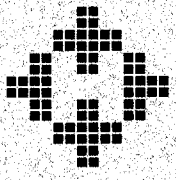
Monitoring the Winnipeg Hospital System: The Update Report

1993/1994

January 1996



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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

In 1992, 306 (10.2%) of the hospital beds in Winnipeg closed, with 209 (7.7%) additional beds closed in 1993. Between 1992 and 1993 expenditures per capita on hospitals decreased by 5%. When Manitoba Health began downsizing the hospital sector, the MCHPE agreed to monitor the effects of the bed closures. *Monitoring the Winnipeg Hospital System: The First Report* focused on 1990 through 1992 and found no adverse effects of downsizing on access to care, quality of care, or the health of Winnipeg residents. Because the bed closures occurred throughout 1992, it was acknowledged that The First Report was preliminary, allowing little time to assess the full impact of downsizing. This Update Report provides the opportunity to reassess the impact of bed closures, focusing on 1993, a full year after the first major closures occurred. Once again, three key questions are addressed: have the bed closures adversely affected 1) Manitobans' access to care? 2) the quality of care delivered? or 3) the health of the population?

Results

Access

Access by Winnipeg residents to hospital services was not adversely affected. In fact, just as many patients were cared for by Winnipeg hospitals in 1993 as in 1991, and more than in 1990, despite considerable reductions in bed numbers and expenditures. This was accomplished by a shift in the way care is delivered. Between 1992 and 1993:

- the number of days patients spent in hospital decreased. The days per 1000 residents dropped by 9%.

- Manitobans' access to surgical care was unaffected by downsizing. Surgical care continued to move from inpatient to outpatient settings, and length of stay for surgical inpatients decreased. Days for adult surgical inpatients decreased by 13%. Access to procedures such as angioplasty, cataracts and knee replacement increased dramatically between 1992 and 1993, by as much as 33% in the case of knee replacement. Concerns about bed closures leading to a rationing of surgical care appear to be unfounded.

- utilization by adult medical patients changed very little: separations decreased by only 1% while days decreased by 3%.

- no decrease in access was observed for pediatric patients, non-Winnipeg patients, or patients from any particular area of Winnipeg (patients from the poorest, middle class and wealthiest neighbourhoods all continued to have good access to care).

Quality of Care

Quality of care remains high. To date there is no evidence that downsizing has negatively influenced the quality of care delivered to patients.

- Mortality rates among those admitted for heart attacks, cancer surgery and hip fractures did not increase. Mortality rates examined separately for elderly patients with the same three conditions also showed no changes.

- Readmission rates to hospital for 13 common types of patients did not show significant increases in 1993. Even small increases were explored further to ensure earlier discharge was not responsible for readmission. No relationship was found between shorter stays and higher readmission rates.

- Although readmission rates are generally higher for more vulnerable groups (i.e., the elderly and those from the poorest neighbourhoods) there were no increases in readmission rates for these groups in 1993.

Health Status

The health of the Winnipeg population remained stable between 1990 and 1993.

- Despite frightening headlines and public concern, there were no increases in mortality rates following bed closures, even for the poor and the elderly, two groups especially vulnerable to any negative impacts of downsizing.

Additional Insights From the Analyses

- Between 1991 and 1993 there was an increase in the overall level of acuity of medical patients at the teaching hospitals.

- Despite cutbacks, overall nursing hours per case did not decrease over the period studied.

- Increased access to long-term care facilities and Personal Care Home beds helped hospitals respond to downsizing and resulted in a marked reduction in acute hospital stays for those patients awaiting admission to nursing homes. The median length of stay in hospital before discharge to a nursing home dropped by 32% between 1992 and 1993; further analysis suggested that this improved access to nursing homes by hospital patients did not occur at the expense of those waiting in the community. More appropriate placement of long-stay patients indicates improved quality of care.

- The absence of routinely collected data on home care services creates a major gap in the information available for monitoring downsizing of the health care system. As patient care shifts from hospital to the community the need to fill this gap becomes critical.

In light of the findings of this and the previous report showing that the system has absorbed the cutbacks well and continues to provide high quality care for an equivalent number of patients as in previous years, it would appear to be time to move beyond our preoccupation with the potential negative impacts of hospital downsizing.

- Information from this report suggests important areas which need more attention from those committed to improving the health of the population and preserving access to high quality health care. Specifically, large differences in health status across groups which differ in socioeconomic characteristics are again highlighted; that is, Winnipeg residents from middle income neighbourhoods have very poor health status relative to that of residents of high income neighbourhoods, and residents of low income neighbourhoods have dramatically poorer health outcomes. More attention should be focused on ways to improve the health status of residents of low and middle income neighbourhoods.

- We found no evidence that downsizing led to growth in the private sector. Cataract procedures in the private sector expanded by over 125% between 1990 and 1993 (from 284 to 649 procedures). This occurred at a time when the number of cataract surgeries in Manitoba hospitals increased by 30% (from 3,556 to 4,634 procedures). If there are continued increases in the private sector concurrent with increases in the public sector then the factors contributing to expansion of the private sector should be critically reviewed.

In Summary:

- There are considerable opportunities for improving the health of Manitobans but these appear to be related more strongly to factors associated with socio-economic status than with the current level of investment in the health care system.

- Bed closures and budget reductions at the urban hospitals have led to increased efficiency with no deterioration in access or quality. Perhaps it is time to critically assess the delivery of care in rural hospitals. It is likely that similar initiatives applied to rural institutions would result in improvements in efficiency, particularly since rural residents, in general, receive much higher levels of acute hospital services in comparison to urban residents.

Conclusions

Downsizing the Winnipeg hospital sector included the closure of 306 beds in 1992, with 209 additional beds closed in 1993. Despite the reductions in beds and budgets, Winnipeg hospitals continued to care for the same number of patients in 1993 as they did in previous years with no detectable decrease in quality. The results of this study suggest Winnipeg hospitals and caregivers have increased the efficiency with which they deliver care. They should be commended; these gains would not have been possible without their considerable efforts.

Monitoring the Winnipeg Hospital System: The Update Report 1993/1994

Introduction

In 1991,[1] Manitoba Health reduced the number of hospital beds in Winnipeg by 29 (1.0%) (Table 1). The following year, 306 (10.2%) of the city's acute hospital beds were closed, with most of these closures at the two teaching hospitals (279). In 1993, a further 209 (7.7%) beds were closed, with 155 of these at the five community hospitals. Manitoba Health said that the downsizing of the system should occur without reducing access and without compromising either the quality of care delivered or the health of the population. The Manitoba Centre for Health Policy and Evaluation was asked to monitor and report on the effects of downsizing.

Monitoring the Winnipeg Hospital System: The First Report (Roos and Shapiro, 1994), which examined developments over the period 1990 through 1992, found that downsizing appeared to have little impact on access to hospital services: the 1992 rate of hospital separations including inpatient care and outpatient surgery changed little; more procedures were performed on an outpatient basis, patients were discharged following shorter stays, particularly the least sick patients. Access to Winnipeg hospitals by non-Winnipeg residents was unaffected by bed closures and the reductions in use of hospitals were not made at the expense of the poorest populations. There was no evidence that bed closures and increased financial pressures negatively influenced the quality of care delivered to patients. Mortality rates, hospital readmission rates, and the rate at which individuals contacted physicians within 30 days after hospital discharge changed little. No adverse impact on the health of Winnipeg's population was observed.

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[1] By 1991, we are referring to the 1991/92 fiscal year. All data in this report were analyzed by fiscal years. The fiscal year runs from April 1 to March 31.

Table 1†
History of Acute Bed Closures at Winnipeg Hospitals
Acute Bed Change
1990-1993

	1990	1991	1992	1993
Total Acute Beds at Start of Fiscal Year	3,042	3,042	3,013	2,707
Net Changes by Type of Hospital				
Teaching	0	(29)	(279)	(54)
Other	0	0	(27)	(155)
Total	0	(29)	(306)	(209)
Change (% decrease)	0	(1.0)	(10.2)*	(7.7)*

Source: Manitoba Health Bed Map. All figures are based on beds set up for use for patient care.

† This table corresponds to Table 1 in the First Report.
* These values exaggerate the loss of available beds. Although 306 acute beds closed in 1992, 75 non-acute beds were added to the system; in 1993 although a further 209 acute care beds closed, 24 non-acute beds were added.

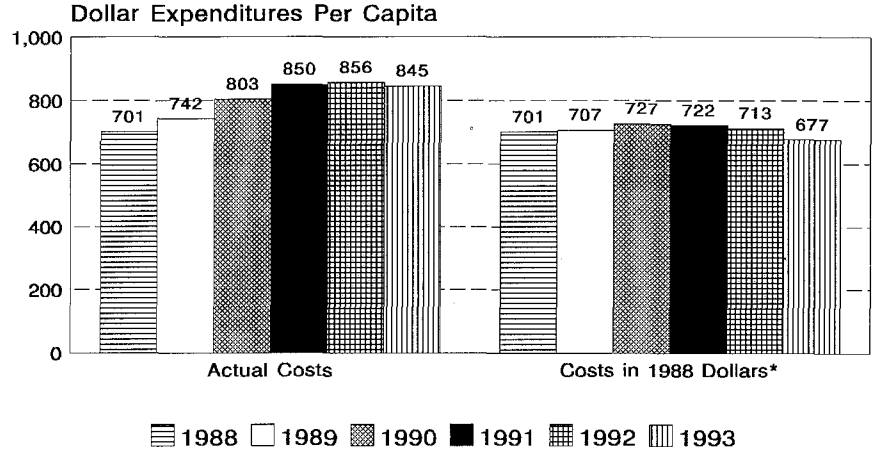
Because the major bed closures occurred during 1992, it was acknowledged that The First Report was preliminary and that 1993 data would provide a more definitive assessment of the impact of the bed closures. Moreover, concerns expressed by a number of groups about the potential effects of bed closures that were not reviewed in The First Report needed to be explored. As part of the Update Report, therefore, we repeated all analyses contained in the First Report, and conducted additional analyses in an attempt to explore the concerns expressed following the release of The First Report. For the sake of brevity, we report below only key findings and those where the patterns are different from those detailed in The First Report.

Results and Discussion

Hospital Expenditures

Expenditures per capita on hospitals from 1988 to 1993 are illustrated in Figure 1. Downsizing has clearly occurred: expenditures per capita (after adjusting for inflation) declined by 1.2% between 1991 and 1992 and by a further 5% between 1992 and 1993 for a total of close to 7% since 1990.

Figure 1§
Changes in Insured Hospital Services:
Costs Per Capita in Manitoba
1988 - 1993



§ This Figure corresponds to Figure 1 in the First Report.
* Adjusted for inflation.
Source: Manitoba Department of Health.

Access to Care

Hospital Utilization

Hospital utilization in Manitoba from 1990 to 1993 is analyzed in this report, focusing on changes between 1992 and 1993. A population-based approach was used to study the use of Winnipeg hospitals. This approach involves categorizing patients according to their area of residence, regardless of where they received their care. For example, many rural residents

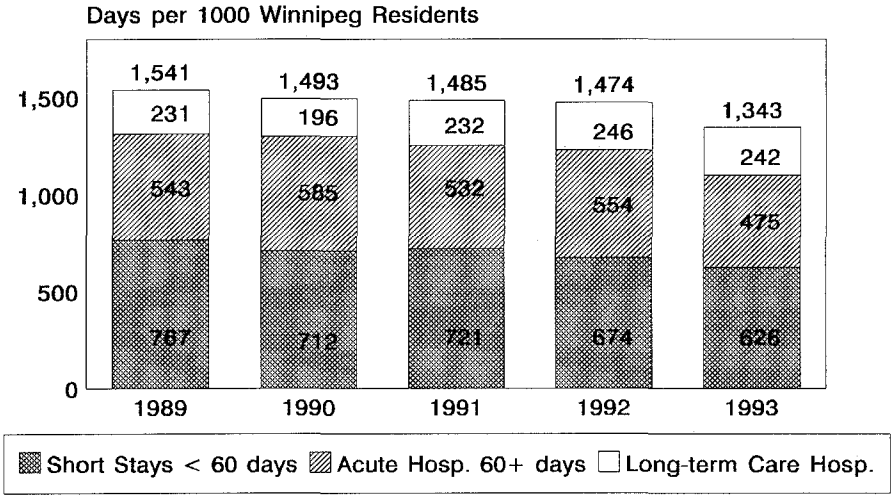
receive care in Winnipeg hospitals; in this report they would be classified as rural residents and would not be included in figures showing hospital use by Winnipeg residents. Use of hospitals by rural residents was also examined.

Figure 2 tracks the changing use of hospital days per 1000 Winnipeg residents. Between 1991 and 1992, there was a 1% overall drop in days spent in hospital per 1000 residents and a 7% drop in short-stay days (admissions which resulted in stays of less than 60 days) at acute hospitals. After the closure of 306 beds in 1992, days per 1000 dropped an additional 9% overall with a further 7% drop in short-stay days. Days for long-stay cases (60+ days) in acute hospitals also decreased by 14%. This large decrease was due, at least in part, to the opening of 75 non-acute care beds in the long-term care facilities at the same time as the large decrease in acute hospital beds. Many of the long stay patients moved from the acute care hospitals to long-term care facilities.[2] The addition of 236 Personal Care Home beds in Winnipeg also allowed many long-stay patients to move from acute care hospitals to Personal Care Homes.

