

Patients Hospitalized for Medical Conditions in Winnipeg, Canada: Appropriateness and Level of Care

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Abstract

A medical record review of patients hospitalized for medical conditions in Winnipeg, Canada during 1998/99 was completed using InterQual utilization review instruments. On admission, 95% of patients required the services provided in an acute care facility. Fifty-eight percent of days in hospital following the day of admission required an acute care setting, and 42% required an alternate level of care. Our results suggest there is room for treating more acute patients within the existing system.

Résumé

Les dossiers des patients hospitalisés pour des raisons médicales en 1998-1999 ont été analysés au moyen des instruments d'examen de l'usage dits InterQual. À leur entrée à l'hôpital, 95 p. 100 des patients avaient besoin des services fournis par un établissement de soins actifs. Par ailleurs, 58 p. 100 des journées d'hospitalisation après l'entrée en établissement exigeaient un milieu de prestation de soins actifs et 42 p. 100 exigeaient un niveau de soins autre. Ces conclusions laissent entendre que la disponibilité au sein du régime actuel est telle qu'il serait possible de soigner un plus grand nombre de patients ayant besoin de soins actifs.

Introduction

In 1992, Manitoba Health, consistent with governments across Canada, began downsizing the acute hospital sector. Following the first set of bed closures, a utilization review of acute care medical beds in a sample of Manitoba hospitals was conducted.¹ Despite the closures which had occurred to that date, only 55.5% of adult medical admissions to urban acute care hospitals and 36% of days in hospital after the day of admission were assessed as acute. Thus, a large proportion of days were spent by patients whose care needs could have been more appropriately met in some alternate setting.

From 1993/94 through 1998/99, the bed supply in Winnipeg hospitals and the days of hospital care used by Winnipeg residents decreased by approximately 12% and 5%, respectively. Given the changes in bed supply and hospital practices that occurred over this time period (i.e., shortening lengths of stay and increases in outpatient surgery), we were interested in once again determining the acuity level of patients hospitalized for medical conditions at Winnipeg acute care hospitals during the 1998/99 fiscal year. We identified the proportion of medical admissions and subsequent days of stay in hospital that met standard criteria indicating an acute care hospital was required. We then determined the level of care required by patients who did not require an acute care setting.

Methods

Winnipeg, the largest urban centre in the province of Manitoba, has six acute care hospitals, two of which are tertiary teaching centres and four are community hospitals. In 1998/99, the number of designated acute medical beds ranged from 60 to 155 at these six hospitals. The sample for this study consisted of adult patients who were hospitalized for medical conditions on acute care medical wards at one of these six acute care hospitals during the 1998/99 fiscal year. Medical patients were defined according to primary service codes, which refer to the hospital services under which the patient was treated for the greatest length of time. The following services were included: family medicine, internal medicine, allergy, cardiology, dermatology, endocrinology, gastroenterology, nephrology, neurology, respirology, rheumatology, oncology, and haematology.

At least 150 medical records were randomly selected from each of the six acute care hospitals, for a total sample of 907. With 150 records per site, we were able to detect a 6% difference in the level of acuity between the tertiary and community hospitals with 95% confidence and 80% power.² A 6% difference

between hospital types provided a moderate effect size and proved financially feasible in terms of total numbers of medical records required for abstraction.

The samples were generated from the Population Health Research Data Repository which contains anonymized records of all interactions with the provincial healthcare system. Files used include the administrative hospital file, which contains dates of admission and separation (i.e., discharge, transfer or death), and up to 16 diagnoses and 12 procedures, the Manitoba Health insurance registry, and public access census files. The reliability and validity of the Repository data have been extensively established.^{3,4,5}

The InterQual ISD Utilization Review Instrument

InterQual's 1999 ISD Clinical Decision Support Criteria were used to assess the appropriateness of admission, continued stay in hospital and discharge. These criteria have been used in previous Canadian studies,^{1,6,7,8,9,10} and have been externally validated.^{11,12} Two Level of Care criteria sets were used for this study: ISD-AC®, Acute Care® and ISD-SAC®, Subacute Care.™ In this paper, the proportions of admissions and days assessed as acute and subacute were combined to reflect total acuity, but are presented separately in graphs and tables, to distinguish these different types of care requirements in Winnipeg hospitals.

