may be that many individuals and their families have moved closer to these facilities because services are

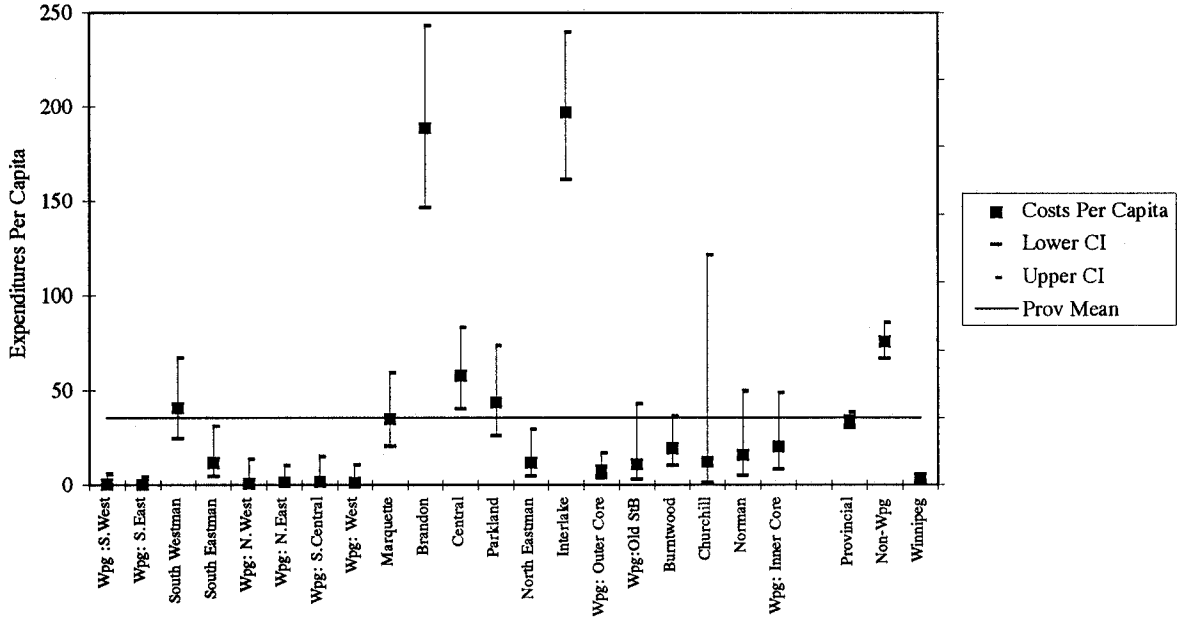
[31] In order to use these data we needed to have all visits by clients recorded on the database. The variable visit rates across RHAs, from an average of less than one for registered clients in one RHA to an average of greater than 10 in another, led us to believe these data should be validated before being included in such a study as this.

available in some areas and not in others. This uneven distribution likely leads to variations in population-based rates of use of mental health services.

In addition, some long stay cases reside permanently at the hospitals. A review of postal codes found 177 long stay cases (LOS >365 days) with the same postal code as Selkirk Mental Health Hospital and 19 with the same postal code as Brandon Mental Health Hospital.

Per capita expenditures on mental health hospitals were higher for Brandon and Interlake residents (Figure 25, Table A6), a result which is congruent with individuals moving to live near institutions to receive care. Expenditures ranged from $3 per capita for Winnipeg residents to $197[32] and $189 per capita for Interlake and Brandon residents, respectively. These data will be less representative of inpatient mental health expenditures in the future because of the slated closure of the Brandon Mental Health Centre[33] but still provide important information.

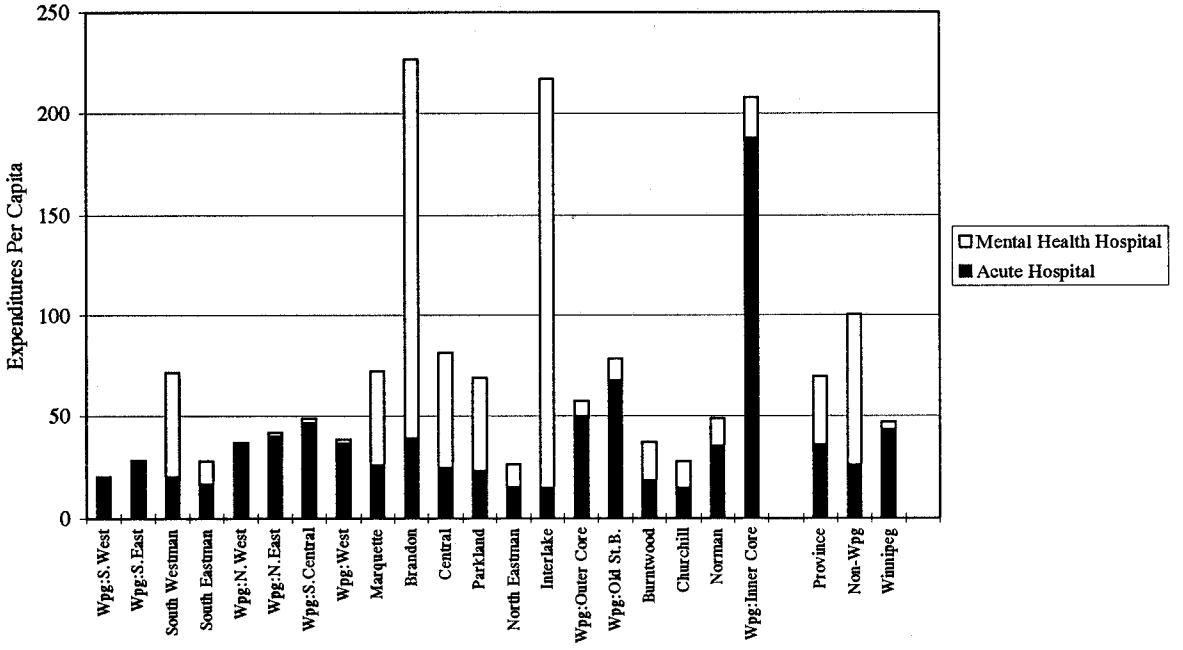
Figure 25: Mental Health Expenditures Per Capita, Adjusted Rates, 1993/94



[32] These results vary from those in Tataryn et al. 1994 Tables F1 and F2 which exclude long-stay costs.
[33] Given the shift to outpatient care in the area, it becomes even more important to maintain complete records in order to evaluate utilization and expenditures.

The existence of long-standing institutions in Brandon and Interlake complicated analyses of mental health care utilization expenditures. In order to further understand mental health care expenditures, we combined inpatient expenditures for mental health inpatient cases from acute care hospitals (using RDRGs and the provincial average CWC) with those of mental hospital expenditures (see Figure 26). The result was an increase in per capita expenditures on mental health in Winnipeg, especially the Inner Core.[34] However, Brandon and Interlake still had 2.5 to four times the provincial average expenditure per capita.

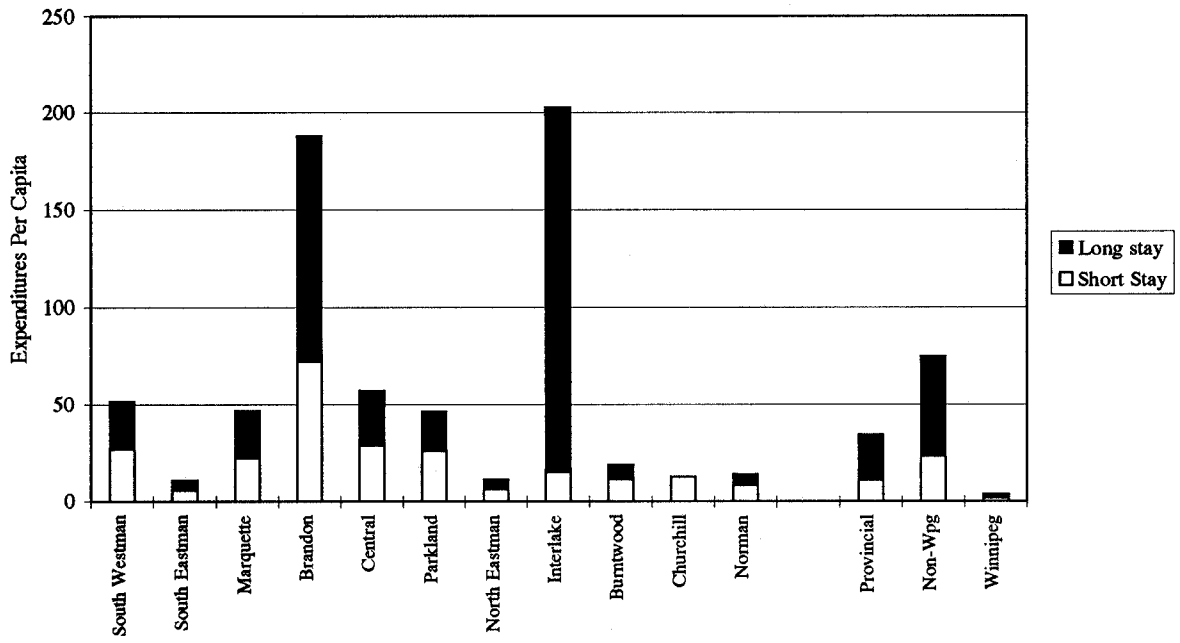
Figure 26: Total Mental Health Inpatient Expenditures Per Capita, Crude Rates, 1993/94



A separate investigation of short and long-stay cases did explain some of the difference in Interlake but not in Brandon (Figure 27). When short-stay per capita expenditures were compared (white portion of bars), Interlake is near the provincial average while Brandon remained higher than the provincial average, although a considerable portion of its expenditures were attributed to long-stay-cases.

[34] Thirty-four per cent of acute hospital cases have as the same postal codes as the Public Trustee Office.

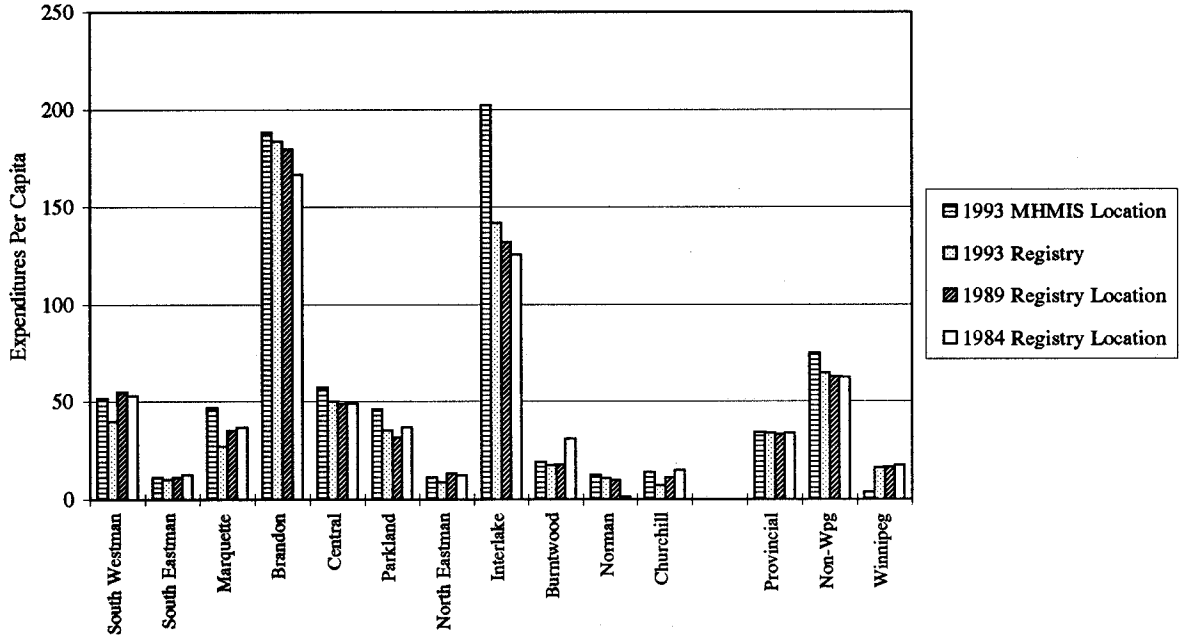
Figure 27: Inpatient Mental Health Hospital Expenditures Per Capita, Long (>365 days) and Short Stays, Crude Rates, 1993/94



The next step was to use the Manitoba Health Registry to explore prior residency. Postal codes on the MHMIS file were used to identify in which area an individual lived at the time the chart was opened. We then determined where individuals who used mental health facilities resided over time by comparing expenditures using the postal code on MHMIS and the 1993, 1989, 1984 and 1976 registry files.