Despite the drop in days, access to hospitals was not compromised. Figure 3 tracks separations per 1000 Winnipeg residents according to where care took place. Overall, no decrease in the rate of separations occurred. This means people were just as likely to be admitted to hospital in 1993 as they were in previous years (even after taking into account the aging of the population). In fact, the rate of separations in 1993 was higher than that in 1990. As was found in The First Report, outpatient surgical cases continued to increase (from 36 to 39 cases per 1000 in 1992 and 1993 respectively), with the movement of inpatient surgery to the outpatient setting contributing to the decrease in days illustrated in Figure 2. Indeed, as shown in Figure 3, between 1989 and 1993, outpatient surgical cases increased by 50%, going from 26 to 39 cases per 1000 residents. When broken down further, short-stay inpatient separations decreased by 2% (going from 96 per 1000 in 1992 to 94 per 1000 in

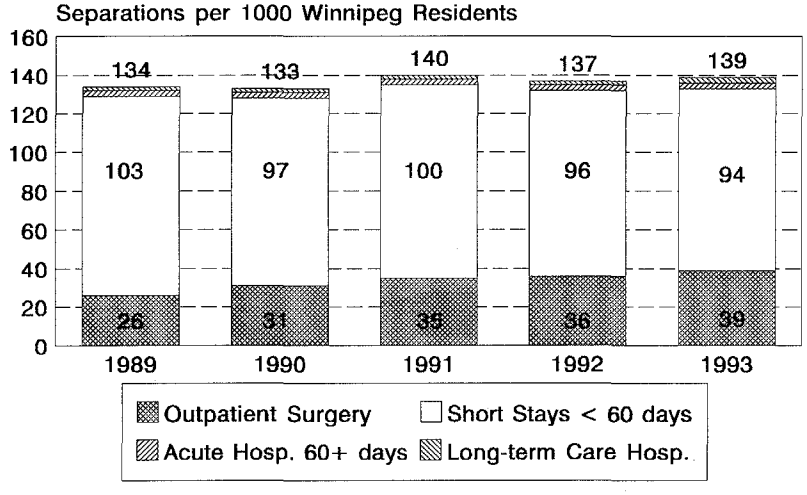
[2] The reason we do not see a corresponding increase in days for long-stay facilities, due to this movement of patients from acute to non-acute beds, is because we only capture days for those patients who have separated, and many of these patients are still in the long-stay facilities.

Figure 2[§]
Changing Use of Hospitals:
Winnipeg Days
1989 - 1993



[§] This Figure corresponds to Figure 3 in the First Report

Figure 3[§]
Changing Use of Hospitals:
Winnipeg Separations
1989-1993



§ This Figure corresponds to Figure 2 in the First Report

1993). This decrease in short-stay inpatient separations was driven by a 4% drop at the teaching hospitals, with the community hospitals showing no change in short-stay separation rates.

Non-Winnipeg residents' use of Winnipeg hospitals shows essentially the same pattern observed for Winnipeg residents: a large drop in days spent in Winnipeg hospitals, little change in overall cases treated, and a shift in site of surgical care from inpatient to outpatient. While the greatest decrease in separations from Winnipeg hospitals for non-Winnipeg residents was evidenced at the teaching hospitals (27.19 separations per 1000 residents in 1992 compared to 25.28 separations per 1000 residents in 1993), we have no evidence that downsizing jeopardized rural residents' access to tertiary care. Access for very high intensity admissions (including those such as coronary artery bypass and angioplasty) remained unchanged for rural patients (6.36 separations per 1000 residents in 1992 compared to 6.38 separations per 1000 residents in 1993).

Changes in Utilization by Type of Care

Whereas overall rates of hospital use appear to have changed little between 1990 and 1993, patterns of care did change. Table 2 shows these changes by type of care for adult residents of Winnipeg. Looking first at surgery, it is evident that there has been a decrease in the rate of inpatient surgical separations with a corresponding increase in outpatient surgery. Between 1992 and 1993 the adult inpatient surgery rate decreased 7% while the outpatient rate increased by 6%. Looking across all four years we see an 8% decrease in adult inpatient surgery rates between 1990 and 1993, and a 24% increase in adult outpatient surgery during the same time period. Winnipeg residents were clearly receiving at least as much surgery in 1993 as they did before bed closures. The mean length of stay for surgical inpatients continued to decrease, dropping 7% between 1992 and 1993 (from 7.64 days to 7.12 days), and showing a 15% decrease when looking across all four years. The shorter stays for surgical inpatients, coupled with the shift from inpatient to outpatient surgery, explains the 13% decrease between 1992 and 1993 (22% decrease across four years) in surgical days per 1000 residents.

Table 2†
Changing Utilization by Type of Care
Winnipeg Residents (Adult)
1990-1993

Type of Care	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Separations per 1000 Residents							
Surgery							
Inpatient	28.68	29.69	28.38	26.51	1.04	0.96	0.93
Outpatient	25.11	28.22	29.46	31.09	1.12	1.04	1.06
Total	53.79	57.91	57.84	57.60	1.08	1.00	1.00
Medical	37.93	38.91	37.15	36.74	1.03	0.95	0.99
Obstetrics	19.38	19.13	19.12	19.65	0.99	1.00	1.03
Psychiatry	3.28	3.47	3.61	3.25	1.06	1.04	0.90
Mean Length of Stay							
Surgical	8.35	8.05	7.64	7.12	0.96	0.95	0.93
Medical	8.15	8.16	8.08	7.91	1.00	0.99	0.98
Obstetrics	3.13	3.11	3.04	2.73	0.99	0.98	0.90
Psychiatry	18.89	18.55	17.93	18.43	0.98	0.97	1.03
Days per 1000 Residents							
Surgical	244.34	242.40	218.82	190.02	0.99	0.90	0.87
Medical	315.11	321.38	302.43	292.01	1.02	0.94	0.97
Obstetrics	60.66	59.34	58.03	53.49	0.98	0.98	0.92
Psychiatry	63.30	65.83	65.93	60.31	1.04	1.00	0.91

† This Table corresponds to Table 5 in the First Report.

The pattern for adult medical patients, as shown in Table 2, differs markedly from surgical patients. Medical separations decreased by 5% between 1991 and 1992 but by only 1% between 1992 and 1993. In contrast to the dramatic length-of-stay drops in surgery, mean

length of stay for medical patients decreased by only 2% between 1992 and 1993, and by only 3% across all four years. Medical days per 1000 residents decreased 3% between 1992 and 1993 (7% decrease across all four years).

The rate of obstetric separations increased by 3% between 1992 and 1993. However, the mean length of stay for these cases dropped dramatically (10%) during the same time period, resulting in an 8% decrease in obstetric days per 1000 residents.

The mean length of stay for psychiatric patients increased by 3% (17.93 to 18.43 days) between 1992 and 1993, however the psychiatric separation rate decreased by 10%, resulting in a 9% decrease in psychiatric days per 1000 residents. This decrease was expected, given the changes that were implemented in 1993 as part of mental health reform.

Changes in Type of Patient Admitted to Hospital

Hospitalization rates for short-stay inpatients who were very ill (i.e., with three or more comorbid conditions) or who required complex care (those with a high level of comorbidity or complications) did not change significantly between 1992 and 1993 (Table 3). However, from Table 3 it is clear that between 1992 and 1993, the days of care per 1000 residents dropped significantly for almost all groups of patients, even those who were very ill.

When surgical and medical patients were examined separately, a large drop in surgical separations for the lowest severity groups was evident and expected given the shift toward outpatient surgery. Likewise, a significant decrease in days was found for all levels of surgical patients, reflecting not only the shift to outpatient surgery but the shorter inpatient stays for these patients. A different pattern was evident for medical patients, where we found little change in either separations or days between 1992 and 1993, for patients at any of the levels of illness or complexity.

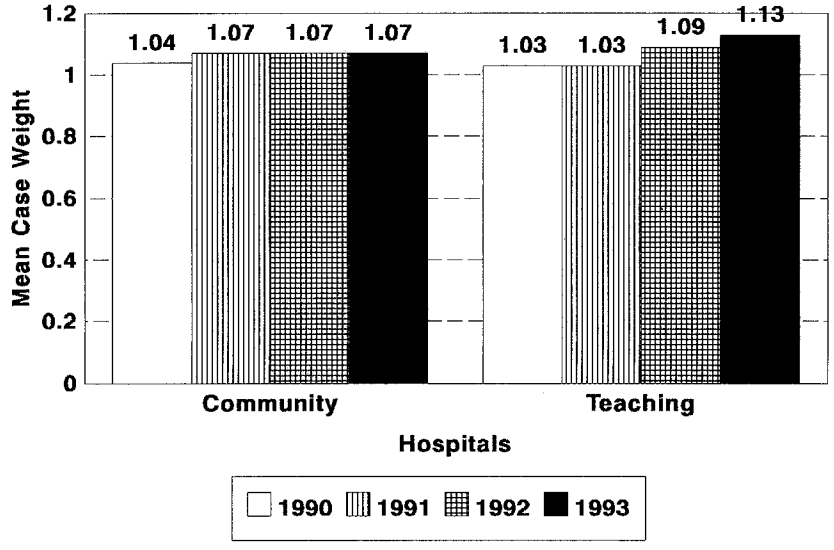
Table 3†
Changes in Types of Short Stay Patients Admitted to Hospital
Winnipeg Residents
1990-1993

	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Separations per 1000 Residents							
Level of Co-morbidity and Complications							
Low	67.56	69.23	65.92	64.74*	1.02	0.95	0.98
Moderate	19.81	20.55	20.15	19.52*	1.04	0.98	0.97
High	9.48	9.87	9.96	9.84	1.04	1.01	0.99
Number of Co-morbid Conditions							
None	73.60	74.84	71.45	69.84*	1.02	0.95	0.98
1	10.15	11.31	10.78	10.47	1.11	0.95	0.97
2	6.78	7.08	7.33	7.42	1.04	1.04	1.01
3+	6.32	6.42	6.47	6.36	1.02	1.01	0.98
Days per 1000 Residents							
Level of Co-morbidity and Complications							
Low	362.65	368.40	332.23	308.74*	1.02	0.90	0.93
Moderate	193.85	195.09	186.31	173.22*	1.01	0.96	0.93
High	155.22	157.42	154.97	143.57*	1.01	0.98	0.93
Number of Co-morbid Conditions							
None	451.90	453.25	417.50	384.58*	1.00	0.92	0.92
1	99.71	109.22	102.61	95.02*	1.10	0.94	0.93
2	75.53	76.10	72.37	69.04	1.01	0.95	0.95
3+	84.58	82.35	81.02	76.88*	0.97	0.98	0.95

† This Table corresponds to Table 4 in the First Report
* Statistically significant decrease in 1993.

Since health care providers at the teaching hospitals stated that they perceived an increased acuity of the medical patients treated after downsizing, we analyzed the data using a number of different measures of acuity, including case weights which measure the level of resource intensity required for a given case. Mean case weights for Winnipeg hospitals increased over the four-year period, and further analysis revealed that this change was driven by an increase at the teaching hospitals (Figure 4).[3] The percentage of patients 85 years of age and older also increased over this period at the teaching hospitals. These results support the perceptions of those at the teaching hospitals that they are treating sicker, frailer patients.

Figure 4
Change in Resource Intensity of Typical Medical Patients (Winnipeg Residents, Adults Only) 1990-1993

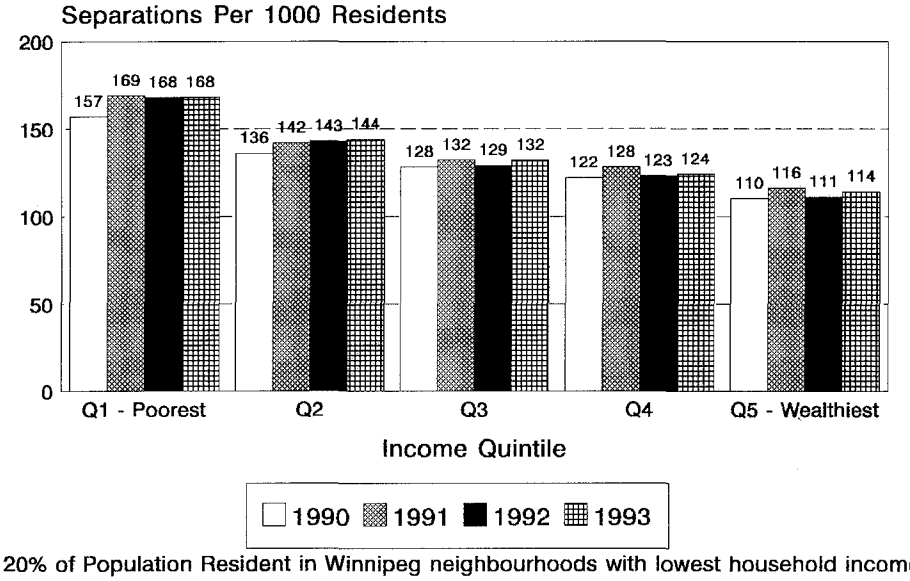


Previous research indicated that lower income groups are at higher risk for poor health and hospitalization (Frohlich and Mustard, 1994). Figure 5 demonstrates a strong relationship

[3] Not surprisingly, given the shift of lower intensity patients from inpatient to outpatient surgery, mean case weights for surgical inpatients also increased during the same time period, at both teaching and community hospitals.

between separations and income level: the lower the income group the higher the rate of admission to hospital. None of the five income groups had poorer access to acute hospitals following bed closures.