The 1999 versions of the InterQual™ ISD Acute and Subacute criteria underwent thorough review by a Working Group comprising Winnipeg Regional Health Authority (WRHA) medical and nursing staff to assess their applicability to the Winnipeg practice setting. The Working Group also developed a set of "Alternate Level of Care Criteria" specific to the Winnipeg practice environment, which were assigned when a patient did not meet the acute, subacute or observation InterQual criteria sets. A list of the Alternate Levels of Care and accompanying criteria for acceptance to each level is available on request.

Data Collection

Three data abstractors (two registered nurses and a physician) completed the medical record reviews between April and September 2000. Abstractors recorded patients' medical record numbers, dates of admission and separation, dates of birth, hospital ward for each

day of stay, living arrangements prior to admission and the services patients received on each day of hospitalization.† Patient names and addresses were not recorded.

Admission was defined as the first 24 hours of the hospitalization. Abstractors applied the criteria sets in the following order: acute, subacute, and observation. If the patient met the acute, subacute, or observation Severity of Illness (SI) and Intensity of Service (IS) criteria, the abstractors recorded the exact indicators under which they qualified and proceeded to assess the subsequent days in hospital. However, if the patient failed to meet the acute, subacute, or observation criteria, an Alternate Level of Care was assigned for the day.

Each day after the day of admission was termed a "subsequent day", and was assessed until the patient no longer met the acute, subacute, or observation criteria. If upon failing to meet the above criteria, the patient was stable enough for discharge, an ALC was assigned. Further review of the record was completed to determine if the patient had an acute exacerbation; however, if none occurred no further abstraction of data was completed and all remaining days in hospital were considered non-acute. Importantly, if a patient failed to meet the acute, subacute or observation criteria but was also too unstable for discharge, the day was assessed as an appropriate acute/subacute day.

Data Analysis and Reliability Assessment

Analyses were completed on the SAS system. Proportions of patients were derived in each level of care category. Chi-square tests were used to assess differences in acuity between tertiary and community hospitals. Inter-rater reliability tests were completed on each abstractor's records, from two to three times. Reliability was evaluated on two measures: (1) crude agreement and (2) Cohen's kappa coefficient, a measure of agreement that corrects for chance.² Reliability was assessed by comparing reviews completed by each abstractor against the principal investigator (SB). Reliability tests were first conducted during the first two weeks of the project. The initial levels of crude agreement ranged from 40-90%. The records for which the level of crude agreement was less than 85% were re-abstracted. The levels of crude agreement between the project coordinator and the abstractors on subsequent evaluations ranged from 90-95%. Cohen's kappa coefficient ranged from 0.70-0.81, representing good to very good agreement beyond chance.

Results

The average age for patients in the sample was 67.1 years. The sample consisted of equal proportions of

* Patients assessed as requiring care at the subacute level are appropriately receiving that care in Winnipeg acute care hospitals.

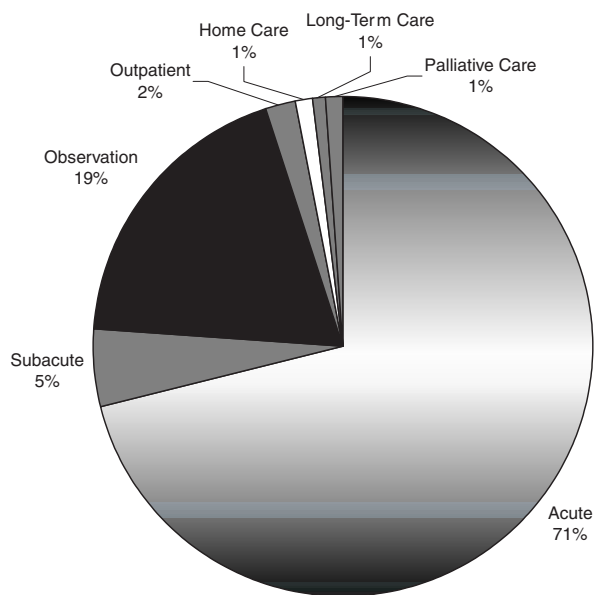
† Admission was defined as the first 24 hours from presentation to hospital, regardless of whether the patient received an admission order that day. Because some patients received care in hospital for greater than 24 hours before they were formally admitted, we created artificial admission dates corresponding to the date of presentation to hospital and initiation of hospital services.