We found that the per capita expenditure allocated to Brandon and Interlake shifted to other RHAs when 1989 or 1984 locations were used. However, the per capita expenditure in Brandon only decreased from $188 to $167 per capita (Figure 28). This suggests that most of the people currently receiving inpatient mental health services at Brandon Mental Health Centre resided in Brandon 12 years ago. The difference between the results using MHMIS address and the Manitoba Health registry suggests that the head of family address in the registry is different than the patient address found in the MHMIS database.

Figure 28: Inpatient Mental Health Hospital Expenditures Per Capita, Crude Rates, 1993/94



Information on the 1976 residence of individuals hospitalized in 1993/94 was not available for 60% of the cases. However, of those identified, it was evident a migration had occurred from Norman, Burntwood and Eastman to Brandon and Interlake areas. These migration patterns, which may have been due to need for treatment, highlight the importance of understanding existing treatment patterns when designing allocation methods for population-based funding.[35]

Although plans exist to close the Brandon Mental Health Centre and increase the amount of care provided in the community, there is a considerable population receiving mental health care which has lived in Brandon and Interlake for many years. This should be considered when interpreting the allocation of dollars to the area's population.

While there are substantial differences from provincial averages in expenditures for Brandon and Interlake, these are attenuated (though still present) when added to the total hospital expenditures which contain acute care hospital use of mental health services (see Fig 26).

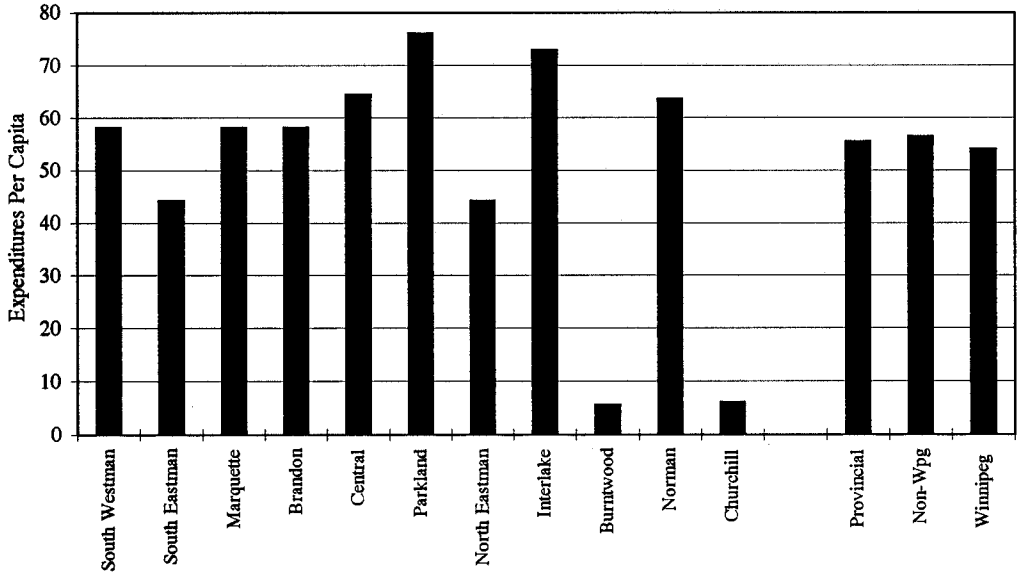
[35] If population-based funding is based on provincial average utilization, the application of these averages would distort funding for mental health when higher numbers of individuals requiring these services reside in only a few locations.

3.5 Home Care

At the time of this report, home care utilization data and costs were not available on an individual basis. Expenditure data for the old administrative Manitoba Health regions for VON, District Health Centres and Winnipeg hospitals were obtained from the Continuing Care division of Manitoba Health. A total was obtained for each of these old regions and a per capita expenditure calculated based on population of new regions. Where there were few changes in the boundaries, the data for the old region was credited to the new RHA but, where an old region such as Westman was split into more than one RHA, the total was allocated using the population distributions. This somewhat awkward attempt to allocate crude costs of home care across the province was made necessary by lack of individual specific data.

The assumption was also made that home care dollars are all spent within the RHA. Included was $63,187,620 out of the total home care budget of $68,325,700 for 1993/94. Not captured were costs of staff working in the provincial office and at Home Care Equipment and Supplies.

Figure 29: Home Care Expenditure Estimates/1000, Crude Rates, 1993/94



A breakdown of utilization between the various areas of Winnipeg was not available, so only a total for Winnipeg is shown (Figure 29, Table A11). As a final caveat, we were not able to undertake age and sex adjustment.

The addition of home care has little effect on the Winnipeg and non-Winnipeg allocation of expenditures. With the exception of Churchill and Burntwood, the per capita expenditure on home care appeared to be fairly equitable across the province in 1993/94. Outside of those two areas, home care expenditures account for 3.9% to 5.7% of expenditures included in this report, although with the crudeness of the data one can not speak to this with a great deal of certainty.

4. SUMMARY

4.1 Total Expenditures

Once the per capita expenditure for each section was generated, the next step was to add per capita expenditures to obtain a total estimate of per capita expenditures for each area. The total expenditure, using the preferred method from each section, is referred to as our benchmark specific total. The benchmark total was composed of hospital costs generated using the hospital CWC, the combined method of allocating outpatient expenditures, costs attributed using the personal care home addresses (excluding federal PCHs), and costs attributed to the location codes provided on the Manitoba Mental Health Information System data. For hospital costs, using the hospital CWC for inpatient expenditures and the combined method of allocating outpatient expenditures was felt to approximate real utilization costs more closely. In terms of PCHs, the decision that once admitted to a PCH an individual became a resident of the RHA where the PCH was located seemed reasonable for answering the question as to how expenditures were distributed in 1993/94.

Before examining the total per capita expenditure, let us reflect on earlier sections. Expenditures on acute hospital care for Winnipeg residents, age and sex adjusted, were 3% higher than the non-Winnipeg average while the per capita expenditure on medical

remuneration was estimated to be 37% higher for Winnipeg residents than non-Winnipeg residents. On the other hand, rural areas had higher expenditures on both PCHs and mental health hospitals.

Many of these differences could be ascertained by examining the rates of utilization (cases, visits or days) for the various types of health services. The purpose of this project was to advance our understanding of how Manitobans use the health care system by using a standard measuring stick - estimated expenditures (i.e. dollars) - to examine utilization. In order to complete this project we needed to devise several methods to allocate expenditures.

Here, using the adjusted rates, we sum up the various sectors in a series of charts in order to get a sense of the impact of the various components. Next, we begin to explore the differences across areas, sensitivity testing the results with various methodologies and then exploring whether characteristics of the population appear to lead to differences in expenditures. This last step explores the correlation between higher premature mortality rates (reflecting poor health status) and expenditures on health care.

