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Redirecting Care from Winnipeg Hospitals to Ten Large Rural Facilities: Estimated Number of Cases, Feasibility and Implications

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Redirecting care from Winnipeg hospitals to ten large rural facilities: Estimated number of cases, feasibility and implications

Volume I: Key Findings

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Introduction

In May, 1992 Manitoba Health announced a broad strategy of health reform. In addition to closing hospital beds in Winnipeg, a key aspect of the reform plan required that consideration be given to redirecting care from Winnipeg to rural hospitals.

In consequence, the Capital Planning Branch of Manitoba Health asked the Manitoba Centre for Health Policy and Evaluation to undertake a study which would assess the potential for redirecting care and to estimate its impact. Because it was assumed that cases treated in Winnipeg hospitals involve more complex care, it followed that cases for redirection would most logically flow to larger rural institutions because they would be most capable of providing such services. Ten facilities in the following locations were identified for explicit study: Brandon, Steinbach, Dauphin, Flin Flon, Morden-Winkler[1], Portage, Selkirk, Swan River, The Pas, and Thompson. Capital Planning Branch considered each of these hospitals to have potential for further development as a regional centre in the health reform process.

Findings

- Geographic analyses of hospital utilization patterns suggested that most of the ten large rural facilities currently function more as local hospitals than as regional or sub-regional centres. Only Brandon hospital provides service to a large catchment area in which other smaller hospitals are providing basic hospital care.

- The size of the population served by a facility has implications for the total number of hospital cases that are generated for treatment, with larger populations producing larger numbers of both general and specialized hospital cases. While Brandon

[1] At the request of Capital Planning, Morden and Bethel (Winkler) hospitals were to be considered jointly because planning for a new amalgamated centre was under way.

hospital serves a population base of almost 100,000, the other nine hospitals each serve a population of less than 40,000 persons. Morden-Winkler, Steinbach, and Dauphin; serve base populations smaller than 30,000 persons. The Pas, Swan River, and flin Flon serve populations of less than 20,000 persons.

- Even when base populations were calculated using boundaries that have been proposed for Rural Health Associations,[2] they were small in comparison to populations currently served by the Brandon hospital. Using the Association boundaries, all of the study facilities except Brandon and Selkirk would serve population bases of less than 50,000 persons.

- In all of the ten service areas except Brandon, there were less than 25 physicians available, with general and family practitioners representing over 70 percent of providers. The Brandon service area, in contrast, had 124 physicians available to serve its population base of 96,315 individuals. Within the group of physicians serving the Brandon service area, there was a much higher complement of internists, surgeons, pediatricians and obstetrician/gynaecologists available to provide specialized services than in other areas.

- Use of Winnipeg hospitals was highest for service areas located in close proximity to the city (Selkirk, Steinbach and Portage). Residents of the Thompson service area also received a relatively high percentage of care from Winnipeg hospitals. These current patterns of use of Winnipeg services may be related to patient preference, physician practice patterns, geography, transportation patterns and/or a lack of trained personnel, equipment, or infrastructure in rural facilities.

- For obstetric care, a total of 810 cases could potentially be redirected to four large rural hospitals. Estimates of the number of cases that might be redirected ranged from 145 cases for Thompson to 289 cases for Selkirk. Over the four centres, an additional nine beds would be required to accommodate the increased numbers of cases. For Selkirk, where the impact would be largest, an additional three beds

[2] Negotiations about the number of rural health associations and their boundaries had not been finalized when this document was released. The boundaries used for this report were derived from a working document dated October 13, 1993.

would be required. Given current occupancy rates, these additional cases could likely be easily handled within existing bed capacity. Redirection of cases would lead to a four percent reduction in the 19,617 obstetric separations from Winnipeg hospitals.

- About 786 pediatric cases could potentially be redirected from Winnipeg back to six rural centres, with Selkirk again receiving the largest number of cases. Even though this would more than double Selkirk's current pediatric caseload, we estimate that only two to three pediatric beds would be required to handle the increase. Over all six centres, approximately nine additional beds would be required. Again, the increase could likely be accommodated within existing capacity. In total, redirection of the 786 cases would lead to an eight percent reduction in Winnipeg pediatric separations.

- Approximately 1180 adult medical cases could be redirected to seven of the target hospitals. Three additional methods used for estimating the total number of adult medical cases yielded similar but slightly larger numbers. Selkirk hospital again would receive the largest number of cases, followed by Thompson hospital. Given current occupancy rates, the additional 11 and 6 beds respectively that would be required for redirected cases in these two locations could also likely be accommodated within existing capacity. Overall, 29 to 36 beds would be used in accommodating redirected cases, leading to a four percent reduction in adult medical cases handled by Winnipeg hospitals.

- Across the different types of hospital care, the largest proportion of services provided in Winnipeg hospitals are for adult surgical care. A total of 1100 adult surgery cases might be redirected to four rural hospitals, with the largest number of cases (692) being sent to Selkirk. Although the aggregate number of surgical cases coming to Winnipeg every year from a given area may appear large, it includes many different types of procedures performed by different types of surgical subspecialists. If cases were to be redirected, Selkirk hospital would increase its surgical caseload by 40 percent. This would likely require a major expansion of its surgical facilities, specialized training of personnel and recruitment of a number of different surgical specialists but result in treatment of a relatively low volume of each type of case. Similar conclusions are reached in consideration of redirecting surgical care to

Thompson and Portage hospitals, although because these facilities currently perform a greater number of surgical cases, increasing surgical caseloads may be more feasible. Overall, redirection of adult surgical cases would lead to only a two percent reduction in adult surgical cases treated in Winnipeg hospitals. One potential consequence of expanding surgical capacity in target hospitals might be increased rates of surgery for service area residents. Rural residents already receive higher adjusted rates of surgery than do Winnipeg residents, particularly for general surgical procedures such as tonsillectomy and cholecystectomy.

- If all cases identified by this study could be redirected, the largest impact would occur for Selkirk hospital, which would receive 1630 cases in addition to the 2377 which it currently handles. Given current occupancy rates of 63.7 percent, many, but not all, of these cases could potentially be handled within the existing capacity of 75 rated beds. However, specific consideration would need to be undertaken to assess the hospital's ability to handle such a large number of additional cases in relation to current function. Similar planning would need to occur for Portage hospital, which would receive an additional 815 cases, as well as for Thompson (636 additional cases) and Steinbach (511 additional cases) hospitals.

- Overall, redirection of care would only reduce caseloads in Winnipeg hospitals by 3.6 percent. The impact for adult surgical cases would be small (2.4%), while a larger percentage reduction of Winnipeg services (7.8%) might be possible for pediatrics.

- While there was general correspondence between regional indicators of need for health care and rates of hospital use, residents of some hospital service areas appear to be hospitalized more than would be expected, given their health status. Service areas which have high rates of use in relation to health needs may have a greater ability to accommodate redirected cases without need for additional facilities than service areas which are currently providing lower rates of care (in relation to need). From this perspective, Swan River, Portage and Brandon may have greater capability to accept redirected cases without requirements for increased resources.

Conclusions

- The assumptions made to estimate numbers of cases that might be redirected were optimistic and likely overestimate the actual numbers of cases that can be shifted. Even with these deliberately optimistic assumptions, however, the total number of cases available for redirection was much smaller than had been anticipated in discussions with many groups.

- In addition to being optimistic, the estimates for this report were made without adjusting for feasibility considerations. With the exception of Thompson, the greatest number of cases for redirection come from service areas located in close proximity to Winnipeg. In these areas, current patterns of use are likely influenced by patient choice and physician practice patterns and there is likely to be resistance to change. Numbers in this study are based on assumption that all of these cases can potentially be redirected, which further inflates the estimates.

- While the idea of delivering care closer to home is appealing, the impact of redirecting such care to rural areas would be small for most of the centres studied. Since most of the facilities currently have occupancy rates under 70 percent, they could accept many of the additional medical, pediatric and obstetric cases without requiring additional hospital beds. Considerations for surgical care are very different: while theoretically possible, shifting such care would likely require major investment in human and capital resources. Instead, there may be potential to increase the numbers of certain types of surgical procedures provided in a few specific large rural facilities.

- In an era of hospital restructuring and reform, consideration must be given to the appropriate balance between local and central provision of hospital services, given the population base being served. Currently, even hospitals in Winnipeg are being asked to centralize provision of specialized services. Significant decentralization of specialized services in rural areas must be considered cautiously. While there are benefits to such approaches in terms of providing care closer to where people live and reducing personal costs of travel to receive medical care, concerns arise from both quality and efficiency perspectives when case volumes for specialized care are

decreased. Quality of surgical care is related to the number of procedures that an institution performs, providing a rationale for centralising the provision of less common procedures. From an efficiency perspective, economies of scale are lost as smaller numbers of specialized types of care are provided in multiple locations.

- Overall, the findings of this report suggest that redirecting care from Winnipeg facilities to large rural hospitals will have a relatively small impact on both rural and Winnipeg facilities. Most of the centres can accommodate much of the increased volume within existing bed capacity, given current occupancy rates. Even where the numbers of cases to be redirected are high, current trends towards shortening hospital stays and moving care to ambulatory settings will lessen the impact on rural institutions.

- The findings of this report have broad implications for rural health reform and the development of strategic regional alliances for future provision of rural health care. Regional hospitals are in a better position to provide specialized care when they serve a large population base which generates a large number of specialized cases requiring treatment. The population bases currently served by nine of the ten hospitals are small in comparison to Brandon (approximately 100,000) and to guidelines being used by some other provinces to guide planning for provision of secondary hospital services (population base of 150,000). Even population numbers that would accrue to these facilities using proposed Rural Health Association boundaries fall short of these numbers.

1. Introduction

1.1 Background

In May 1992, Manitoba Health announced that it would be embarking on a broad strategy of health reform. A major goal was to shift service delivery from "high-cost institutional settings to lower cost and more appropriate prevention, support and home care services to help people avoid illness and reduce their need for institutional care" (Manitoba Health, 1992). A large component of the set of reforms focused on restructuring the hospital system by shifting services and resources "from teaching hospitals to community hospitals or long term care facilities and from institutions to community-oriented services." More specifically, the strategy document outlined a plan to close 240 Winnipeg teaching hospital beds during fiscal year 1993/94, representing a 14 percent reduction from 1991/92 rated bed capacity.[3] In addition, the reform plan identified a theme of delivering services closer to home while setting in motion a process of rural hospital reform. A newly formed Rural Health Advisory Council was to provide guidance in the "realignment of up to 200 rural hospital beds" during fiscal year 1993/94 by defining more appropriate ways to use rural hospital beds. Explicit consideration was to be given to accommodating care that would be redirected from urban teaching and community hospitals to rural hospitals as a result of the reform process.

It was generally perceived that the reform plans had great implications for both short term and long term use of rural health facilities. Rural hospitals saw the reforms as an opportunity to turn around patterns of declining use and falling occupancy rates. In planning submissions, some were making requests for additional capacity to accommodate 'repatriated' cases: hospital care currently provided to rural residents by Winnipeg hospitals that, with the anticipated changes, would be redirected to rural hospitals.

Within Manitoba Health, Capital Planning Branch is responsible for ongoing planning of new facilities and improvements to existing facilities and for "... coordinating the processes that develop and maintain the Province's health care infrastructure [i.e. institutional] in a manner

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[3] As of March 31, 1992 the two teaching hospitals had a combined rated bed capacity of 1,701 beds (Manitoba Health Services Commission, 1993).

which is responsive to future needs..." (Manitoba Health Services Commission, 1993). The reform strategy clearly had implications for planning, but the magnitude of the impact was difficult to estimate. However, staff anticipated that the major effects of closure of Winnipeg hospital beds would be at the level of larger rural hospitals, where the capacity to handle more complex redirected cases would be greater. To understand the implications of the reform process, Capital Planning requested that the Manitoba Centre for Health Policy undertake a study to consider the impact of services that would likely be redirected from Winnipeg hospitals to large rural facilities. Ten facilities, each a potential candidate for development as a regional or sub-regional centre, were identified for explicit study: Brandon General Hospital, Bethesda (Steinbach) Hospital, Dauphin General Hospital, Flin Flon General Hospital, Morden and Bethel (Winkler) Hospitals (to be considered as a single entity),[4] Portage District General Hospital, Selkirk and District General Hospital, Swan River Valley Hospital, The Pas Health Complex, and Thompson General Hospital (Figure 1). These institutions are referred to as 'target' hospitals or facilities in this report.

1.2 Objectives

The objectives of the study were twofold. The first was to estimate the number of cases that might potentially be redirected to each of the identified facilities. Specifically, how many and what types of additional cases were these individual hospitals likely to receive if care could be provided to local residents in regional facilities instead of Winnipeg hospitals? How feasible would it be to consider redirection of the estimated number of cases? What would be the implications for capital development?

The second objective was to assess the impact at a system level. Overall, how many cases could potentially be transferred? How large an impact would redirection of cases have on Winnipeg hospitals and on the ten target facilities when considered as a group? What implications would redirection have for the system as a whole from the perspective of long term infrastructure development?

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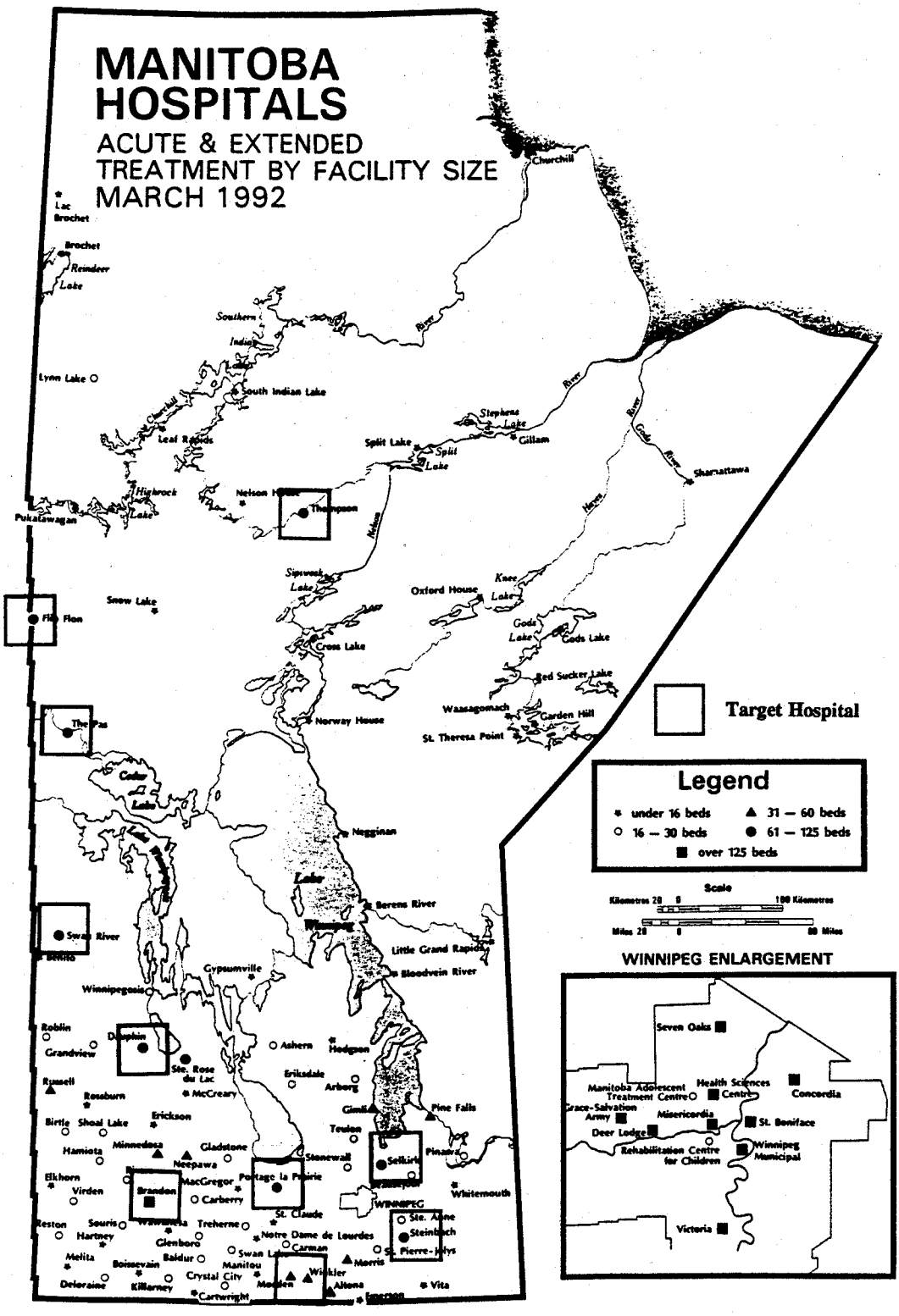
[4] At the request of Capital Planning, Morden and Bethel (Winkler) hospitals were to be considered jointly because planning for a new amalgamated centre was underway.

Figure 1

Target facilities and other Manitoba hospitals



Adapted from: Manitoba Health. Manitoba Health Services Commission Annual Report 1991/92.

2. Methods

2.1 General approach

A population-based approach (Morrissey, Sloan and Valvona, 1988) was used for the analyses in this report (Figure 2). This approach required that hospital service areas for each of the ten target hospitals be defined. Using assumptions about which geographic areas and which population groups can logically be considered to be served by target institutions, several approaches were undertaken to identify existing and potential users of their care (i.e. base population for target hospital in Figure 2).