males and females. The average length of stay was 13.9 days (range 1-500 days). Ninety percent of patients had a length of stay of 30 days or less (short stay), and 10% had a length of stay of longer than 30 days (long-stay). Almost 60% of the sample reported living with a spouse or family member prior to the hospitalization, 32% lived alone and 6% lived in a care facility. Our sample was representative of all medical hospitalizations at the six acute care hospitals for the 1998/99 fiscal year on the following variables: age, sex, length of stay, and proportion of short and long-stays.

Level of Care Required on Admission and for Subsequent Days

The level of care required on the day of admission for all six acute care hospitals is presented in Figure 1. Total acuity on admission was 76% (71% acute; 5% subacute). A further 19% of admissions were assessed as requiring observation-level services, and were therefore considered appropriate admissions.[‡] Five percent (5%) of admissions were non-acute and assessed as requiring an Alternate Level of Care (ALC).

Figure 1: Level of Care on Admission - All Hospitals, Winnipeg, 1998/99



The proportion and number of patients who were assessed as acute, subacute, observation and non-acute (i.e., those requiring an alternate level of care) on the day of admission is provided by hospital type in Table 1.

Total acuity on the day of admission for medical patients at Winnipeg acute care teaching hospitals was

Table 1: Level of Care Required on Day of Admission by Hospital Type, Winnipeg, 1998/99

LEVEL OF CARE	CATEGORY	ADMISSION (N)		SUBSEQUENT DAYS (N)	
		Tertiary	Community	Tertiary	Community
Total Acute	Total	87% (267)	70% (423)	60%(2658)	51% (4203)
	Acute	80% (246)	66% (399)	37% (1643)	31%(2579)
	Subacute	7% (21)	4% (24)	23% (1015)	20% (1624)
Observation	Total	11% (33)	23% (136)	3% (137)	3% (214)
Alternate Level of Care	Total	2% (7)	7% (41)	37%(1609)	46%(3760)
	Long-Term	•	2% (10)	22% (983)	31% (2566)
	Home Care	•	1.5% (9)	4% (179)	6% (488)
	Outpatient	•	2% (14)	3% (147)	3% (213)
	Palliative Care	•	•	5% (206)	2% (200)
	Other	•	•	3% (94)	4% (293)

Data are not reported when fewer than 5 cases are represented per category.

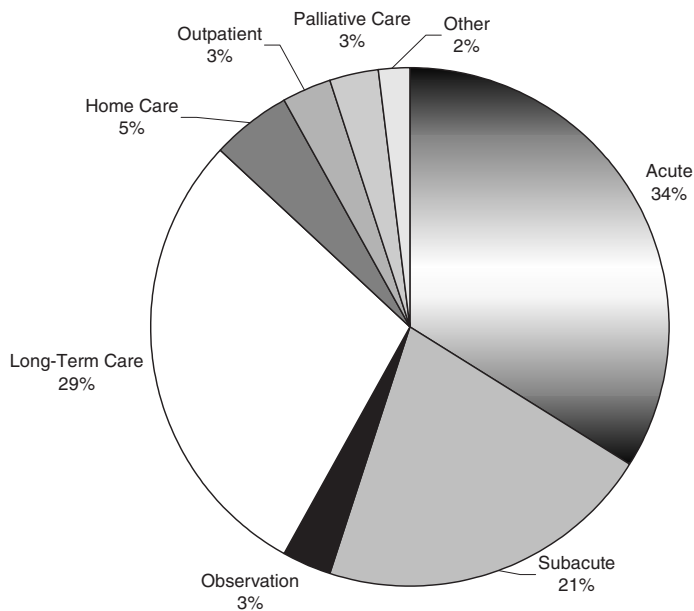
significantly greater than at community hospitals ($\chi^2=30.68$, $p<.001$). The range of total acuity at the teaching hospitals was 85 to 89%, while at the community hospitals the range was from 55 to 87%. However, because admissions of patients who required observation-level services are considered appropriate, the total proportion of appropriate admission for medical patients was 98% for the teaching hospitals and 93% for the community hospitals (not significantly different).