Figure 30: Total Health Care Expenditures Per Capita, Adjusted Rates, 1993/94

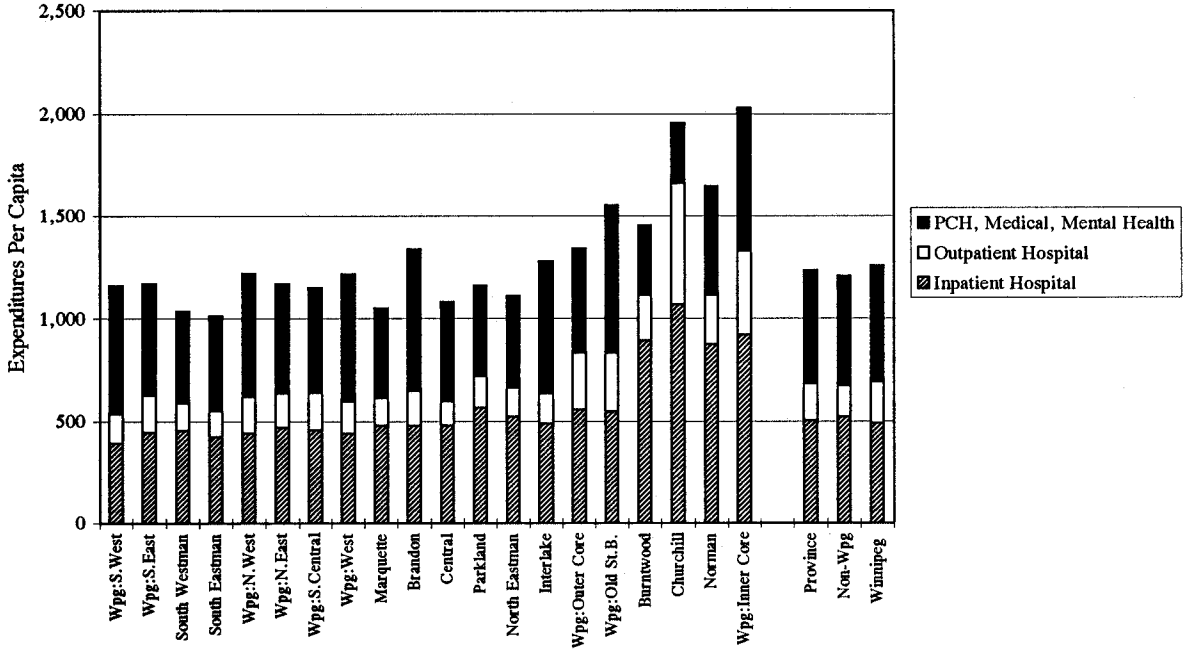


Figure 31: Total Health Care Expenditures Per Capita, Adjusted Rates, 1993/94

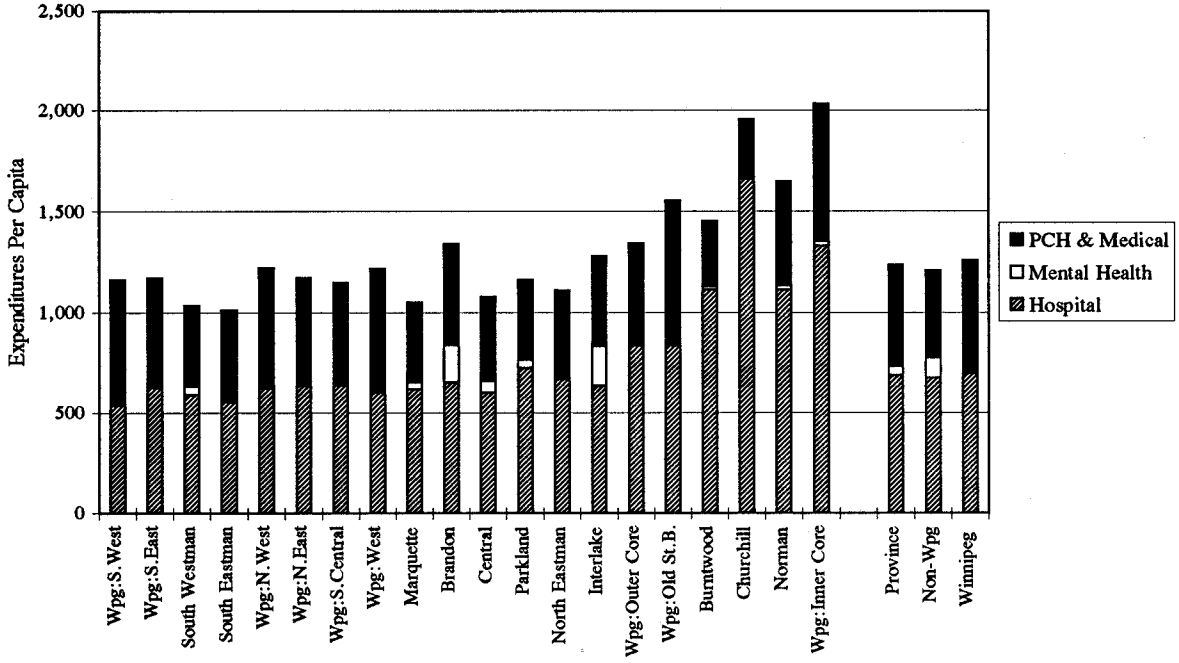
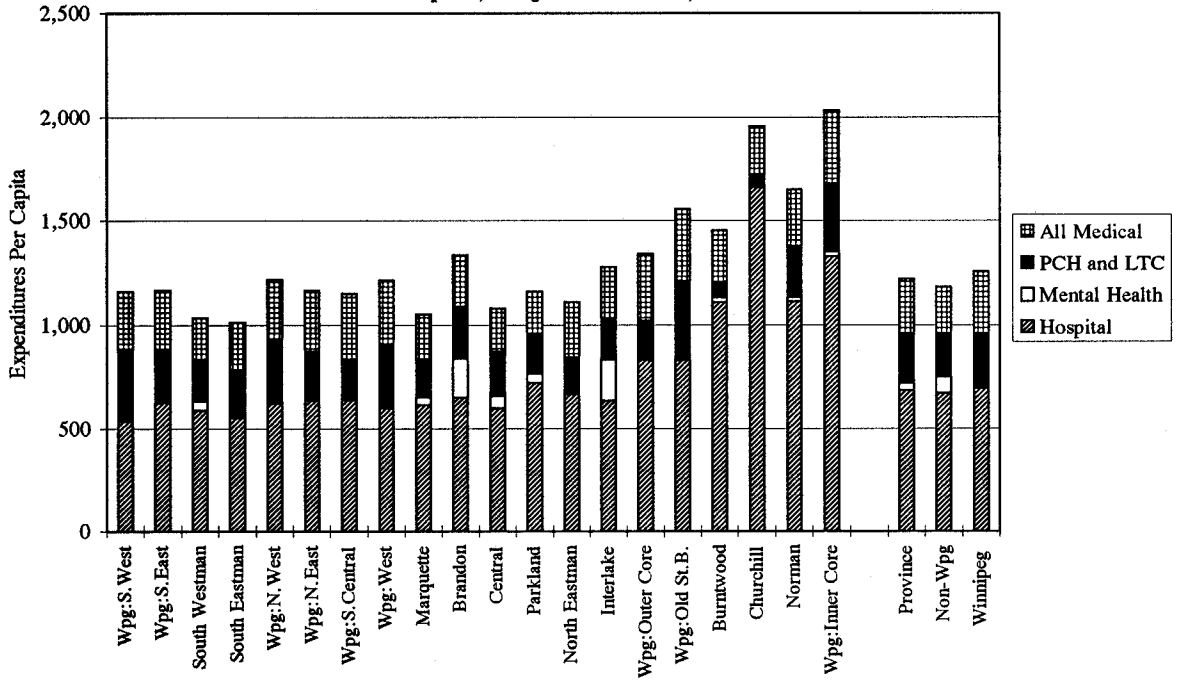


Figure 32: Total Health Care Expenditures Per Capita, Adjusted Rates, 1993/94



Various areas appear to use health care resources differently and this is illustrated in the preceding three figures and Tables A12 and A13. In Figure 30, the age and sex adjusted per capita expenditure (crude rates are shown in Table A14 and A15) for inpatient and outpatient expenditures are shown separately, with all other expenditures combined. Inpatient expenditures accounted for 34% to 62% of an area's total expenditures and outpatient expenditures for 11% to 30%[36] (Table A13). Acute hospitals accounted for 46% to 85% of all per capita expenditures. As was often found throughout this paper, the variation between Winnipeg and non-Winnipeg was minimal, with hospital expenditures in Winnipeg comprising of 57% of the total and non-Winnipeg 55%.

The effect of the addition of mental health hospital costs (shaded white) is evident in Figure 31. In both Brandon and Interlake, a substantial portion of over-all expenditures on residents of these areas were attributed to mental health, 14% and 15% respectively (Table A13). Remembering that a significant amount of mental health care is provided in acute hospitals (see Figure 26) and is indistinguishable from acute hospital expenditures, it is useful to compare the percentage of expenditures which were attributed to mental health hospital and acute care hospital use.

The northern areas, Burntwood, Churchill and Norman, have a larger proportion of their expenditures attributed to hospitals (69-86%) than other areas; this may reflect significantly lower expenditures on PCHs and long-term care facilities for Burntwood and Churchill.

The last figure in this series (Figure 32) separated out the PCH and long-term care expenditures from medical care[37] and other professional[38] payments. The percent which is attributed to PCHs and LTCs varies from 2% in Churchill, which has no personal care or long-term facilities and a younger population, to 29% in Winnipeg South West. Winnipeg South West has a large component of PCH beds and more individuals migrating into than out

[36] Churchill has 30% of its total expenditures attributed to outpatient care. As was discussed in the hospital section, while an effort was made to exclude all out-of-province residents' costs, this was a challenge for a facility which provides a significant amount of care to non-Manitoba residents.
[37] This includes salaries of medical interns and residents.
[38] This includes dental surgery, chiropractors' services and optometry fees.

of the area to live in PCHs. Overall, the percentage of the total per capita expenditures attributed to PCHs and LTC was 20% in Winnipeg and 17% for non-Winnipeg.

All medical and professional payments accounted for 12% and 16% of total expenditures in Churchill and Norman respectively, but 28% in Winnipeg South Central. Overall, non-Winnipeg uses 19% of its health care expenditures on medical services while Winnipeg uses 24% (Table A13).

The final step is to add in home care, for which we only have crude rates. The addition of home care has little effect on the Winnipeg and non-Winnipeg distribution. It accounts for 4.4% of non-Winnipeg expenditures and 4.1% of Winnipeg expenditures (see Table A11). With the exception of Churchill and Burntwood, the per capita expenditure on home care appeared to be fairly equitable across the province in 1993/94, although with the crudeness of the data one can not speak to this with a great deal of certainty.

If this whole methodology for allocating resources comes reasonably close to describing reality, it is clear that areas use health care services differently. It appears the existence of different types of facilities in an area, whether they are Mental Health Hospitals, Personal Care Homes, or the concentration of physicians, can result in variations in the distribution of expenditures within that region.

Once sectors were totalled, the difference between the per capita expenditures on Winnipeg residents was 6% higher, on average, than on non-Winnipeggers. Before further comparing differences between the areas and attempting to determine whether these are real or not, it is important to be convinced that the methods for ascertaining these costs are valid. Do the results vary when different methods are used? The next section explores this question.

4.2 Sensitivity Analysis

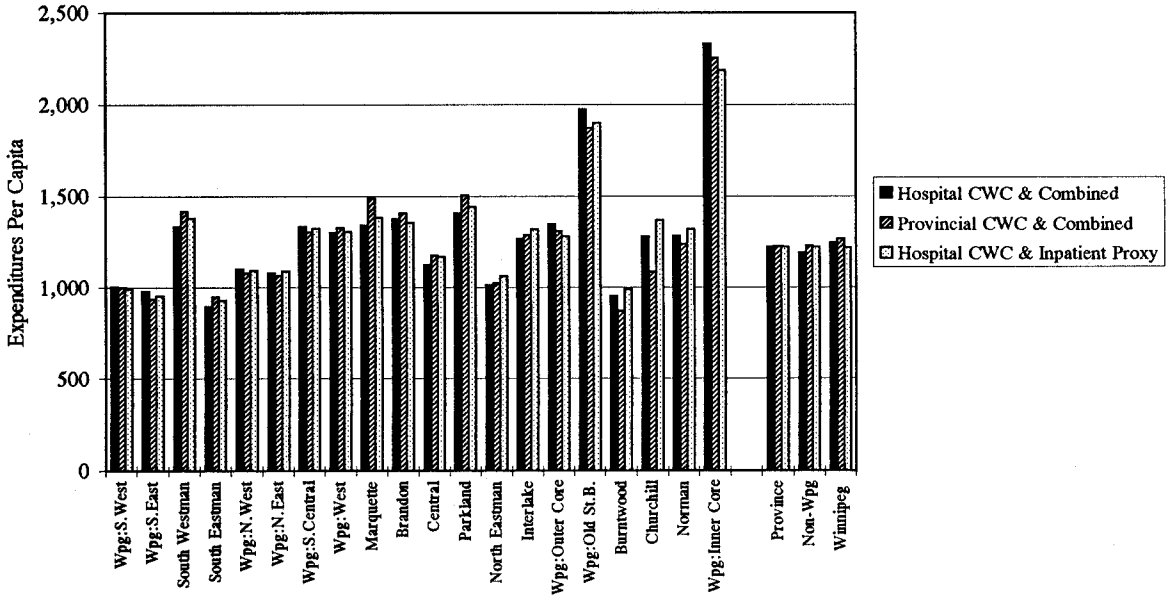
Hospital Expenditures - Inpatient

Throughout the paper several approaches are used for allocating costs. Some approaches appear to provide different results for some areas and so it is important to understand whether

conclusions based on adding up total expenditures are sensitive to the method used. The first area examined was hospitals, where two different methods of allocating inpatient costs and two different methods of allocating outpatient expenditures were used.

Figure 33 (and Table A16) compares the total per capita expenditure (crude rates) as measured using the benchmark total expenditures with estimates of total expenditures obtained using two other methods of calculating hospital costs. For the first and second columns, the method of allocating inpatient expenditures varied with everything else held constant; in the last column, the outpatient methodology changed. In the benchmark method, inpatient costs were determined using the hospital average CWC, whereas the second method used the provincial average CWC. The last method allocated inpatient costs using the hospital CWC but allocated outpatient expenditures using the inpatient proxy method rather than the combined method.

Figure 33: Total Health Care Expenditures Per Capita, Three Methods of Allocating Hospital Expenditures, Crude Rates, 1993/94



What sort of differences arise across the different methodologies? While it appears there are few differences between per capita expenditures calculated using different methods (Table A17) – for the most part the variation is 5% or less – there are at least two areas where the

differences have an important impact. The first is Churchill, where total expenditures were 15% lower when the provincial average CWC was used rather than the hospital specific CWC. These results are not surprising given that the Hospital Case Mix Costing Update 1993/94 (Shanahan et al., 1996) demonstrated the average cost per weighted case at the Churchill Health Centre is much greater than the provincial average. A similar but smaller effect was noted for populations which use other northern facilities or other more expensive hospitals, notably the residents of Burntwood, Old St. Boniface and Norman.

The second difference was in the RHA of Marquette where the per capita expenditure increased by 11% when the provincial CWC was used. This is because the average cost per weighted case at most hospitals used by Marquette residents is less than the provincial average CWC. Similarly, this effect was seen across several of the rural areas – South Eastman, South Westman and Parkland, where per capita expenditure rose by 6%, 6% and 7% respectively.

There was a 3% shift of expenditures to the rural areas if the provincial average CWC was used. This reflects the impact across the province of the more expensive cost and volumes of some urban hospitals. When attempting to estimate the costs of health care consumed by various populations, the decision whether one should use the hospital specific CWC or the provincial CWC is an important one. The answer, it seems, depends on the question being asked. If the question involves understanding how resources are actually used and how they vary between hospitals (or regions), then as long as hospitals are funded differently and perform differently one should use hospital-specific information.

On the other hand, if the question being addressed involves allocation of dollars based on the distribution of the population, then the average provincial CWC might be a more appropriate measure with which to start. This allows a distribution of dollars based on individuals being treated in facilities, not on historical funding patterns[39].

Funding decisions are far more complex than simply deciding whether to use a weighting system for hospital care and if so which one. Decisions must also be made on dealing with

[39] Using this methodology there would be no adjustment for hospitals which may have higher costs due to location or tertiary responsibilities.

tertiary costs and geographical differences, as well as the need for different types of health services due to variations in the demographics of a population.

The last column of Table Sum A17 illustrates the overall impact of the two methods of allocating outpatient expenditures is small. For the most part, the difference between these two methods is less than between the two inpatient methodologies. Only two areas have more than a 5% difference in per capita expenditures. Churchill's expenditures would increase by 7% if the inpatient proxy method was used to allocate outpatient costs, whereas the Inner Core would fall by 6% if the inpatient proxy were used. Across the province, the overall effect of using the inpatient proxy method results in a 3% per capita increase in expenditures allocated to non-Winnipeg areas.

What, then, do these various methodologies mean in terms of overall expenditures? It appears there is no significant impact in the overall per capita allocation, except in those areas where the population uses hospitals with costs which are very different than the provincial average (e.g. Churchill, where the hospital is more costly, and Marquette, where hospitals are less costly).

This suggests that despite a lack of detailed data on actual costs per case for hospital care, we were able to estimate expenditures in a consistent fashion, except perhaps for areas such as Churchill, which is anomalous in terms of location, population size and the fact that much of the care provided in the hospital is to non-residents.

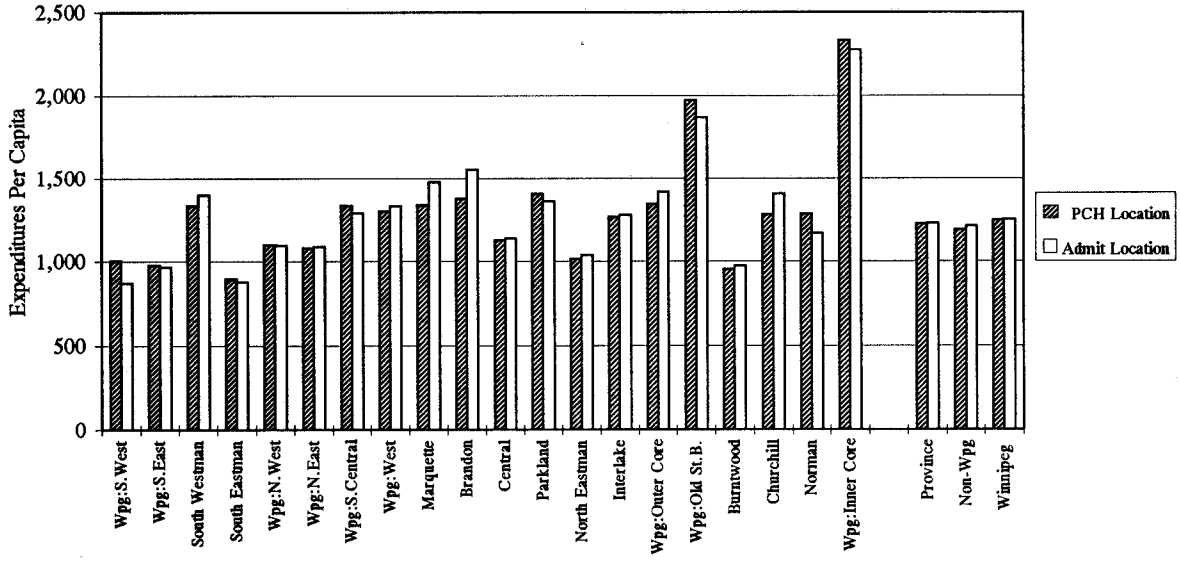
Personal Care Home Expenditures

Comparing per capita PCH expenditures on residents of various areas of Winnipeg or between newly-formed regions of the province may be somewhat deceptive if some areas have few PCH beds. This situation might occur because there were relatively few individuals in an area requiring such services or, with the recent formation of new regions, because historical patterns of care now involve migration across RHA borders.

People also move to PCHs that best fit their needs. This movement was a particular concern when reporting on various areas of Winnipeg, since the divisions of the city are somewhat artificial. We were aware that many PCHs had been constructed in particular areas for social, religious and other community reasons.

In order to address this concern we used two methods to allocate expenditures: one based on PCH location and the other on the area of an individual's residence prior to admission to a PCH. It was observed that the second allocation had a considerable impact on the distribution of PCH expenditures across the city of Winnipeg (see Figure 18), but the question remained whether this effect was significant in terms of total expenditures.

Figure 34: Total Health Care Expenditures Per Capita Using PCH Location and Location Prior to PCH Admission, Crude Rates, 1993/94



When the method based on area of residence on admission was combined with all other expenditures there was only a marginal change from the benchmark expenditures in non-Winnipeg regions but up to a 13% shift within Winnipeg. Areas of Winnipeg which were most affected were Winnipeg South West, Old St. Boniface and Outer Core (see Figure 34).

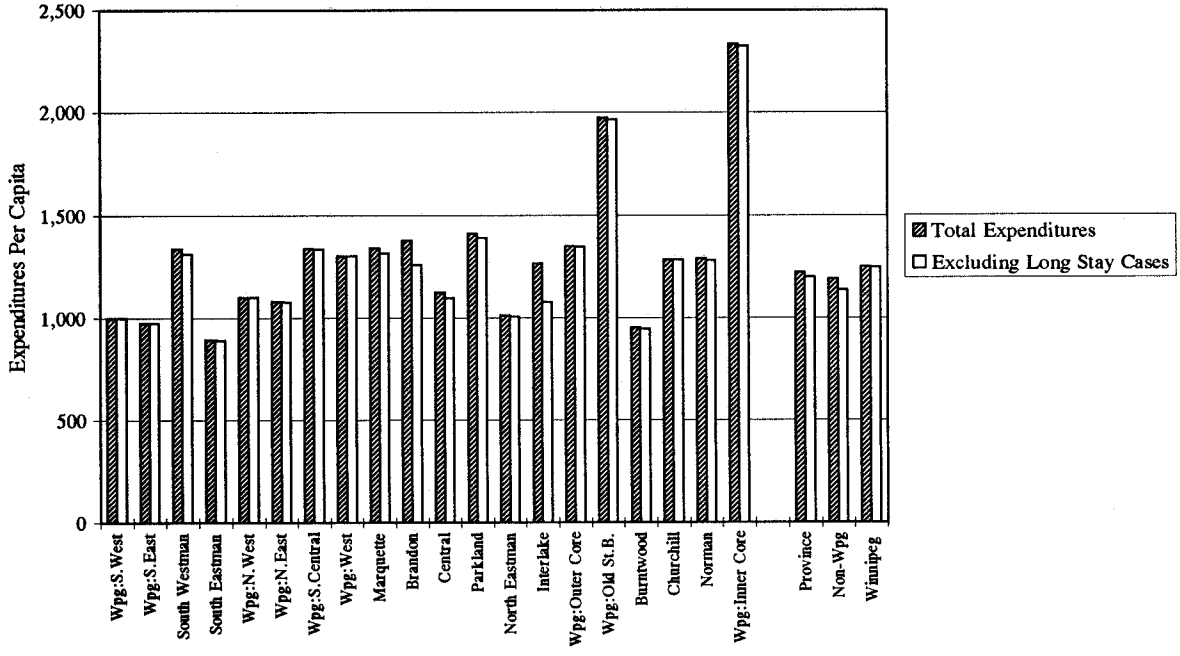
While it does not appear useful to describe PCH expenditures for residents of small areas of Winnipeg, we can likely describe expenditures for Winnipeg as a whole and for the RHAs.

Mental Health Expenditures

Here we explored differences in allocation using previous areas of residence of clients, as well the effect of excluding long-stay individuals and including acute hospital Mental Health expenditures. These alternatives were designed to address concerns regarding comparability due to the numbers of mental health clients which are either long-term residents of mental health facilities or have moved to areas where these facilities exist for care.

If mental health facilities were excluded from this analysis, we over-estimate Winnipeg acute hospital expenditures as Winnipeg uses acute care facilities for the provision of mental health services.

Figure 35: Total Expenditures Per Capita Compared to Exclusion of Long Stay Cases at Mental Health Facilities, Crude Rates, 1993/94



In order to address the issue of very long-stay cases (permanent residents) (Figure 35), costs attributed to individuals who were determined to be long-stay (stays >365 days)[40] were excluded. This exclusion of long-stay cases drops the total per capita expenditure in Brandon by 9%, Interlake by 17% and for all non-Winnipeg residents by 5%.

Having explored some of the variations in expenditures which may be attributed to how care is delivered across the province, we now turn to differences in the characteristics of the population which may influence differences in expenditures.

4.3 Crude vs. Adjusted Rates

The age and sex characteristics of a region's population, together with the health of the residents, are factors recognized as contributing to varying regional requirements for health care, and hence as factors which ultimately influence patterns of care delivered. For example, we know that all things being equal, an elderly population uses more hospital days than does a relatively younger one.

The use of adjusted rates, throughout the paper, provides synthetic rates that may differ considerably from crude rates. The adjustment changes a region's rate to what it would be if it had a population similar to Manitoba's as a whole. Therefore, in regions with population structures similar in age and sex to that of the province (Winnipeg and Interlake), age and sex adjustment of rates made very little difference (Black, et al., 1993).

Some regions, notably South Westman, Marquette, Parkland, Winnipeg Inner Core, and Old St. Boniface have a high proportion of elderly persons. Because they use more health services than younger age groups, in these regions adjustment had the effect of making their rates look lower (Figure 36).

In contrast, for regions with very young population structures (Churchill, Burntwood, Norman and to a lesser degree Winnipeg South East and South Eastman), adjustment

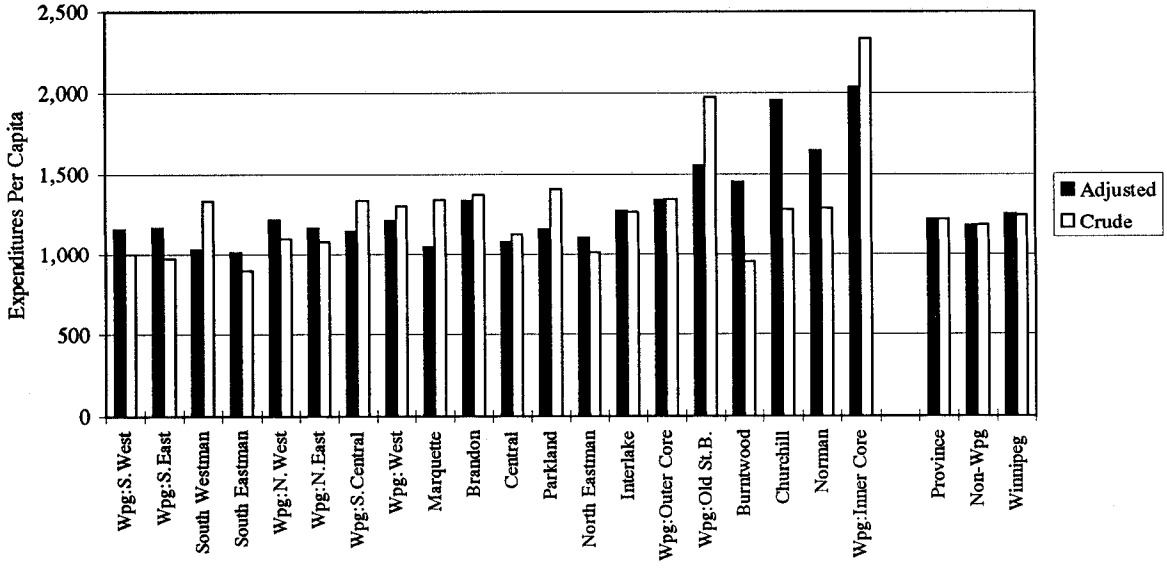
[40] The costing of these days uses a standardized per diem across all cases. If the care for long-stay cases is less resource-intensive, this methodology would overestimate costs for these cases.

produced rates higher than crude rates. Thus Burntwood, which had the second-lowest per capita expenditure using crude rates, had the third-highest rate of expenditure per capita expenditure once the effect of it's young population was adjusted for.

4.4 Relevance of Need Factors

If age and sex were the only two factors which affected utilization and thus expenditures, we would expect that once we adjusted for age and sex, per capita expenditures across regions would be similar, but we know that this is not in fact the case. Per capita expenditures range from $1014 in South Eastman to $2035 in Winnipeg's Inner Core. Figure 36 and Table A18 provide both crude and direct per capita expenditures. The difference between per capita expenditures on Winnipeg residents at $1254 and non-Winnipeg residents at $1182 was 6%. One key area where expenditures vary are physician expenditures - this sector accounts for much of the difference between Winnipeg and non-Winnipeg.

Figure 36: Total Health Care Expenditures Per Capita, Adjusted and Crude Rates, 1993/94

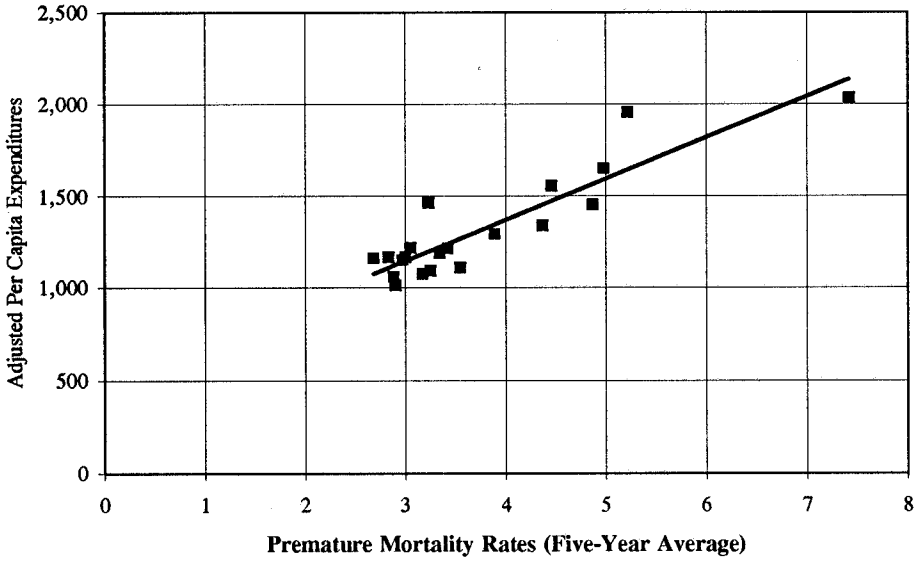


It is important to recall that there were *no adjustments* for differences in health status in any of these calculations. The next step therefore is to understand whether the underlying health of the population in an area is strongly related to the differences in expenditures we have

documented. That is: *does the province spend more health care dollars on the provision of health care for those who are less healthy?*

As we mentioned earlier, because premature mortality is widely accepted as the best single indicator of a population's health status and therefore need for health services, we decided to organize all our graphs based on each area's score on this indicator. Overall the expenditure patterns have corresponded with our ordering of the areas; the province spends more delivering health care to area's whose populations are less healthy. The strength of this relationship can be seen in Figure 37 where the correlation between total health care expenditures and premature mortality rates (both adjusted for age and sex) is .90 ($p < .001$).

Figure 37: Expenditures Per Capita (Age and Sex Adjusted) Versus Premature Mortality Rates



Differential costs of providing services

One key factor we have not attempted to adjust for is the differential costs of providing services; that is, there are no direct adjustments for comparatively high northern costs of services. While this is not necessary for describing current expenditure patterns, it may be important in understanding differences across areas. Such adjustments are important for any discussion of how dollars *should* be allocated.

5. DISCUSSION

While the aim of a project such as this should be to describe how 100% of Manitoba's health care dollars are spent, because of the unavailability of data, we were forced to restrict the analysis to 79% of the total Manitoba Health budget. To achieve even this coverage, major data limitations had to be overcome. Where possible a variety of data sources were used and where we were particularly concerned, the methods were sensitivity tested. Public health expenditures, community mental health costs and activities, hospital capital costs, PCH capital costs, Pharmacare and the Red Cross were some of the expenditure categories not included in this accounting of expenditures.

Table 6: Expenditures captured in this project

	Total Expenditures[41]	Percent
Mental health[42]	38,871,204	2.1%
Physician[43] & other professionals	310,918,578	16.8%
PCH & LTC[44]	262,668,945	14.2%
Hospital[45]	778,910,075	42.1%
Home care	63,187,620	3.5%
Total in study	1,454,566,422	78.7%
Total Manitoba Health estimates	1,848,263,600	100.0%

Using the variety of data sets to fill holes was a time-consuming process and one that could not be conveniently used in an ongoing fashion. Major data limitations exist for outpatient data for hospitals, community health centres, mental health, and public health services and home care. Another missing piece are the data of salaried physicians who do not file evaluation claims. This is currently the case in all Winnipeg urban community hospitals'

[41] These amounts may be less than amounts found in the Annual Report, because we have not captured all expenditures, or they may be more such as in the physician expenditures, where we have moved salary and sessional payments out of the hospital budgets.
[42] Includes physician salaries.
[43] Includes salaries and sessional payments to physicians in the hospitals budgets
[44] Includes physician salaries not captured using evaluation claims
[45] Excludes salaries and sessional payments for physicians in the hospital budgets.

emergency departments, as well as for other groups of physicians such as those who work in such areas as intensive care units, and MCTRF.

Without data that are comparable and complete across the system, funding methods based on per capita allocations will be difficult to support. With patient specific data in all sectors of the health care system, changes to the system could be monitored. Attaching costs to utilization opens the possibility of tallying and tracking expenditures across the system but, until utilization data is complete, the impact of policy decisions such as the planned substitution of home care for institutional care will not be completely understood.

With this project we have pushed the capabilities of the Population-Based Health Information System (POPULIS) developed by MCHPE one step closer to understanding how populations use the resources of the health care system and determining how usage and expenditure patterns in the system are related to health and health need characteristics. While we have previously conducted sector-by-sector comparative analyses of regional populations' use of the health care system, we have not had the capacity to add things up; there was no common yardstick. By converting expenditures in each of these sectors to dollars, a common yardstick has been identified and this report represents our first attempt at calculating actual and adjusted health care expenditures across an entire population.

The question remains as to whether this methodology will be seen by policy makers and stakeholders to be useful in understanding how resources are used in their domains. Are there too many black holes in the data to be useful? We think not, but the decision is up to the reader.

This report shows that overall the distribution of provincial health expenditures on a per capita basis seems to be relatively equitable between residents of Winnipeg and non-Winnipeg which given the similarity in PMR, is promising. It also appears that there is a strong positive correlation between expenditures and health needs of the population (as defined by the high premature mortality rates) which would suggest that those who suffer from poor health are receiving more health services than those who live in areas low premature mortality rates. However, there is nothing in this report to suggest that within areas those in poor health are

receiving the most appropriate health services or even sufficient health services, it merely highlights that in a system with limited resources those areas with higher needs appear to be receiving more health care expenditures. We have also indicated that premature mortality rates have been demonstrated to be the single best indicator of need for health services but that is not to suggest that the provision of health services per se will address all premature mortality. Root causes, such as unemployment, inferior living conditions, hazardous working conditions and child poverty must also be addressed as each of these have impacts on the health status of the population.

The similarity in the distribution of expenditures on Winnipeg and non-Winnipeg residents, given the similarity of health characteristics indicate that the system seems to be working well in terms of distribution between urban and rural areas. But before one becomes too comfortable with the findings, it is clear when looking at premature mortality rates that we are a very long way from achieving equity in health status, even though many more resources are being spent on residents in high-need areas.

While the resources used by Winnipeg residents are 6% greater than their non-Winnipeg counterparts, it is evident that these resources are used differently. Non-Winnipeg residents use hospitals, acute and mental health combined, more than do Winnipeggers, but Winnipeggers have much higher expenditures on physicians than do residents of the rest of the province.

It is important to assess the needs of a population when examining per capita expenditures. As has been discussed, there are many factors which determine need. Age is clearly an important one - an elderly population would be more likely to require more hip replacements, cataract surgery, and cardiology consults, among other things. A population which a high proportion of children will require more immunization programs than a predominantly older population. Other factors such as socio-economic status, and health status for example, incidence of chronic disease all reflect different needs of a population. These must all be factored in when attempting to use data such as has been generated in this report.

Other factors must be considered, including recognition that it is inherently more expensive to provide care in certain areas than in others. It costs more to staff and supply a hospital in a remote location such as Churchill, than it does to run a comparably-sized southern hospital. There are also costs which accompany tertiary care which tend to be allocated to all patients who receive care in these facilities.

If the methodologies discussed here or similar methodologies are to be used, we must be aware of the implications of such methods. Many problems have been mentioned in this paper and there are no doubt many more that will come to the minds of the readers. It is likely however, that no other jurisdiction in North America has ever had the capability of undertaking such analysis. Despite the limitations, the results of this paper combined with other POPULIS analyses on PCHs, hospital utilization and physician visits provide strong insights as to how the province spends money to deliver health services to residents across the province.

An Interface between "Needs-Based Funding for Regional Health Authorities: A Proposed Framework" and "A Project to Investigate Expenditures on Health Care for Manitobans"

The Manitoba Centre for Health Policy and Evaluation has two reports scheduled for release which have different mandates, but are similar in some respects. Because of the similarities, the authors felt it might be beneficial to highlight some of the key differences in methods and assumptions between the two.

The two reports are: *A Project to Investigate Expenditures on Health Care for Manitobans* (Shanahan et al.) and *Needs-Based Funding for Regional Health Authorities: A Proposed Framework* (Mustard et al.). The first is one of a series of the Population-Based Health Information System (POPULIS) reports, which explore how health services are used. It examines the expenditure on health services by people in various areas of Manitoba. The second project was done in support of a Methodology Advisory Committee at Manitoba Health, which was asked to consider options for a needs-based funding methodology and make recommendations to Manitoba Health. Simply put, the first report looks at past expenditures, while the second suggests a funding method for the future.

To reach these distinctly different ends, each project employed different methods. The POPULIS project's mandate was to find a way to estimate how much the province spent providing health services to residents of different areas of Manitoba. The year 1993/94 was chosen, expenditures were attributed to individuals sector by sector (hospital, physician, PCH, mental health and home care) and finally totalled for each Regional Health Authority (RHA) and nine areas of Winnipeg. For example, inpatient expenditures were attributed to individuals based on actual hospitalizations, using case weights adjusted for factors which affect costs including: length of stay, severity of illness, whether the patient was acute or non-acute and whether hospitalization was terminated by transfer or death. Using actual costs at each hospital, an attempt was made to account for all measurable cost factors during each period of hospitalization. Despite MCHPE's best efforts, the project was limited in some

respects by the availability of data, primarily the lack of utilization data for public health, home care and other outpatient services.

Expenditures in each sector included in the report – outpatient hospital, personal care home, long-term care, physician remuneration, mental health, and home care – were estimated and allocated using separate methodologies. The result was a description of expenditures in 1993/94 by the populations in various areas of Manitoba.

The goal of the needs-based funding methodology project was very different. Here, the purpose was to devise a method to equitably allocate future provincial government expenditures from each of six service pools - institutional acute care services, institutional long-term care, continuing care, health promotion, medical remuneration and pharmacare - to the RHAs in relation to each area's need for health care services. Within each service pool, per capita estimates were developed on the use of services by males and females of different ages. These then were converted to dollar estimates. Next, these per capita resource estimates were used to allocate health care resources to each RHA based on the age and sex distribution of its population. Separately, a series of measures of health status for RHA populations was determined and used to adjust the age-specific per capita allocations within each service pool upwards (in the case of poor health status) or downwards (in the case of good health status) for each RHA.

The methods for estimating per capita expenditures within each service pool differed from the methods used in the POPULIS report to a greater or lesser degree depending upon assumptions made by the investigators and committee members. For example, the first step in the allocation of the institutional acute care pool (hospitals) in the needs-based funding project was to determine the average expenditure on hospital services across the province in each of the age-sex strata. The was done using case weights, but unlike the POPULIS project, there were no adjustments for long length of stay, non-acute care or deaths. Also, once the weights were attributed, total acute hospital budgets were allocated based on mean provincial costs rather than hospital-specific costs. These differences reflect differences in purpose; the POPULIS report's goal was to estimate expenditures in 1993/94, whereas the needs-based

funding project's objective was to distribute provincial government dollars equitably to the RHAs in relation to need for health care services.

In summary, one difference between the reports is that there is no needs adjustment in the POPULIS project, where it is paramount to the needs-based funding project. Another is that the POPULIS project looks at expenditures in 1993/94, while the needs-based funding project focuses on building a methodology for the future. Key differences are summarized below:

Category	**POPULIS**	**RHA Needs-based Funding Methodology**
Purpose	Sum expenditures across regions	Devise funding methodology for the future
Needs adjusted	No	Yes
Age adjusted	Yes	Yes
Year of data used	1993/94	1994/95
Sectors of health services included	Acute care hospitals, long term hospitals, PCH, mental health, medical remuneration and home care	Institutional acute and long-term care, continuing care, home based, health promotion/disease prevention, medical remuneration, and pharmacare
Hospital expenditures		
Adjusted for case mix	Yes	No
Adjusted for long-stay cases	Yes	No
Weights applied to cases	Case weights (RDRGs)	*Typical*[46] weights (CMGs)
Hospital specific costs	Yes	No
Outpatient hospital expenditure allocation	Mixture of inpatient -outpatient utilization data	Inpatient utilization data
Length of hospital stay	Short Stay - adjustment only if transfer or death	Short stay - adjustment if the length of stay was very short
	Long stay - adjustment only if length of stay was longer than the *trim*[47]	Long stay - no adjustment

[46] Typical weights refer to the diagnosis specific weight
[47] Trim is the point where the length of stay is abnormally long for that diagnosis

GLOSSARY

CIHI	Canadian Institute for Health Information
CWC	cost per average weighted case
DPG	Day Procedure Group
FC	fixed cost
LOS	length of stay
LTC	long term care
MCTRC	Manitoba Cancer Treatment and Research Foundation
MCHPE	Manitoba Centre for Health Policy and Evaluation
MHMIS	Mental Health Management Information Systems
PCH	personal care home (nursing home)
PD	per diem
PMR	premature mortality rates
POPULIS	Population-Based Health Information System
RDRG	Refined Diagnostic Related Group
RHA	Regional Health Authority
TFC	total fixed cost
TVC	total variable cost
VC	variable cost

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APPENDIX TABLES

A1

Inpatient Hospital Expenditures, Hospital CWC, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	343	323	365	0.68	394	369	420	0.78
Wpg: S. East	2.83	371	348	395	0.73	448	416	482	0.88
South Westman	2.88	582	547	620	1.15	456	429	485	0.90
South Eastman	2.90	377	354	402	0.74	426	400	454	0.84
Wpg: N. West	2.97	401	377	428	0.79	442	414	473	0.87
Wpg: N. East	3.00	436	412	461	0.86	471	444	500	0.93
Wpg: S. Central	3.05	541	505	581	1.07	458	427	491	0.90
Wpg: West	3.17	477	448	508	0.94	441	413	469	0.87
Marquette	3.23	608	573	646	1.20	480	452	510	0.95
Brandon	3.25	496	456	540	0.98	481	443	524	0.95
Central	3.34	497	476	518	0.98	479	459	499	0.95
Parkland	3.42	691	658	725	1.36	569	543	596	1.12
North Eastman	3.55	484	451	519	0.96	523	488	561	1.03
Interlake	3.89	489	462	518	0.97	490	463	518	0.97
Wpg: Outer Core	4.37	562	537	588	1.11	558	533	584	1.10
Wpg: Old St. Boniface	4.46	705	640	776	1.39	552	500	609	1.09
Burntwood	4.87	551	522	583	1.09	894	820	975	1.77
Churchill	4.98	622	491	787	1.23	1,071	905	1,266	2.12
Norman	5.22	681	636	730	1.35	873	801	953	1.73
Wpg: Inner Core	7.42	1,063	971	1,164	2.10	923	842	1,013	1.82
Province	3.50	506	499	514	1.00	506	499	514	1.00
Non-Wpg	3.53	529	519	539	1.05	525	515	535	1.04
Winnipeg	3.48	489	478	500	0.97	492	481	503	0.97

Areas sorted by five-year premature mortality rates

A2

Inpatient Hospital Expenditures, Provincial CWC, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	339	320	361	0.67	393	368	419	0.77
Wpg: S. East	2.83	331	312	352	0.65	401	373	431	0.79
South Westman	2.88	664	625	704	1.31	516	487	545	1.02
South Eastman	2.90	429	405	455	0.84	492	463	522	0.97
Wpg: N. West	2.97	379	355	404	0.75	419	392	449	0.83
Wpg:N.East	3.00	422	399	445	0.83	460	435	488	0.91
Wpg: S. Central	3.05	511	477	548	1.01	430	401	460	0.85
Wpg: West	3.17	501	470	533	0.99	460	432	490	0.91
Marquette	3.23	756	715	801	1.49	592	561	624	1.17
Brandon	3.25	529	486	576	1.04	512	471	557	1.01
Central	3.34	548	526	571	1.08	527	507	549	1.04
Parkland	3.42	787	751	824	1.55	643	616	672	1.27
North Eastman	3.55	496	463	531	0.98	543	506	582	1.07
Interlake	3.89	512	486	540	1.01	514	488	542	1.01
Wpg: Outer Core	4.37	523	500	547	1.03	519	496	543	1.02
Wpg: Old St. Boniface	4.46	606	552	665	1.19	476	433	524	0.94
Burntwood	4.87	469	445	494	0.92	744	689	804	1.46
Churchill	4.98	423	331	541	0.83	696	580	835	1.37
Norman	5.22	633	592	677	1.25	809	743	881	1.59
Wpg: Inner Core	7.42	985	898	1,080	1.94	844	769	926	1.66
Province	3.50	508	501	516	1.00	508	501	516	1.00
Non-Wpg	3.53	568	558	578	1.12	563	553	573	1.11
Winnipeg Total	3.48	464	454	474	0.91	467	457	477	0.92

Areas sorted by five-year premature mortality rates

A3

Outpatient Hospital Expenditures, Combined Method, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	138	133	143	0.77	142	137	147	0.79
Wpg: S. East	2.83	172	165	180	0.96	178	170	186	1.00
South Westman	2.88	148	142	155	0.83	135	130	141	0.76
South Eastman	2.90	126	120	132	0.71	128	122	135	0.72
Wpg: N. West	2.97	178	168	187	0.99	181	172	190	1.01
Wpg: N. East	3.00	163	158	169	0.91	165	159	171	0.92
Wpg: S. Central	3.05	185	174	196	1.03	181	170	192	1.01
Wpg: West	3.17	157	150	164	0.88	160	152	167	0.89
Marquette	3.23	142	135	149	0.79	134	128	141	0.75
Brandon	3.25	170	164	176	0.95	168	163	174	0.94
Central	3.34	124	119	128	0.69	122	117	126	0.68
Parkland	3.42	163	156	170	0.91	153	147	160	0.86
North Eastman	3.55	141	131	150	0.79	142	133	152	0.80
Interlake	3.89	146	141	151	0.81	146	141	152	0.82
Wpg: Outer Core	4.37	275	267	284	1.54	276	267	284	1.54
Wpg: Old St. Boniface	4.46	297	277	318	1.66	282	262	302	1.58
Burntwood	4.87	171	161	180	0.95	217	197	237	1.21
Churchill	4.98	432	343	520	2.41	590	491	688	3.30
Norman	5.22	218	207	229	1.22	242	228	255	1.35
Wpg: Inner Core	7.42	395	374	416	2.21	406	383	430	2.27
Province	3.50	179	177	181	1.00	179	177	181	1.00
Non-Wpg	3.53	149	147	151	0.83	148	146	150	0.83
Winnipeg	3.48	201	198	204	1.12	202	199	205	1.13

Areas sorted by five-year premature mortality rates

A4

Outpatient Hospital Expenditures, Inpatient Proxy, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	129	125	132	0.72	136	132	139	0.76
Wpg: S. East	2.83	152	148	156	0.85	162	158	166	0.91
South Westman	2.88	190	186	195	1.06	166	162	171	0.93
South Eastman	2.90	159	154	164	0.89	168	163	173	0.94
Wpg: N. West	2.97	169	164	173	0.94	174	170	179	0.97
Wpg: N. East	3.00	172	168	176	0.96	175	172	179	0.98
Wpg: S. Central	3.05	172	166	177	0.96	161	156	167	0.90
Wpg: West	3.17	160	155	164	0.89	154	150	159	0.86
Marquette	3.23	185	180	190	1.03	162	157	167	0.91
Brandon	3.25	149	145	154	0.83	147	143	151	0.82
Central	3.34	165	162	169	0.92	162	159	166	0.91
Parkland	3.42	195	191	200	1.09	177	172	181	0.99
North Eastman	3.55	190	184	196	1.06	198	191	204	1.11
Interlake	3.89	202	198	206	1.13	202	197	206	1.13
Wpg: Outer Core	4.37	206	202	210	1.15	205	201	209	1.14
Wpg: Old St. Boniface	4.46	224	215	233	1.25	202	193	211	1.13
Burntwood	4.87	205	199	212	1.15	260	250	270	1.45
Churchill	4.98	519	454	595	2.90	587	512	672	3.28
Norman	5.22	251	243	258	1.40	278	271	287	1.56
Wpg: Inner Core	7.42	250	242	258	1.40	246	238	255	1.38
Province	3.50	179	178	180	1.00	179	178	180	1.00
Non-Wpg	3.53	185	184	187	1.04	185	183	186	1.03
Winnipeg	3.48	174	172	175	0.97	174	173	176	0.97

Areas sorted by five-year premature mortality rates

A5

Total Hospital Expenditures, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	481	456	506	0.70	536	505	566	0.78
Wpg: S. East	2.83	543	514	572	0.79	626	587	665	0.91
South Westman	2.88	731	681	781	1.07	591	553	629	0.86
South Eastman	2.90	503	471	536	0.73	554	517	592	0.81
Wpg: N. West	2.97	579	547	611	0.85	623	587	659	0.91
Wpg: N. East	3.00	599	570	628	0.87	636	604	669	0.93
Wpg: S. Central	3.05	726	680	772	1.06	639	599	679	0.93
Wpg: West	3.17	634	599	670	0.93	600	567	634	0.88
Marquette	3.23	750	699	800	1.09	615	574	655	0.90
Brandon	3.25	667	617	717	0.97	650	601	699	0.95
Central	3.34	620	591	649	0.91	600	573	628	0.88
Parkland	3.42	853	805	902	1.25	722	683	762	1.05
North Eastman	3.55	625	579	670	0.91	665	615	716	0.97
Interlake	3.89	635	599	671	0.93	636	601	671	0.93
Wpg: Outer Core	4.37	837	806	869	1.22	834	802	866	1.22
Wpg: Old St. Boniface	4.46	1002	920	1084	1.46	834	766	902	1.22
Burntwood	4.87	722	676	768	1.05	1,111	988	1234	1.62
Churchill	4.98	1052	801	1304	1.54	1,621	1291	1951	2.37
Norman	5.22	899	830	968	1.31	1,115	1011	1219	1.63
Wpg: Inner Core	7.42	1457	1348	1567	2.13	1,330	1230	1429	1.94
Province	3.50	685	676	694	1.00	685	676	694	1.00
Non-Wpg	3.53	679	665	692	0.99	673	660	687	0.98
Winnipeg	3.48	690	677	703	1.01	694	681	707	1.01

Areas sorted by five-year premature mortality rates

PCH Expenditures Per Capita, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	199	183	217	1.06	277	254	301	1.47
Wpg: S. East	2.83	91	79	106	0.49	162	139	187	0.86
South Westman	2.88	297	263	336	1.58	180	158	204	0.96
South Eastman	2.90	159	138	185	0.85	212	184	246	1.13
Wpg: N. West	2.97	200	181	222	1.07	261	236	288	1.39
Wpg: N. East	3.00	120	107	134	0.64	153	137	171	0.82
Wpg: S. Central	3.05	147	127	170	0.78	104	90	121	0.55
Wpg: West	3.17	254	232	279	1.35	227	207	249	1.21
Marquette	3.23	306	269	348	1.63	184	161	210	0.98
Brandon	3.25	269	241	300	1.43	250	224	279	1.33
Central	3.34	222	203	243	1.18	196	179	215	1.05
Parkland	3.42	289	256	326	1.54	188	166	213	1.00
North Eastman	3.55	102	80	129	0.54	145	114	185	0.77
Interlake	3.89	169	150	191	0.90	187	166	211	1.00
Wpg: Outer Core	4.37	129	116	143	0.69	125	112	139	0.66
Wpg: Old St. Boniface	4.46	504	440	578	2.68	322	275	376	1.71
Burntwood	4.87	14	8	25	0.07	68	38	124	0.36
Churchill	4.98	0	0	0	0.00	0	0	0	0.00
Norman	5.22	126	99	161	0.67	243	192	308	1.29
Wpg: Inner Core	7.42	368	326	414	1.96	236	207	269	1.25
Province	3.50	188	183	193	1.00	188	183	193	1.00
Non-Wpg	3.53	197	189	206	1.05	193	185	201	1.03
Winnipeg Total	3.48	181	174	188	0.96	184	177	191	0.98

Areas sorted by five-year premature mortality rates

Long Term Care Facility Expenditures, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower Ci	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	45	29	71	1.05	64	39	105	1.50
Wpg: S. East	2.83	62	30	131	1.45	90	45	177	2.09
South Westman	2.88	34	8	145	0.79	19	5	67	0.43
South Eastman	2.90	4	1	16	0.08	4	1	21	0.10
Wpg: N. West	2.97	34	15	78	0.80	42	19	93	0.97
Wpg: N. East	3.00	68	47	98	1.58	81	56	117	1.89
Wpg: S. Central	3.05	114	58	227	2.66	86	41	180	2.00
Wpg: West	3.17	93	61	143	2.17	83	55	128	1.94
Marquette	3.23	2	0	7	0.04	1	0	5	0.03
Brandon	3.25	0	0	10	0.01	0	0	8	0.01
Central	3.34	19	3	107	0.44	19	3	116	0.44
Parkland	3.42	5	1	15	0.11	3	1	10	0.07
North Eastman	3.55	21	5	82	0.50	25	7	90	0.58
Interlake	3.89	9	3	26	0.21	8	3	22	0.19
Wpg: Outer Core	4.37	57	36	89	1.33	55	35	86	1.29
Wpg: Old St Boniface	4.46	75	37	154	1.75	46	25	86	1.07
Burntwood	4.87	1	0	5	0.02	5	0	54	0.12
Churchill	4.98	16	1	324	0.37	46	2	951	1.08
Norman	5.22	2	0	12	0.06	4	1	21	0.08
Wpg: Inner Core	7.42	118	73	192	2.75	91	51	161	2.12
Province	3.50	43	36	52	1.00	43	36	52	1.00
Non-Wpg	3.53	10	5	22	0.24	10	5	21	0.23
Winnipeg	3.48	67	56	81	1.57	69	57	83	1.60

Areas sorted by five-year premature mortality rates

Total Medical, Including Interns and Residents Expenditures Per Capita, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	261	255	266	1.01	269	263	275	1.04
Wpg: S. East	2.83	263	257	269	1.02	275	268	282	1.06
South Westman	2.88	205	194	217	0.79	188	177	199	0.73
South Eastman	2.90	198	192	204	0.77	209	203	216	0.81
Wpg: N. West	2.97	275	269	281	1.06	281	275	288	1.09
Wpg: N. East	3.00	276	270	282	1.07	280	274	286	1.08
Wpg: S. Central	3.05	334	325	343	1.29	306	297	314	1.18
Wpg: West	3.17	307	298	315	1.19	291	282	299	1.13
Marquette	3.23	217	209	226	0.84	198	190	206	0.77
Brandon	3.25	239	232	246	0.92	236	229	242	0.91
Central	3.34	191	187	195	0.74	191	186	195	0.74
Parkland	3.42	202	196	209	0.78	188	182	194	0.73
North Eastman	3.55	237	229	245	0.92	244	236	253	0.95
Interlake	3.89	235	227	243	0.91	234	225	243	0.91
Wpg: Outer Core	4.37	307	302	313	1.19	307	301	313	1.19
Wpg: Old St. Boniface	4.46	366	349	383	1.42	326	312	341	1.26
Burntwood	4.87	188	182	195	0.73	240	227	252	0.93
Churchill	4.98	196	160	233	0.76	230	185	278	0.89
Norman	5.22	228	218	238	0.88	253	241	266	0.98
Wpg: Inner Core	7.42	362	348	376	1.40	349	336	363	1.35
Province	3.50	258	257	260	1.00	258	257	260	1.00
Non-Wpg	3.53	212	210	214	0.82	213	211	216	0.83
Winnipeg	3.48	293	291	296	1.14	291	289	294	1.13

Areas sorted by five-year premature mortality rates

*Other Professional Expenditures Per Capita, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	15	15	15	0.98	14	14	14	0.95
Wpg:S. East	2.83	16	16	16	1.10	16	16	16	1.07
South Westman	2.88	17	17	17	1.15	17	17	17	1.13
South Eastman	2.90	21	21	21	1.42	22	22	22	1.45
Wpg: N. West	2.97	12	12	12	0.63	12	12	12	0.61
Wpg: N. East	3.00	16	16	16	1.07	16	16	16	1.06
Wpg: S. Central	3.05	14	14	14	0.99	13	13	13	0.97
Wpg: West	3.17	14	14	14	1.45	13	13	13	1.32
Marquette	3.23	19	19	19	1.14	19	19	19	1.11
Brandon	3.25	14	14	14	0.83	14	14	14	0.81
Central	3.34	17	17	17	1.05	18	18	18	1.05
Parkland	3.42	16	16	16	0.97	16	16	16	0.95
North Eastman	3.55	18	18	18	1.17	18	18	18	1.18
Interlake	3.89	16	16	16	1.06	16	16	16	1.05
Wpg: Outer Core	4.37	12	12	12	0.79	12	12	12	0.79
Wpg: Old St. Boniface	4.46	17	17	17	1.11	17	16	17	1.10
Burntwood	4.87	10	10	10	0.64	10	10	10	0.67
Churchill	4.98	7	7	7	0.83	7	7	7	0.84
Norman	5.22	19	19	19	1.13	19	19	19	1.14
Wpg: Inner Core	7.42	8	8	8	0.56	8	8	8	0.56
Province	3.50	15	15	15	1.00	15	15	15	1.00
Non-Wpg	3.53	16	16	16	1.10	17	17	17	1.12
Winnipeg	3.48	14	14	14	0.93	14	14	14	0.91

Areas sorted by five-year premature mortality rates

*Oral, Dental, Periodontal Surgery, Optometry, and Chiropractic

A10

Mental Health Hospital Expenditures Per Capita, Crude and Adjusted Rates, 1993/94

Area	Five-Year Premature Mortality Rates	Crude Per Capita	Crude Lower CI	Crude Upper CI	Area/ Provincial Average	Adjusted Per Capita	Adjusted Lower CI	Adjusted Upper CI	Area/ Provincial Average
Wpg: S. West	2.68	1	0	6	0.02	1	0	6	0.02
Wpg: S. East	2.83	0	0	3	0.01	0	0	4	0.01
South Westman	2.88	52	31	86	1.51	41	25	67	1.19
South Eastman	2.90	11	4	29	0.32	12	5	31	0.35
Wpg: N. West	3.05	1	0	15	0.02	1	0	14	0.02
Wpg: N. East	3.00	2	0	9	0.04	2	0	10	0.05
Wpg: S. Central	2.97	2	0	17	0.06	2	0	15	0.05
Wpg: West	3.42	2	0	14	0.05	1	0	11	0.04
Marquette	3.17	47	28	79	1.36	35	21	59	1.03
Brandon	3.23	188	146	242	5.50	189	146	243	5.52
Central	3.25	57	40	82	1.67	58	40	83	1.70
Parkland	3.34	46	28	76	1.35	44	26	74	1.28
North Eastman	3.55	11	5	27	0.33	12	5	29	0.35
Interlake	3.89	202	166	246	5.92	197	161	240	5.75
Wpg: Outer Core	4.37	7	4	16	0.22	8	4	17	0.23
Wpg: Old St. Boniface	4.46	11	3	42	0.32	11	3	43	0.33
Burntwood	4.87	19	10	36	0.55	19	10	36	0.57
Churchill	5.22	13	1	135	0.37	13	1	121	0.37
Norman	4.98	14	5	39	0.40	16	5	50	0.47
Wpg: Inner Core	7.42	20	9	46	0.58	21	9	49	0.60
Province	3.50	34	30	39	1.00	34	30	39	1.00
Non-Wpg	3.53	75	66	85	2.19	76	67	86	2.22
Winnipeg	3.48	4	2	6	0.10	3	2	5	0.10

Areas sorted by five-year premature mortality rates

Home Care Expenditures, Crude Per Capita Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Crude Per Capita $	% of Total Expenditure on Home Care
South Westman	2.88	58	4.2%
South Eastman	2.83	44	4.9%
Marquette	3.23	58	4.2%
Brandon	3.25	58	3.9%
Central	3.34	65	5.7%
Parkland	3.42	76	5.3%
North Eastman	3.55	44	4.4%
Interlake	3.89	73	5.7%
Burntwood	4.87	6	0.6%
Churchill	4.98	6	0.5%
Norman	5.22	64	4.9%
Province	3.50	56	4.5%
Non-Wpg	3.53	56	4.6%
Winnipeg	3.48	54	4.3%

Areas sorted by five-year premature mortality rates

Total Expendiures by Sector, Adjusted Per Capita Rates

Area	Five-Year Premature Mortality Rates	Hospital Inpatient	Hospital Outpatient	Hospital Total	Mental Health	PCH and LTC	All Medical (incl other)	Grand Total
Wpg: S. West	2.68	394	142	536	1	341	284	1,162
Wpg: S. East	2.83	448	178	626	0	251	291	1,168
South Westman	2.88	456	135	591	41	198	205	1,035
South Eastman	2.90	426	128	554	12	217	231	1,014
Wpg: N. West	2.97	442	181	623	1	303	293	1,220
Wpg: N. East	3.00	471	165	636	2	235	296	1,169
Wpg: S. Central	3.05	458	181	639	2	190	319	1,150
Wpg: West	3.17	441	160	600	1	310	304	1,215
Marquette	3.23	480	134	615	35	185	216	1,051
Brandon	3.25	481	168	650	189	250	249	1,338
Central	3.34	479	122	600	58	215	208	1,081
Parkland	3.42	569	153	722	44	191	204	1,161
North Eastman	3.55	523	142	665	12	170	262	1,109
Interlake	3.89	490	146	636	197	195	250	1,278
Wpg: Outer Core	4.37	558	276	834	8	180	319	1,341
Wpg: Old St. Bonifac	4.46	552	282	834	11	368	342	1,555
Burntwood	4.87	894	217	1,111	19	73	250	1,453
Churchill	4.98	1,071	590	1,661	13	46	237	1,957
Norman	5.22	873	242	1,115	16	246	272	1,649
Wpg: Inner Core	7.42	923	406	1,330	21	327	357	2,035
Provincial	3.50	506	179	685	34	231	273	1,223
Non-Wpg	3.53	525	148	673	76	203	230	1,182
Winnipeg	3.48	492	202	694	3	252	305	1,254

Areas sorted by five-year premature mortality rates

Distribution of Total Expenditures, Adjusted Rates

Area	Five-Year Premature Mortality Rates	Hospital Inpatient	Hospital Outpatient	Hospital Total	Mental Health	PCH and LTC	All Medical (incl other)	Grand Total
Wpg: S. West	2.68	34%	12%	46%	0%	29%	24%	100%
Wpg: S. East	2.83	38%	15%	54%	0%	21%	25%	100%
South Westman	2.88	44%	13%	57%	4%	19%	20%	100%
South Eastman	2.90	42%	13%	55%	1%	21%	23%	100%
Wpg: N. West	2.97	36%	15%	51%	0%	25%	24%	100%
Wpg: N. East	3.00	40%	14%	54%	0%	20%	25%	100%
Wpg: S. Central	3.05	40%	16%	56%	0%	17%	28%	100%
Wpg: West	3.17	36%	13%	49%	0%	26%	25%	100%
Marquette	3.23	46%	13%	59%	3%	18%	21%	100%
Brandon	3.25	36%	13%	49%	14%	19%	19%	100%
Central	3.34	44%	11%	56%	5%	20%	19%	100%
Parkland	3.42	49%	13%	62%	4%	16%	18%	100%
North Eastman	3.55	47%	13%	60%	1%	15%	24%	100%
Interlake	3.89	38%	11%	50%	15%	15%	20%	100%
Wpg: Outer Core	4.37	42%	21%	62%	1%	13%	24%	100%
Wpg: Old St. Bonifac	4.46	35%	18%	54%	1%	24%	22%	100%
Burntwood	4.87	62%	15%	76%	1%	5%	17%	100%
Churchill	4.98	55%	30%	85%	1%	2%	12%	100%
Norman	5.22	53%	15%	68%	1%	15%	16%	100%
Wpg: Inner Core	7.42	45%	20%	65%	1%	16%	18%	100%
Provincial	3.50	41%	15%	56%	3%	19%	22%	100%
Non-Wpg	3.53	44%	13%	57%	6%	17%	19%	100%
Winnipeg	3.48	39%	16%	55%	0%	20%	24%	100%

Areas sorted by five-year premature mortality rates

Total Expenditures by Sector, Crude Per Capita Rates, 1993/94

Area	Five-Year Premature Mortality Rate	Hospital Inpatient	Hospital Outpatient	Hospital Total	Mental Health	PCH and LTC	All Medical (incl other)	Grand Total
Wpg: S. West	2.68	343	138	481	1	244	275	1,001
Wpg: S. East	2.83	371	172	543	0	154	279	976
South Westman	2.88	582	148	731	52	332	223	1,337
South Eastman	2.90	377	126	503	11	163	219	896
Wpg: N. West	2.97	401	178	579	1	234	287	1,101
Wpg: N. East	3.00	436	163	599	2	188	292	1,081
Wpg: S. Central	3.05	541	185	726	2	261	348	1,338
Wpg: West	3.17	477	157	634	2	348	320	1,304
Marquette	3.23	608	142	750	47	308	236	1,341
Brandon	3.25	496	170	667	188	270	252	1,377
Central	3.34	497	124	620	57	241	208	1,126
Parkland	3.42	691	163	853	46	293	218	1,411
North Eastman	3.55	484	141	625	11	123	254	1,013
Interlake	3.89	489	146	635	202	178	251	1,267
Wpg: Outer Core	4.37	562	275	837	7	186	319	1,349
Wpg: Old St. Bonifac	4.46	705	297	1,002	11	579	382	1,975
Burntwood	4.87	551	171	722	19	15	198	954
Churchill	4.98	622	432	1,052	13	16	202	1,283
Norman	5.22	681	218	899	14	129	247	1,288
Wpg: Inner Core	7.42	1063	395	1,457	20	486	370	2,334
Province	3.50	506	179	685	34	231	273	1,224
Non-Wpg	3.53	529	149	679	75	208	228	1,190
Winnipeg	3.48	489	201	690	4	248	307	1,249

Areas sorted by five-year premature mortality rates

Distribution of Dollars Spent Across Areas, Crude Rates

Area	Five-Year Premature Mortality Rates	Hospital Inpatient	Hospital Outpatient	Hospital Total	Mental Health	PCH and LTC	All Medical	Grand Total
Wpg: S. West	2.68	34%	14%	48%	0%	24%	27%	100%
Wpg: S. East	2.83	38%	18%	56%	0%	16%	29%	100%
South Westman	2.88	44%	11%	55%	4%	25%	17%	100%
South Eastman	2.90	42%	14%	56%	1%	18%	24%	100%
Wpg: N. West	2.97	36%	16%	53%	0%	21%	26%	100%
Wpg: N. East	3.00	40%	15%	55%	0%	17%	27%	100%
Wpg: S. Central	3.05	40%	14%	54%	0%	20%	26%	100%
Wpg: West	3.17	37%	12%	49%	0%	27%	25%	100%
Marquette	3.23	45%	11%	56%	3%	23%	18%	100%
Brandon	3.25	36%	12%	48%	14%	20%	18%	100%
Central	3.34	44%	11%	55%	5%	21%	18%	100%
Parkland	3.42	49%	12%	60%	3%	21%	15%	100%
North Eastman	3.55	48%	14%	62%	1%	12%	25%	100%
Interlake	3.89	39%	12%	50%	16%	14%	20%	100%
Wpg: Outer Core	4.37	42%	20%	62%	1%	14%	24%	100%
Wpg: Old St. Boniface	4.46	36%	15%	51%	1%	29%	19%	100%
Burntwood	4.87	58%	18%	76%	2%	2%	21%	100%
Churchill	4.98	48%	34%	82%	1%	1%	16%	100%
Norman	5.22	53%	17%	70%	1%	10%	19%	100%
Wpg: Inner Core	7.42	46%	17%	62%	1%	21%	16%	100%
Province	3.50	41%	15%	56%	3%	19%	22%	100%
Non-Wpg	3.53	44%	13%	57%	6%	17%	19%	100%
Winnipeg	3.48	39%	16%	55%	0%	20%	25%	100%

Areas sorted by five-year premature mortality rates

Total Expenditures: Three Methods of Allocating Hospital Costs
Comparison of Area to Provincial Average, Crude Rates, 1993/94

Area	Five-Year Premature Mortality Rates	Benchmark Hospital CWC & Combined (1)	Area/ Provincial Average (2)	Provincial CWC & Combined Outpatient (3)	Area/ Provincial Average (4)	Hospital CWC & Inpatient Proxy (5)	Area/ Provincial Average (6)
Wpg: S. West	2.68	1,001	0.82	998	0.81	991	0.81
Wpg: S. East	2.83	977	0.80	937	0.76	957	0.78
South Westman	2.88	1,337	1.09	1,418	1.16	1,379	1.13
South Eastman	2.90	896	0.73	948	0.77	929	0.76
Wpg: N. West	2.97	1,101	0.90	1,078	0.88	1,092	0.89
Wpg: N. East	3.00	1,080	0.88	1,066	0.87	1,089	0.89
Wpg: S. Central	3.05	1,337	1.09	1,307	1.07	1,324	1.08
Wpg: West	3.17	1,304	1.07	1,328	1.08	1,307	1.07
Marquette	3.23	1,341	1.10	1,489	1.21	1,384	1.13
Brandon	3.25	1,377	1.13	1,410	1.15	1,356	1.11
Central	3.34	1,126	0.92	1,178	0.96	1,168	0.95
Parkland	3.42	1,411	1.15	1,507	1.23	1,444	1.18
North Eastman	3.55	1,013	0.83	1,024	0.84	1,062	0.87
Interlake	3.89	1,267	1.04	1,290	1.05	1,323	1.08
Wpg: Outer Core	4.37	1,349	1.10	1,310	1.07	1,280	1.05
Wpg: Old St. Boniface	4.46	1,975	1.61	1,876	1.53	1,901	1.55
Burntwood	4.87	954	0.78	872	0.71	989	0.81
Churchill	4.98	1,284	1.05	1,086	0.89	1,372	1.12
Norman	5.22	1,288	1.05	1,240	1.01	1,321	1.08
Wpg: Inner Core	7.42	2,333	1.91	2,255	1.84	2,189	1.79
Province	3.50	1,223	1.00	1,226	1.00	1,223	1.00
Non-Wpg	3.53	1,190	0.97	1,228	1.00	1,223	1.00
Winnipeg	3.48	1,249	1.02	1,268	1.03	1,222	1.00

Areas sorted by five-year premature mortality rates

Total Expenditures: Three Methods of Allocating Hospital Costs, Crude Rates, 1993/94

Area	Five-Year Premature Mortality Rates	Benchmark Hospital CWC & Combined Outpatient (1)	Provincial CWC & Combined Outpatient (2)	Hospital CWC & Inpatient Proxy (3)	Ratio (2/1)	Ratio (3/1)
Wpg: S. West	2.68	1,001	998	991	1.00	0.99
Wpg: S. East	2.83	977	937	957	0.96	0.98
South Westman	2.88	1,337	1,418	1,379	1.06	1.03
South Eastman	2.90	896	948	929	1.06	1.04
Wpg: N. West	2.97	1,101	1,078	1,092	0.98	0.99
Wpg: N. East	3.00	1,080	1,066	1,089	0.99	1.01
Wpg: S. Central	3.05	1,337	1,307	1,324	0.98	0.99
Wpg: West	3.17	1,304	1,328	1,307	1.02	1.00
Marquette	3.23	1,341	1,489	1,384	1.11	1.03
Brandon	3.25	1,377	1,410	1,356	1.02	0.98
Central	3.34	1,126	1,178	1,168	1.05	1.04
Parkland	3.42	1,411	1,507	1,444	1.07	1.02
North Eastman	3.55	1,013	1,024	1,062	1.01	1.05
Interlake	3.89	1,267	1,290	1,323	1.02	1.04
Wpg: Outer Core	4.37	1,349	1,310	1,280	0.97	0.95
Wpg: Old St. Boniface	4.46	1,975	1,876	1,901	0.95	0.96
Burntwood	4.87	954	872	989	0.91	1.04
Churchill	4.98	1,284	1,086	1,372	0.85	1.07
Norman	5.22	1,288	1,240	1,321	0.96	1.03
Wpg: Inner Core	7.42	2,333	2,255	2,189	0.97	0.94
Province	3.50	1,223	1,226	1,223	1.00	1.00
Non-Wpg	3.53	1,190	1,228	1,223	1.03	1.03
Winnipeg	3.48	1,249	1,268	1,222	1.02	0.98

Areas sorted by five-year premature mortality rates

Total Expenditures Per Capita, Crude and Adjusted Rates (hospital, medical, pch, ltc, mental health)

Area	Five-Year Premature Mortality Rates	Crude Rates	Area to Provincial Average	Adjusted Rates	Area to Provincial Average
Wpg:S.West	2.68	1,001	0.82	1,162	0.95
Wpg:S.East	2.83	976	0.80	1,168	0.96
South Westman	2.88	1,337	1.09	1,035	0.85
South Eastman	2.90	896	0.73	1,014	0.83
Wpg:N.West	2.97	1,101	0.90	1,220	1.00
Wpg:N.East	3.00	1,081	0.88	1,169	0.96
Wpg:S.Central	3.05	1,338	1.09	1,150	0.94
Wpg:West	3.17	1,304	1.07	1,215	0.99
Marquette	3.23	1,341	1.10	1,051	0.86
Brandon	3.25	1,377	1.13	1,338	1.09
Central	3.34	1,126	0.92	1,081	0.88
Parkland	3.42	1,411	1.15	1,161	0.95
North Eastman	3.55	1,013	0.83	1,109	0.91
Interlake	3.89	1,267	1.04	1,278	1.04
Wpg:Outer Core	4.37	1,349	1.10	1,341	1.10
Wpg:Old St.B.	4.46	1,975	1.61	1,555	1.27
Burntwood	4.87	954	0.78	1,453	1.19
Churchill	4.98	1,283	1.05	1,957	1.60
Norman	5.22	1,288	1.05	1,649	1.35
Wpg:Inner Core	7.42	2,334	1.91	2,035	1.66
Province	3.50	1,224	1.00	1,223	1.00
Non-Wpg	3.53	1,190	0.97	1,182	0.97
Winnipeg	3.48	1,249	1.02	1,254	1.03

Areas sorted by five-year premature mortality rates