Figure 5
Hospital Separations By Income Quintile: Winnipeg Residents (Short Stay <60 Days) 1990-1993

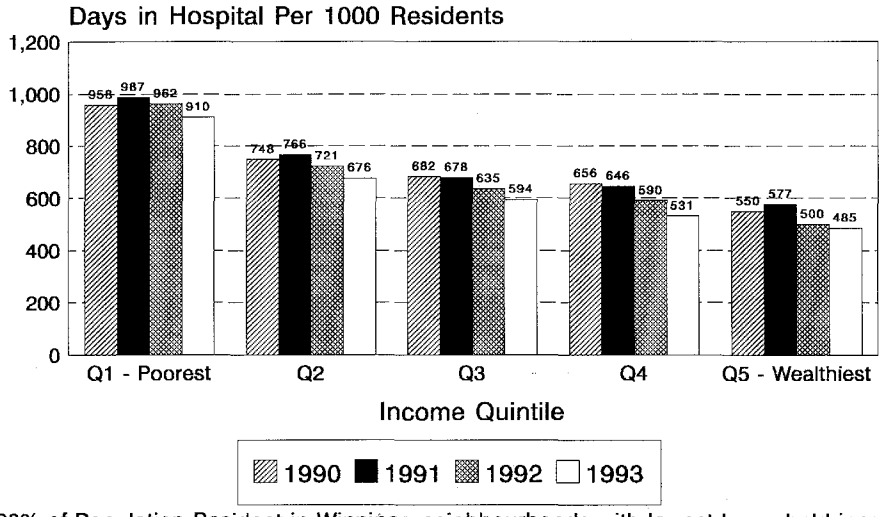


Q1 = 20% of Population Resident in Winnipeg neighbourhoods with lowest household incomes

All income groups used fewer days of hospital care over the period 1990 to 1993 (Figure 6). These decreases are the result of reducing the length of surgical stays and the shift to outpatient surgery. When surgical and medical separations were examined separately, no change in days per 1000 residents was evident for medical cases from any income quintile but large decreases in days occurred for all income groups for patients undergoing surgery.

Once again it is important to note the marked differences in hospital use across income groups. In 1993, middle income residents spent over 22% more days in hospital than those living in the wealthiest neighbourhoods. The lowest income group spent 53% more days in

Figure 6[§]
Days in Hospital by Income Quintile:
Winnipeg Residents (Short Stay <60 Days)
1990-1993



Q1 = 20% of Population Resident in Winnipeg neighbourhoods with lowest household incomes

[§] This Figure corresponds to Figure 6 in the First Report

hospital than the middle income group. Ongoing research at the Centre suggests that these differences in hospital use across socioeconomic status reflect real differences in the health of these groups, not differences driven by social causes of admissions. Patients admitted to Winnipeg hospitals from the lowest income neighbourhoods were just as likely to meet criteria suggesting that acute care was required as were patients admitted from middle income or even from the highest income neighbourhoods.

Access to Pediatric Care

In 1992, 19 pediatric beds were closed in Winnipeg. Twelve more beds were removed during the 1993 fiscal year. In light of these changes it is important to monitor access to care for the pediatric population. Table 4 shows that despite the bed closures the rate of total separations increased by 4% in 1993, largely because of the 11% increase in outpatient surgery. Inpatient separations, mean length of stay and days per 1000 residents under 15 years of age

changed little between 1992 and 1993, although there was a considerable drop in days between 1991 and 1992.

Table 4†
Characteristics of Pediatric Use of Hospitals
For Short Stay and Outpatient Care
Winnipeg Residents, 0-14
1990-1993

	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Separations per 1000 Residents							
Inpatient	34.50	38.50	35.27	35.44	1.12	0.92	1.00
Outpatient Surgery	12.50	15.75	15.62	17.27	1.26	0.99	1.11
Total	47.0	54.25	50.89	52.71	1.15	0.94	1.04
Mean Length of Stay	3.76	3.80	3.68	3.64	1.01	0.97	0.99
Days per 1000 Residents	129.95	146.60	129.91	129.00	1.13	0.89	0.99

† This Table corresponds to Table 6 in the First Report. The values for 1990-1992 differ from the original table because the original rates were calculated using the entire population in the denominator, whereas here only residents under 15 years of age are used.

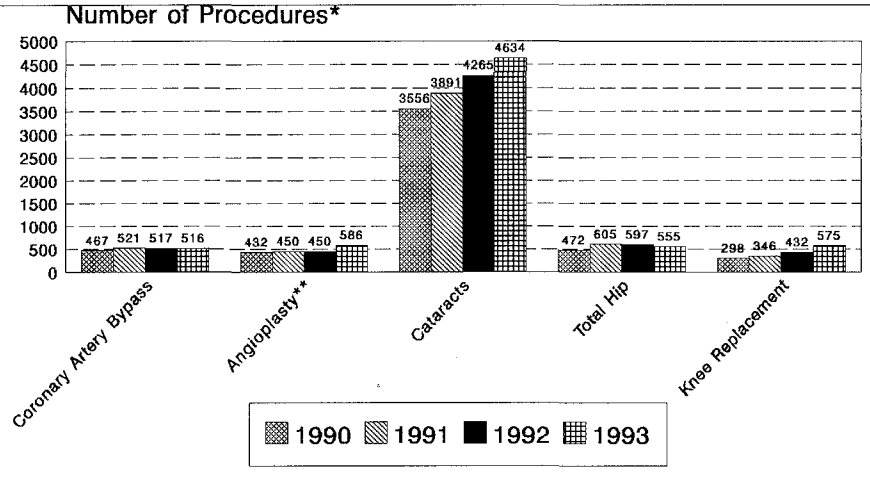
We also looked at days and separation rates for the lowest income groups to ensure access for these children was not affected. No significant changes were detected.

Access to Specific Procedures

Access to certain types of procedures, either because they offer considerable benefits in terms of quality of life or because they have been noted in the popular press as potentially rationed

in Canada, are of particular interest. Figure 7 presents data for several of these procedures, showing the numbers performed before, during and after the 1992 downsizing.

Figure 7§
Access to High Profile Procedures:
Number of Procedures Performed
All Manitoba 1990 - 1993



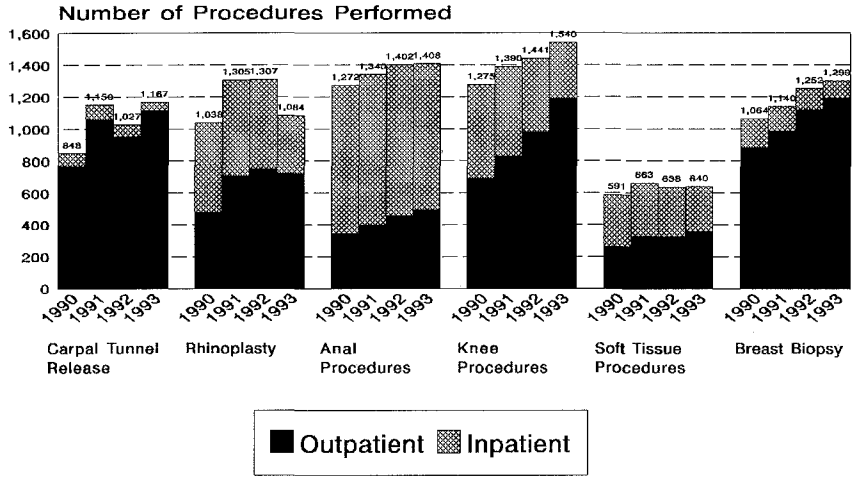
§ This Figure corresponds to Figure 7 in the First Report.
* Frequencies in this graph represent number of procedures, rather than number of individuals undergoing this procedure.
** Differs from values in the First Report which showed number of individuals rather than procedures.

Between 1992 and 1993, the number of bypass surgeries remained the same, whereas total hip replacements dropped 7%. Angioplasty, knee replacement, and cataract surgery increased by 30%, 33%, and 9% respectively. Over all four years, cataract surgery increased by 30%. This procedure primarily benefits the elderly, whose numbers are increasing; however, over the same four-year period the elderly population (65+ years) increased by only 5.0%.

While the data in Figure 7 are for all Manitoba residents, similar patterns were evident for both Winnipeg and non-Winnipeg residents, with the exception of angioplasty and cataract surgery. For these two procedures the increases for non-Winnipeg residents were much greater than the increases for Winnipeg residents; however, the rates for Winnipeg residents were much higher to begin with.

Figure 8 presents data for six common surgical procedures with a large proportion performed on an outpatient basis. With the exception of rhinoplasty, all procedures showed an increase in outpatient volumes between 1992 and 1993. For anal procedures and soft tissue procedures this increase appears to represent a substitution of outpatient for inpatient surgeries. For carpal tunnel release, knee procedures and breast biopsy, however, the expansion in outpatient services has led to an overall increase in the number of these procedures performed.

Figure 8[§]
Impact of Expansion of Outpatient Surgery on Numbers of Common Surgical Procedures:
All Manitoba
1990-1993

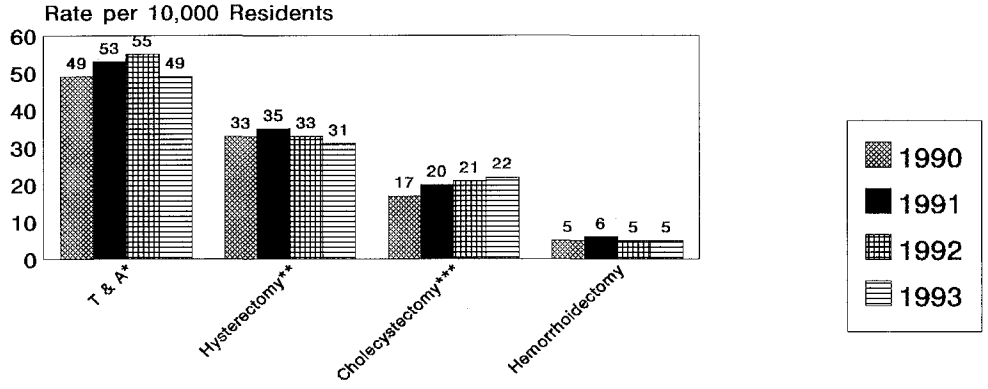


[§] This Figure corresponds to Figure 8 in the First Report.

Figure 9 plots four-year rates for Winnipeg residents who have undergone four common surgical procedures that have been the subject of critical reviews in the literature because of potential overuse: tonsillectomy and adenoidectomy, hysterectomy, cholecystectomy and hemorrhoidectomy (Bernstein et al., 1993; Scott and Black, 1991; Roos et al., 1977; The Lancet, 1975). Between 1992 and 1993, an 11% drop was observed for tonsillectomy (T & A) and hysterectomies decreased by 6%. However, the pressures on the system caused by

downsizing appear to have had little impact on cholecystectomy (5% increase) or hemorrhoidectomy.

Figure 9[§]
Common Surgical Procedures Considered to be Sometimes Discretionary: Winnipeg Residents 1990-1993



§ This Figure corresponds to Figure 9 in the First Report
* per 10,000 age 17 and younger
** per 10,000 females
*** includes only those cholecystectomies (laparoscopic and open) that were primary procedures

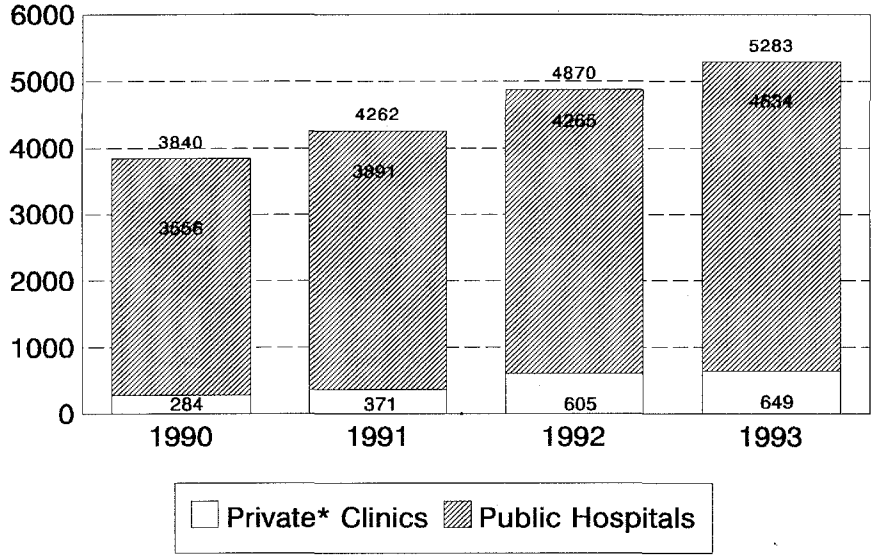
Downsizing and Growth in Private Clinics

One of the major concerns about downsizing has been the assumption that less investment in health care inevitably means an inferior public system and the need for a private sector to ensure that people who have the money will be able to jump the inevitable long waits for surgery. Figure 10 tracks the growth in cataract surgery for Manitoba residents over the downsizing period, combining information on the numbers performed in private clinics across the province[4] with the numbers performed in the publicly funded system. In the private

[4] Note that these data only include data from private clinics located within the province. The Gimbel Clinic in Alberta is reputed to receive large numbers of paying cataract patients from Manitoba, but we have not yet received the data necessary to incorporate these into the analysis. Therefore, the data in Figure 10 represent growth in cataract procedures performed in the private sector within the province, but likely underestimate the total growth in private sector provision of services to Manitoba residents.

clinics patients are required to pay a fee of up to $1273 per eye; the province pays the surgeon's fee even though the operation occurs outside the public system.

Figure 10
Growth in Private Clinic Caseloads*
Cataract Surgery 1990 - 1993



* These include private clinics located in Manitoba.
Surgical fees are paid by Manitoba Health; facility fee is paid by patient.

While the increase in public caseloads was 30% (from 3,556 to 4,634 procedures) between 1990 and 1993, the relative growth in the private sector was much more dramatic, increasing over 128% (from 284 to 649 procedures). This increase in procedures at private clinics was not likely caused by downsizing. Despite downsizing, the capability to provide publicly funded cataract surgery actually increased. That is, "downsizing" was not incompatible with an expansion in the public sector's capability to perform cataract surgery and was associated with increased numbers of publicly funded procedures. In this instance, then, downsizing could not be said to cause a growth in private caseloads. If growth in the private sector continues at the same time that the number of publicly funded procedures increases, then a careful review of privatization and the issues around this growth should be undertaken.