The level of care required for subsequent days of stay in hospital (i.e., all days after the day of admission) for all six hospitals is presented in Figure 2. The total acuity for subsequent days was 55% (34% acute; 21% subacute). Three percent (3%) of subsequent days required care at the observation-level, while 42% of subsequent days spent in hospital by medical patients in 1998/99 were non-acute and assessed as requiring an Alternate Level of Care (ALC). Twenty-nine percent (29%) of subsequent days were assessed as requiring services provided in a long-term care facility [i.e., nursing home (14%), chronic care (8%) or rehabilitation 7%)], 5% required home care services, and 3% of days were assigned to each of outpatient services and palliative care.

The level of care required by medical patients for subsequent days in hospital is provided by hospital type in Table 1. Total acuity at teaching hospitals was

[‡] The care provided at the observation level (i.e., reassessments, short-term treatment and diagnostic testing) is a component of the acute care system in Winnipeg hospitals.

Figure 2: Level of Care for All Subsequent Days - All Hospitals, Winnipeg, 1998/99



significantly higher than at community hospitals ($\chi^2=105.8$, $df=2$, $p<.001$), however, even at the teaching hospitals approximately 40% of days spent on acute care medical wards were non-acute, and could have been better spent in some alternate care setting.

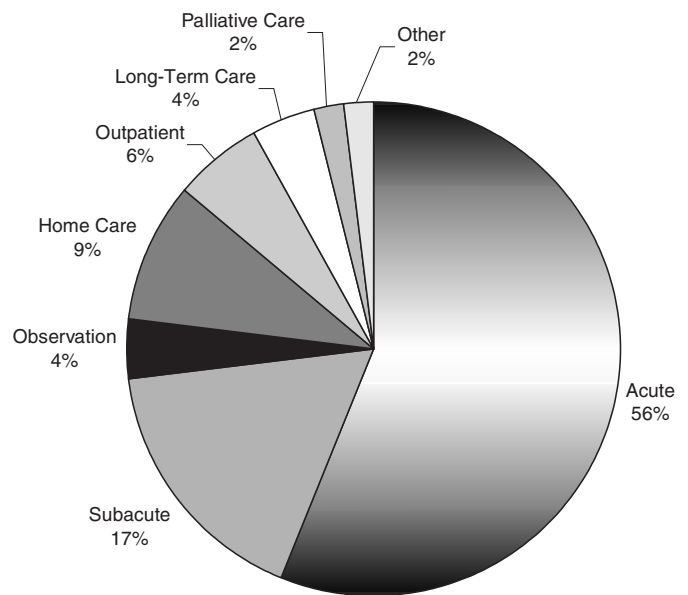
Total Acuity by Length of Stay

As the total acuity for subsequent days was substantially less than on the day of admission, we undertook analyses to determine how the level of acuity changed over time. Included in the analysis were those individuals who were assessed as either acute or subacute on the day of admission ($n=693$). Total acuity dropped steadily from day 1 through day 30. By day 12, 195 patients of the original 693 patients remained in hospital and 70% (137) were assessed as either acute or subacute. By day 20, 111 patients remained in hospital and only 60% (67) were assessed as either acute or subacute. By day 24 the level of acuity reached a plateau, and from that point onward about half of the remaining patients could have been cared for in an alternate setting.

Subsequent Days of Care: Short-Stay Cases

Short-stay hospitalizations (i.e., hospitalizations of 30 days and less) accounted for 90% of 1998/99 medical separations across the six acute care facilities and 45% of total days used by medical patients. We undertook analysis on the level of acuity on subsequent days for short stay cases to determine how they were being managed.

Figure 3: Level of Care on Subsequent Days for Short-Stay Patients -All Hospitals, Winnipeg, 1998/99



The level of care required for subsequent days associated with short-stay hospitalizations for all six hospitals is presented in Figure 3. The total acuity for subsequent days was 73% (56% acute; 17% subacute). Four per cent of subsequent days required services provided in an observation unit, and 23% of subsequent days were non-acute and required an Alternate Level of Care. