# VARIATION IN LENGTH OF STAY AS A MEASURE OF EFFICIENCY IN MANITOBA HOSPITALS

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## Abstract • Résumé

**Objective:** To examine the efficiency of Manitoba hospitals by analysing variations in length of stay for patients with similar characteristics.

**Design:** Retrospective study. Multiple regression analyses were used to adjust for patient (case-mix) characteristics and to identify differences in length of stay attributable to the hospital of admission for 14 specific, frequently encountered diagnostic categories and for all acute admissions.

**Setting:** The eight major acute care hospitals in Manitoba.

**Participants:** Manitoba residents admitted to any one of the eight hospitals during the fiscal year 1989–90, 1990–91 or 1991–92. Patients transferred to or from another institution, those with atypically long stays and those who died in hospital were excluded.

**Outcome measure:** Length of hospital stay.

**Results:** The length of stay was strongly influenced by hospital of admission, even after adjustment for key patient characteristics. Excluding the most seriously ill patients and those with the longest stays, approximately 186 beds could potentially have been saved if each hospital had discharged its patients as efficiently as the hospital with the shortest overall length of stay.

**Conclusions:** A substantial proportion of days currently invested in treating acute care patients could be eliminated. At least some bed closures in Manitoba hospitals could be accommodated simply through more efficient treatment of patients in the remaining beds, without decreasing access to hospital care.

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**Objectif :** Examiner l'efficience des hôpitaux du Manitoba en analysant les variations de la durée du séjour de patients qui avaient des caractéristiques semblables.

**Conception :** Étude rétrospective. On a utilisé des analyses à régressions multiples pour tenir compte des caractéristiques des patients (groupes mixtes de cas) et pour identifier les différences dans la durée du séjour attribuables à l'hôpital d'admission, dans 14 catégories de diagnostics spécifiques et fréquents et pour toutes les admissions nécessitant des soins actifs.

**Contexte :** Les huit principaux hôpitaux de soins actifs du Manitoba.

**Participants :** Résidents du Manitoba admis dans un des huit hôpitaux au cours des exercices 1989–1990, 1990–1991 ou 1991–1992. On a exclu les patients transférés à un autre ou d'un autre établissement, ceux dont le séjour a été d'une longueur inusitée et ceux qui sont morts à l'hôpital.

**Mesure des résultats :** Durée de l'hospitalisation.

**Résultats :** Même après correction pour tenir compte des principales caractéristiques du patient, l'hôpital où il a été admis a eu une forte incidence sur la durée du séjour. Si l'on ne compte pas les patients les plus gravement malades et ceux dont le séjour a été le plus long, on aurait pu économiser environ 186 lits si chaque hôpital avait libéré ses patients avec autant d'efficience que l'hôpital où la durée globale du séjour a été la plus courte.

**Conclusions :** On pourrait supprimer une partie importante des jours actuellement consacrés au traitement de patients en soins actifs. On aurait pu fermer au moins quelques lits dans des hôpitaux du Manitoba simplement en traitant de façon plus efficiente les patients hospitalisés dans les lits restants, sans réduire l'accès aux soins hospitaliers.


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Continuing escalation of health care costs and a weak economy have forced provincial governments to face tough decisions about cutbacks in their health care systems. Because a large portion of health care budgets is consumed by hospital services, hospitals have become obvious targets for budget cuts. The logical response of hospital administrators forced to make cuts is to close beds. Invariably, announcements of bed closures instil fear into the minds of the public and health care personnel, because closing beds is associated with restricting access to care. This assumption is based on the premise that the beds currently in the system are being used at maximum efficiency.

One measure of efficiency of bed use is length of hospital stay. Reports by organizations such as the Canadian Institute for Health Information have long demonstrated interhospital differences in length of stay for patients with similar relevant characteristics.[1] There has been little attempt, however, to assess the magnitude and the implications of such differences. If differences in length of stay are large and could be reduced without compromising patient care, fears associated with bed closures could be alleviated. Reassuringly, shorter stays have not been found to be related to adverse patient outcomes.[2,3] In fact, a study of close to 4000 US hospitals showed that hospitals that discharged patients more efficiently had lower postdischarge death rates.[3]

We examined the efficiency of hospital discharge practices in Manitoba by analysing variations in length of stay for patients in eight large urban hospitals.

## Methods

### Sample and study period

Manitoba hospital discharge data for the fiscal years 1989–90, 1990–91 and 1991–92 were obtained from the Manitoba Health provincial administrative health care database.[4] We selected only acute inpatient cases (generally, stays of 1 to 60 days) from the eight large acute care facilities (125 beds or more) in Manitoba. All analyses focused on 1991–92 data, except for those comparing consistency across 3 years.

### Patient characteristics

Because length of stay can be influenced not only by hospital factors but also by differences in patient characteristics, we adjusted for the following variables in our analyses: type of diagnosis or surgical procedure, severity of illness, age, sex, residence or nonresidence in service area, residence or nonresidence in core area of Winnipeg, having or not having Treaty Indian status, and income level.

We grouped patients into homogeneous diagnostic and surgical groups using Refined Diagnosis Related Group (RDRG) software,[5] which categorizes patients according to the *International Classification of Diseases* codes (9th revision, clinical modification)[6] entered on the hospital discharge record. The RDRG classification system also subdivides each diagnostic or surgical group into three (medical) or four (surgical) levels according to the presence (or absence) and severity of specific coexisting illnesses or complications expected to increase length of stay.

Patients treated in the region where they resided were categorized as "resident"; all others were categorized as "nonresident." Because hospitals serve patients from various neighbourhoods, and because poorer patients are generally thought to require longer stays in hospital than patients with higher incomes,[7] three measures of patient socioeconomic status were used, as follows:

1. A description of neighbourhood income level developed from public-use tapes from the 1986 Canada census.[8] Urban enumeration areas were ranked from poorest to wealthiest and then grouped into population quintiles, each containing 20% of the population, quintile 1 being the poorest. Because of the wide range of household incomes within the same enumeration area in rural areas, all rural residents were grouped into one category.
2. Classification of patients according to whether or not they resided in the core area of Winnipeg, as this area is known to have high rates of low-income housing, poverty, unemployment and single-parent families.[9]
3. Classification of patients according to whether or not they had Treaty Indian status, as native people are among the most disadvantaged in Canadian society and are disproportionately likely to be treated in the three hospitals serving the core area of Winnipeg.

### Statistical analyses

We analysed the data using both a category-specific approach and an overall approach. The category-specific approach focused on patients in the diagnostic categories frequently encountered at all of the study hospitals (i.e., acute myocardial infarction, bronchitis and asthma, digestive disorders, heart failure and shock, psychoses, simple pneumonia, anal and stomal procedures, inguinal and femoral hernia procedures, major bowel procedures, total cholecystectomy, transurethral prostatectomy, uterine and adnexal procedures for nonmalignant disease, cesarean section, and uncomplicated vaginal deliveries). These categories accounted for 27% of medical admissions, 26% of surgical admissions and 63% of obstetric admissions at the eight hospitals.

Multiple linear regression analyses were conducted within each diagnostic category to estimate what the differences in length of stay would have been had the same patient been treated at each of the hospitals, controlling for the patient characteristics identified as relevant in the study design. To determine the influence of the hospital of admission on length of stay, for each of the 14 selected diagnostic categories we applied two separate regression models, one including all variables (and their significant interactions) except the hospital variable, and one with the hospital variable added. By examining the percentage variation explained by the two models we determined how much additional variation in length of stay could be attributable to the hospital of admission. We evaluated the consistency of hospital rankings across categories using Kendall's coefficient of concordance, a nonparametric test to compare rank orderings.[10] Consistency across 3 years of data was evaluated using Spearman's rank correlation.[11] We also compared our findings for each of the 14 diagnostic categories with those reported for the United States.

Although the category-specific approach highlighted some of the differences between hospitals across selected categories, the second approach, examining all acute admissions together, was necessary for an overall assessment of efficiency. To accomplish this, an RDRG weight was assigned to each acute care admission, reflecting the expected length of stay given the reason for admission and the severity of illness. We calculated RDRG relative weights from information on nonoutlier lengths of stay for a sample of almost 2 million discharge records, primarily for patients aged 65 years or more, using the 1986 US Medpar database.[12] We used the US data because of the greater number of cases available and the fact that they constituted an independent sample. A comparison of the weights based on the US data with RDRG weights calculated on almost 350 000 Manitoba nonoutlier lengths of stay from 1989–90 to 1991–92 showed that, although the US weights were lower than the Manitoba weights because of longer stays in Manitoba (mean weights 0.87 and 1.40 respectively), the correlation of the relative ranking of the two sets of weights (of essence to this analysis) was high (0.87).

For the second (overall) approach we applied two multiple regression models, and for each compared actual and predicted mean lengths of stay (using the RDRG weights to adjust for reason for admission and severity of illness). Both models adjusted for the other patient characteristics discussed earlier. In the first model, predicted stays were calculated on the basis of the proportions of patients with these characteristics treated at each hospital and the stays expected for these patients when the average of all hospitals was used as the standard. The hospital with the lowest ratio of actual to predicted stays, as calculated in the first model, was identified as the most efficient, and the lengths of stay at this hospital were used as the standard for calculating the predicted stays in the second model. The ratios produced using this approach were used to compare overall mean length of stay across hospitals and to estimate the number of days and beds that could be saved if efficiency were increased.

To increase the homogeneity of the patient groups being compared across hospitals we excluded patients with atypically long stays as well as those who died in hospital or were transferred to or from another institution (including hospitals and nursing homes). For the overall analysis the most seriously ill patients (those with major or catastrophic coexisting illnesses or complications) were also excluded. For the category-specific analyses these exclusions accounted for 11.9% of the cases and represented 30.5% of the hospital days. For the overall analysis the corresponding values were 25.4% and 62.1%.

All regressions were conducted using SAS software.[13]

## Results

### Effect of patient characteristics on length of stay

The amount of variation in length of stay before the most seriously ill patients were excluded was 34%. This finding is identical to that of a US study by McMahon and associates,[14] which used laboratory values recorded within 24 hours of admission as well as the worst value recorded combined with DRG to explain variation in length of stay. This similarity suggests that the Manitoba hospitals' coding of diagnoses is thorough enough to support the use of case-mix adjusters that rely on discharge diagnosis and that the RDRG system for adjusting for case severity is comparable to that of a system such as McMahon and colleagues' that requires much more detailed data to be abstracted from a hospital record.

Our adjustment factors appear to have captured well the patient characteristics that influence length of stay. For a representative diagnostic category, total cholecystectomy, the mean length of stay varied markedly across our severity levels, ranging from 5.2 days for patients with no or minor coexisting illnesses or complications to 13.8 days for those with catastrophic coexisting illnesses or complications (Table 1). Older patients had longer stays than younger patients. Contrary to our expectations, residence in the service area did not tend to be associated with shorter lengths of stay; this would seem to be because younger patients are more likely to travel out of their region for care and tend, as just noted, to have shorter stays than older patients. In general, the socioeconomic indicators influenced length of stay in the ex-

pected direction, although for most of the categories the differences were not marked.

### Efficiency in specific categories

The hospital to which a patient was admitted significantly affected length of stay for all of the diagnostic categories studied except simple pneumonia, anal and stomal procedures, and cesarean section. Adjusted mean lengths of stay for all significant categories are given in Table 2. Detailed statistical results (multiple regression coefficients, percentage variation explained and $p$ values) for both models in each diagnostic category are available from the authors on request.

Table 1: Mean length of stay for patients admitted to eight large acute care hospitals in Manitoba in 1991–92 for total cholecystectomy, by patient characteristics

| Characteristic | Mean length of stay (and SD*), d |
|---|---|
| **Coexisting illness or complication†** | |
| None or minor | 5.2 (2.9) |
| Moderate | 6.9 (4.4) |
| Major | 8.7 (5.4) |
| Catastrophic | 13.8 (6.8) |
| **Age, yr** | |
| < 31 | 4.6 (2.4) |
| 31–60 | 5.4 (3.2) |
| > 60 | 8.1 (5.0) |
| **Sex** | |
| Male | 7.0 (4.5) |
| Female | 5.5 (3.5) |
| **Resident in service area** | |
| Yes | 6.0 (4.0) |
| No | 5.7 (3.2) |
| **Winnipeg area of residence** | |
| Core area | 7.2 (4.0) |
| Other | 5.9 (3.8) |
| **Treaty Indian status** | |
| Yes | 6.2 (3.1) |
| No | 5.9 (3.9) |
| **Income level‡** | |
| Urban residents | |
| Quintile 1 | 6.5 (3.9) |
| Quintile 2 | 6.2 (4.4) |
| Quintile 3 | 5.7 (3.8) |
| Quintile 4 | 5.4 (3.3) |
| Quintile 5 | 5.8 (4.4) |
| Rural residents | 5.8 (3.3) |

*SD = standard deviation.
†Measure of severity of illness.[5]
‡See the Methods section for description of how patients were separated into income levels. For urban patients those in quintile 1 are the poorest and those in quintile 5 the wealthiest. All rural residents were grouped into one income category.

Acute myocardial infarction was the medical diagnosis for which the length of stay was most influenced by the hospital of admission: on average, patients with similar characteristics stayed as few as 9.6 days in one hospital and as many as 13.5 days in another. Among the surgical categories the length of stay for inguinal and femoral hernia procedures was most affected by the hospital of admission, the adjusted mean length of stay ranging from 2.6 to 4.4 days.

Although there was a trend toward overall consistency of hospital ranking across diagnostic categories, sometimes the same hospital had a relatively long stay for one category and a short stay for another. For example, hospital C had the second shortest mean stay for acute myocardial infarction and the longest mean stay for bronchitis and asthma (Table 2).

Hospitals whose patients had the longest stays for a particular diagnosis in one year tended to be those whose patients had long stays in subsequent years. Rank correlations of pairs of 3 years of data were generally high (1989–90 with 1990–91, range −0.17 to 0.95, median 0.80; 1990–91 with 1991–92, range 0.50 to 0.89, median 0.70).

### Overall efficiency and potential savings

We assessed the relative efficiency of the eight hospitals after adjusting for the types of patients treated. Two standards were used: each hospital's overall performance was compared with the average of all eight hospitals and then with that of the most efficient hospital overall (hospital H). Hospital A was 16% less efficient than the average hospital, or, to state this somewhat differently, required on average 25% more days than the most efficient hospital to treat patients with similar characteristics (Fig. 1). (The actual and predicted mean lengths of stay based on the regression equations from which Fig. 1 was derived are available from the authors.)

Using the overall estimates of hospital efficiency we calculated the number of hospital days and beds that could potentially be saved if each hospital achieved the same lengths of stay as hospital H. This was a conservative calculation that excluded not only the patients with the longest stays but also the most seriously ill patients. We first estimated the number of days that could be saved by multiplying the inefficiency rates shown in Fig.

**Table 2: Adjusted mean length of stay (and 95% confidence interval [CI]) at each hospital, by diagnostic category**

| Diagnostic category | Hospital; mean length of stay (and 95%CI), d | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H |
| **Medical** | | | | | | | | |
| Acute myocardial infarction | 12.9 (11.9–13.9) | 13.5 (12.5–14.4) | 9.6 (8.8–10.4) | 11.0 (10.2–11.8) | 10.9 (9.8–12.1) | 10.5 (9.8–11.2) | 9.6 (8.7–10.6) | 10.5 (9.5–11.6) |
| Bronchitis or asthma | 3.2 (2.5–4.0) | 3.2 (2.4–3.9) | 4.4 (4.0–4.8) | 3.0 (2.4–3.6) | 4.4 (4.0–4.7) | 4.0 (3.2–4.8) | 4.1 (3.8–4.3) | 3.8 (2.9–4.8) |
| Digestive disorder | 5.1 (4.5–5.8) | 3.9 (3.1–4.7) | 4.1 (3.6–4.6) | 3.7 (3.1–4.3) | 4.6 (4.1–5.1) | 4.3 (3.4–5.1) | 4.8 (4.4–5.2) | 4.3 (3.4–5.2) |
| Heart failure and shock | 12.9 (10.1–15.7) | 10.8 (9.1–12.6) | 10.8 (9.7–12.0) | 9.2 (7.8–10.6) | 10.7 (8.9–12.4) | 9.4 (8.0–10.8) | 9.5 (8.0–11.0) | 7.8 (6.3–9.3) |
| Psychosis | 22.3 (19.2–25.3) | 22.1 (18.7–25.5) | 25.3 (22.8–27.7) | 29.7 (27.2–32.3) | –† (26.5–33.8) | 30.1 (23.7–27.3) | 25.5 | –† |
| **Surgical** | | | | | | | | |
| Inguinal or femoral hernia procedure | 4.4 (4.1–4.6) | 2.8 (2.6–3.0) | 3.2 (2.9–3.5) | 3.6 (3.4–3.8) | 2.6 (2.3–3.0) | 4.1 (3.9–4.3) | 4.0 (3.7–4.4) | 3.2 (3.0–3.5) |
| Major bowel procedure | 19.4 (17.7–21.1) | 14.0 (12.3–15.8) | 15.6 (14.4–16.7) | 15.5 (14.1–17.0) | 15.0 (13.2–16.8) | 18.6 (16.2–21.0) | 15.4 (14.0–16.7) | 13.6 (11.5–15.7) |
| Total cholecystectomy | 6.4 (6.0–6.9) | 5.2 (4.9–5.6) | 5.4 (4.9–5.8) | 7.3 (6.8–7.8) | 5.1 (4.6–5.6) | 7.1 (6.6–7.5) | 5.2 (4.7–5.6) | 4.5 (4.1–4.9) |
| Transurethral prostatectomy | 6.6 (6.2–7.1) | 6.1 (5.5–6.6) | 7.9 (7.4–8.5) | 6.2 (5.4–7.0) | 7.9 (7.3–8.5) | 7.3 (6.7–7.8) | 5.7 (5.0–6.3) | 7.3 (6.7–8.0) |
| Uterine or adnexal procedure for nonmalignant disease | 8.0 (7.8–8.3) | 6.3 (6.0–6.6) | 6.2 (6.0–6.4) | 6.1 (5.9–6.4) | 7.2 (6.9–7.5) | 6.0 (5.6–6.4) | 6.4 (6.3–6.6) | 6.6 (6.2–7.0) |
| **Obstetric** | | | | | | | | |
| Uncomplicated vaginal delivery | 3.6 (3.5–3.7) | 3.0 (3.0–3.1) | 3.1 (3.0–3.1) | 3.3 (3.2–3.4) | 3.5 (3.4–3.6) | –† (2.9–3.0) | 2.9 | –† |

*Simple pneumonia, anal and stomal procedures, and cesarean section were excluded because lengths of stay for these categories were not significantly affected by the hospital of admission.
†Fewer than 50 cases in total.