Quality of Care

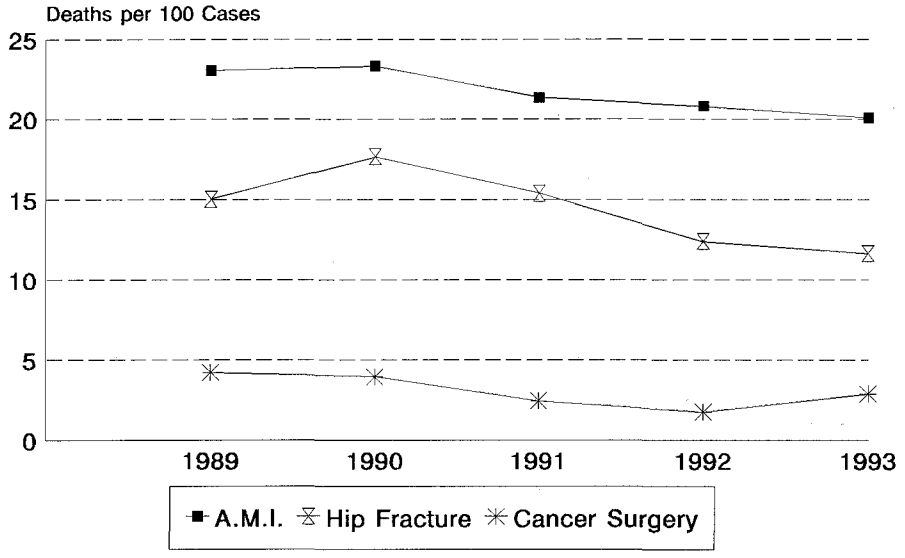
Health care professionals expressed concern about the potential negative impact that downsizing was having on quality of care. They observed problems which they felt were caused by the bed closures and budgetary constraints. For example, representatives from the teaching hospitals, where the cuts were more dramatic, expressed concern that not only were they seeing a sicker mix of patients, but that nurses actually had less time to spend with their patients. They expressed concern that this would lead to poorer outcomes for patients, and often recalled specific problems. While such incidents cannot and should not be discounted, it is important to determine whether there were actually more problems with quality of care following downsizing, whether there were fewer problems, or whether the occurrence of problems remained unchanged.

A number of different quality of care indicators were examined. These indicators represent an important set of outcome measures for the hospital and health care system, providing a view of system-wide patterns often unavailable to professionals working within a specific institution.

Mortality

Mortality rates have been widely used as measures of quality of hospital care and have recently played an important role in efforts to improve quality of care (Hannan et al., 1994; Hannan et al., 1995). Figure 11 records the five-year annual mortality rates within 30 days of discharge from hospital for Winnipeg residents who were treated for one of three common conditions: acute myocardial infarction (AMI), hip fracture, and cancer surgery. All deaths, whether they occurred in hospital or after discharge, were included in the analysis. Although mortality rates within 30 days of discharge are generally sufficient when using this measure as an indicator of hospital performance (Garnick, DeLong and Luft, 1995), we also examined mortality rates within 60 and 90 days of admission as well as age/sex adjusted population mortality rates for the three different time frames (30, 60 and 90 days). For all methods and conditions, no significant increases in mortality were observed.

Figure 11
Quality of Care - Rate of Death Within 30 Days of Discharge
Winnipeg Residents 1989-1993



Mortality rates for elderly patients hospitalized for AMI, hip fracture, and cancer surgery were examined separately, because the elderly may be particularly vulnerable to negative aspects of bed closures since they are high users of the hospital system.[5] No increases across the years in mortality were evident for elderly patients with any of the three conditions.

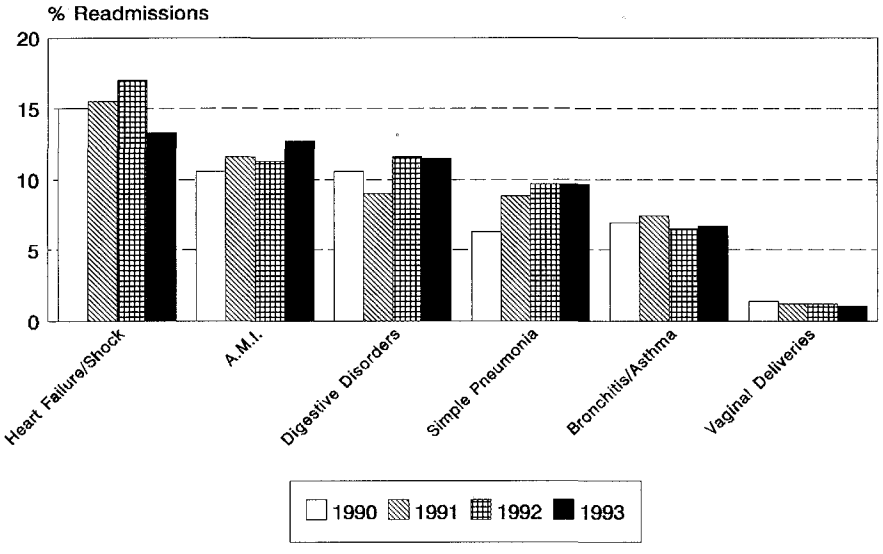
Readmission

Another concern expressed by physicians and nurses was that fewer beds would result in pressure to discharge patients before they were stable, leading to higher rates of complications. If, under pressure from downsizing, patients were discharged from hospital too soon, one might expect increased rates of readmission. Readmission rates are commonly used as a measure of quality (Brook and Lohr, 1987; Corrigan and Martin, 1991; Epstein, Bogen, Dreyer and Thorpe, 1991; Gooding and Jette, 1985; Riley and Lubitz, 1986; Thomas

[5] Small numbers of deaths precluded a similar analysis on residents of the poorest neighbourhoods in Winnipeg.

and Holloway, 1991). We therefore examined readmission rates for patients treated for 13 medical, surgical and obstetric categories in Winnipeg hospitals. These categories were chosen because they were high frequency and spread out fairly evenly across the seven Winnipeg hospitals. Readmissions within 30 days of discharge were captured regardless of whether the patient returned to the same Winnipeg hospital where the initial treatment took place or to any other hospital in Manitoba.

Figure 12§
Rate of Readmission to Hospital Within 30 Days of Discharge For Common Types of Medical/Obstetric Patients: Winnipeg Hospitals 1990 - 1993

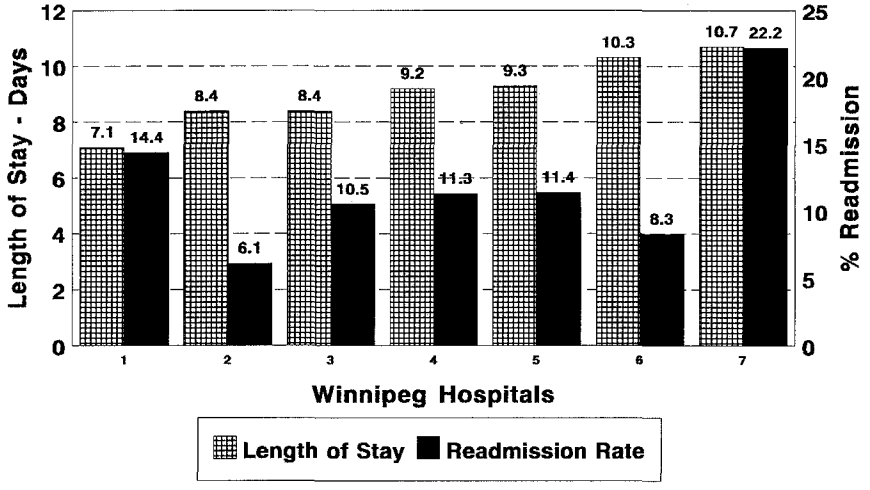


§ This Figure corresponds to Figure 11 in the First Report.

In Figure 12, which shows six medical and obstetric categories, increases in readmission rates for acute myocardial infarction (AMI) and bronchitis/asthma are evident between 1992 and 1993 (a drop in readmission rate is evident for heart failure/shock patients). Although the increases for AMI and bronchitis were not statistically significant, they were further examined to ensure we were not overlooking possible problem areas. Because the concern was with premature discharge, we examined the outcomes of AMI and bronchitis/asthma patients at

each Winnipeg hospital to determine if patients treated at those hospitals with longer stays were less likely to be readmitted to hospital than those discharged from hospitals with shorter lengths of stay. Figure 13 shows average length of stay and readmission rates for hospitals according to how long they kept their AMI patients in hospital. No relationship between length of stay and readmission rates is evident. In fact, the two hospitals with the highest readmission rates were the hospitals with the shortest and longest stays.

Figure 13
Comparison of Length of Stay and 30 Day Readmission For Acute Myocardial Infarction Winnipeg Hospitals 1993



Note: The number of patients discharged ranged from 54 to 158 across the hospitals

Figures 12 and 13 suggest that while there were no detectable increases in readmissions associated with the shortened stays accompanying downsizing, there were noticeable differences across Winnipeg hospitals in the likelihood of patients being readmitted to hospital in the 30 days following discharge for their heart attack. Indeed, there was more than a threefold variation in readmission rates between the two hospitals with the lowest and highest rates and these differences were statistically significant. While these differences may be due,

in part, to differences in patient characteristics, such as age, they are clearly not explainable by the length of time patients are kept in hospital, and require further exploration.[6]

Figure 14 shows readmission rates for seven different surgical procedures. Between 1992 and 1993, small increases in readmissions are apparent for major bowel procedures, prostatectomy, uterine/adnexal procedures, anal/stomal procedures and inguinal/femoral hernias; however, none of these increases were statistically significant. Nevertheless, where there were even small increases, we investigated further to determine whether readmission rates were highest for the shortest stay hospitals. Figure 15 shows average length of stay for prostatectomy procedures from shortest to longest stay hospitals. Once again, no relationship was found between length of stay and readmission rates. Interestingly, Hospitals 3, 4, 5, and 6 in Figure 15 did not differ significantly in length of stay but did differ significantly in the rate at which their patients were readmitted within 30 days of discharge. As with AMI, it is possible that these differences in readmission rates across hospitals could be due to differences in patient characteristics (see footnote 6) and warrant further examination.

Readmission rates were also examined for two groups which might be more vulnerable to any negative effects of downsizing: the elderly and residents of the poorest neighbourhoods. While both groups tend to have higher readmission rates than other patients, there was no change in rates over the four years examined, and hence these higher rates are not likely related to downsizing.

One concern with the use of readmission rates to determine whether pressures for early discharge have had on adverse impact on quality of care, is whether patients are showing up in emergency rooms and doctors' offices rather than being readmitted to hospital. To explore this concern we tracked contacts with physicians within 30 days of hospital discharge for patients with three common medical conditions: AMI, bronchitis/asthma, and digestive

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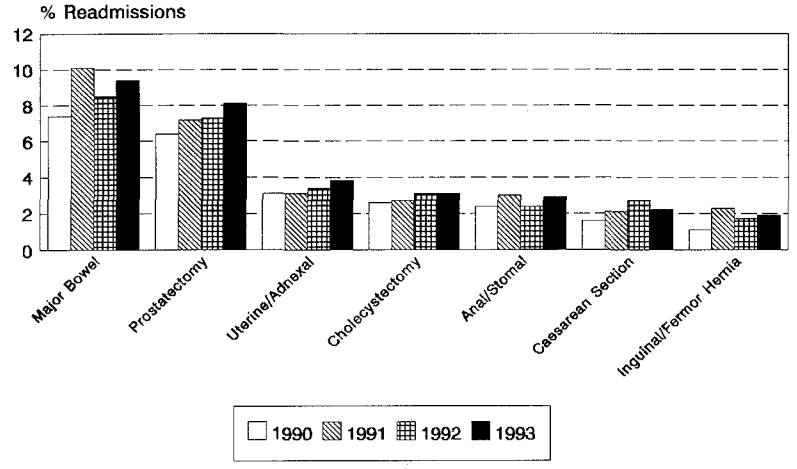
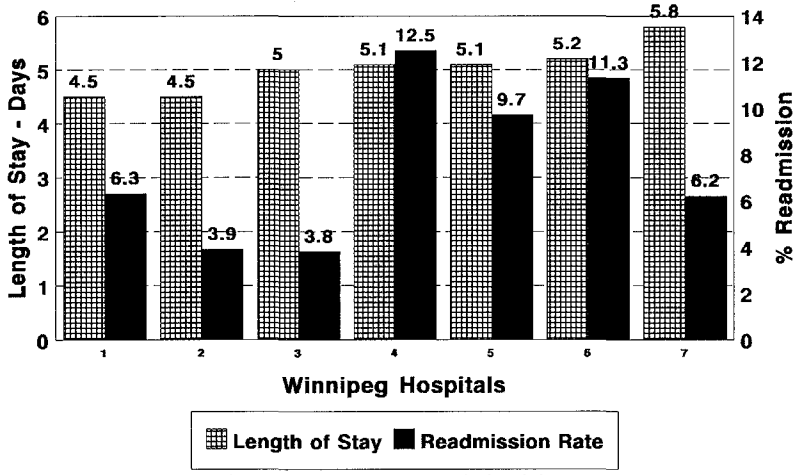
[6] Preliminary analyses using logistic regressions indicate that differences in readmission rates across hospitals remain even once patient characteristics such as age, neighbourhood income level and severity of illness are taken into consideration. The logistic regressions confirm our above conclusions that readmission rates have not increased significantly across the years studied.

Figure 14§
Rate of Readmission to Hospital Within 30 Days of Discharge For Common Types of Surgical Patients: Winnipeg Hospitals 1990 - 1993



§ This Figure corresponds to Figure 12 in the First Report.

Figure 15
Comparison of Length of Stay and 30 Day Readmission For Prostatectomy Patients Winnipeg Hospitals 1993



Note: The number of patients discharged ranged from 40 to 127 across the hospitals

disorders. Visits were counted if they occurred in the physician's office, emergency room[7] and/or outpatient clinics. There was no change in the frequency of these physician contacts between 1992 and 1993 for any of the three conditions.

Nursing Issues

Groups representing nurses from various hospitals and nursing organizations expressed concern that the amount of time available to spend with patients had decreased after the bed closures in 1992. In order to address this concern, changes in registered nursing staff hours[8] per patient at each of the two teaching hospitals were examined over a three-year period. Between 1991 and 1993 nursing hours per inpatient day actually increased by over 15% at both of the teaching hospitals. While this is surprising, given the reports we received, the increase could have been explained by the increase in patient acuity we observed at the teaching hospitals.

We therefore reanalysed these data adjusting for patient acuity, by examining nursing hours per weighted case.[9] As is evident in Figure 16, contrary to nurses' perceptions, nursing hours per weighted case at the teaching hospitals did not decrease over the three-year period. Our conclusions were subsequently confirmed by one of the teaching hospitals reviewing their own records. Because these were aggregate data we were unable to determine whether hours within different services (such as medicine, surgery, ICU, etc.) changed over the time period, and reports from nurses at the teaching hospitals suggest that trends within these different services may vary. While we found no change in nursing hours between 1991 and 1993,

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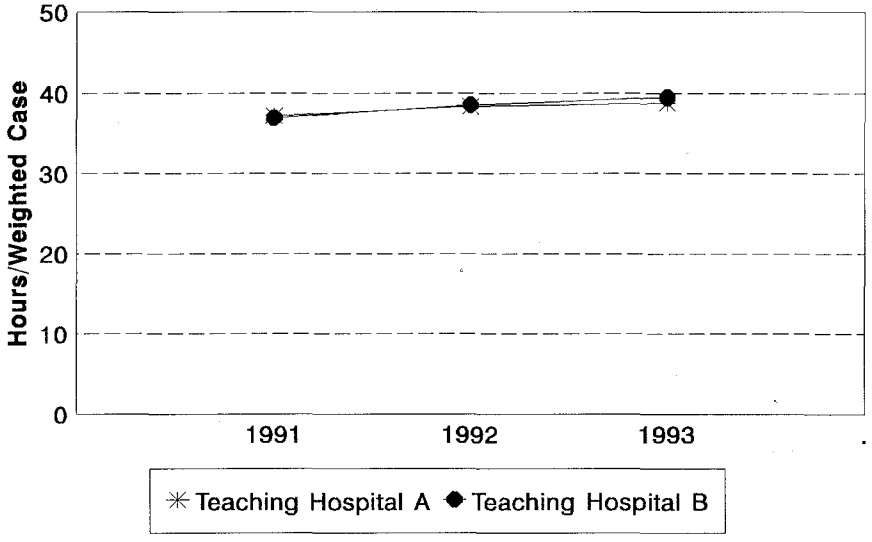
[7] Emergency room visits include contacts at Health Sciences Centre and St. Boniface Hospital only. Emergency room physicians at community hospital emergency departments in Winnipeg did not file evaluation claims during the period of this report and therefore such activity was not included in this analysis.

[8] Registered Nursing staff includes both Registered Nurses and Registered Psychiatric Nurses. We also examined the hours for all Departmental Nursing staff (including nurses' aids and orderlies) and found the same pattern of results as for the Registered Nursing staff.

[9] Cases were weighted according to expected intensity of resource use.

records from one of the teaching hospitals, as well as discussions with nurses, suggest that many of the cuts to nursing staff did not occur until late in 1993 and therefore 1994 data may tell quite a different story. Data for 1994 was unavailable at the time of this report.

Figure 16
Registered Nursing Staff
Hours per Weighted Case
At the Winnipeg Teaching Hospitals



Nursing groups also expressed concern that adverse events may have increased in Winnipeg hospitals as a result of downsizing. Although our analyses of mortality and readmission rates did not support these perceptions, we attempted to explore this concern further. We examined a set of four codes, known as E-codes, that are recorded on the hospital abstract and have been suggested for use in assessing the quality of hospital care (Canadian Institute for Health Information, 1994), although their validity for this purpose has not been examined. The four categories of E-codes are: 1) misadventures to patients during surgical or medical care; 2) surgical/medical procedures that caused later complications; 3) adverse effects due to drugs; and 4) accidental poisoning by drugs. It should be noted that adverse events do not always

result from poor quality of care. Brennan et al. (1991) found that while the rate of adverse events in New York hospitals was estimated to be 3.7%, those due to negligence were closer to 1.0%.[10]

Table 5 shows the frequency of these E-codes expressed as a percentage of total inpatient cases. Looking at all hospitals together, a small (from 1.31 to 1.63) but significant increase in the codes occurred between 1991 and 1992, and they remained elevated in 1993. Once these data are broken down by hospital, however, the pattern is not so clear: only at Teaching Hospital B are the 1992 and 1993 rates significantly higher than all earlier years. Viewed somewhat differently, prior to 1992, Teaching Hospital B had a very low rate of these codes; in 1992 its rate increased to that of the other hospitals in the city. It should be noted that since this is the first time we have used E-codes as a quality of care indicator we have not had the opportunity to check the validity of this indicator as we have for readmission data (Roos, Cageorge, Austen and Lohr, 1985). That is, we do not know the percent of these events that make their way to the hospital record, and whether recording of these events varies from hospital to hospital, or over time.[11] Our preliminary assessment of the validity of this measure is not encouraging.[12] Given the pattern, it may well be that before 1992 these events were not recorded reliably at Teaching Hospital B. Even if we assume that the

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[10] An example of an adverse event not caused by negligence or poor quality of care is any negative drug reaction occurring in a patient for whom a drug has been appropriately prescribed for the first time. When a drug reaction occurs in a patient given a specific drug despite a known sensitivity to it, this adverse event is properly judged to be caused by negligence.

[11] Preliminary validation involved a comparison of the percent E-codes with percent complications recorded on the hospital abstract. Complications are defined as any condition that arises after hospitalization that increases the patient's length of stay and/or changes the course of treatment (Canadian Institute for Health Information, 1994). While the patterns were similar when looking at all hospitals together (i.e., higher percent complications in 1992 and 1993 than previous years), individual Winnipeg hospitals showed a completely different pattern than was found with E-codes. The percent complication at Teaching Hospital B was actually lower in 1993 than previous years, whereas Teaching Hospital A showed higher percents in 1992 and 1993 than previous years. As with E-codes, recording of complications may be subject to coding bias and has not been subjected to validity checks.

[12] Despite these concerns, we decided to include these data since conversations with physicians and nurses (and newspaper stories) suggested there had been a major deterioration in quality of care and we wanted to bring any relevant data to bear on the issue.

data in Table 5 measure what they are supposed to measure, the clearest observation to be made is that Winnipeg hospitals continue to do very well delivering high quality care to their patients.

Table 5
Percentage of Hospital Complications as Captured by E-Codes†
Recorded at Winnipeg Hospitals
1989 - 1993

	1989	1990	1991	1992	1993
All Hospitals	1.31	1.41	1.31	1.63	1.61*
Community Hospitals	1.61	1.55	1.45	1.69	1.73**
Teaching Hospital A	1.37	1.60	1.40	1.63	1.57***
Teaching Hospital B	.59	.85	.89	1.52	1.36*

† The four categories of E-codes captured here are E870-E876, E878-E879, E930-E949, and E850-E858.
* This value is significantly higher than all previous years except 1992.
** This value is significantly higher than the values for 1990 and 1991, but not 1989 and 1992.
*** This value is significantly higher than 1989 only.

Long-stay Inpatient Care in Acute Hospitals

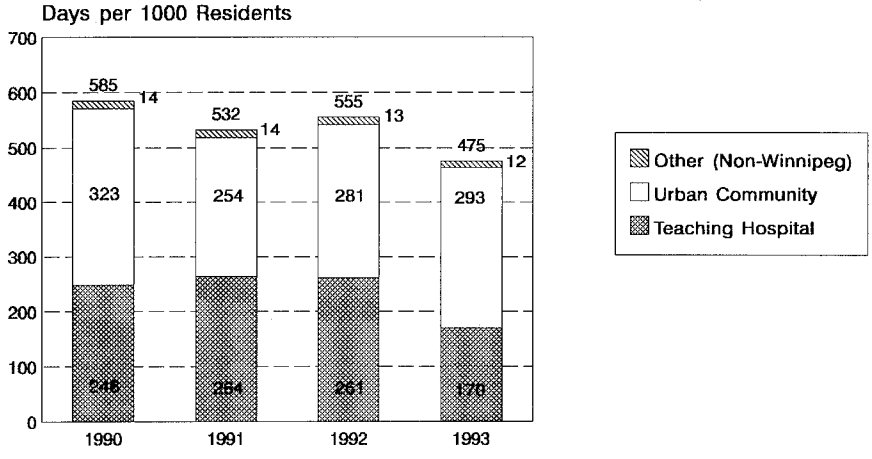
Concurrent with the large number of acute care bed closures in 1992 was the opening of 75 long-term care beds and 236 Personal Care Home (PCH) beds in Winnipeg. These beds were added with the intention of shifting non-acute patients from acute hospital to long-term care and PCH beds, and this appears to have happened (Table 6) with both the rate of separations and days for long-stay inpatient care in acute hospitals decreasing significantly between 1992 and 1993. The decrease in days in acute hospitals for these patients was driven by the teaching hospitals, where there was a 35% drop between 1992 and 1993 (Figure 17). At the same time, the days for long-stay patients at the community hospitals increased by 4%.

Table 6†
Changing Use of Long Stay Inpatient Care (60+ Days) In Acute Hospitals
Winnipeg Residents
1990-1993

	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Persons hospitalized per one thousand residents	3.17	3.02	3.05	2.87	0.95	1.01	0.94
Hospital separations per 1000 residents	3.27	3.11	3.16	2.96	0.95	1.02	0.94
Average length of stay	177.48	169.98	174.54	160.49	0.96	1.03	0.92
Hospital days per 1000 residents	585.39	531.69	554.27	475.31	0.91	1.04	0.86

† This Table corresponds to Table 11 in the First Report

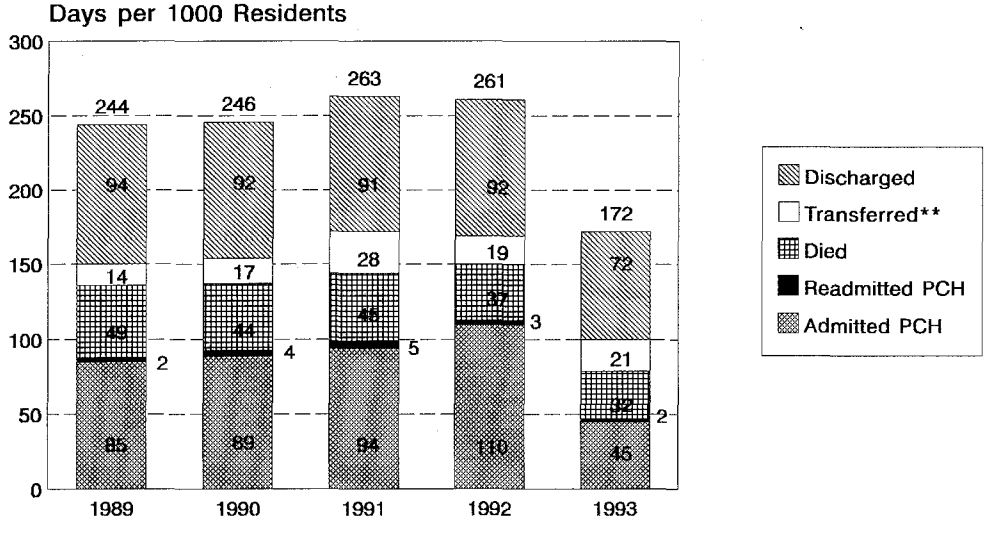
Figure 17§
Where Long Stay Inpatient Care in Acute Hospitals Took Place
Winnipeg Residents
1990 - 1993



§ This Figure corresponds to Figure 18 in the First Report

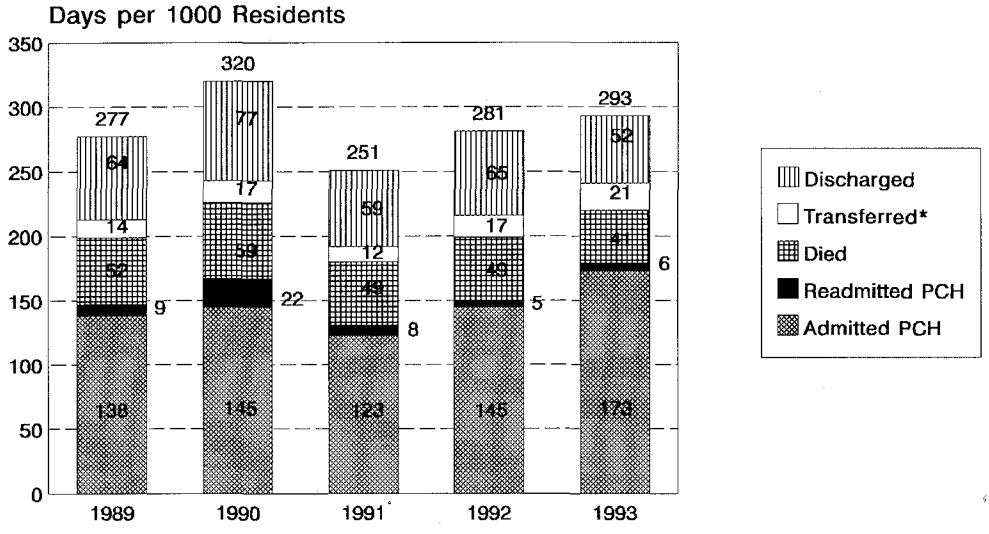
Figures 18 and 19 describe the characteristics of long-stay patients at both the teaching and community hospitals by showing where these patients went after discharge from hospital. Clearly the characteristics of long-stay patients at the teaching hospitals changed after the bed closures, resulting in a very different mix of long-stay patients at the teaching and community hospitals in 1993. In 1992, 42% (110/261) of the long-stay days at the teaching hospitals were incurred by patients awaiting their first placement in a PCH; this dropped to 26% (45/172) in 1993. In contrast, 59% (173/293) of the long-stay days at the community hospitals were incurred by patients awaiting placement in a PCH in 1993.

Figure 18
Teaching Hospital Use of Long Stay Patients by Final Placement Upon Discharge from Acute Winnipeg Hospitals: Winnipeg Residents 1989 - 1993*



* Days in this figure may not equal days for Teaching Hospitals shown in Figure 17 due to rounding.
** Includes transfers to long-term care facilities or other hospitals.

Figure 19
Urban Community Hospital Use of Long Stay Patients by Final Placement Upon Discharge from Acute Winnipeg Hospitals: Winnipeg Residents 1989 - 1993



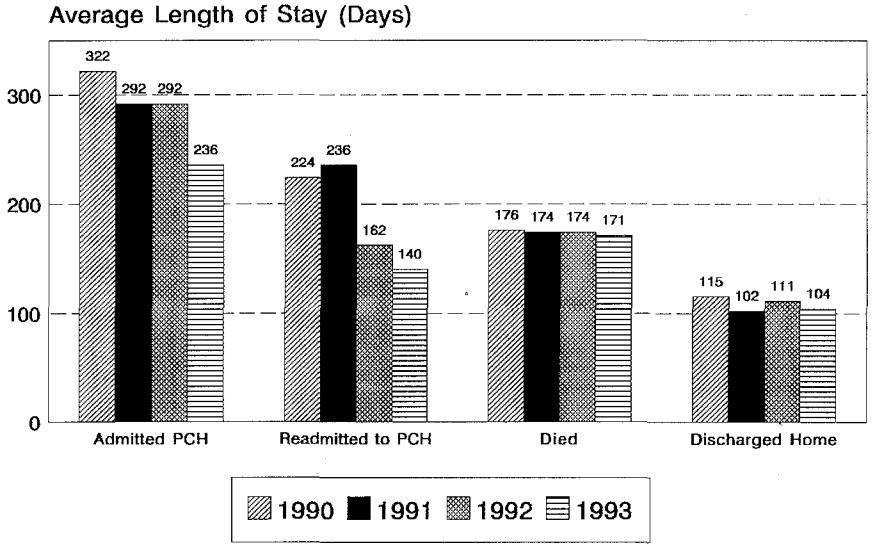
* Includes transfers to long-term facilities or other hospitals.

While there are still a large number of days used in the acute hospital system by patients awaiting first placement in PCHs, the waiting time itself has decreased substantially, with the average length of stay prior to admission to PCH decreasing almost 20% in 1993 (Figure 20). This is most likely due to the addition of the 236 PCH beds in Winnipeg in 1993. Also evident in Figure 20 is the marked decrease in average length of stay for patients readmitted to PCH. Between 1991 and 1992 average length of stay for these patients decreased by over 31%, with a further decrease of over 13% in 1993. To ensure that these patients weren't being sent back to PCHs before they were ready, we examined their mortality and readmission rates. Mortality rates for PCH patients hospitalized for AMI or hip fracture showed no change over the four-year period, 1990 to 1993.[13] Readmission rates for PCH

[13] Mortality rates for patients undergoing cancer surgery were not included in this analysis due to the small number of PCH patients undergoing these procedures.

patients hospitalized for four high-frequency categories (bronchitis or asthma, AMI, heart failure and digestive disorders) showed no changes over the same four-year period, even though length of stay did decrease significantly for three of the four categories.

Figure 20[§]
Average Length of Stay of Long Stay Patients by Final Placement Upon Discharge from Acute Winnipeg Hospitals: Winnipeg Residents 1990 - 1993



[§] This Figure corresponds to Figure 20 in the First Report

Personal Care Home Utilization

Because more than half of the individuals admitted to PCHs in Winnipeg are discharged directly from hospital, the availability of nursing home beds can influence how the hospital system can respond to downsizing. Between 1992 and 1993 there was a 3% increase in the number of PCH beds per 1000 residents aged 75 and over, and a 15% increase in the rate of admissions per 1000 (Table 7). Clearly, access to PCHs helped hospitals respond to downsizing.

The types of patients admitted to PCHs, as reflected in their expected length of stay, did not vary from previous years[14] (Table 8). Waiting time for admission to PCH dropped dramatically between 1992 and 1993. The median length of stay in hospital before discharge to a PCH dropped 32%, whereas the median length of waiting time for admission to PCH after panelling dropped 41%. This latter group of patients includes those admitted from both the community and hospital; the large decrease in waiting time for these patients suggests that the improved access to PCHs by hospital patients did not occur at the expense of those patients waiting in the community.

Table 7†
Changing Utilization of PCH Resources:
Winnipeg Residents Age 75+
1990-1993

	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Population (age 75+)	35,398	36,488	37,493	38,101	1.03	1.03	1.02
PCH Beds per 1000*	130	128	126	130	0.98	0.98	1.03
Residents per 1000*	134	132	132	135	0.99	1.00	1.02
Admissions per 1000*	25	27	27	31	1.08	1.00	1.15
Number of Admissions*	873	983	1,000	1,191	1.13	1.02	1.19
Days of care per capita*	39	39	38	38	1.00	0.97	1.00

† This Table corresponds to Table 13 in the First Report.
* All rates and frequencies are based on the population aged 75 years and older.

[14] A patient's ELOS score at admission varies according to age, sex and level of care; that is, younger patients admitted at a lower level of care have a longer expected length of stay. (See Glossary of Terms for explanation.)

Table 8†
Changing Characteristics of Patients Admitted to Nursing Home:
Winnipeg Residents Age 75+
1990-1993

	1990	1991	1992	1993	Ratio 1991/1990	Ratio 1992/1991	Ratio 1993/1992
Expected Length of stay (years)*	4.12	4.17	4.06	4.11	1.01	0.97	1.01
Median Length of Waiting Time (days)	179	175	184	109	0.98	1.05	0.59
Median Length of stay in Hospital**	247	200	210	143	0.81	1.05	0.68
Admit from hospital (%)	55	54	56	58	0.98	1.04	1.04
Total number admissions	873	983	1,000	1,191	1.13	1.02	1.19

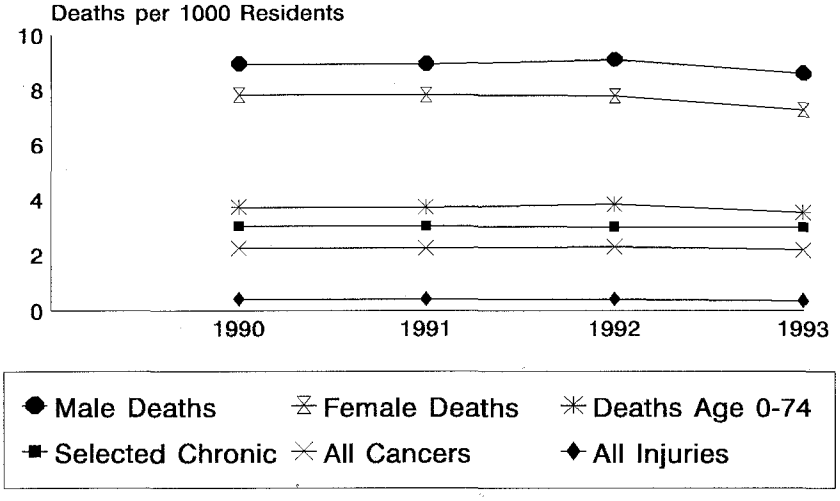
† This Table corresponds to Table 14 in the First Report.
* All rates and frequencies are based on the population aged 75 years and older.
** The median is the midpoint, or the value below which half of the values fall. For example, in 1990 half of the people admitted to PCH waited 179 days or less between panelling and admission.

Health of Winnipeg Residents

Did the closure of hospital beds have a negative impact on the health of Winnipeg residents? Physicians' concerns that "increased morbidity and mortality" would result from bed closures prompted us to examine a number of health status measures. These measures, selected from those developed as part of the Population Health Information System (Cohen and MacWilliam, 1994), were chosen because they are among some of the most commonly used to assess population health. Focusing on population health allows us to look at "the big picture" in terms of the impact of hospital downsizing.

All-age mortality indicators for males and females, cause-specific mortality measures (deaths from chronic disease, cancer, and injuries), and deaths among residents aged 0-74 showed essentially no change between 1990 and 1993 (Figure 21).

Figure 21§
Changes in Ill-Health of Population
Mortality Rate Indicators:
Winnipeg Residents 1990-1993

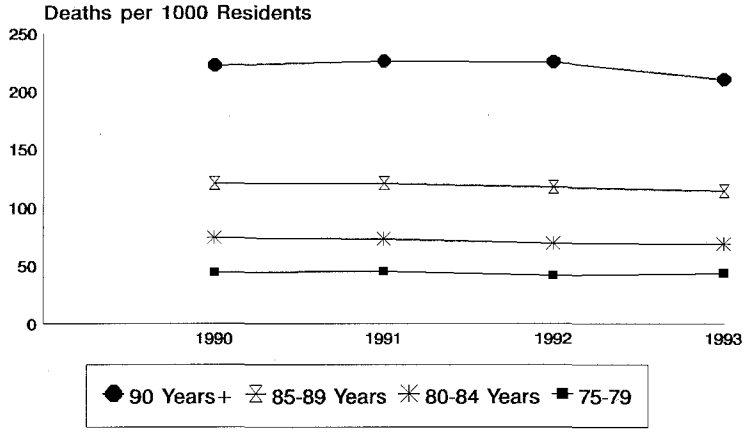


§ This Figure corresponds to Figure 21 in the First Report

Because the elderly are at greatest risk and are the heaviest users of hospitals, we also tracked age specific mortality rates for those aged 75 and older. The data show that for each of the age groups (75-79, 80-84, 85-89, and 90+), there was no increase in mortality rates between 1990 and 1993 (Figure 22).

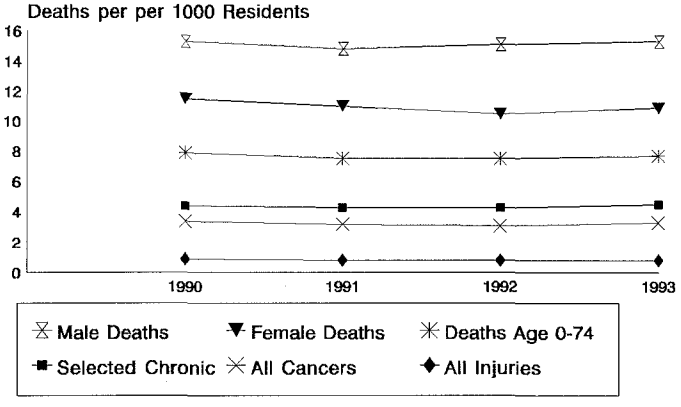
These same indicators (mortality rates) were used to track whether there was a negative impact on the health status associated with the bed closures among the poorest, most vulnerable population group (i.e., those living in neighbourhoods with the lowest mean household incomes). Since these groups rely heavily on the teaching hospitals, the impact that closures have on their health is particularly important to monitor. Figure 23 suggests that even among the most vulnerable Winnipeg residents, bed closures had no detectable impact on any of these indicators of health status.

Figure 22§
Changes in Mortality Rate Among The Very Elderly Population: Winnipeg Residents 1990 - 1993



§ This Figure corresponds to Figure 22 in the First Report.

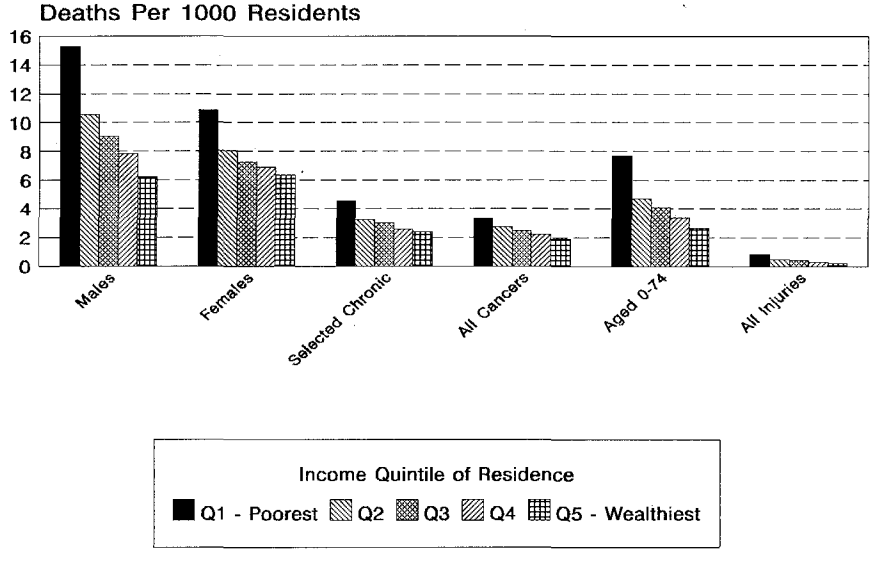
Figure 23§
Changes in Ill-Health of Most Vulnerable Population Residents of Neighbourhoods in the Lowest Income Quintile: Winnipeg Residents 1990-1993



§ This Figure corresponds to Figure 23 in the First Report

We acknowledge that mortality would have had to increase dramatically to affect a noticeable change on these indicators of population health. However, while downsizing produced no detectable change in health status using these measures, these same measures demonstrate quite dramatic differences in health status across differing socio-economic groups. Figure 24 shows the marked gradient in mortality rates according to neighbourhood of residence. In general, individuals in the middle income neighbourhoods had poorer health status (as measured by these indicators) than did individuals residing in the highest income neighbourhoods; those residing in the poorest neighbourhoods demonstrated the worst health status. To put these differences in perspective, research at MCHPE suggests that if middle income residents could achieve the life expectancy of high income residents, this would represent a greater gain in life expectancy than could be achieved by eliminating cancer.