Having identified the resident population of the geographically defined service area(s) for each of the target hospitals, it was then possible to compare population bases and to examine the patterns of hospital care that service populations receive. Specifically analyzed were the amount and type of care that residents received from: 1) the target hospital, 2) from Winnipeg hospitals, and 3) from other hospitals (Figure 2). Redirection of care from Winnipeg hospitals to target hospitals was assessed in terms of the types and numbers of cases currently being treated in Winnipeg hospitals.

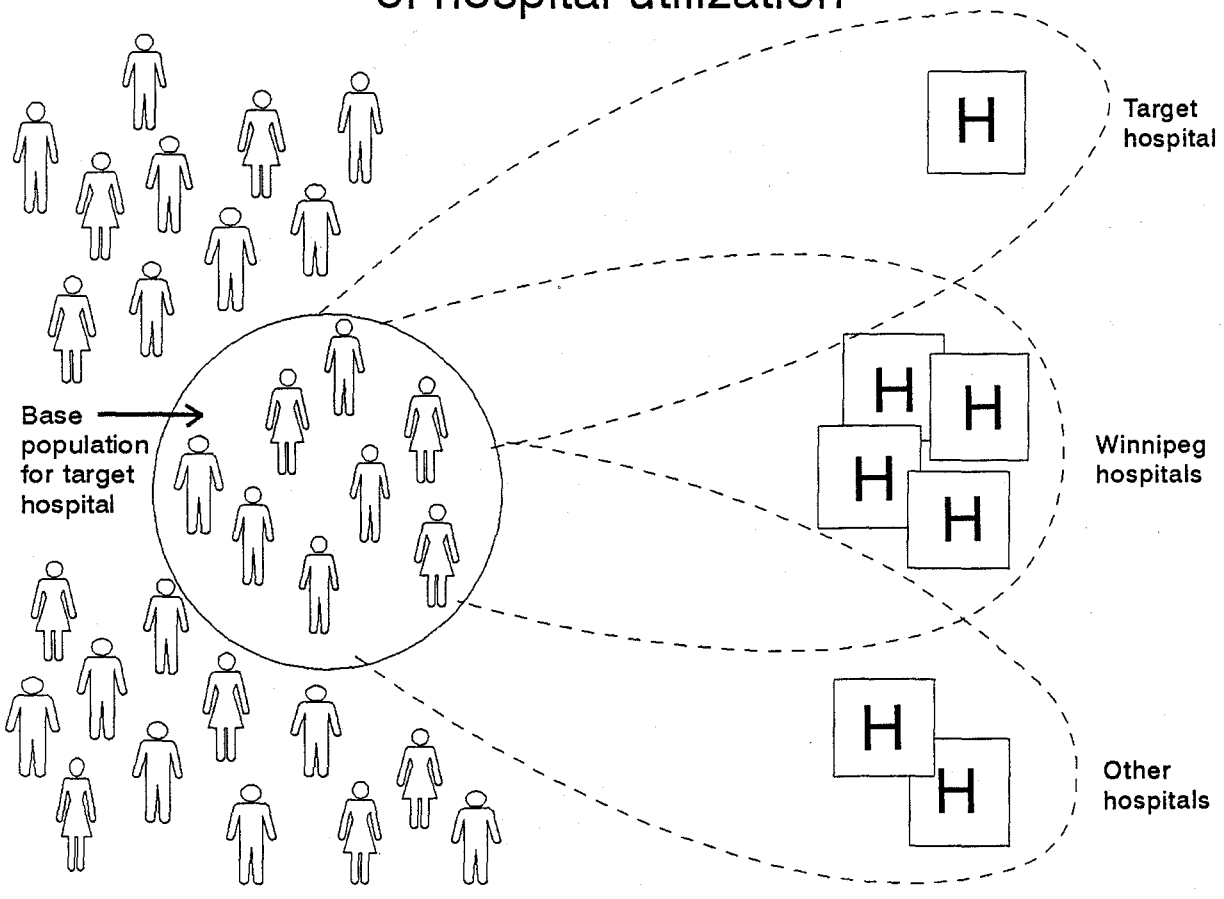
In addition to patterns of utilization of hospital care, several other issues were reviewed. For each service population, the numbers and types of physicians available were identified. Secondly, rates of overall use of hospital services and indicators of need for health care were compared.

2.2 Source of data

Data used for the primary analyses were derived from the complete set of hospital abstracts submitted to Manitoba Health for fiscal year 1991/92.[5] These include abstracts submitted by hospitals (both in and out of province) that provided services to Manitoba residents as defined

[5] Other analyses have demonstrated that rates of rural hospitalization were consistent with 1992/93, the latest year for which data are available. Rural residents had 208 hospital separations per 1,000 standard population in 1991/92 compared with 209 separations per 1,000 population in 1992/93.

Figure 2: Population-based analysis of hospital utilization



by Manitoba Health. Population counts are based on analysis of the Manitoba Health Registry as of December 31, 1991.[6]

Information about inpatient hospital contacts is captured in a standard format, the hospital discharge abstract, submitted to Manitoba Health after a patient has 'separated' (e.g. been discharged, transferred, or died) from hospital. Because hospital discharge abstracts are based on information gathered at time of separation from the hospital, the analyses in this report are therefore based on separations.[7] However, the word 'separation', 'discharge' and 'hospital stay' are used interchangeably.

Hospitals provide a variety of clinical services on an outpatient basis, including contacts for 'not for admission' (NFA) and day surgery, day care, and day visits, but are not required to report on them, which makes them unreliable for analysis. However, reporting of surgical procedures performed under local or general anaesthetic is mandatory. Among abstracts submitted for non-inpatient activities, we identified those reporting surgical procedures that can alternately be performed on an inpatient or NFA basis (e.g. cataract surgery, hernia repair). This category includes adult, pediatric and obstetrical outpatient surgical cases. A total of 31,970 such cases, which we labelled as 'major surgical outpatient' care,[8] were retained in the dataset. We thereby excluded 71,867 contacts for minor procedures (e.g. toenail removal, skin biopsy) and other services provided on a non-inpatient basis.

Hospital data analyzed by the Centre are comparable to those compiled annually by Manitoba Health in the Manitoba Health Services Commission Annual Report. As in Manitoba Health

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[6] Numbers produced by the Manitoba Centre's registry file overcount Manitoba's population by 0.7 percent in comparison to figures produced by Manitoba Health. This is related to slightly different approaches to using information about changes in registry status.

[7] Technically, the number of admissions to hospital should be equivalent to the number of separations from hospital, but the lag time between admission and separation dates for inpatient care sometimes means that admissions and separations occur in different fiscal years, leading to minor differences between the two approaches to counting hospital contacts.

[8] This was done by identifying outpatient cases (day care with zero day length of stay) for care that was recognized as falling into a surgical DRG category. The DRG program (Averill, 1991) 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 and nonsurgical care. It therefore permits identification of hospitalizations involving surgery, for either inpatient or outpatient care.

reports, they include information about hospitalizations in both active treatment and extended treatment beds, while excluding newborn separations. Our numbers differ slightly, however, because we excluded hospitalizations for persons who were not resident in Manitoba[9] and for contacts that did not fall within the fiscal year. In addition, we limited our analyses to inpatient and major surgical outpatient cases, as described above. The initial data set therefore included abstracts for 183,414 total hospital contacts (151,444 inpatient separations and 31,970 surgical outpatient contacts) for a population of 1,140,406 Manitoba residents.

Residence information at the level of the municipality or local government district[10] was obtained from the Manitoba Health registry file as at December 31, 1991 in order to assign individuals to population groups. Because of coding conventions, residence information from the registry file for Treaty Status Indians[11] may not be reliable; postal code information from hospital discharge abstracts was therefore used to assign region of residence for these individuals.

2.3 Mapping hospital utilization

A major component of the study involved determining which geographic boundaries should be used to identify hospital service areas, which in turn were used to define the relevant population served (currently or potentially) by each of the ten target facilities. To inform this process, current patterns of use of target facilities were used to map areas surrounding the ten institutions. Specifically, areas (municipalities and local government districts) were classified into the following categories based on the percentage of hospitalizations received by residents of the area which occurred at the target hospitals: over 70 percent (i.e. over 70 percent of the hospitalizations received by the residents of the area occurred at the target hospital); 50 to 69 percent; 30 to 49 percent; 15 to 29 percent; and >0 to 14 percent. For ease of presentation, however, the first three categories were collapsed into a single category of over 30 percent.

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[9] The Manitoba Health definition of residents includes persons who reside temporarily out of the province (e.g. students attending post-secondary schools) as well as Manitoba residents moving to another province (for two months after their move).

[10] Municipal and local government district boundaries represent the smallest geographic areas for which data relating to hospital use are routinely available. Manitoba Health annually reports the percentage of hospitalizations received by residents of these areas from different facilities.

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

2.4 Defining hospital service areas

For each target hospital, three definitions were developed to define hospital service areas. Two of these definitions were developed by analyzing current patterns of hospital care, while the third was based on a regional planning approach.

The first used a *30% plus* rule to define service area boundaries: the hospital service area included all rural municipalities (i.e. towns, villages and cities) and local government districts in which residents received 30 percent or more of their hospital services from the target hospital. The second definition used a *15% plus* definition (i.e. included all rural municipalities and local government districts in which residents received 15% or more of their hospital service from the target facility).

A third definition was developed based on boundaries outlined by the Rural Health Advisory Council for eight future rural health associations (Manitoba Health Organizations, 1993).[12] It has been proposed that regional associations should assume increased responsibility for managing the delivery of certain physician, hospital and other health services and steps are being taken to implement regional planning in Manitoba. Because redirection of Winnipeg hospital services promises to be an important planning issue for these bodies, we included the rural health associations as a third definition of hospital service areas (*RHA* definition). For the purpose of these analyses, however, there were problems with using rural health association boundaries to define hospital service areas for the ten target hospitals. Specifically, three of the associations (Central, Parklands, and Norman) each include two target hospitals within their boundaries. For each pair of target hospitals (i.e. Morden-Winkler and Portage; Dauphin and Swan River; Flin Flon and The Pas), the *RHA* service area definition therefore leads to double-counting of the population base and, hence, the cases that they serve. Specifically, cases redirected from Winnipeg to regional hospitals would be have to be split between the two target hospitals. Tables were constructed to reflect this issue.

Thus, for each of the ten hospitals, three different health service areas were defined, two of which were based on current patterns of use - the *30% plus* and the *15% plus* definitions - and a third defined from a planning perspective - the *RHA* definition. For the most part,

[12] Negotiations about the number of rural health associations and their boundaries had not been finalized when the document was released. The boundaries used for this report were derived from a working document dated October 13, 1993.

analyses presented in Volume I are based on the *15% plus* definition. However, implications of relying on the *30% plus* definition and the *RHA* definition are also discussed, based on sensitivity analyses. This included inspection of visual information from the mapping exercise, and comparison of information about population base of the service area and the resultant number of cases that could maximally be redirected from Winnipeg across definitions. A full set of tables for each of the three definitions is included in Volume II.

2.5 Assessing hospital capacity and physician supply

Indicators of hospital capacity and occupancy rates for each of the target hospitals were derived from the data published by Manitoba Health Services Commission (1993). Total numbers of inpatient and surgical outpatient services provided by each facility were calculated from the dataset.

Estimates of the numbers and types of physicians available in each of the service areas were developed by identifying physicians directly involved in patient care who received fee for service billings of $40,000 or more in 1991-92.[13] The methods and rationale for this approach were similar to those used in the physician module of the Population Health Information System (Tataryn, et al. 1994). Counts of physicians and physician specialists were developed for each of the service area definitions by identifying these who had practice locations in these areas during fiscal year 1991/92.

2.6 Describing current patterns of utilization

Rates of utilization were developed for each service area by calculating the number of hospital events per 1,000 population. To permit comparisons across service areas, rates were age- and sex- adjusted using Manitoba rates and an indirect method of standardization. The adjusted rate of premature mortality, which serves as an indicator of need for health care (Eyles et al., 1991, Eyles and Birch, 1993; Birch and Chambers, 1993), was used to aid interpretation of adjusted rates of use. Because many of the service areas had very small population bases, stable estimates of the 0-64 Year Adjusted Mortality Ratio could not be obtained. Therefore, the regional indicator, available from the health status module of the Population Health Information System (Cohen and MacWilliam, 1994) was used.

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[13] Earnings were calculated using submitted claims. They therefore capture all earnings for fee for service physicians but may undercount earnings of salaried physicians.

In addition to rates of use, numbers and percentages of hospitalizations for residents of a hospital service area were described according to the hospital setting in which they took place. Specifically, cases were classified into care delivered by the following categories of hospital:

Target hospital

The target hospital refers to the hospital of primary interest, for which the hospital service areas were defined. The ten hospitals for which analyses were conducted include: Brandon, Dauphin, Flin Flon, Morden-Winkler, The Pas, Portage, Selkirk, Steinbach, Swan River, and Thompson hospitals.

Winnipeg hospitals

Winnipeg acute hospitals include Concordia, Grace, Health Sciences Centre, Misericordia, St. Boniface, Seven Oaks and Victoria hospitals. Winnipeg hospitals were further subdivided into two categories: community and teaching hospitals. Winnipeg teaching hospitals include the Health Sciences Centre and the St. Boniface hospitals; all others were classified as Winnipeg community hospitals. Riverview and Deer Lodge hospitals were excluded from this category.

Other hospitals

This category comprises all other hospitals (i.e. other than the target hospital and Winnipeg hospitals) used by residents of given hospital service areas, including smaller rural hospitals, as well as out of province hospitals and nursing stations. In short, this category identifies residents' hospital care that occurs at facilities other than the target hospital and at Winnipeg hospitals.

General approach

The process of describing patterns of care involved counting the number of contacts (i.e. separations and surgical outpatient cases) that took place during fiscal year 1991-92; for residents of defined hospital service areas, the number of contacts with each of the three categories of hospital were counted. In addition, percentages of the service area population's total hospitalizations occurring in each of the hospital categories were calculated. In this way, for each service area, both the total number and percentage of hospitalizations occurring in Winnipeg facilities were calculated.

For clinical relevance, patterns of care received by residents of hospital service areas were described according to type of care. Cases were classified into the following mutually exclusive categories: adult surgical, adult medical, obstetric, psychiatric,[14] and pediatric (including both medical and surgical) services. Each of these categories includes inpatient care and, where relevant, (i.e. surgery, obstetrics and pediatrics) outpatient cases involving a surgical procedure.

This approach permitted two types of analyses. First, for each hospital service area, differences in patterns of use of Winnipeg hospitals were compared by type of care. Second, for each type of care, differences in patterns of use of Winnipeg hospitals were analyzed across hospital service areas.

2.7 Estimating numbers of cases appropriate for redirection

From a clinical perspective, presumably not all cases that are treated in Winnipeg hospitals can be adequately treated in large rural centres that are, in contrast to urban and teaching hospitals, less likely to have specialized equipment and personnel. Once the number and percentage of cases treated in Winnipeg facilities were identified, estimates of the number of these cases that could be redirected to the target facilities were developed. Because there is very little research to guide considerations of this nature, criteria were created specifically for this report. It should be noted that these criteria were developed from the perspective of **encouraging** delivery of care in rural centres: because of this, they likely overestimate the numbers of cases that might be redirected.

Number of cases exceeding benchmark use:

Analysis by type of care and for any given service area definition showed there was considerable variation across the ten hospital service areas in the percentage of cases which were treated in Winnipeg hospitals. Capital Planning suggested that across the ten target hospitals, some function well as regional centres and provide more comprehensive care to their service populations than others. For this reason, Dauphin was chosen as a benchmark to

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[14] Because hospital discharge abstracts for psychiatric care are not submitted to Manitoba Health by several relevant institutions - the Eden Mental Health Centre, Selkirk Mental Health Centre, and Brandon Mental Health Centre - analyses of psychiatric care systematically underreport utilization by residents of some areas, and must be interpreted accordingly. They have not been intensively analyzed in this report.

identify a potential target to which other hospital service areas might be aimed, given similar resources. The number of cases that might be redirected from Winnipeg hospitals, given attainment of the same pattern, was calculated for each hospital service area (and service area definition). This criterion therefore provided an estimate of the number of cases that might potentially be redirected. It was used for adult surgical, adult medical, pediatric and obstetric care.

Three additional criteria were developed specifically for adult medical inpatient care in order to provide additional estimates of the number of cases that might be redirected. These criteria represent fairly arbitrary cutoffs and therefore provide only rough estimates of cases feasible to transfer.

Number of low or moderate intensity cases:

Admissions to Winnipeg hospitals for patients who do not require resource intensive care may represent care that, from a clinical perspective, might reasonably be delivered to rural residents by large rural hospitals instead of Winnipeg hospitals. To identify low or moderate intensity hospitalizations, we first used DRG weights[15] to rank all cases from lowest to highest intensity of resource use. We assumed that, among cases coming to Winnipeg hospitals, the lowest 50 percent of cases represented low or moderate intensity cases that might be transferable to large rural centres. The number of cases falling into this category for each hospital service area (for each of the three service area definitions) was calculated. This criterion was used for adult medical care only.

Number of low complexity cases:

Complexity of care, as determined by comorbidity and complications, has implications for determining which cases should be treated at a level of hospital care capable of providing more specialized services. It was assumed that care of greater complexity should, in general, reflect a greater requirement for more specialized services that can be delivered by large urban and teaching hospitals. Complexity of care was measured using the RDRG (Refined DRG) program (Fetter and Freeman, 1989), which classifies cases into levels of complexity (based on patient comorbidity and complications of care) according to their likely impact on

[15] 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.

use of hospital resources.[16] The number of low complexity cases (i.e. those where comorbidity and complications were likely to have no or only minor impact on expected hospital resource use) that were treated in Winnipeg hospitals provide an estimate of the number of cases that could be redirected. This criterion was used for adult medical care only.

Rural Health Research Centre definition cases:

In studies published in the United States, the Rural Health Research Center found that small rural hospitals tend to admit patients in a limited number of DRG categories, which typically represent low intensity medical admissions. Based on analysis of discharges from rural hospitals and the judgements of a technical advisory panel of rural clinicians, the Research Centre divided 271 DRG categories for medical care into "two groups: (1) conditions that <u>are not</u> appropriate to treat at rural primary care hospitals; and (2) conditions that <u>are</u> appropriate to treat at rural primary care hospitals." The DRGs that are included in the "appropriate to admit" list are either short term acute care DRGs or chronic DRGs without complications, representing care for patients requiring low intensity medical interventions for diagnosis or treatment. While this classification system was developed for smaller U.S. rural hospitals, to the extent that it identifies low intensity care that is currently taking place in Winnipeg hospitals, it identifies care that might be more appropriately delivered in rural facilities.

Thus, four different approaches were used to develop estimates of the number of adult medical inpatient cases that might be redirected from Winnipeg secondary and tertiary hospitals to rural hospitals. To estimate the number of obstetrical and pediatric cases that might be redirected, a single criterion, the 'number of cases exceeding benchmark use of Winnipeg hospitals', was used.

To estimate the impact of redirected care, a formula (the number of cases times the average length of stay, divided by the number of days in a year and adjusted for occupancy rate), was used to estimate the number of hospital beds that would be required. Additional bed

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[16] Comorbidity, together with complications of care, affects the complexity of hospital care required to treat given patients. 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; 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. The final category also included a catastrophic category for surgical cases, where, for instance, a patient had an acute myocardial infarction while undergoing surgery.

requirements were calculated for inpatient medical, pediatric and obstetrical care based on these estimates.

For surgical procedures (which have implications for requiring more specialized resources), care was analyzed by categories of procedures, including care for obstetric and pediatric surgical care. Specifically, the number of cases for each type of procedure performed in the target hospital, other rural hospitals, Winnipeg community hospitals, and Winnipeg teaching hospitals were reviewed to consider the feasibility of transfer of cases to the target hospital.

2.8 Limitations

The restriction of the analyses to inpatient care and major day surgery cases omits a significant and increasing portion of activities performed by hospitals. The data set excluded outpatient contacts that did not qualify as major day surgery procedures because these data are not routinely reported by hospitals, making them unreliable for analysis.[17] Unfortunately, limitations of the data preclude analysis of these issues.

Another limitation of the study is related to the estimates of cases that would be possible to redirect. These estimates were based on somewhat arbitrary criteria developed explicitly for this study. Ideally, as done by the Rural Health Research Center, a panel of rural and urban physicians should review specific types of cases and determine which would be clinically appropriate to redirect. However, this project was aimed at producing rough estimates of impact. The estimates developed likely overestimate the magnitude of the change that might be anticipated. Given the early study findings, it was considered unnecessary to proceed with a detailed clinical analysis.

[17] It is estimated that the total number of outpatient contacts for the province probably exceeds 400,000 annually (Toll, personal communication, 1993). In 1991/92, approximately 25 percent (just over 100,000) of these contacts were captured in the hospital abstract system. Of these, only 31,970 were contained in the original dataset.

3. Key Findings

Within the group of ten target facilities, considerable variation in size, volume of inpatient separations, surgical outpatient activity and occupancy rates was evident in fiscal year 1991/92 (Table 1). Considering Morden and Winkler hospitals as a single entity, all of these facilities had 60 or more beds. However, hospital size varied markedly, ranging from Steinbach hospital with 60 beds, through Morden-Winkler and Dauphin hospitals with 105 beds, to Brandon hospital, with 291 beds. Across the facilities, occupancy rates ranged from a low of 46.4 percent to a high of 72.7 percent. The number of inpatient separations ranged from 1,386 to 8,659, and the number of outpatient surgical cases ranged from 141 to 1,950. From this table, Brandon hospital clearly functioned in a very different manner than the other facilities: it handled more than twice as many inpatient cases and over four times the number of outpatient surgical cases than other centres, reflecting its role as an urban hospital with a well developed capability to provide specialized services. The other facilities, however, all represent potential candidates for development as regional or sub-regional centres, and at initiation of the study, plans were being made for redevelopment of a combined Morden-Winkler facility.

3.1 Defining hospital service areas

Mapping current patterns of hospital service delivery

Provincial patterns of hospital service delivery for the 10 target hospitals for fiscal year 1991/92 were mapped by classifying rural municipalities and local government districts according to the highest percentage of hospital services that their residents received from one or more target hospitals (Figure 3). More detailed maps of service delivery patterns for each of the centres are located in Volume II.

An examination of the provincial map suggests that all ten target hospitals achieved somewhat irregular penetration of service provision to surrounding geographical areas. Most of the target facilities provided high levels of service to a relatively small area. They achieved

Table 1

Target hospitals: Capacity, occupancy and volume indicators, 1991/92

Hospital	Rated bed capacity[1]	Occupancy rate(%)[2]	Number of inpatient separations	Number of outpatient surgical cases	Total number of cases
Steinbach	60	66.8	2295	281	2576
Swan River	68	72.7	2773	141	2914
Selkirk	75	63.7	2005	372	2377
The Pas	84	46.4	2843	437	3280
Flin Flon	100	61.1	1386	169	1555
Thompson	100	51.4	3923	435	4385
Portage	104	65.7	3755	431	4186
Morden-Winkler	105	53.8 57.9	2866	452	3318
Dauphin	105	59.0	2789	410	3199
Brandon	291	63.9	8659	1950	10609

[1] Source: Manitoba Health. Annual Report 1991/92, Manitoba Health Services Commission (Table 5).

[2] Source: Manitoba Health. Annual Statistics 1991/92, Manitoba Health Services Commission (Table 14).

variable penetration at lower levels of service, where presumably other rural hospitals are providing a larger proportion of services to patients.

Mapping of the areas in which 30 percent or more of hospital services were received from target hospitals showed that most target facilities appeared to be servicing relatively small geographic areas except for The Pas, Flin Flon, and Thompson hospitals. However, while the areas for which these hospitals provide more than 30 percent of hospital services are geographically large, they are also very sparsely populated.

In mapping areas in which residents receive over 15% of services from target hospitals (i.e. light grey and dark grey shading in Figure 3), it can be seen that Brandon hospital appears to be providing services to a fairly large geographical area. Nevertheless, in some areas where one would expect Brandon to be providing hospital services, residents receive less than 15% of services from this facility. Most other hospitals (i.e. Morden-Winkler, Portage, Dauphin, Selkirk, Swan River and Steinbach) seem to be providing services to a fairly small geographic area, even when a *15% plus* definition is used. Some of these hospitals appear to be functioning as local hospitals rather than as regional centres, evidenced by the large number of areas that receive less than 15% of services from them.

When the proposed boundaries for the rural health associations are overlaid on the map of current patterns of use, several patterns are identifiable (Figure 4). First, three of the RHAs (Central, Parklands and Norman) contain two target regional facilities each. From a regional perspective, this situation raises important issues about redirecting care. Second, most of the RHA boundaries include areas in which residents receive less than 15% of their care from the target hospital(s). This would suggest that the target hospitals are not currently playing a well defined regional role. One of the issues relevant to consider in the redirection of care from Winnipeg hospitals to these facilities is whether these patterns of care can be altered to enable target facilities to play a larger regional role.

From examination of the maps and discussions with rural representatives, it was possible to identify some of the factors that may contribute to these patterns of use. Geographic features and transportation routes appear to be important. For instance, areas that are located in close proximity to Winnipeg have lower rates of servicing by target facilities, presumably related to residents' choices to access Winnipeg hospitals. Also important are current levels and types

Figure 3

Service patterns for ten target hospitals

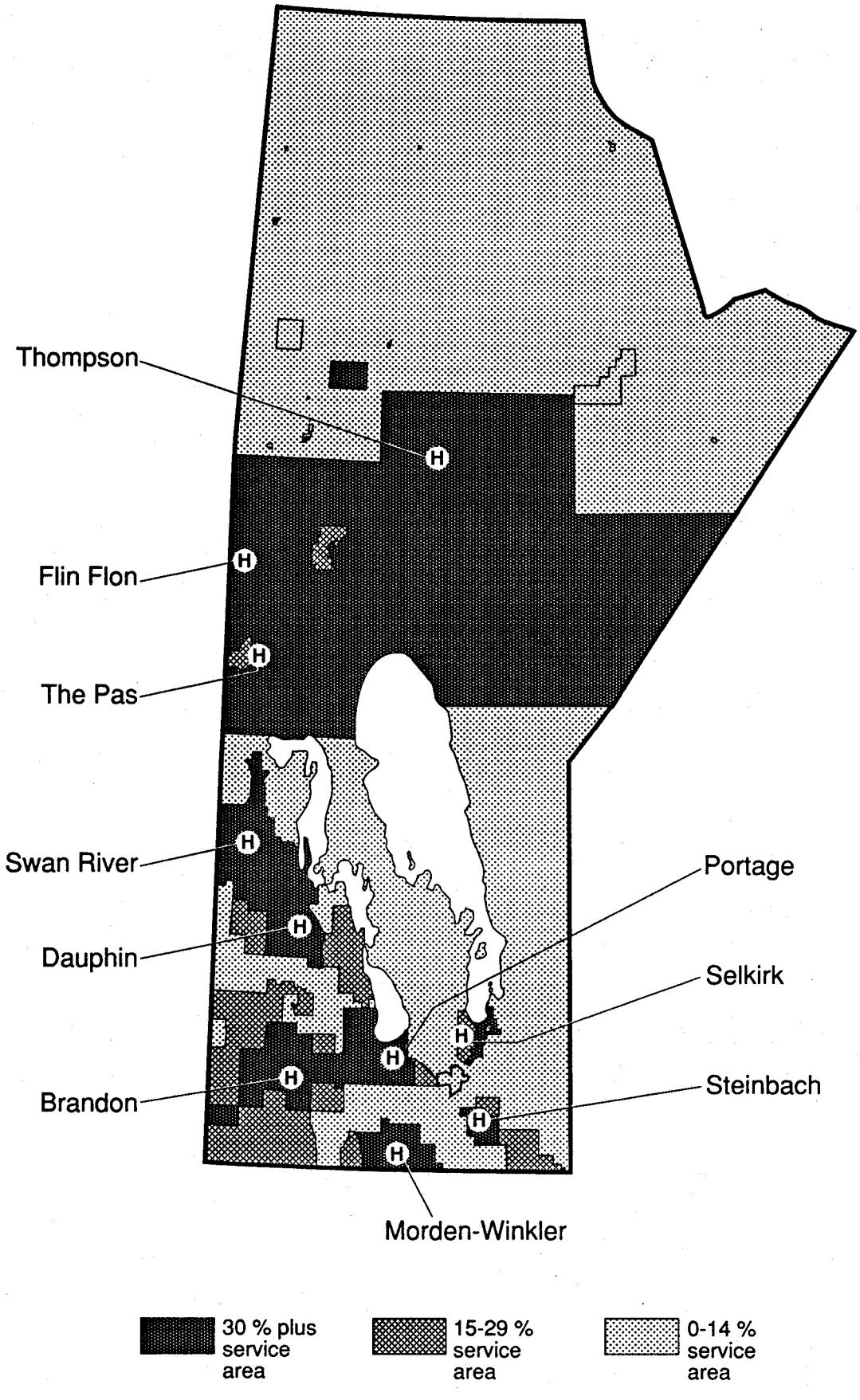
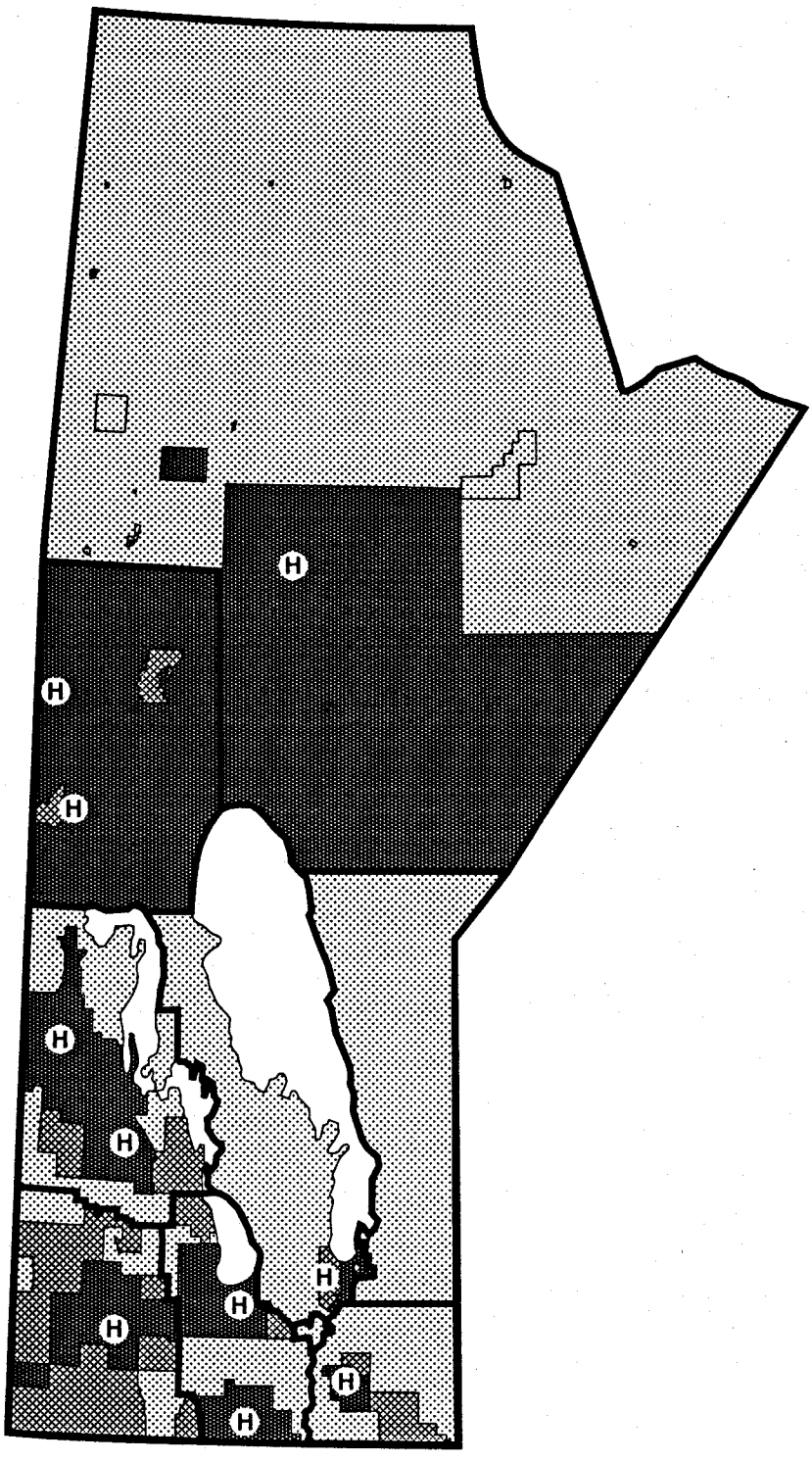


Figure 4

Service patterns for ten target hospitals with proposed Rural Health Association boundaries



of services, including physician services, available from the target hospital in relation to other local hospitals. For example, when a target hospital is located close to another hospital in which surgical services are well developed, patients are not likely to use the target hospital for regional surgical care. In addition, physician referral patterns, historical patterns of hospital utilization, and patient preferences were all mentioned as factors that appear to have a large impact on patterns of use.

Whatever contributes to current patterns of hospital use, it is clear that these patterns have profound implications for redirecting current Winnipeg-based services. If current patterns of use of Winnipeg services are driven by patient preference, it is likely to be very difficult to convince patients to alter their patterns of care-seeking. If, on the other hand, patterns of service delivery are influenced by a lack of trained personnel, technology, or infrastructure, then patterns may be more amenable to change.

Defining base populations using service area considerations

Base populations for the three hospital service area definitions are presented in Table 2. Population bases for the *30% plus* definition ranged from 7,792 (Flin Flon Hospital service area) to 57,402 (Brandon Hospital service area). Using the *15% plus* definition led to small percentage increases for some centres (i.e. 3 percent increase for Swan River; 4 percent increase for Thompson; 6 percent increase for Morden-Winkler; and 10 percent increase for The Pas). In other cases, the change in definition made a substantial difference in the population base (i.e. 79 percent increase for Selkirk; and 68 percent increase for Brandon). The population bases for the *15% plus* definition ranged from 1,061 for Flin Flon to 96,315 for Brandon. Rural Health Association boundary definitions increased the population bases still further, but led to complete duplication of population base counts for Dauphin and Swan River, for Flin Flon and The Pas,[18] and for Portage and Morden-Winkler hospital service areas. For hospitals occupying the position of being the only large rural centre within a rural health association, use of this definition increased the population base by 20 to 30 percent above the *15% plus* definition (e.g. for Brandon, Thompson and Steinbach Hospitals), but by 138 percent for Selkirk Hospital.

[18] For Flin Flon and The Pas, the population base defined using the Rural Health Association boundaries was smaller than the sum of the '15 percent plus' population bases for the two centres, reflecting overlapping of the '15 percent plus' definition for the two hospital service areas.

Table 2

Base population by service area definition

Hospital service area	30% plus definition	15% plus definition	Rural health association definition
Flin Flon	7792	10601	24956
The Pas	15557	17164	
Swan River	15172	15621	46038
Dauphin	18335	22778	
Steinbach	20496	27536	49950
Morden-Winkler	27005	28600	94531
Portage	27121	36154	
Selkirk	16952	30277	71929
Thompson	35835	37189	44965
Brandon	57402	96315	117717

In contrast to base population counts, which show variation over the three definitions of hospital service area, the percentage of hospitalizations in Winnipeg hospitals was relatively stable across the three definitions of hospital service area for most target hospitals (Figure 5 and Table 3). Steinbach hospital service areas were the exception: considering the *30% plus* hospital service area, residents received 32.4 percent of their services from Winnipeg hospitals; for the *15% plus* hospital service area, this increased to 36.4 percent and for the rural health association definition, 44.6 percent of hospital services received by residents were provided by Winnipeg hospitals.

Because of its great impact on the population base under consideration, the hospital service area definition has a major influence on determining the number of cases available for recruitment from Winnipeg hospitals. For this report, the *15% plus* service area definition was chosen to portray the potential for transferring care from Winnipeg to large rural hospitals. There were several reasons for this:

1) The *15% plus* definition is derived from existing patterns of use. It therefore assumes that cases can be recruited from areas that already have some use of the hospital, in contrast to the rural health association boundaries.
2) Rural and regional representatives on the Rural Health Advisory Panel suggested that a regional hospital should provide specialized services to a wide area and that a *15% plus* definition would be more compatible with this role than a *30% plus* definition.
3) We wished to provide an optimistic estimate of the potential impact of any redirection of service, recognizing that current patterns of utilization may be related to historical patterns of introduction of new technology in larger centres. This phenomenon may perpetuate rural residents' reliance on large centres for hospital care even though, over time, larger rural centres develop the capacity to deliver more technologically sophisticated services.

In our opinion, however, the assumptions generated using the *15% plus* definition are likely to err on the side of overestimating the magnitude of any potential for redirecting care. First, the approach assumes that 100 percent of any cases that are deemed feasible for redirection could be redirected to the target hospital even if residents of the area in question currently receive only 15% of their hospital care from the target hospital. This introduces a very

Figure 5

Percent of hospitalizations in Winnipeg hospitals by service area definition

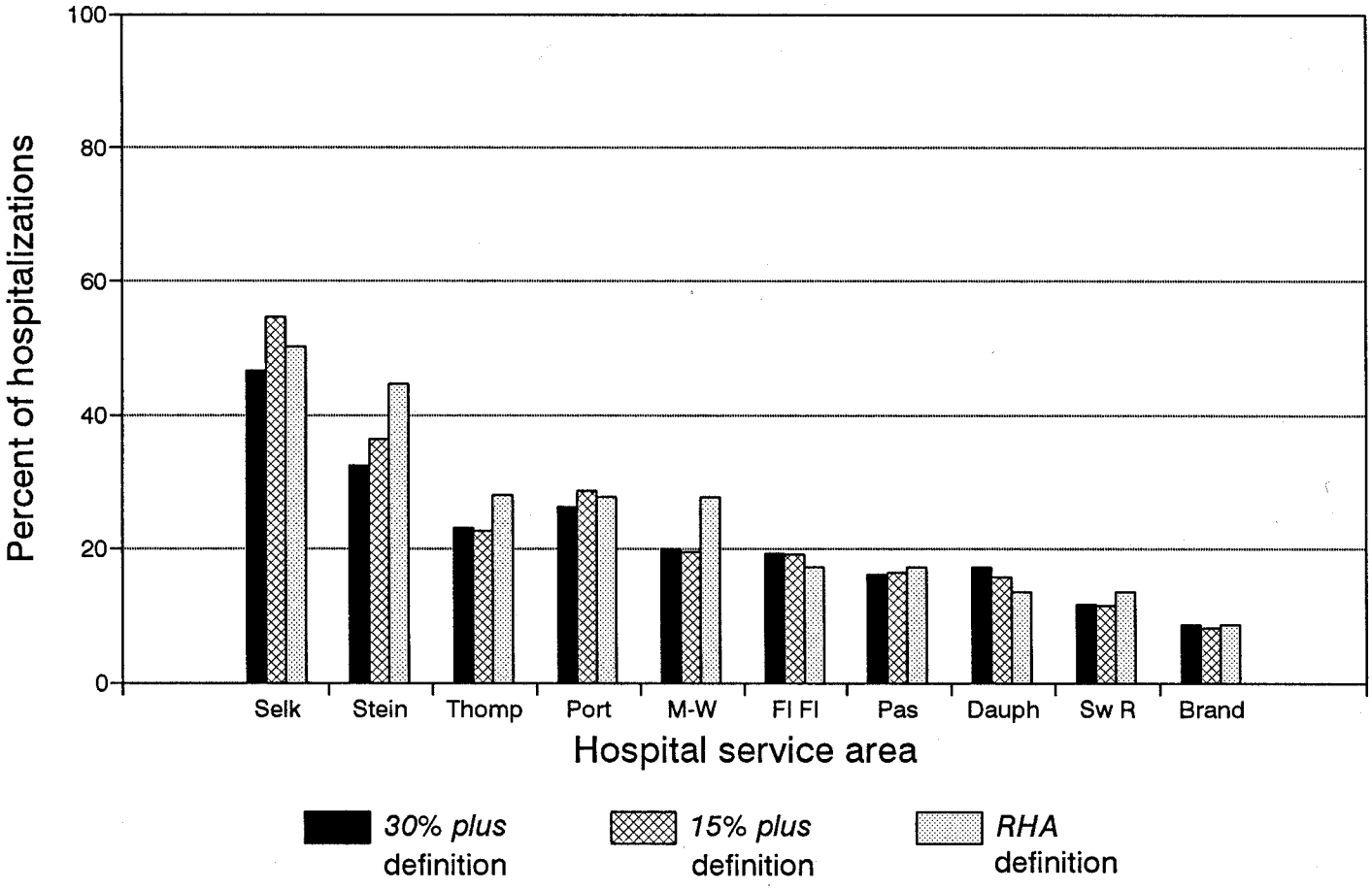


Table 3

Percent of hospitalizations in Winnipeg hospitals by service area definition

Hospital service area	30% plus definition	15% plus definition	Rural health association definition
Selkirk	46.5	54.5	50.2
Steinbach	32.4	36.4	44.6
Thompson	22.9	22.6	27.8
Portage	26.1	28.6	27.6
Morden-Winkler	19.9	19.5	
Flin Flon	19.3	18.9	17.2
The Pas	16.2	16.4	
Dauphin	17.2	15.7	13.4
Swan River	11.6	11.5	
Brandon	8.6	8.1	8.5

optimistic bias. In reality, some cases would be likely to be redirected to other rural hospitals[19] and some patients might choose not to be 'redirected' for their hospital care.[20] Second, in some cases, the *15% plus* service area definition double counts available cases, as is the case with overlap of service areas for Flin Flon and The Pas.

For simplicity of analysis and comment, only analyses relating to the *15% plus* definition are presented in the body of the report. A full set of tables for each of the three definitions is included in Volume II so that the impact of different assumptions may be compared.

The size of the population served by a facility has implications for the total number of hospital cases that are generated for treatment, with large populations generating large numbers of both general and specialized hospital cases. Using the *15% plus* definition, Brandon hospital serves a population base of almost 100,000, the nine other hospitals each serve a population of less than 40,000 persons. Morden-Winkler, Steinbach, Dauphin, The Pas, Swan River and Flin Flon serve base populations smaller than 30,000 persons. The latter three hospitals serve populations of less than 20,000 persons.

Even when base populations were calculated using proposed Rural Health Association boundaries,[21] they were small in comparison to populations actually served by the Brandon hospital. Using the Association boundaries, all of the study facilities except Brandon and Selkirk would serve population bases of less than 50,000 persons. While the Rural Health Association of Central would have a base population of 94,531, both Portage and Morden-Winkler hospitals would serve this population.

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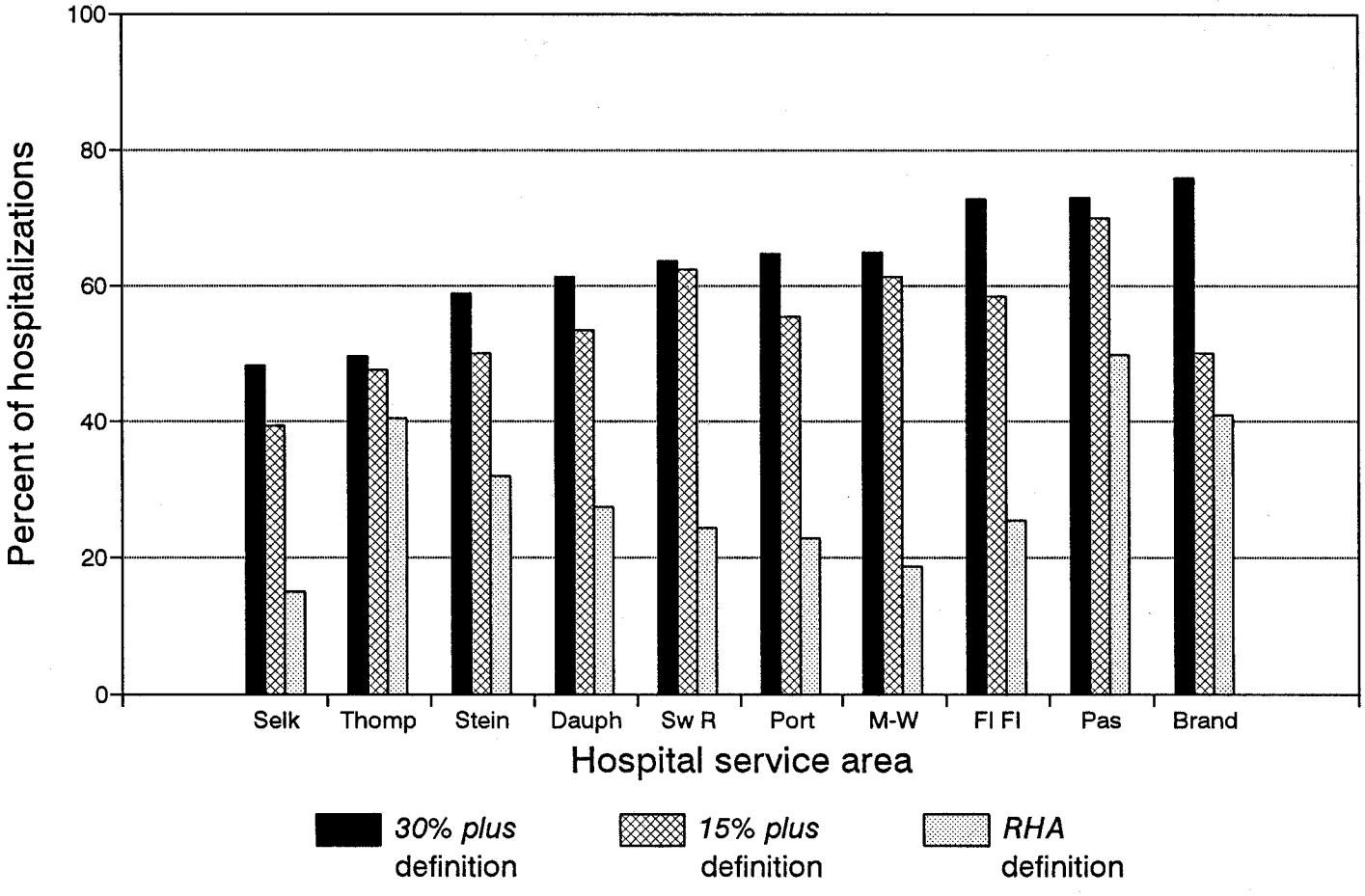
[19] Indeed, comparison of the service area definitions suggest that, in moving from the '30 percent plus' and the '15 percent plus' definition, many of the areas added to the population base are those where residents receive a large proportion of their care from rural hospitals other than the index hospital. Assuming that care that is redirected from Winnipeg hospitals will go to the index hospital is a very optimistic assumption, given residents' patterns of use of these areas.

[20] Figure 6, which presents percent of hospitalizations in target hospitals according to service area definition, suggests that redirection of cases from Winnipeg hospitals may be more feasible using the *30% plus* definition, repatriating cases from areas where residents already receive a large proportion of their care from the target hospital.

[21] Negotiations about the number of rural health associations and their boundaries had not been finalized as of May 1994. The boundaries used for this report were derived from a working document dated October 13, 1993.

Figure 6

Percent of hospitalizations in target hospitals by service area definition



3.2 Description of current patterns for *15% plus* service areas

Population base

The population base served by a regional hospital has implications for the total number of cases requiring hospital care and the degree of specialization that can be attained and supported. Based on the *15% plus* definition, base populations for the ten hospital service areas differed markedly (Figure 7). Service area populations ranged from 10,601 for Flin Flon hospital to 96,315 for Brandon hospital. Thompson hospital served the second largest population base, with 37,189 residents in its service area.

Physician resources

In 9 of the 10 service areas, there were less than 25 physicians available to hospital service areas in 1991/92 (Table 4). Numbers ranged from 10 physicians for the Swan River service area to 24 physicians for the Morden-Winkler area, with general and family practitioners representing over 70 percent of providers. Brandon, with 124 physicians available to service its population base of 96,315 individuals, had a much lower proportion of general and family practitioners and a much higher complement of internists, surgeons, pediatricians and obstetrician/gynaecologists.

Rates of use of hospital services in relation to indicators of need

The regional 0-64 year adjusted mortality ratios (AMR) give an indication of the relative needs of a region (Table 5). A value of less than 1 (i.e. 0.83 and 0.90) indicates that a region has, on average, lower health needs than the Manitoba population, while a value of greater than 1 suggests that a region has greater health needs.

The regional AMRs do not give information specific to the smaller hospital service areas; nonetheless they do give some indication of the relative needs of the region in which a hospital service area is located. In Table 5, hospital service areas are ordered by increasing need, as indicated by the regional AMR. Of the ten service areas, the Brandon service population appears to have the lowest health care needs because it is located in the region with the lowest Adjusted Mortality Ratio. Thompson service area appears to be located in the region with the highest need for health care.

Figure 7

Base population served by target hospitals (*15% plus* definition)

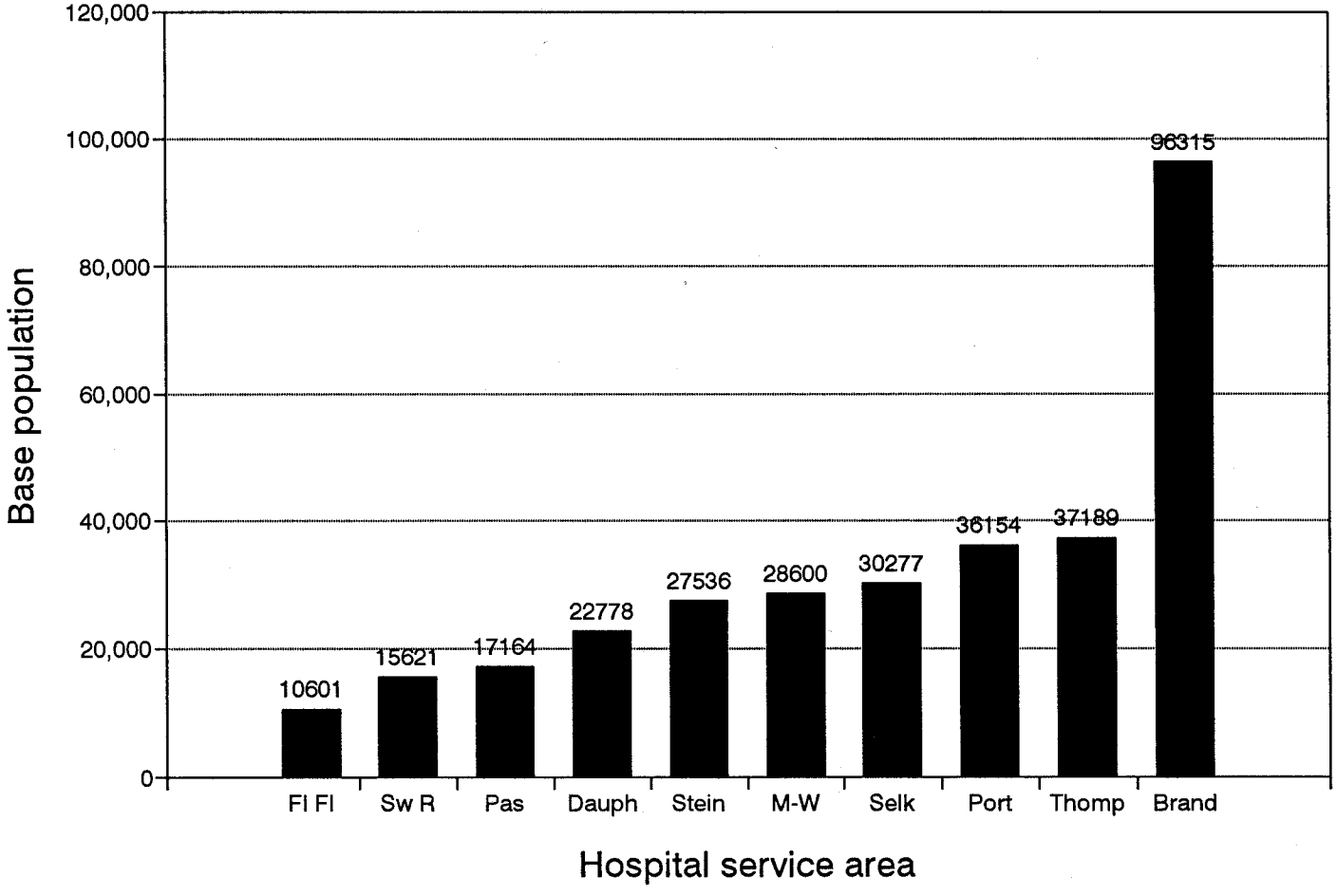


Table 4

Physician resources[1] by hospital service area
(*15% plus* definition)

Hospital service area	General and family practice	Internist and medical specialty	Surgery: General and specialty	Pediatric	Obstetric and gynae-cologic	Other MDs	Total MDs
Swan River	9	0	0	0	0	1	10
Flin Flon	12	0	0	0	0	1	13
The Pas	12	0	0	0	0	1	13
Selkirk	12	0	1	1	0	3	17
Steinbach	17	0	1	0	0	3	21
Portage	17	0	1	1	0	3	22
Dauphin	19	0	2	0	0	2	23
Thompson	N/A	N/A	N/A	N/A	N/A	N/A	23
Morden-Winkler	18	0	1	0	0	5	24
Brandon	72	12	13	4	5	18	124

[1] Estimates of the numbers and types of physicians available to each of the service areas were developed by identifying physicians directly involved in patient care who received fee for service billings of $40,000 or more in 1991-92. The methods and rationale for this approach were similar to those used in the physician module of the Population Health Information System (Tataryn et al. 1994). Counts of physicians and physician specialists were developed for each of the service area definitions by identifying physicians who had practice locations in these areas during fiscal year 1991/92.

Table 5

Service area rates of use of hospital care in relation to regional indicators of need
(*15% plus* definition)

Hospital service area	Regional 0-64 year Adjusted Mortality Ratio[1]	Age- and sex-adjusted rate of hospital use[2] (per 1000 pop.)
Brandon	0.83 (Westman)	176
Morden-Winkler	0.90 (Central)	164
Portage	0.90 (Central)	194
Steinbach	1.07 (Eastman)	167
Selkirk	1.09 (Interlake)	159
Dauphin	1.17 (Parklands)	187
Swan River	1.17 (Parklands)	258
Flin Flon	1.41 (Norman)	237
The Pas	1.41 (Norman)	276
Thompson	1.71 (Thompson)	288

[1] Source: Cohen & MacWilliam. Population health: Health status indicators; Volume II: Tables and Figures, page 50.

[2] Rate of hospital use includes all inpatient (short and long stay) as well as surgical outpatient use.

There is some correspondence between the regional indicator of need for health care and rates of use of hospital care (Black, Roos and Burchill, 1993). That is, as need for care increases, so does rate of use. Nonetheless, there are some service areas that appear to be using high rates of hospital care in relation to regional indicators of need. Specifically, Brandon service area residents appear to have a high rate of use in relation to a low regional indicator of need for health care. Some other service areas, notably Portage and Swan River, also appear to have higher than expected rates of use.

Clearly, rates of use in relation to need for care have implications for considerations of redirecting care. Service areas which have high rates of use in relation to health needs may have a greater ability to accommodate redirected cases without need for additional facilities than service areas which are currently providing lower rates of care (in relation to need) to their service populations. From this perspective, Brandon, Portage, and Swan River may have greater capability to accept redirected cases than other centres.

Patterns of use of target, Winnipeg, and other hospitals across service areas

Figure 8 presents profiles of percentage use of the target hospital, other rural hospitals, and Winnipeg hospitals for all ten service areas, arranged in order from highest to lowest percentage use of Winnipeg hospitals. Residents of the ten rural hospital service areas had different patterns of use of Winnipeg services; Winnipeg hospitalizations represented only 8.1 percent of residents' care for the Brandon service area and 54.5 percent of care for residents of the Selkirk service area.[22] The reliance on Winnipeg hospitals was higher for service areas that are geographically in close proximity to Winnipeg (Selkirk, Steinbach, and Portage service areas). Residents of the Thompson service area also received a relatively high percentage of care from Winnipeg hospitals (22.6 percent), likely related to referral and transportation programs for northern residents. When hospitalizations that occurred in nursing stations were excluded, this figure rose to 26.0 percent.

The total numbers of cases treated by Winnipeg hospitals showed a different pattern than the percentage distributions (Figure 9 and Table 6). For instance, while Brandon had the lowest overall percentage use of Winnipeg contacts (8.1 percent), it had the fifth highest number of

[22] For the '30 percent plus' definition, the range was from 8.6 to 46.5 percent; for the Rural Health Association definition, it was from 8.5 to 50.2 percent.

Figure 8

Percent of hospitalizations in target, Winnipeg, and other hospitals (*15% plus* definition)

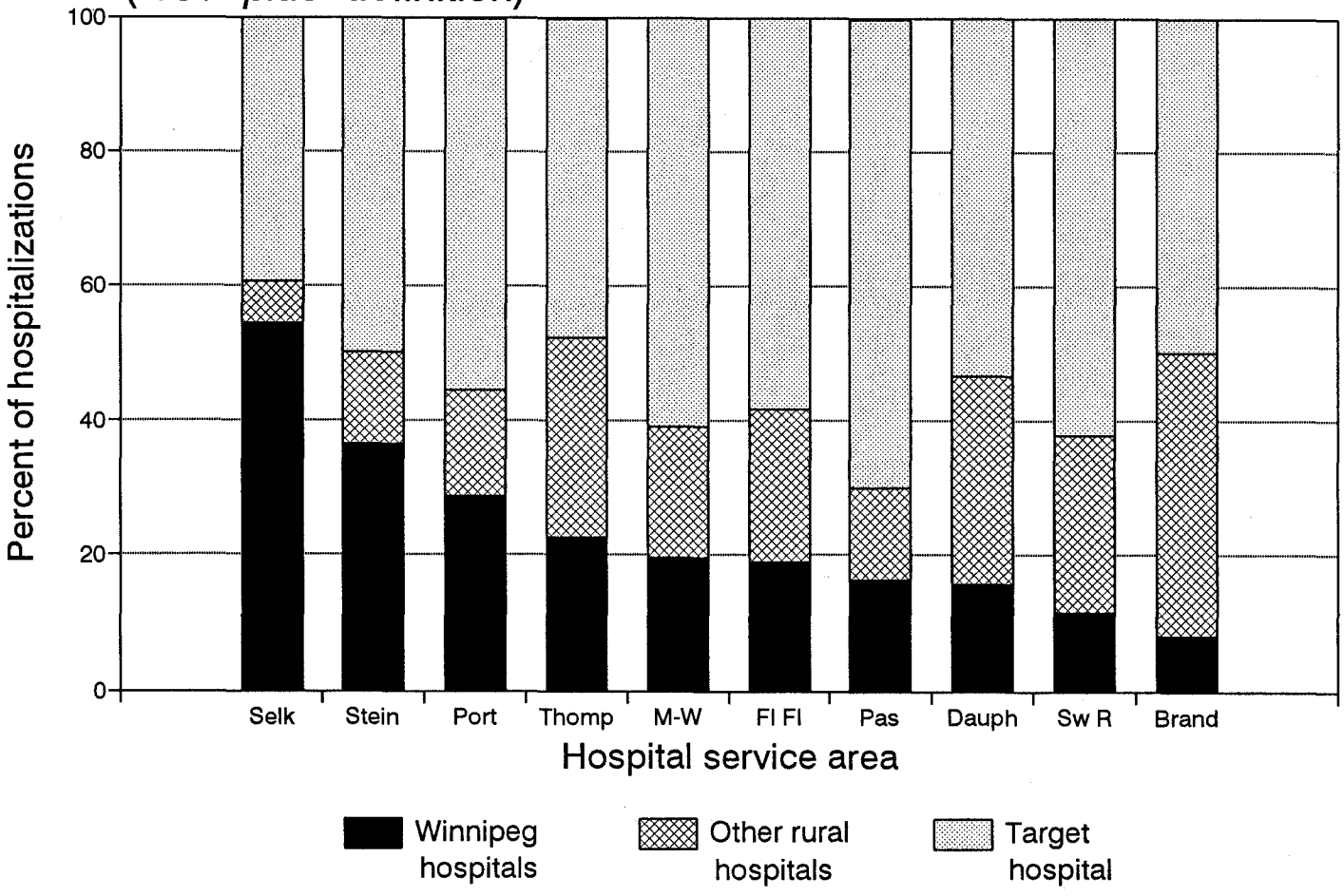


Figure 9

Percent and number of hospitalizations in Winnipeg hospitals
(*15% plus* definition)

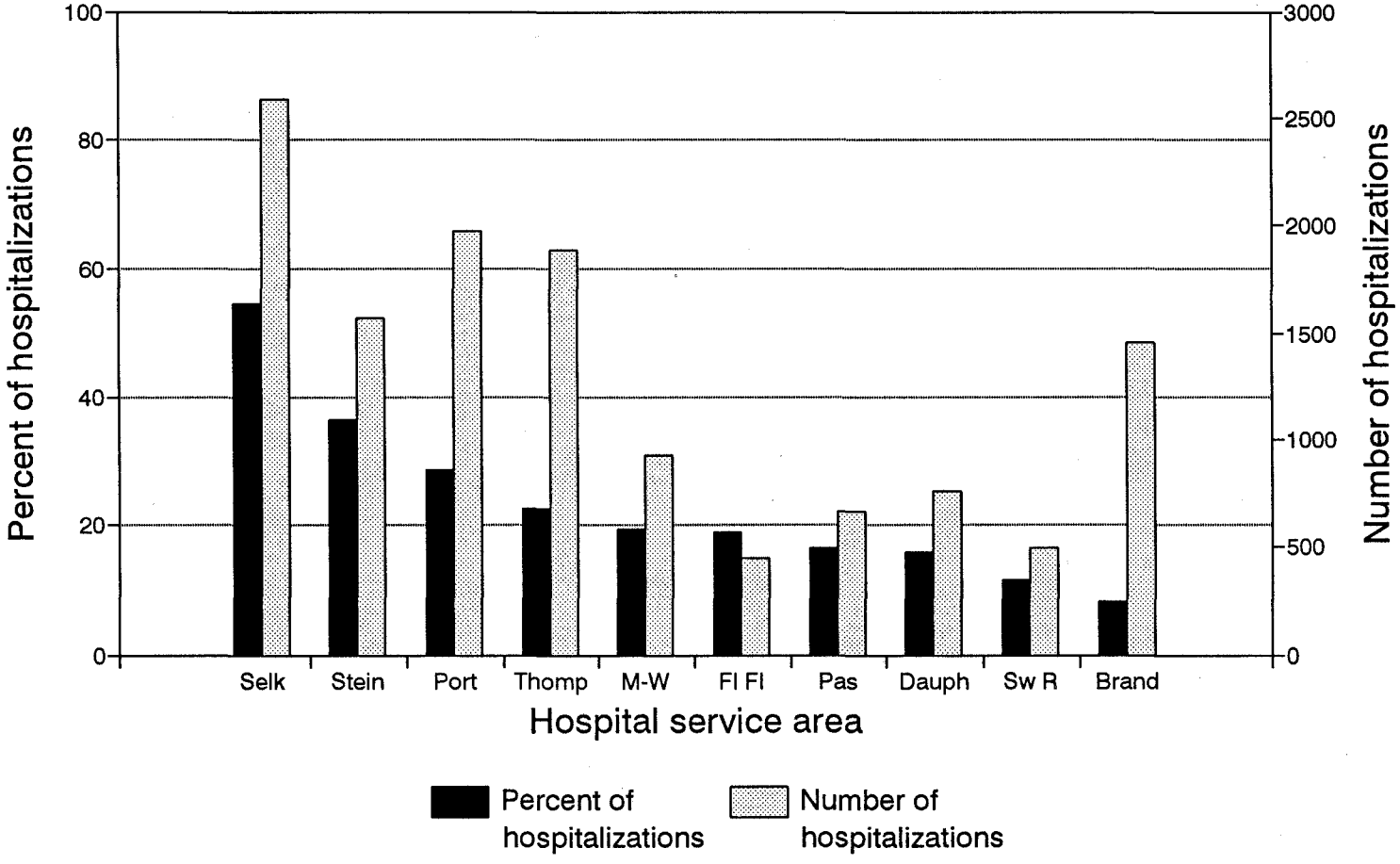


Table 6

Number and percent of hospitalizations in Winnipeg hospitals
(*15% plus* definition)

Hospital service area	Number of hospitalizations in Winnipeg hospitals	Percent of hospitalizations in Winnipeg hospitals
Selkirk	2589	54.5
Steinbach	1572	36.4
Portage	1973	28.6
Thompson	1884	22.6
Morden Winkler	922	19.5
Flin Flon	445	18.9
The Pas	662	16.4
Dauphin	757	15.7
Swan River	496	11.5
Brandon	1455	8.1

such cases, based on its large service population. The number of Winnipeg hospitalizations ranged from 445 for the Flin Flon service area to 2,589 for the Selkirk service area. Clearly, the *15% plus* definition identified a much higher number of cases than did the *30% plus* definition because it was based on a larger population. Using the latter definition, the cases ranged from 335 (Flin Flon) to 1,795 for the Thompson service area (see Volume II). Service areas with both high percentages and numbers of cases currently serviced in Winnipeg (Thompson, Selkirk, Steinbach and Portage) would likely experience the greatest impact from a redirection of services from Winnipeg hospitals. From a practical perspective, however, mapping of current service patterns suggests that for Selkirk, Steinbach and Portage, the large number of cases treated in Winnipeg hospitals is related to proximity to Winnipeg facilities which encourages patients to seek care in these facilities. The potential to influence such patient choices is likely to be lower than for the Thompson service area, which has a high number of cases related to patient transfer and transportation patterns.

Patterns of use by type of care within service areas

Theoretically, the largest impact of transfer of care will occur in areas where residents currently receive both a high percentage and a high number of hospitalizations in Winnipeg hospitals: such a pattern would generate redirection of a large number of cases to the target hospital. Selkirk hospital service area, with both the highest number and the highest percentage of such cases in 1991/92, was chosen for more intensive analysis by type of care for this reason. Practically, however, the largest impact may actually occur for areas where the percentage and number of Winnipeg hospitalizations are high, but where contact rates are influenced by issues other than patient choice. For this reason, Thompson service area was also reviewed to consider patterns of use by type of care.

Patterns of use of the target hospital, Winnipeg hospitals, and other hospitals by type of care for residents of the Selkirk service area are outlined in Table 7. Overall, there were 4,747 total hospital contacts for residents of this service area in 1991/92. Of these, 1,860 (39.2 percent) took place in the Selkirk hospital, 2,589 (54.5 percent) took place in Winnipeg hospitals, and 298 (6.3 percent) took place in other rural hospitals. As a percentage of each type of care, Winnipeg hospitalizations were high across all categories, but were highest for adult surgery (72.0 percent of adult surgery cases were handled by Winnipeg facilities), obstetric (67.0 percent of obstetric cases), and pediatric care (65.8 percent of pediatric cases). The 2589 cases treated in Winnipeg facilities represent the maximum number of cases that

Table 7

Selkirk Hospital:
Number and percent of hospitalizations in various settings:
(*15% plus* definition)

Type of care		Admissions to: Selkirk Hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Adult surgery	No.	508	25	1367	1900
	(%)	(26.7)	(1.3)	(72.0)	(100.0)
Adult medicine	No.	1056	222	582	1860
	(%)	(56.8)	(11.9)	(31.3)	(100.0)
Psychiatric	No.	20	25	39	84
	(%)	(23.8)	(29.8)	(46.4)	(100.0)
Obstetric	No.	169	13	370	552
	(%)	(30.6)	(2.4)	(67.0)	(100.0)
Pediatric	No.	107	13	231	351
	(%)	(30.5)	(3.7)	(65.8)	(100.0)
TOTAL	No.	1860	298	2589	4747
	(%)	(39.2)	(6.3)	(54.5)	(100.0)

would be available for transfer, but are subject to considerations of appropriateness and feasibility. In addition, since patient choice influences many of the patterns for the Selkirk hospital service area, the practical feasibility of influencing these patterns must also be considered.

Patterns of use of the target hospital, Winnipeg hospitals, and other hospitals by type of care for residents of the Thompson service area are outlined in Table 8. Overall, there were 8,356 total contacts for residents of this service area. Of these, 3,981 (47.6 percent) were hospitalizations in the Thompson hospital, 1,888 (22.6 percent) were hospitalizations in Winnipeg hospitals, and 2,491 (29.8 percent) were hospitalizations in other hospital settings, including nursing stations.[23] Across types of hospital care, different patterns were evident. A relatively high percentage of psychiatric, adult medical and pediatric cases were treated in hospital settings other than Thompson and Winnipeg hospitals. Winnipeg hospitalizations, as a percentage of total, were lower than for the Selkirk service area. They were highest for adult surgical care (43.5 percent), followed by obstetric care (23.0 percent). The cases treated at Winnipeg hospitals (i.e. 678 adult surgery, 416 adult medicine, 14 psychiatric, 398 obstetric and 378 pediatric cases) represent all of the cases that can potentially be redirected, subject to considerations of appropriateness and feasibility.

Across service areas, adult surgery consistently had the highest percentage of Winnipeg hospitalizations and adult medical care the lowest. Because of the different patterns by type of care, patterns for specific types of care were compared across hospital service areas.

Patterns of use across service areas by type of care

Patterns of use of Winnipeg hospitals for provision of adult surgical care (inpatient and outpatient) varied across the 10 service areas (Figure 10). As a percentage of adult surgical care, Brandon service area residents had the lowest use of Winnipeg hospitalizations (16.2 percent), while Selkirk had the highest (72.0 percent). Conversely, Table 9 illustrates that residents of the Brandon service area received the largest percentage of adult surgical services from their target hospital, while residents of the Selkirk service area received the lowest (only 26.7 percent). The Flin Flon service area had the lowest number of cases treated in Winnipeg

[23] Separate analyses of these patterns were conducted after removing hospitalizations that occurred in nursing stations. In these analyses, residents of the Thompson service area had higher percentage use of Thompson and Winnipeg hospitals and lower percentage use of other non-Winnipeg hospitals. This approach did not change conclusions reached in the report, except as noted.

Table 8

Thompson Hospital: Number and percent of hospitalizations in various settings:

(*15% plus* definition)

Type of care		Admissions to: Thompson Hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Adult surgery	No.	814	67	678	1559
	(%)	(52.2)	(4.3)	(43.5)	(100.0)
Adult medicine	No.	1182	1386	416	2984
	(%)	(39.6)	(46.4)	(13.9)	(100.0)
Psychiatric	No.	35	59	14	108
	(%)	(32.4)	(54.6)	(13.0)	(100.0)
Obstetric	No.	1034	297	398	1729
	(%)	(59.8)	(17.2)	(23.0)	(100.0)
Pediatric	No.	916	682	378	1976
	(%)	(46.4)	(34.5)	(19.2)	(100.0)
TOTAL	No.	3981	2491	1884	8356
	(%)	(47.6)	(29.8)	(22.6)	(100.0)

Figure 10

Percent of adult surgical hospitalizations in Winnipeg hospitals
(*15% plus* definition)

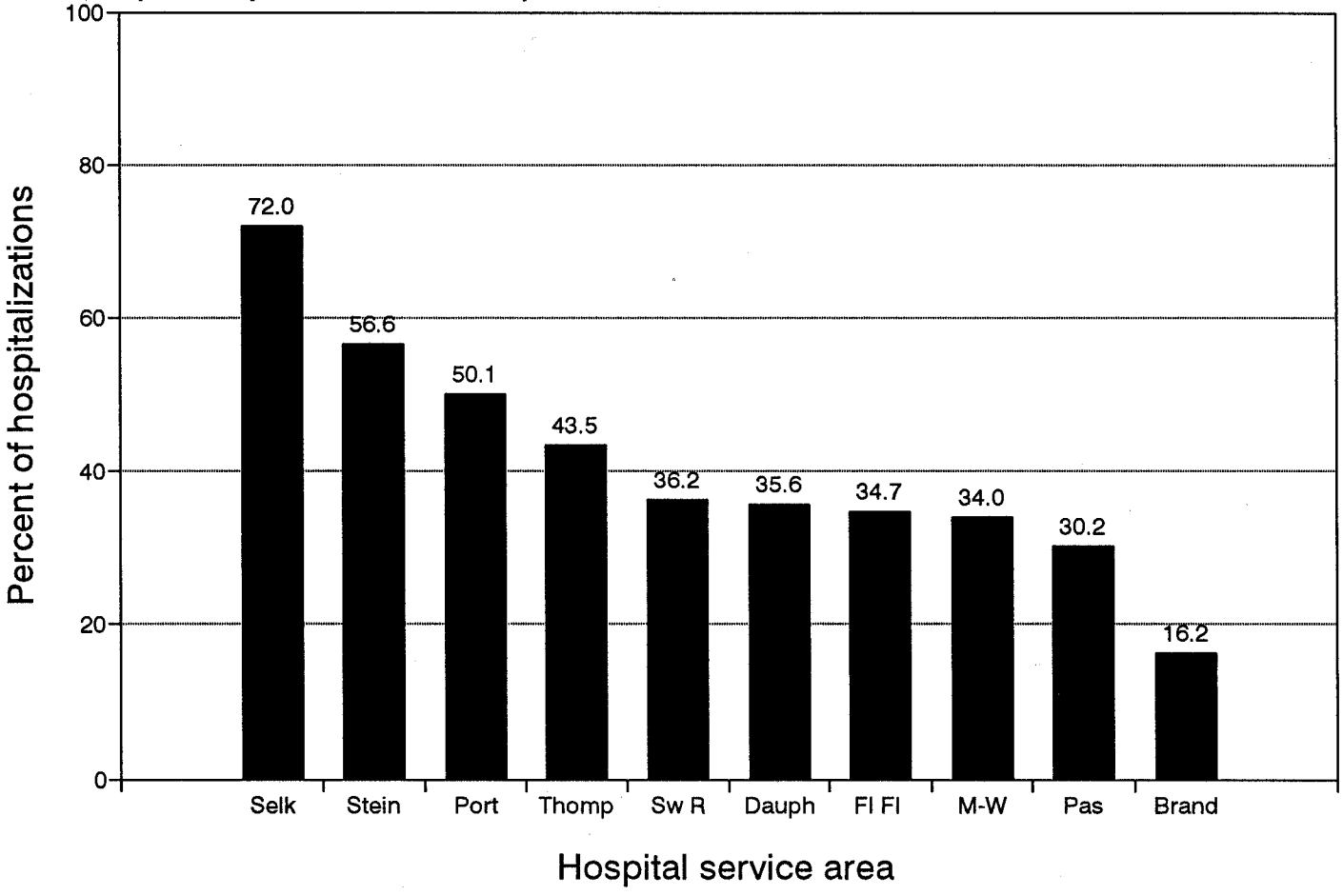


Table 9

Number and percent of adult surgical hospitalizations in various hospital settings:
(*15% plus* definition)

Hospital service area		Admissions to: Target hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Brandon	No.	3177	942	797	6285
	(%)	(64.6)	(19.2)	(16.2)	(100.0)
Bethesda-Steinbach	No.	486	110	777	1373
	(%)	(35.4)	(8.0)	(56.6)	(100.0)
Selkirk	No.	508	25	1367	1900
	(%)	(26.7)	(1.3)	(72.0)	(100.0)
Thompson	No.	814	67	678	1559
	(%)	(52.2)	(4.3)	(43.5)	(100.0)
Dauphin	No.	649	193	466	1308
	(%)	(49.6)	(14.8)	(35.6)	(100.0)
Swan River	No.	295	219	291	805
	(%)	(36.6)	(27.2)	(36.2)	(100.0)
Flin Flon	No.	313	141	241	695
	(%)	(45.0)	(20.3)	(34.7)	(100.0)
The Pas	No.	606	80	296	982
	(%)	(61.7)	(8.1)	(30.2)	(100.0)
Morden-Winkler	No.	902	143	538	1538
	(%)	(57.0)	(9.0)	(34.0)	(100.0)
Portage	No.	790	174	968	1932
	(%)	(40.9)	(9.0)	(50.1)	(100.0)

and the Selkirk area the highest. Clearly, there is considerable variation in patterns of provision of adult surgical care to residents of service areas by the target hospital in relation to Winnipeg hospitals. The maximum number of adult surgical cases that can potentially be redirected from Winnipeg hospitals therefore ranges from 241 (Flin Flon) to 1,367 (Selkirk). Appropriateness and feasibility considerations influence what proportion of these might be possible to transfer.

In contrast to adult surgical care, the percentage of adult medical care provided by Winnipeg hospitals shows less variability across hospital service areas, ranging from 4.4 percent for the Brandon service area to 31.3 percent for the Selkirk service area (Figure 11). All target hospitals except Thompson and Brandon provide over 50 percent of adult medical hospitalizations to their residents (Table 10); for Thompson this figure increases to 50.0 percent when hospitalizations in nursing stations were excluded. Residents of the Brandon service area receive a high percentage of adult medical hospitalizations from other rural hospitals, in contrast to the pattern for adult surgical care. The total number of cases treated in Winnipeg ranged from 109 (Swan River) to 582 (Selkirk). Theoretically, all hospital service areas might be able to diminish the percentage of care received from Winnipeg hospitals to that achieved by the Dauphin service area (6.6 percent).

For obstetric separations, the Brandon service area has the largest number of total contacts (2,032), followed by Thompson (1,729) (Table 11). The percentage of contacts with Winnipeg hospitals was highest for service areas in close proximity to Winnipeg (Figure 12): Selkirk (67.0 percent), Steinbach (47.4 percent), and Portage (30.9 percent). Brandon service area had the lowest percentage use of Winnipeg hospitals (5.3 percent). Actual numbers of cases treated in Winnipeg hospitals ranged from 27 in the Flin Flon service area to 398 in the Thompson service area.

For pediatric contacts (inpatient and outpatient), the Brandon service area had the largest number of total contacts (2,154), followed by Thompson (1,976) (Table 12). The percentage of contacts with Winnipeg hospitals was again higher for areas relatively close to Winnipeg (Figure 13). Pediatric residents of the Selkirk service area received 65.8 percent of their hospitalizations in Winnipeg facilities; this was followed by the Steinbach service area (45.4 percent), the Morden-Winkler service area (34.4 percent), and the Portage service area (26.1 percent). Residents of the Swan River service area had the lowest percentage of contacts with

Figure 11

Percent of adult medical hospitalizations in Winnipeg hospitals
(*15% plus* definition)

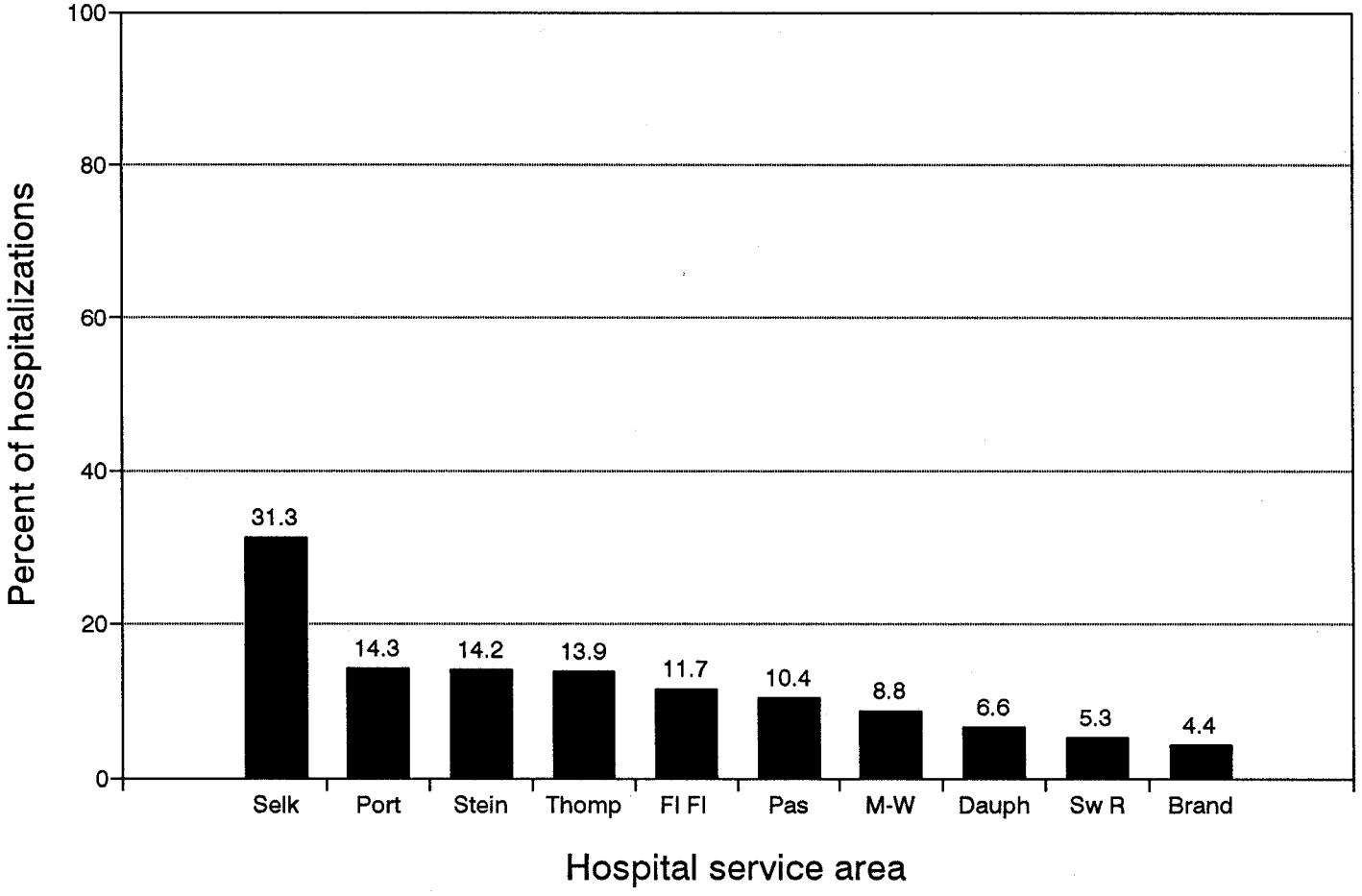


Table 10

Number and percent of adult medical hospitalizations in various hospital settings:
(*15% plus* definition)

Hospital service area		Admissions to: Target hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Brandon	No.	2970	5075	369	8414
	(%)	(35.3)	(60.3)	(4.4)	(100.0)
Bethesda-Steinbach	No.	1121	345	243	1709
	(%)	(65.6)	(20.2)	(14.2)	(100.0)
Selkirk	No.	1056	222	582	1860
	(%)	(56.8)	(11.9)	(31.3)	(100.0)
Thompson	No.	1182	1386	416	2984
	(%)	(39.6)	(46.4)	(13.9)	(100.0)
Dauphin	No.	1391	902	162	2455
	(%)	(56.9)	(36.7)	(6.6)	(100.0)
Swan River	No.	1404	544	109	2057
	(%)	(68.3)	(26.4)	(5.3)	(100.0)
Flin Flon	No.	674	251	123	1048
	(%)	(64.3)	(24.0)	(11.7)	(100.0)
The Pas	No.	1175	329	175	1679
	(%)	(70.0)	(19.6)	(10.4)	(100.0)
Morden-Winkler	No.	1300	573	181	2054
	(%)	(63.3)	(27.9)	(8.8)	(100.0)
Portage	No.	1704	643	391	2738
	(%)	(62.2)	(23.5)	(14.3)	(100.0)

Table 11

Number and percent of obstetric hospitalizations in various hospital settings:
(*15% plus* definition)

Hospital service area		Admissions to: Target hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Brandon	No.	1449	474	109	2032
	(%)	(71.3)	(23.3)	(5.3)	(100.0)
Bethesda-Steinbach	No.	264	81	311	656
	(%)	(40.2)	(12.3)	(47.4)	(100.0)
Selkirk	No.	169	13	370	552
	(%)	(30.6)	(2.4)	(67.0)	(100.0)
Thompson	No.	1034	297	398	1729
	(%)	(59.8)	(17.2)	(23.0)	(100.0)
Dauphin	No.	255	76	57	388
	(%)	(65.7)	(19.6)	(14.6)	(100.0)
Swan River	No.	316	100	40	456
	(%)	(69.3)	(21.9)	(8.8)	(100.0)
Flin Flon	No.	152	60	27	239
	(%)	(63.6)	(25.1)	(11.3)	(100.0)
The Pas	No.	462	65	87	614
	(%)	(75.2)	(10.6)	(14.1)	(100.0)
Morden-Winkler	No.	428	87	53	568
	(%)	(75.4)	(15.3)	(9.3)	(100.0)
Portage	No.	576	107	306	989
	(%)	(58.2)	(10.8)	(30.9)	(100.0)

Figure 12

Percent of obstetric hospitalizations in Winnipeg hospitals
(*15% plus* definition)

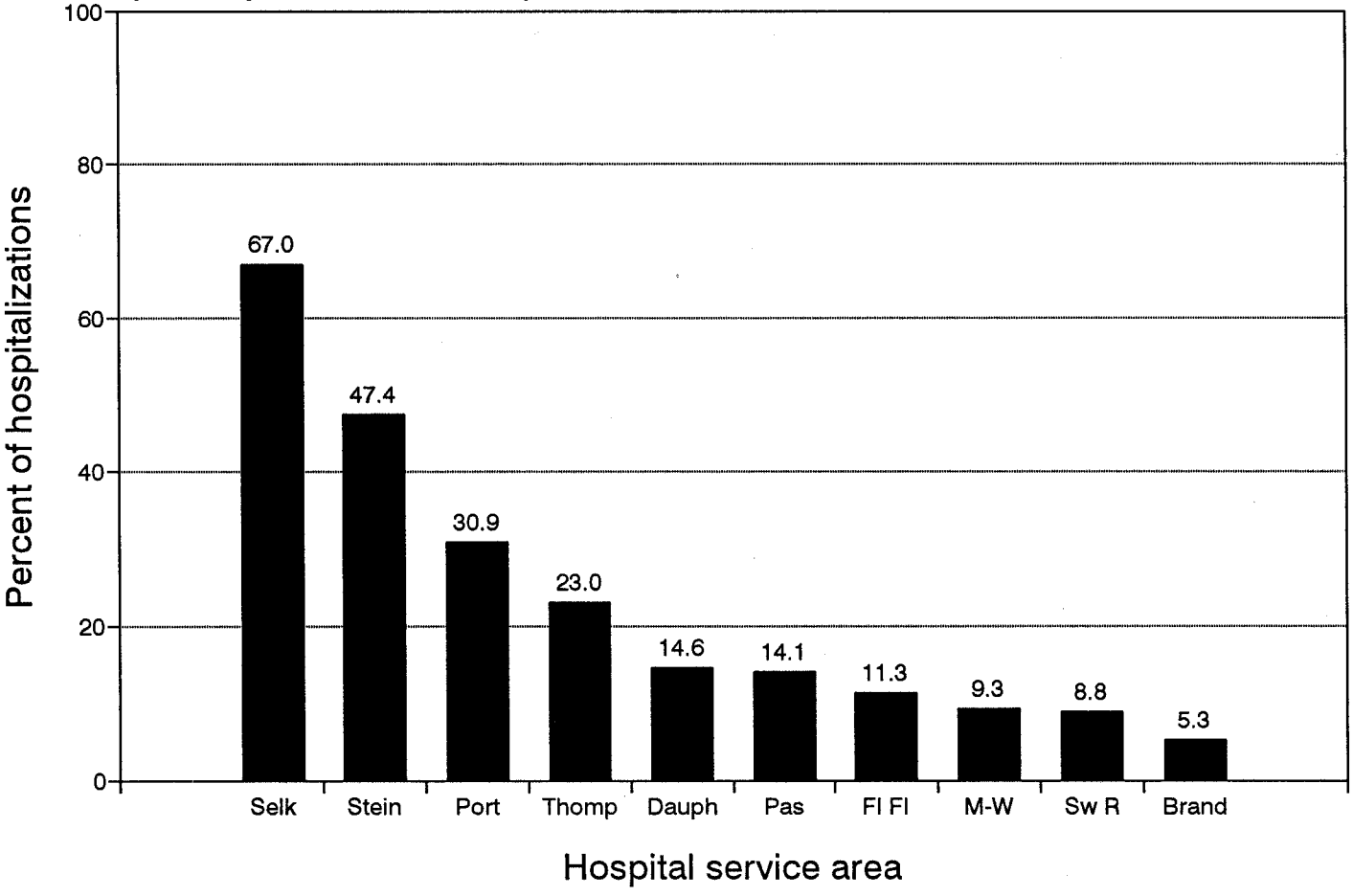


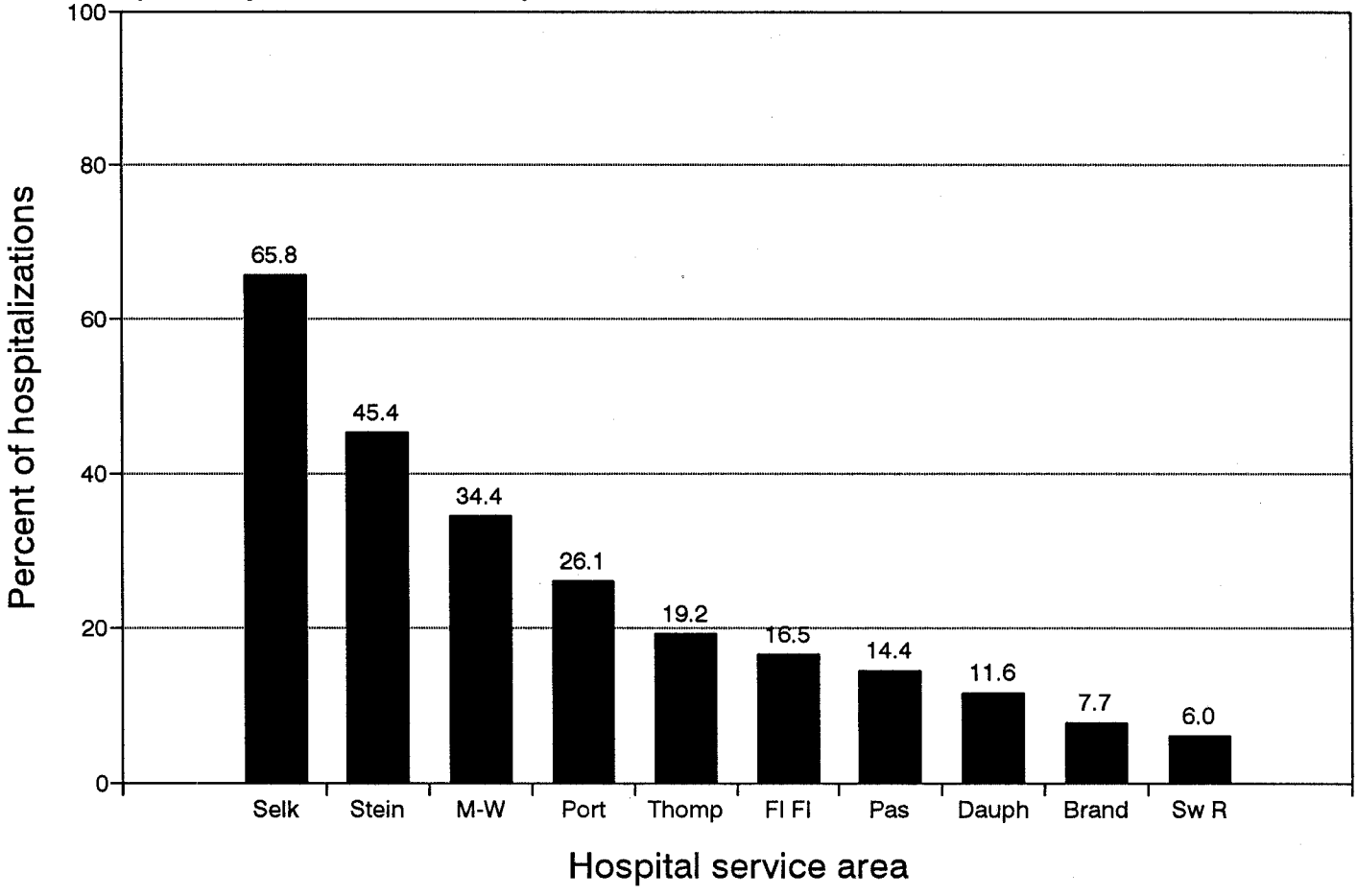
Table 12

Number and percent of pediatric hospitalizations in various hospital settings:
(*15% plus* definition)

Hospital service area		Admissions to: Target hospital	Other non-Winnipeg hospitals	Winnipeg hospitals	Total
Brandon	No.	1197	792	165	2154
	(%)	(55.6)	(36.8)	(7.7)	(100.0)
Bethesda-Steinbach	No.	220	48	223	491
	(%)	(44.8)	(9.8)	(45.4)	(100.0)
Selkirk	No.	107	13	231	351
	(%)	(30.5)	(3.7)	(65.8)	(100.0)
Thompson	No.	916	682	378	1976
	(%)	(46.4)	(34.5)	(19.2)	(100.0)
Dauphin	No.	198	270	61	529
	(%)	(37.4)	(51.0)	(11.6)	(100.0)
Swan River	No.	594	250	54	898
	(%)	(66.1)	(27.8)	(6.0)	(100.0)
Flin Flon	No.	183	61	48	292
	(%)	(62.7)	(20.9)	(16.5)	(100.0)
The Pas	No.	508	69	97	674
	(%)	(75.4)	(10.2)	(14.4)	(100.0)
Morden-Winkler	No.	195	86	147	428
	(%)	(45.6)	(20.1)	(34.4)	(100.0)
Portage	No.	699	133	293	1125
	(%)	(62.1)	(11.8)	(26.1)	(100.0)

Figure 13

Percent of pediatric hospitalizations in Winnipeg hospitals
(*15% plus* definition)



Winnipeg hospitals, at 6.0 percent,[24] while Brandon had 7.7 percent. The actual number of cases treated in Winnipeg therefore ranged from 48 for the Flin Flon service area to 378 for the Thompson service area, a portion of which may be feasible to direct back to target centres.

By type of care, adult surgery consistently had the highest percentage use of Winnipeg facilities (with the exception of the Morden-Winkler service area whose residents used a slightly higher percentage for pediatric care). Overall, the Selkirk service area had the highest percentage use of Winnipeg hospitals and Brandon the lowest. This pattern was maintained across all types of care with the exception of pediatric care, for which residents of the Swan River service area had the lowest percentage use of Winnipeg facilities.

3.3 Estimates of numbers of cases for redirection

Redirection of obstetric care

Estimates of the number of obstetric cases that may be feasible to redirect to each of the ten large rural hospitals were developed by calculating the number of cases that would be treated in Winnipeg hospitals if each service area attained the same pattern of percentage use of Winnipeg hospitals as that of the Dauphin service area (Table 13). Where service areas had a lower percentage use of Winnipeg hospitals than Dauphin, it was assumed that no additional cases could be redirected. Table 13 shows the total number of obstetric cases in each service area, the number and the percent of obstetric cases treated in Winnipeg hospitals, and estimates of the number of obstetric cases that may be appropriate to redirect from Winnipeg hospitals back to regional hospitals, using Dauphin as a benchmark. Several areas have an equivalent or slightly lower percentage use of Winnipeg hospitals than the Dauphin service area.

Estimates of the number of cases which might be redirected ranged from 145 cases for Thompson to 289 cases for Selkirk. For the three hospital service areas bordering on

[24] This low percentage referral of cases to Winnipeg may be related to a very high adjusted rate of hospitalization for this age group in this service area. A similar pattern has been found in other work (Black, Roos, and Burchill, 1993).

Table 13

Estimate of number of obstetric cases for redirection from Winnipeg to target hospitals
(using Dauphin as benchmark and *15% plus* definition)

Hospital service area	Total number of obstetric cases	Number of obstetric cases in Winnipeg hospitals	Percent of obstetric cases in Winnipeg hospitals	Estimated number of cases for redirection to target hospitals
Selkirk	552	370	67.0	289
Steinbach	656	311	47.4	215
Portage	989	306	30.9	161
Thompson	1729	398	23.0	145
Dauphin	388	57	14.6	--
The Pas	614	87	14.1	--
Flin Flon	239	27	11.3	--
Morden-Winkler	568	53	9.3	--
Swan River	456	40	8.8	--
Brandon	2032	109	5.3	--
			TOTAL	810

Winnipeg (Selkirk, Steinbach, and Portage), it would be appropriate but perhaps not feasible to transfer 665 obstetric cases from Winnipeg hospitals back to regional hospitals. There is perhaps greater potential to redirect care from Winnipeg to Thompson hospital, where use of Winnipeg hospitals is related to referral and transportation patterns.

The impact of such redirection of care would be greatest for Selkirk hospital, which would receive 289 cases in addition to the 169 it already provides (Table 7). In terms of requirements for hospital beds to accommodate the increased numbers of cases, the impact would be small. Assuming the Manitoba average length of stay of 3.3 days (Black, Roos, and Burchill, 1993) and 85 percent occupancy, Selkirk, with the largest number of cases, would require 3.1 additional obstetric beds to handle redirected obstetric care. If such transfers were to occur for all four centres, a total of 810 obstetric cases might be redirected from Winnipeg hospitals.

Redirection of pediatric care

Estimates of the number of pediatric cases that are feasible to redirect to large rural centres are provided in Table 14. Using Dauphin as a benchmark, Selkirk hospital would again receive the largest number of redirected cases (190). At an average length of stay of 3.7 days (Black, Roos, and Burchill, 1993), and assuming an 85 percent occupancy rate, Selkirk would require 2.3 pediatric beds to accommodate the additional cases. The impact of these additional 190 cases would be large in relation to the 107 cases currently treated in Selkirk hospital (Table 7). Overall, a total of 786 pediatric cases might be redirected from Winnipeg hospitals.

Redirection of adult medical care

Using Dauphin as a benchmark, the number of adult medical cases that might be redirected ranges from 45 for Morden-Winkler to 218 for Thompson and 459 for Selkirk (Table 15). These additional approaches used to estimate the numbers of adult medical cases that might be appropriate to redirect yielded similar but slightly larger numbers (Table 16). Selkirk hospital service area consistently had the largest estimated number of cases, ranging from 272 to 459 cases, suggesting that it would be appropriate to redirect a large proportion of the care coming to Winnipeg hospitals back to this hospital. The estimates also suggested that Thompson could receive a large number of medical cases instead of sending them for treatment in Winnipeg hospitals: from 170 to 233 cases could be treated in the Thompson

Table 14

Estimate of number of pediatric cases for redirection from Winnipeg to target hospitals
(using Dauphin as benchmark and *15% plus* definition)

Hospital service area	Total number of pediatric cases	Number of pediatric cases in Winnipeg hospitals	Percent of pediatric cases in Winnipeg hospitals	Estimated number of cases for redirection to target hospitals
Selkirk	351	231	65.8	190
Steinbach	491	223	45.4	166
Portage	1125	293	26.1	163
Thompson	1976	378	19.2	150
Morden-Winkler	428	147	34.4	98
The Pas	674	97	14.4	19
Dauphin	529	61	11.6	--
Flin Flon	292	48	7.8	--
Brandon	2154	165	7.7	--
Swan River	888	54	6.0	--
			TOTAL	786

Table 15

Estimate of number of adult medical cases for redirection from Winnipeg to target hospitals
(using Dauphin as benchmark and *15% plus* definition)

Hospital service area	Total number of adult medical cases	Number of adult medical cases in Winnipeg hospitals	Percent of adult medical cases in Winnipeg hospitals	Estimated number of cases for redirection to target hospitals
Selkirk	1860	582	31.3	459
Thompson	2984	416	13.9	218
Portage	2738	391	14.3	211
Steinbach	1709	243	14.2	130
The Pas	1679	175	10.4	64
Flin Flon	1048	123	11.7	53
Morden-Winkler	2054	181	8.8	45
Dauphin	2455	162	6.6	--
Swan River	2057	109	5.3	--
Brandon	8414	369	4.4	--
			TOTAL	1180

Table 16

Alternate estimates of number of adult medical cases for redirection from Winnipeg to target hospitals
(*15% plus* definition)

Hospital service area	Number of cases exceeding benchmark use	Number of low or moderate intensity cases in Winnipeg hospitals	Number of low complexity cases in Winnipeg hospitals	Number of cases based on Rural Health Research Centre definition
Selkirk	459	272	309	336
Thompson	218	170	233	232
Portage	211	169	196	218
Steinbach	130	122	146	130
The Pas	64	72	89	92
Flin Flon	53	68	61	74
Morden-Winkler	45	98	96	99
Dauphin	--	66	83	74
Swan River	--	52	65	61
Brandon	--	179	197	177
TOTAL	1180	1268	1475	1493

hospital (requiring 6 medical beds). Potentially, even some care (177 to 197 cases) could be redirected back to Brandon Hospital. While there is some variability across the estimates for individual hospital service areas, overall, all four were reasonably close in estimating the total number of cases that might be transferred from Winnipeg hospitals to large rural hospitals. Except for Brandon, rankings were similar across measures. Summing across all ten centres, estimates of the total number of adult medical cases that could be redirected ranged from 1,180 to 1,493 cases.

Redirection of adult surgical care

Table 17 presents estimates of the number of adult surgical cases that could be treated in large rural hospitals but are currently being treated in Winnipeg hospitals. Based on each centre achieving a capability to perform on site surgery comparable to Dauphin so that each hospital service area would reduce its percentage of Winnipeg cases to 35.6 percent or less, a total of 1,100 of 6,419 Winnipeg cases from *15% plus* service areas could be redirected to four large rural hospitals. Selkirk would receive the largest number of such cases, followed by Portage and Thompson. To identify some of the implications of trying to achieve lower use of Winnipeg facilities patterns of care for specific groups of major surgical procedures[25] were reviewed for two hospital areas.

Table 18 shows the patterns of use of different hospital settings for clinical categories of surgical care for Brandon hospital service area, the area that has the lowest percentage use of Winnipeg resources for surgical care. For the 7,895 cases requiring surgical facilities from this service area, 86.2 percent are performed by non-Winnipeg hospitals, with Brandon performing 60.1 percent and other rural hospitals performing 26.2 percent. Brandon hospital is clearly able to provide a wide range of specialized surgical services: 50 percent of the area's neurosurgical and ophthalmological procedures, 67 percent of ENT procedures, 85 percent of thoracic procedures, and 67 percent of orthopaedic procedures. Residents of the Brandon hospital service area receive only 2.8 percent of their surgical services at Winnipeg community hospitals; care provided by Winnipeg hospitals comes largely from teaching hospitals (10.0 percent). The Brandon service area has 13 general and specialty surgeons (Table 4); it is the only service area to have more than two surgical specialists. Availability

[25] The total cases in these tables are larger than those for adult surgical care because they also include obstetric and paediatric surgical cases.