1 by the actual number of days used for the included patients for each of the hospitals. The total number of days that could potentially be saved was 54 186 (range 0 to 12 440 days for any given hospital). We then used each hospital's occupancy rates to calculate the number of beds that could be saved given improved efficiency. The estimated total number of beds that could potentially be saved was 186 (range 0 to 41 for any given hospital).

Alternative estimates of potential beds saved based on the 14 diagnostic categories studied and all analyses were repeated with the previous year's data. Although the estimates of savings differed, all approaches found significant inefficiencies across the system.[15]

### Comparison with US data

We used 1989 data from a representative sample of 233 393 US discharges[16] to compare length of stay in Manitoba hospitals with that in US hospitals. American patients in the same 14 diagnostic categories were selected. Both the US and the Manitoba data were adjusted for age and for severity of illness (the two factors that had the biggest effect on length of stay in our study). (To ensure that differences in the number of diagnoses coded in the two data sets did not affect the assignment of severity levels[17] we regrouped the Manitoba data using only the first seven diagnoses and the first four procedures [the number of codes allowed in the US hospital dataset]. This regrouping changed the severity level assignment in only 0.5% of the cases.) Only US hospitals with 200 beds or more were included; patients who were transferred, died, or stayed in hospital longer than 60 days were excluded from both samples. In most cases the mean length of stay in US hospitals for a given category was shorter than the shortest mean length of stay in the Manitoba hospitals, which suggests that an even greater saving of hospital days and beds could be achieved in Manitoba if US means were used as the standard.

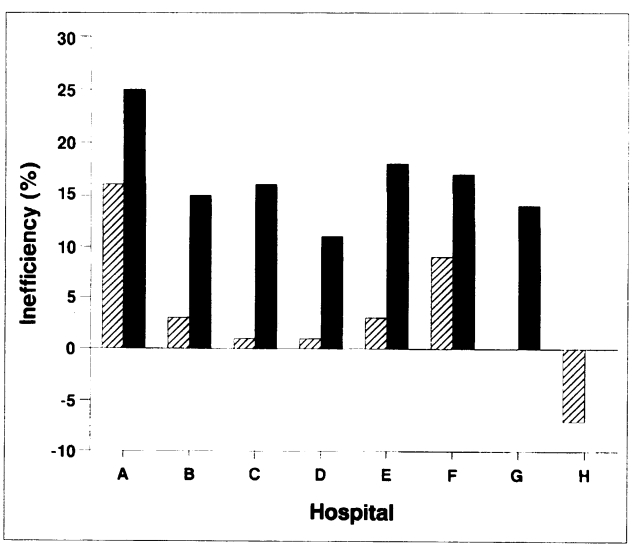


**Fig. 1: Overall inefficiency rates of the eight major acute care hospitals in Manitoba in relation to the average of the eight hospitals (striped bar) and to the most efficient hospital (black bar).**

## Discussion

Manitoba hospitals were found to differ markedly in the lengths of stay for patients with similar characteristics. Since the hospitals generally have quite similar access to home care services, those operating more efficiently are unlikely to have extra resources. Because the more efficient hospitals tended to show consistent patterns over a 3-year period, the observed patterns are likely to be real, not random variations that change from year to year.

Even though some of the hospitals tended to be more efficient than others, most of the efficient hospitals had inefficient discharge practices in some diagnostic areas; conversely, even the less efficient hospitals showed some areas of remarkable efficiency.

In comparing discharge patterns across hospitals, adjusting for the type and severity of illness and for the age and sex of the patient is clearly important. One indication that our adjustments for these differences worked reasonably well is that the hospitals with the longest stays were not consistently the tertiary care teaching hospitals. Longer stays, therefore, do not necessarily reflect patient needs but, more likely, reflect physicians' decisions or administrative inefficiencies.

Would reductions in length of stay compromise patient outcomes? Studies conducted in the United States do not indicate that hospitals with shorter stays have more adverse outcomes[2,3] or that decreases in length of stay over time are related to increased readmission[18] or mortality[19] rates. Preliminary Manitoba analyses suggest that patients discharged from hospitals with shorter stays are not readmitted more frequently than those discharged from hospitals with longer stays (M.L. Harrison, L.A. Graff, N.P. Roos and M.D. Brownell, Faculty of Medicine, University of Manitoba, Winnipeg: unpublished observations, 1994).

Our Manitoba–United States comparisons showed that for most diagnostic categories the US average length of stay was shorter than that at the most efficient Manitoba hospital. These results strongly suggest that more efficient discharge patterns should be achievable in Manitoba hospitals without compromising patient care. We are, of course, not the first to observe that patients in Canadian hospitals have longer stays than patients in US hospitals.[20] Shorter stays in US hospitals may be due in part to tighter control of use; however, caution must be exercised when emulating the US hospital system,

which is the most costly health care system in the world.[21,22] Admissions to California hospitals, for example, are estimated to cost approximately 46% more than admissions to Ontario hospitals.[23] Currently in the United States, millions of dollars are spent on utilization management to control costs and improve efficiency by means of case-by-case prospective payment and monitoring systems. In contrast, Manitoba, like the rest of Canada,[24] has controlled hospital costs not by "micromanaging" every decision made by physicians but, rather, by restricting capacity (the number of beds) and controlling global budgets, leaving the responsibility for increasing efficiency to each hospital.

Our analyses were intentionally conservative, excluding the most ill and fragile patients from all assessments of efficiency and all calculations of days or beds that could potentially be saved. Our intent was not to insist that a certain length of stay for a particular diagnostic category could be achieved by all hospitals or that a certain number of beds could be closed at a particular hospital but, rather, to identify the potential for improving acute care hospital efficiency overall. The hospital system appears to have the capacity to handle more patients, or to absorb a sizeable number of bed closures, without rationing access to acute hospital care.

In 1991–92 a 136-bed hospital in Winnipeg received net payments of $21.4 million, whereas a 246-bed hospital received $35.8 million,[25] with at least half of these budgets being devoted to inpatient care. Although the marginal costs of operating beds are less than the average costs, the potential dollar savings associated with closing up to 186 beds are clearly substantial. To realize major savings, more efficient discharge practices have to be accompanied by management efforts to trim overhead and administrative costs.

Evidence of interinstitutional differences in efficiency elsewhere in Canada[26] suggests that our approach is germane to other provinces. Hospitals and governments have tended to assume that every bed closed should be *replaced* by another type of service — possibly a less intensive and less expensive one. Our findings suggest that at least some bed closures could be accommodated without the replacement of service simply through more efficient treatment of patients in the remaining beds. However, bed closures alone do not necessarily guarantee improved efficiency. Incentives need to be built into the system to reward hospitals for more efficient discharge practices.

Achieving efficiency is clearly not an easy task. It requires the cooperation of physicians, hospital administrators and other staff. Nevertheless, governments have a fundamental responsibility to the public to ensure that the appropriate number of beds are available and that they are used to the best advantage.

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23. Redelmeier DA, Fuchs VR: Hospital expenditures in the United States and Canada. *N Engl J Med* 1993; 328: 772–778
24. Barer ML, Evans RG: The meeting of the twain: managing health care capital, capacity, and costs in Canada. In Gelijins AC (ed): *Technology and Health Care in an Era of Limits*, National Academy Press, Washington, 1992: 97–119
25. *Annual Report*, Manitoba Health Services Commission, Winnipeg, 1991–92
26. BC Royal Commission on Health Care and Costs: *Closer to Home: the Report of the BC Royal Commission on Health Care and Costs*, Crown, Victoria, 1991: 131–151

**May 1–3, 1995: Prairie Connections — Infection Control '95**
Winnipeg
*Keynote speaker: Margaret A. Worsley*
Mrs. Gerry Hansen, conference planner, Community and Hospital Infection Control Association–Canada, PO Box 46125 RPO Westdale, Winnipeg MB R3R 3S3; tel 204 895-0595, fax 204 895-9595