Figure 24[§]
Health Characteristics of the Winnipeg Population According to Relative Affluence of 1993 Neighbourhood of Residence



[§] This Figure corresponds to Figure 24 in the First Report

Our analyses of utilization across income groups (see Figures 5 and 6) suggest these differences in health status are not the result of limited access to hospital care for those in the lower income groups. A shift in focus may be necessary: investments in understanding social and environmental determinants of health may help identify ways of reducing hospital use, much more than simply providing more health care. While compelling arguments have been made regarding the importance of early childhood development on later health (Cyander, 1994; Hertzman, 1994) research in this area is lacking. One American Study found that disadvantaged children enrolled in a preschool program designed to enrich their early developmental experiences were more likely to graduate from high school, enrol in post-secondary education programs, be employed, and were less likely to be arrested, be on welfare or have teenage pregnancies (Weikart, 1989). While such outcomes should be associated with increased health status, such a connection needs to be established with empirical evidence. Carefully planned studies should be implemented to explore the connection between early childhood experiences and health. Such studies would benefit from the involvement of other departments such as Education and Family Services.

Limitations

While a population-based approach, using administrative data, provides a system-wide perspective of how changes to the acute care system in Winnipeg have affected access, quality of care and the health status of Winnipeg residents, clearly there are elements of health care delivery that are overlooked by such an approach.

Although we were able to accurately report the number of patients who were treated in hospital, we have no information regarding waiting lists for various procedures, and therefore do not know whether these have changed due to downsizing. However, given that we found an increase in the volume of high profile procedures such as cataract surgery and angioplasty (procedures often associated with waiting lists) it seems unlikely that the waiting time for these procedures actually increased during the study period.

While the number of patients gaining access to hospitals in 1993 did not decrease compared to previous years, the location of some patients within hospital may have differed. We heard concerns from one hospital that because inpatient wards were so full, patients were spending too long (sometimes their entire stay) in the Observation Unit (OU). While we would have captured any patient staying in OU over 24 hours as an inpatient, we were unable to distinguish between patients cared for on an inpatient ward and patients remaining in the OU. Whether long stays in the OU are detrimental to patient care requires further exploration.

The system-wide outcome measures of mortality and readmission rates are used widely in the literature to describe quality of hospital care; however, missing from this discussion is information on the quality of life patients experience once discharged, and patient and family satisfaction with hospital care. These are clearly quality of care issues that deserve attention. While they were not within the scope of this report, MCHPE recognizes the importance of monitoring these aspects of quality of care, and is an active collaborator with the Manitoba Health Reform Impact Study. This study includes interviews with patients, health care providers and ordinary Manitobans regarding downsizing. Samples from two high risk

populations (the elderly and recently hospitalized patients) are being carefully monitored[15] in terms of their health status, utilization of services, and their perceptions of the quality and availability of services. The Manitoba Health Reform Impact Study will add an important perspective to the system-wide viewpoint of downsizing the Winnipeg hospital system provided in the current report.

The absence of routinely collected data on home care services created a major gap in the information available for monitoring downsizing of the Winnipeg hospital system. We do not know if more home care services were being provided as patients shifted from hospitals to their communities. Also lacking is information on the personal costs of such shifts, such as drug costs to patients being cared for at home rather than in the hospital.

Finally, although the analysis of 1993 data should capture any changes occurring due to the 1992 bed closures, more bed closures occurred in 1993 (see Table 1) and downsizing has continued since then. At the time of writing of this report, we are re-analysing the key figures and tables from this report using 1994 data, and despite further downsizing, the overall patterns and conclusions remain the same. This does not mean that the perceptions of increased pressure on the system, experienced by many health care providers, are false. Indeed, at one of the teaching hospitals where major bed closures occurred, 13 beds had to be re-opened in response to such pressures: 7 beds were opened in Family Medicine in January of 1994 and remained open until the fall of 1995; 6 psychiatric beds re-opened in the fall of 1994 and remained open at the time of this report. At the same hospital, an additional 20 beds for patients panelled for PCHs had to be re-opened between January and June of 1995 to free up a back-log of patients in the Emergency Room. Such incidents suggest the system is indeed under stress and the temporary re-opening of beds may be a very rational response to such pressure. As pressures on the system continue, it will be important for hospitals to be able to react flexibly to demands for acute care.

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[15] Monitoring will involve in-depth interviews at two different points in time as well as reviews of hospital records.

Conclusions

This Update Report examined the impact of bed closures in Winnipeg's acute hospitals on access to health care, quality of care, and health status. The following conclusions are evident:

- Access by Winnipeg residents to hospital services was not adversely affected. Indeed, hospital efficiency improved considerably: just as many patients were cared for in 1993 as in 1991, with fewer resources. A shift occurred in the way care is delivered: more outpatient and fewer inpatient surgical procedures were performed; the number of days spent in hospital decreased; and the acuity of medical inpatients at teaching hospitals increased. Access to Winnipeg acute hospitals by rural and pediatric patients remained good despite downsizing.

- Dramatic decreases were evident in the days of care used for surgical, obstetric and psychiatric patients. Days used for medical patients did not show the same pattern, dropping only 3% between 1992 and 1993. A critical look at lengths of stay for medical patients would be useful to determine whether efficiency of management could be improved in this area. MCHPE is currently examining the extent to which medical patients in acute care hospitals could be cared for in alternative settings.

- Improvements in efficiency occurred without negatively affecting quality of care. Mortality within 30 days after discharge did not increase for three common types of patients. Rates of readmission to hospital did not increase significantly.

- Downsizing acute beds while increasing the availability of beds in both long-term care facilities and PCHs resulted in more appropriate placement of long-stay patients and a drop in length of acute hospital stay for patients awaiting placement in PCHs by almost 20%. Both of these developments suggest important improvements in patient care that have been achieved while downsizing.

- The health of the Winnipeg population remained stable over the four years studied.

- The absence of routinely collected data on home care services creates a major gap in the information available for monitoring downsizing of the health care system. As patient care shifts from hospital to the community the need to fill this gap becomes critical.

- Despite the cutbacks and the increase in patient acuity at the teaching hospitals, overall nursing hours per weighted case remained constant over the period studied.

- We need to move beyond our preoccupation with the negative impacts which hospital downsizing might have. In two in-depth reports we have followed up numerous suggestions by participants about where to look for problems and have consistently shown that the system has absorbed the cutbacks well and continues to provide high quality care in undiminished quantities. While there is obviously a limit to the number of bed closures that can occur without affecting care, these studies suggest that during the period of these reports the cutbacks were associated with increased efficiencies, without deleterious effects on patient outcomes.

- There are remarkable opportunities for improving the health of the population which require investments other than in the health care sector. Downsizing health care expenditures may in fact be a prerequisite to funding programs which will be more effective in achieving health gains. More attention should be focused on programs aimed at the broader determinants of health, including early childhood development. Well-designed and evaluated studies focusing on investments in early childhood development and the impact on population health could help identify ways of reducing use in the acute hospital sector. Since we have demonstrated that individuals from middle and low income neighbourhoods spend more time in hospitals than residents of high income neighbourhoods, investments in early childhood could possibly have long-term pay offs in reduced acute care requirements.

- Manitoba Health could use the occurrence of adverse events associated with hospitalization as an additional indicator of quality in monitoring quality of hospitals care if the coding of these events were standardized across hospitals. The patterns we observed appear to be more indicative of coding bias than changes in quality of care.

- We found no evidence to suggest that downsizing led to the growth observed in the private sector. The number of cataract procedures in private clinics grew dramatically between 1990 and 1993, despite a marked increase in procedures in the public sector. If growth in the private sector continues despite growth in the public system, then factors contributing to the expansion of the private sector should be critically assessed.

The results of this study suggest that the Winnipeg hospitals responded to the pressures of downsizing by increasing the efficiency with which they deliver care, with no deleterious effects to patient outcomes. Given these findings, perhaps it is time to critically assess the delivery of care in rural hospitals. Similar policy initiatives applied to rural institutions would likely result in improvements in efficiency.

Methods Appendix

Study Period

This report, together with *Monitoring the Winnipeg Hospital System: The First Report* analyzes data from the Manitoba Health Data base for the fiscal years 1990/1991, 1991/1992, 1992/1993, 1993/1994. Unless otherwise specified, all analyses are based on Winnipeg residents' use of hospitals, since over this period, the Winnipeg hospitals were the primary site of bed closures. Information on region of residence was obtained from the Manitoba Health registry file as of December of the target year, except in the case of reported Treaty Indians.[16] For these individuals, residence information on the registry file may not be reliable because Manitoba Health assigns the region of residence as the First Nation of origin, usually a municipality denoted as an Indian reservation, instead of using actual residence information. Postal code information from hospital discharge abstracts and the registry file was therefore used to assign region of residence.

Statistical Analysis

We have applied the standard normal theory for studying any significant changes in rates of events over the four-year period. Because the longitudinal data are from one Manitoban population, we used the normal test for a single population. For example, when comparing the 1993/94 rates to the 1992/93 rates, we assumed that the 1992/93 rates are the population parameters and the 1993/94 rates are their estimators. With large datasets, there is practically no chance of making a type II error (the probability of wrongly pronouncing inequality of rates when in fact they are not) while type I error rate (the probability of wrongly concluding inequality of rates when in fact they are) is controlled at a preset level, traditionally at 5%, in any test. However, the type I error is considered to be the more serious kind of error. To maintain balance between these two types of error, we set the significance level (type I error rate) at 1% rather than the conventional 5%. Since multiple comparisons are made, we have adjusted the significance level using the Bonferroni method.

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[16] The designation 'Treaty Indians' refers to a specific group of the aboriginal population who have certain rights and privileges under the Indian Act of Canada.

Glossary of Terms

Population Based Rates

The numerator for rates was calculated by counting or summarizing events (i.e., separations) over each fiscal year for individuals identified as residents of Winnipeg regardless of where the hospitalization took place. Denominators were based on counts of individuals resident in Winnipeg as of December that year. Rates of the numbers of separations and total number of hospital days were developed by dividing numerator information by population denominators, measured in thousands.

Age- and sex-standardized rates of indicators were developed to permit comparisons across time periods. The elderly population aged 75 and over of Winnipeg grew at the rate of 3% between 1990 and 1991, and by 2.6% a year between 1991 and 1993. The age and sex structure of the population is recognized as contributing to different requirements for hospital resources, and hence as factors that ultimately influence patterns of care delivered. Unless otherwise indicated, rates presented in this report have been age- and sex-adjusted using the December 1992 Manitoba population and a direct method of standardization. This procedure mathematically removes the effects of different population structure that influence overall rates of use of health care. These 'adjusted' rates provide an indication of the use of care in one year relative to use in another, after the effects of changes in population structure have been removed.

Number of Separations counts the number of hospital discharges (separations) during the year for Winnipeg residents. It is a function of both the rate of persons hospitalized and the average number of times they are hospitalized; it is the most commonly used measure of hospital utilization.

Number of Days of Hospital Care counts the total number of days spent in hospital by residents. This measure is a function of the number of separations and the average length of stay. It provides a useful estimate of the total resources used to provide inpatient hospital care to residents during one year versus another.

Length of Stay measures the average number of days of care for inpatient hospitalizations. Zero day stays for surgical outpatient care are therefore not included in the calculation. This measure has been used to assess the efficiency of hospital use of days, after controlling for such factors as severity of cases (Brownell and Roos, 1992). It is not a population-based measure because the denominator is the number of hospitalizations; consequently it has not been age- and sex-adjusted in the analyses.

Inpatient Hospital Care refers to all separations in which patients had hospital stays of one or more days. It has been further classified into: short-stay inpatient care, comprising all admissions with 1 to 59 days length of stay; and long-stay inpatient care, comprising admissions lasting 60 days or longer.[17] The term acute care is used interchangeably with the term short-stay inpatient care. Long-stay inpatient care which occurred in acute Winnipeg hospitals is distinguished from care at long-term care and rehabilitation institutions[18] - contrary to how this was reported in our first Utilization of Hospital Resources (Black et al., 1994) report. The current analyses therefore focus mainly on long-stay patients in acute care institutions.

Outpatient Surgical Care refers to day surgery cases. These were defined as outpatient cases (day care with zero day length of stay) for surgical care recognized as falling into a surgical DRG category (Averill, 1991).[19] The analyses excluded outpatient contacts which occurred for purposes other than major day surgery procedures. Hospitals are not required to report

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[17] The first 59 days of a long stay admission are included in the long stay rather than the short stay analyses.

[18] These institutions include Deer Lodge Centre, Riverview Health Centre, Rehabilitation Centre for Children and Manitoba Adolescent Treatment Centre.

[19] The DRG program classifies hospital care into homogenous groups with respect to clinical and resource consumption and is used as a tool to pay hospitals for care provided in the United States. Since having a surgical procedure is one of the major factors contributing to higher resource use (costs) during a hospital stay, the program partitions care into surgical or nonsurgical. It therefore permits identification of hospitalizations involving surgery, for either inpatient or outpatient care.

on these activities and, therefore, there is variation in the way they are recorded across hospitals, making them unreliable for analysis.

Number of Comorbid Conditions

Comorbidity refers to medical conditions that exist in addition to the main reason for hospitalization (usually recorded as the "most responsible diagnosis" on hospital discharge abstracts). The type and number of comorbid conditions provide an indication of the health status (and risk of death) of patients (Charlson et al. 1987). We used counts of comorbid conditions. Cases (patients) were classified as having none, one, two, or three or more, of the comorbid conditions known to increase risk of death.

Level of Comorbidity and Complications

Comorbidity, together with complications of care affect the complexity of hospital care required to treat given patients. The RDRG (Refined DRG) program (Fetter and Freeman, 1989) classifies cases into levels of severity and complexity based on the impact that they are likely to have on use of hospital resources. We used the RDRG program to classify patients into three groups of complexity: those where comorbidity and complications were likely to have no or only minor impact on hospital resource use (low); those in which comorbidity and complications were likely to have a moderate impact; and those where comorbidity and complications were likely to have a major impact (high). The final category also included a catastrophic category for surgical cases, where, for instance, a patient had an acute myocardial infarction while undergoing surgery.

Intensity of Resource Use

Resources used to provide hospital care vary across cases.[20] We used two different measures of resource intensity. First, to define high intensity admissions (see section on

[20] Resources used by hospitals include labour and non-labour inputs such as drugs, equipment, food and fuel. Resource inputs vary in terms of price, volume and mix (Black and Frohlich, 1991).

"Hospital Utilization" under "Access to Care") we used DRG weights[21] to classify hospital care into three levels of intensity of resource use. Each hospital separation was assigned a DRG weight and all cases were ranked from lowest to highest intensity of resource use. Three levels were then defined to classify rates of hospital care received by regional residents: the lowest ten percent of cases - including separations for false labour, paediatric tonsillectomy and/or adenoidectomy, and other cases requiring few resources - were classified as very low intensity; the highest 5% of cases, which used 11.5% of hospital days and included separations for coronary artery bypass procedures, craniotomy and other major cases requiring intense hospital treatment, were called "very high" intensity admissions. Because this high intensity care is typically obtained by rural residents in Winnipeg hospitals their access to such care was tracked over the period.

Second, to compare resource intensity across hospitals (see section on "Changes in Type of Patient Admitted to Hospital" under "Access to Care") we used Relative Case Weights (RCWs), which reflect the expected resource use of hospital patients. The RCWs were developed for the Hospital Case Mix Costing Project (Shanahan et al., 1994) and are based on Maryland cost data and length of stay data from Manitoba hospitals. They are based on RDRG categories which provide greater differentiation of levels of comorbidity and complications than DRG categories. We applied the RCWs to typical medical patients. Typical patients are defined as those whose hospitalization had a normal length of stay, whose treatment was completed in a single acute care facility, whose course of treatment did not end in death, and whose hospitalization did not include days classified as non-acute (extended care or panelled). Medical patients are those who did not undergo a surgical procedure.

Measuring Health of the Population

For this report, we have developed health status indicators from administrative data and Vital Statistics death information. We selected a subset of the 102 indicators reported for the entire

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[21] DRG weights describe resource use for different types of care in relation to an arbitrarily defined standard case. While they were developed exclusively with United States cost data, they correlate well with similar intensity weights (CMG) developed from U.S. data for Canadian applications.

Manitoba population as part of the Population Health Information System 1991 (Cohen and MacWilliam, 1994). Using administrative data to assess health status has the major advantage over surveys in that the measures can be readily repeated over time (i.e., annually).
Since the number of deaths is small for some conditions, in order to have a stable assessment of mortality rates, two years of vital statistics data were used (calendar years 1989 and 1990 for 1990; 1990 and 1991 for 1991; 1991 and 1992 for 1992; 1992 and 1993 for 1993). The numerator and denominators for all rates were determined by counting individuals identified as residents of Winnipeg.

Description of Health Status Indicators

Death Rates for Males and Females. Mortality rates for all causes of death for Winnipeggers were calculated separately for males and females of all ages.

Deaths Among Those Aged 0-74. In this ratio, only deaths for persons aged 0-74 years are counted and only the population who are 0-74 years of age are included in the denominator. British researchers (Carstairs & Morris, 1989) as well as a group at McMaster (Birch & Eyles, 1991) have suggested that the standardized mortality ratio for this younger population is the best single indicator of health status capturing a population's need for health care. The Scottish Health Authorities have used a similar ratio for allocating funds for health care.

Cancer Deaths. In Canada, cancer accounts for about one-quarter of all deaths (Bisch et al., 1989) with lung cancer, breast cancer and cancer of the colon accounting for the most cases and deaths. Other cancers such as bladder and kidney are associated with occupational exposures (Andersen et al., 1987). We report rates of death for which cancer was reported as the primary cause, over this period (the following ICD-9-CM codes were used to define this group - 140-239).

Selected Chronic Disease. For adults in the mid years, chronic diseases are the main causes of death and disability, particularly heart disease, stroke, and diabetes. For the elderly, heart disease, stroke, chronic obstructive lung disease (emphysema), and diabetes are among the

leading causes of death (McGinnis et al., 1992). If an individual's cause of death was any of the following chronic diseases, they were counted in this group; asthma (493) ischemic heart disease (410-414), diabetes (250), hypertension (401-405), emphysema (492-496) and vascular complications (430-437).

Ischemic Heart Disease. Ischemic Heart Disease is the biggest single contributor to deaths in the chronic disease category. Given the importance of this disease, separate indicators are presented (ICD 410-414).

All Injuries. Injuries including suicides are the highest cause of death for adolescents and young adults. Most unintentional injuries are attributable to motor vehicles. Deaths associated with seven different types of injuries are included; motor vehicle (E810-E819), vehicular non-traffic (E820-E829) fire (E890-E899), falls (E880-E888), suicide (E950-E959), drowning (E910-E915), homicide, poisoning (E850-E869) as well as the other injuries category.

Income Quintiles

Public-Use Census Files. Data from the 1986 Canadian census are available for public use, aggregated to the geographic unit of the enumeration area. In Winnipeg, there are approximately 800 enumeration areas containing residential households, with an average population of 700 people. These residential areas can be characterized by several demographic and economic indicators, including mean household income, mean educational level of women and labour force participation. A measure of the mean household income for a given enumeration area was used in this study (Mustard, 1991).

These enumeration areas were ranked from poorest to wealthiest and they were grouped into five population quintiles, each quintile containing 20% of the city's population. Each Winnipeg resident was linked to an enumeration area by postal code, and a quintile income rank (with Quintile 1 being the poorest) was assigned.

Quality of Care

30 Day Mortality Rate. Adverse outcomes of care have long been recognized as important in evaluating health care delivery. Since 1986, the U.S. Health Care Financing Administration has encouraged comparison of rates of adverse events across hospitals by publishing death rates for institutions. We identified all deaths which occurred within 30 days of discharge for patients treated with three common conditions. Because a death in hospital is counted as a discharge, in-hospital deaths were also captured as deaths within 30 days of discharge. Garnick, DeLong and Luft (1995) found that 30 days after discharge was sufficient when using mortality as an indicator of hospital performance. Mortality rates within 60 and 90 days of admission were also analyzed in this report. For the above analyses the number of deaths was the numerator and the number of patients hospitalized for each of the three conditions was the denominator. We also calculated age/sex adjusted population rates using the same numerator but population figures in the denominator. The population based rates were calculated within 30 days of discharge and within 60 and 90 days of admission. There were no exclusions for these analyses.

Readmission Rates. Readmissions (to any hospital across Manitoba, not just Winnipeg hospitals) which occurred within 30 days of discharge from Winnipeg hospitals were also examined. For the cross-hospital comparisons, we excluded the sickest patients (those having comorbidities or complications expected to have a major or catastrophic impact on length of stay as identified using the RDRG software, Fetter and Freeman, 1989) and the most vulnerable patients (those known to have higher readmission rates including aboriginal and core area residents). The lengths of stay for the cross-hospital comparisons were based on the initial admission. For the over-time analysis, the sickest and most vulnerable patients were included to ensure all readmissions would be detected.

Contacts with Physicians. All contacts with physicians which occurred outside the hospital within 30 days of discharge were examined. The sickest and most vulnerable patients were included in this set of analyses. Emergency Room contacts include contacts at Health Sciences Centre and St. Boniface Hospital only. Emergency room physicians at community

hospital emergency departments in Winnipeg did not file evaluation claims during the period of this report and therefore such activity was not included in this analysis.

Registered Nursing Staff Hours

We calculated Registered Nursing staff hours using the Hospital Statistics Part 1 form filed annually by hospitals to Statistics Canada. Except for hours in surgical suites, the hours reported on this form are for inpatient care only. To remove the outpatient hours from the reported hours for surgical suite use, we used two different methods. The first method assumed that the ratio of inpatient to outpatient hours per case was the same. The second method assumed that this ratio was three to one, that is inpatient cases were assumed to use three times more nursing department hours in the operating and recovery rooms than outpatient cases. Despite the differences in total hours using these two different methods, the pattern of results were the same.

Hours per inpatient day were calculated by dividing the total inpatient paid nursing staff hours by the total number of days. Hours per weighted case were calculated by dividing the total inpatient paid nursing staff hours by the number of weighted cases. Cases were weighted using the Relative Case Weights developed in the Hospital Case Mix Costing Project 1991/92 (Shanahan et al., 1994) which provide the expected resource use of a case given the condition the patient is treated for and the level of comorbity and complication.

Registered Nursing staff includes both Registered Nurses and Registered Psychiatric Nurses. Nursing department staff includes the registered nursing staff as well as other nursing department staff, such as nurses' aids, LPNs and orderlies.

E-Codes

E-Codes refer to diagnostic codes where there is an external cause of injury. These codes are recorded on the hospital abstract. A subset of these codes has been proposed as directly applicable to hospital quality management programs and to be used to identify adverse, and often unavoidable, events (Canadian Institute for Health Information, 1994). These codes include:

"misadventures to patients during surgical and medical care" (E870 to E876)

"surgical and medical procedures as the cause of abnormal reaction of patient or later complication, without mention of misadventure at the time of the procedure" (E878 to E879)

"drugs, medicaments and biological substances causing adverse effects in therapeutic use" (E930 to E949)

"accidental poisoning by drugs, medicaments and biologicals" (E850 to E858).

Personal Care Home Use

Region of Residence. For numerator data, (i.e., PCH use data) region of residence was assigned according to the Municipal Code in the PCH file, which refers to the last region of residence prior to admission to PCH and does not change regardless of the location of the PCH. [22] For non-PCH residents, region of residence is identified from the Manitoba Health population registry. Many Status Indians do not actually reside on the reserve with which they are registered. In this case, the postal code associated with each claim is used to determine region of residence.

All use is calculated for the region in which the person resided prior to admission to PCH, regardless of where the admission took place. In other words, if a person living in a non-Winnipeg region was admitted to a PCH in Winnipeg, that person's utilization would be attributed to the non-Winnipeg region.

Residents. Residents are all persons who lived in a personal care home at some time during the fiscal year.

Admissions. Admissions to nursing homes include all first-time admissions.

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[22] The registry could not be used to assign region of residence because of the length of stay in PCH: municipal code in the registry changes to that of the PCH whereas the municipal code in the PCH file remains the same for as long as the person resides in a PCH.

Expected Length of Stay (ELOS) for Admissions. Every admission was assigned an Expected Length of Stay (ELOS) based on the person's age, sex and level of care,[23] (Shapiro and Tate, 1988) and these numbers were used to derive mean expected lengths of stay. If standards of admission varied markedly across regions or type of home, (i.e., if some facilities tended to admit younger, healthier individuals), this would be reflected in variations in ELOS for individuals admitted.

From Hospital. We classified an admission "from hospital" if that person was admitted to a PCH within 7 days of a separation from hospital. For people not admitted from hospital, we checked the "fromcode" in the PCH file. For those admitted from Mental Health Centres or unspecified in the PCH file, we created an "Other" category. Residents who did not fall into either of these two categories were considered to be admitted from the Community.

Length of Stay (LOS). For all residents admitted from hospital, the length of stay in hospital was calculated. We report median LOS because the mean is skewed by outliers. The median is the mid-point. For persons admitted to PCH from the hospital, if all of their lengths of stay in hospital were arranged from the briefest to the longest, the median is the mid-point of that range. In other words, half of the people admitted to PCH from hospital had hospital stays that are shorter than the median LOS, and half of them had hospital stays that are longer than the median LOS.

Length of Waiting Time (LWT) after assessment. For each admission, the date when the person was panelled for acceptance to PCH is recorded. The difference between the admission date and panelling date is the LWT. As for length of stay, because of outliers, the median rather than the mean LWT is reported.

The LWT reported here does not take into account the number of days that occur for administrative reasons after panelling, i.e., the number of days required to transmit the

[23] All nursing home residents are assessed at one of four levels of care, depending on the number of nursing hours they require per day.

panel's decision to both the individual and the nursing home. We also do not adjust for people who may be temporarily removed from the Waiting List because of an acute illness requiring hospitalization. LWT is also sensitive to the availability of Continuing Care in the community, especially in remote areas of the province. For all these reasons, LWT should be viewed with some caution.

It should be noted that, because Home Care data are not computerized, we were unable to determine how many people died or were admitted to hospital after panelling prior to admission.

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