Table 17

Estimate of number of adult surgical cases for redirection from Winnipeg to target hospitals
(using Dauphin as benchmark and *15% plus* definition)

Hospital service area	Total number of adult surgical cases	Number of adult surgical cases in Winnipeg hospitals	Percent of adult surgical cases in Winnipeg hospitals	Estimated number of cases for redirection to target hospitals
Selkirk	1900	1367	72.0	692
Portage	1932	968	50.1	280
Thompson	1559	678	43.5	123
Swan River	805	291	36.2	5
Dauphin	1308	466	35.6	--
Flin Flon	695	241	34.7	--
Morden-Winkler	1583	538	34.0	--
The Pas	982	296	30.2	--
Steinbach	1373	777	29.0	--
Brandon	4916	797	16.2	--
			TOTAL	1100

Table 18

Brandon hospital: Number of surgical cases by type of surgery (*15% plus* definition)

Type of surgery	Cases in Brandon hospital	Cases in other non-Winnipeg hospital	Cases in Winnipeg community hospital	Cases in Winnipeg teaching hospital	Total cases
Neuro	100	71	*	37	212
Ophthalmology	202	30	50	125	407
ENT	431	68	18	47	564
Thoracic	60	*	*	9	71
Cardiac	125	11	*	69	206
Vascular	28	18	*	5	51
GI	230	39	8	18	295
General	741	309	22	70	1142
Orthopedic	502	78	58	106	744
Urologic	372	170	19	88	649
Gynaecologic	742	148	16	53	959
Obstetric	690	401	9	86	1186
Oncology	252	320	5	26	603
Trauma	253	268	7	19	547
Plastics	31	123	*	15	171
Other	54	16	*	16	88
TOTAL	4813	2071	222	789	7895
(%)	(60.1)	(26.2)	(2.8)	(10.0)	(100.0)

of surgical personnel and facilities are clearly linked to Brandon's ability to provide specialized surgical procedures. In contrast, the Dauphin service area, used as a benchmark, has two practising surgeons. Dauphin hospital performs 53.8 percent of the 2,126 procedures provided to residents of the service area (see Volume 11).

Selkirk, with the largest number of surgical cases for redirection, has only one surgeon practising in the service area. A total of 2,619 surgical cases were generated from the population residing in the Selkirk hospital service area (Table 19). In contrast to Brandon and Dauphin service area residents, residents of the Selkirk hospital service area received only 33.8 percent of their surgical care from rural hospitals (31.2 percent from Selkirk hospital and 2.6 percent from other rural hospitals). To achieve a percentage use consistent with the Dauphin service area would require that Selkirk hospital increase its current surgical caseload by 40 percent. In addition, Selkirk would be required to perform a significant percentage of specialized surgical care to achieve this objective, raising questions about necessary investments in surgical facilities, recruitment of surgeons, staff training and potential tradeoffs in quality of care. Similar concerns arise from reviewing patterns of care for Thompson and Portage (See Volume II). While it may be theoretically possible, from a clinical perspective, to increase the numbers of specific types of surgical cases performed at these hospitals, such facilities are not likely to be able to perform large numbers of many different kinds of surgery in the same way that Brandon, an urban hospital serving a much larger population base with resident specialized surgeons, can. Such shifts in care would likely require a large investment of resources, including updating or expansion of surgical facilities, specialized training of personnel, and recruitment of a number of different surgical specialists. Instead, there may be greater potential to increase capacity to perform certain types of surgical procedures in specific large rural facilities. Because of these issues, there is likely to be greater potential to shift obstetric, pediatric and adult medical care than to shift surgical care.

Number of redirected cases for target hospitals

If all cases identified by this study could be redirected, the largest impact would occur for Selkirk hospital, which would receive 1630 cases in addition to the 2377 which it currently handles (Table 20). Given current occupancy rates of 63.7 percent, many, but not all, of these cases could potentially be handled within the existing capacity of 75 rated beds (Table 1). However, specific consideration would need to be undertaken to assess the hospital's

Table 19

Selkirk hospital: Number of surgical cases by type of surgery (*15% plus* definition)

Type of surgery	Cases in Selkirk hospital	Cases in other non-Winnipeg hospital	Cases in Winnipeg community hospital	Cases in Winnipeg teaching hospital	Total cases
Neuro	31	*	15	39	87
Ophthalmology	11	*	74	87	172
ENT	26	*	82	78	186
Thoracic	*	*	*	14	18
Cardiac	*	*	5	75	81
Vascular	16	*	5	*	24
GI	35	*	32	38	105
General	146	8	117	70	341
Orthopedic	65	*	145	109	321
Urologic	38	8	90	66	202
Gynaecologic	125	9	132	133	399
Obstetric	156	21	43	145	365
Oncology	84	*	9	29	126
Trauma	56	12	17	29	114
Plastics	22	*	9	16	47
Other	7	*	7	17	31
TOTAL (%)	818 (31.2)	67 (2.6)	786 (30.0)	948 (36.2)	2619 (100.0)

Table 20

Estimate of total number of cases for redirection from Winnipeg to target hospitals by type of care

(using Dauphin as benchmark and *15% plus* definition)

Hospital service area	Adult medical cases	Adult surgical cases	Obstetric cases	Paediatric cases	Total cases
Selkirk	459	692	289	190	1630
Portage	211	280	161	163	815
Thompson	218	123	145	150	636
Steinbach	130	--	215	166	511
Morden-Winkler	45	--	--	98	143
The Pas	64	--	--	19	83
Flin Flon	53	--	--	--	53
Swan River	--	5	--	--	5
Dauphin	--	--	--	--	--
Brandon	--	--	--	--	--
TOTAL	1180	1100	810	786	3876

ability to handle such a large number of additional cases in relation to current function. Similar planning would need to occur for Portage hospital, which would receive an additional 815 cases, as well as for Thompson (636 additional cases) and Steinbach (511 additional cases) hospitals.

Impact of redirection of care

If all identified cases were to be redirected (3,876 cases), 30.4 percent of cases from *15% plus* service areas that are currently treated in Winnipeg hospitals would be redirected back to target hospitals (Table 21). Return of surgical cases would be lower than for other types of care (i.e. only 17.1 percent of adult surgery compared to over 40 percent for other types of care).

Redirection of all identified cases to the 10 target hospitals would have a relatively small impact on reducing number of cases treated in Winnipeg hospitals. Overall, redirection of care would only reduce caseloads in Winnipeg hospitals by 3.6 percent. The impact for adult surgical cases would be small (2.4 percent), while a greater reduction of Winnipeg services (7.8 percent) might be possible for pediatrics.

Table 21

Estimate of number of cases for redirection from Winnipeg to target hospitals and impact of redirection

(using Dauphin as benchmark and *15% plus* definition)

Type of care	Number of cases appropriate to redirect	Winnipeg cases from *15% plus* service areas		All Winnipeg cases[1]	
		Number of cases	Percent decrease with redirection	Number of cases	Percent decrease with redirection
Adult surgery	1100	6,419	17.1	46,767	2.4
Adult medicine	1180	2,751	42.9	30,397	3.9
Obstetrics	810	1,758	46.1	19,617	4.1
Paediatrics	786	1,697	46.3	10,049	7.8
TOTAL	3876	12,755	30.4	106,830	3.6

[1] Excludes out of province residents treated in Winnipeg hospitals.

4. Discussion

The concept of delivering care closer to where Manitobans live is an appealing one, especially in an environment when increased pressures are being placed on Winnipeg hospital beds. This report suggests that, from a theoretical perspective, a significant proportion of the hospital care being delivered by Winnipeg facilities to residents of areas served by ten regional hospitals might be redirected back to these facilities. However, the impact of redirecting such care in terms of the number of additional beds used in rural areas would be small. Since most of the facilities currently have occupancy rates under 70 percent, they could accept many of the additional medical cases without requiring additional hospital beds. Considerations for surgical care go beyond hospital beds: shifting care would require major investments in other resources including human resources and training and upgrading of operating rooms to support specialized interventions.

The impact of service transfer is likely to be greatest for centres which have both large numbers and percentages of cases being treated in Winnipeg, such as Selkirk, Steinbach, Portage and Thompson. However, from a practical perspective, where such patterns of utilization occur because patients may choose to use Winnipeg hospitals instead of local rural facilities, there is likely to be resistance to change. The greatest potential to shift such care is for centres that have a high reliance on Winnipeg hospital resources, but where transportation and medical care systems influence utilization patterns, such as in the Thompson region. Even for this region, it may take a very organized effort to redirect care away from Winnipeg hospitals.

The assumptions used to estimate numbers of cases that might be redirected were optimistic and likely overestimate the actual numbers of cases that can be shifted. Even with these deliberately optimistic assumptions, however, the total number of cases available for redirection was much smaller than had been anticipated in discussions with many groups.

In an era of hospital restructuring and reform, consideration must be given to the appropriate balance between local and central provision of hospital services, given the population base being served. Currently, even hospitals in Winnipeg are being asked to centralize provision of specialized services. Significant decentralization of specialized services in rural areas must be considered cautiously. While there are benefits to such approaches in terms of providing

care closer to where people live and reducing personal costs to residents of travel to receive medical care, when case volumes for specialized care are decreased, concerns arise from both quality and efficiency perspectives. Quality of surgical care is related to the number of procedures that an institution performs, providing a rationale for centralising the provision of less common procedures. From an efficiency perspective, economies of scale are lost as smaller numbers of specialized types of care are provided in multiple locations.

For the most part, the findings of this report suggest that redirecting care from Winnipeg facilities to large rural hospitals will have a relatively small impact. Most of the centres can accommodate much of the increased volume within existing bed capacity, given current occupancy rates. Even where the numbers of cases to be redirected are high, current trends towards shortening hospital stays and moving care to ambulatory settings will lessen the impact on rural institutions.

The findings of this report have broad implications for rural health reform and the development of strategic regional alliances for future provision of rural health care. Hospitals and regions are in a better position to provide specialized care when they serve a large population base which generates a large number of specialized cases requiring treatment. The population bases currently served by nine of the ten hospitals are small in comparison to Brandon (approximately 100,000) and to guidelines being used by some other provinces to guide planning for provision of secondary hospital services (population base of 150,000). Even population numbers that would accrue to these facilities using proposed Rural Health Association boundaries fall short of these numbers.

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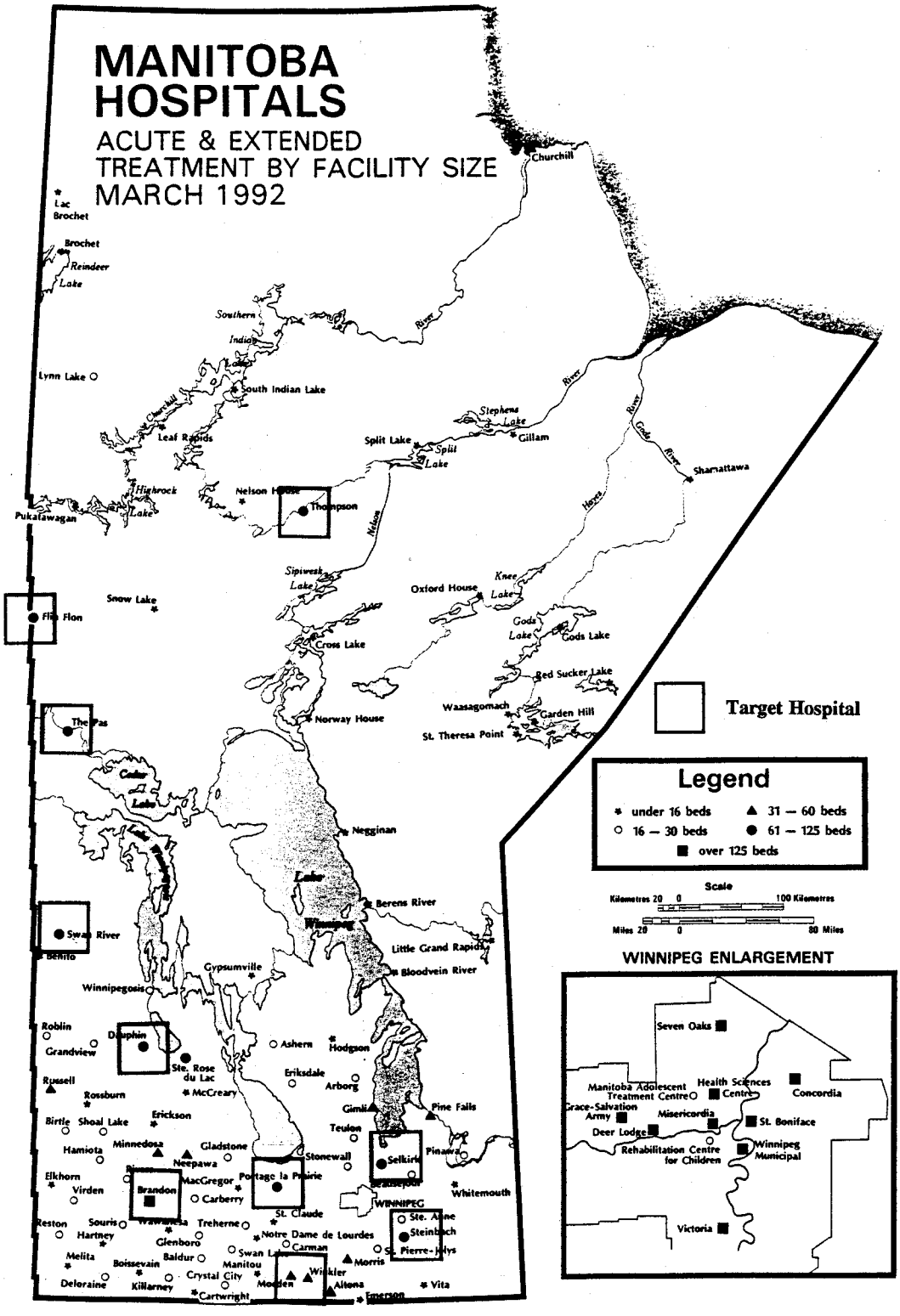
Figure 1

Target facilities and other Manitoba hospitals



Adapted from: Manitoba Health. Manitoba Health Services Commission Annual Report 1991/92.

Figure 3

Service patterns for ten target hospitals

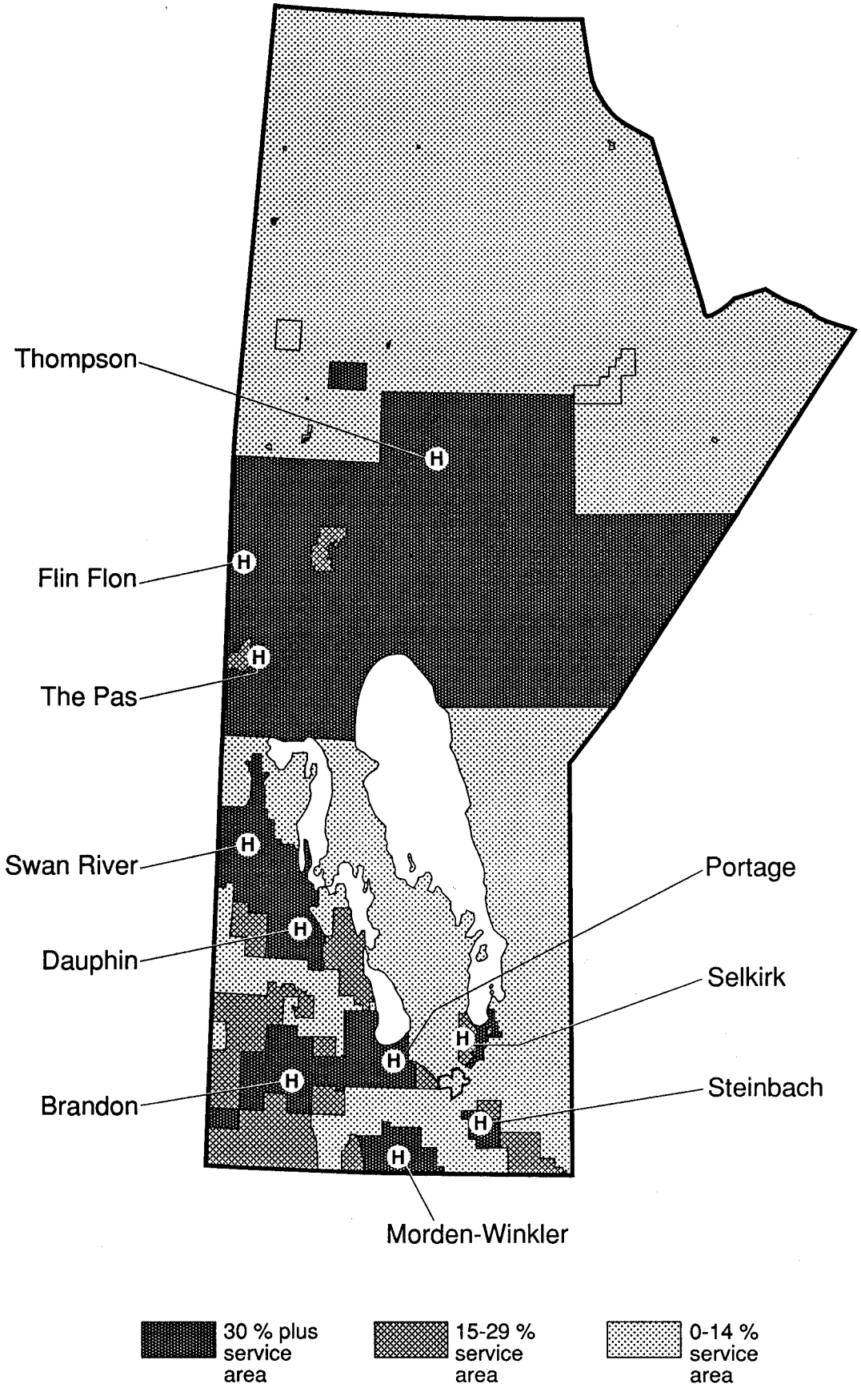


Figure 4

Service patterns for ten target hospitals with proposed Rural Health Association boundaries