**May 3–6, 1995: North American Society of Pacing and Electrophysiology 16th Annual Scientific Sessions**
Boston
North American Society of Pacing and Electrophysiology, Natick Executive Park, 2 Vision Dr., Natick MA 01760-2059; tel 508 647-0100, fax 508 647-0124

**May 6–8, 1995: Catholic Health Association of Canada Annual Convention: Community — a Core Value**
Quebec City
Catholic Health Association of Canada, 1247 Kilborn Pl., Ottawa ON K1H 6K9; tel 613 731-7148, fax 613 731-7797

**Du 6 au 8 mai 1995 : Congrès annuel de l'Association catholique canadienne de la santé : L'esprit communautaire — une valeur essentielle**
Québec
Association catholique canadienne de la santé, 1247, pl. Kilborn, Ottawa ON K1H 6K9; tél 613 731-7148, fax 613 731-7797

**May 4–9, 1995: Federation of Canadian Societies of Clinical Hypnosis 4th National Assembly–Frontiers of Hypnosis**
Banff, Alta.
Kari Richardson, Banff Centres for Conferences, PO Box 1020, Station 11, Banff AB T0L 0C0; tel 403 762-6234, fax 403 762-6388

**May 6–10, 1995: 28th Annual Spring Conference**
New Orleans
Program Department, Society of Teachers of Family Medicine, PO Box 8729, Kansas City MO 64114; tel 800 274-2237, 816 333-9700, ext 4510

**May 11–13, 1995: 13th Annual Conference of the Canadian Society of Diagnostic Medical Sonographers**
Victoria
*Keynote speakers: Drs. David Sahn, Catherine Otto and David Nyberg*
Christine Dyck, registrar; tel 604 595-9272, 604 383-6366, fax 604 595-9594

**May 11–14, 1995: American Association for the History of Medicine 68th Annual Meeting (in conjunction with meetings of other history of medicine and health care societies)**
Pittsburgh
Dr. Jonathon Erlen, 123 Northview Dr., Pittsburgh PA 15209

**May 12–14, 1995: General Practice Psychotherapy Association (Canada) 8th Annual Educational Conference**
Mississauga, Ont.
Greg Dubord, First Canadian Medical Centre, First Canadian Place, PO Box 225, Toronto ON M5X 1C8; tel 416 368-6787, fax 416 203-6585

**May 14–16, 1995: Canadian Life Insurance Medical Officers Association 50th Annual Meeting**
Regina
Darlene, Crown Life Insurance Co., 1901 Scarth St. E, Regina SK S4P 3B1; tel 306 751-6044

**May 17–20, 1995: Society for Obstetric Anesthesia and Perinatology 27th Annual Meeting**
Montreal
Society for Obstetric Anesthesia and Perinatology, PO Box 11086, Richmond VA 23230-1086; tel 804 282-5051, fax 804 282-0090

**May 18–19, 1995: The Centre for Health Economics and Policy Analysis 8th Annual Health Policy Conference — Jurisdictional Roles in Health Policy: Who's on First and What's Up Next?**
Toronto
Doris Hutchinson, Centre for Health Economics and Policy Analysis, Department of Clinical Epidemiology and Biostatistics, McMaster University, 1200 Main St. W, Hamilton ON L8N 3Z5; tel 905 525-9140, ext 22135; fax 905 546-5211

**May 27, 1995: Canadian Fertility and Andrology Symposium: Sexuality, Fertility and Menopause (copresented by the Canadian Fertility and Andrology Society)**
Niagara-on-the-Lake, Ont.
Continuing Education, Faculty of Medicine, Rm. H121, Health Sciences, University of Western Ontario, London ON N6A 5C1; tel 519 661-2074, fax 519 661-3797


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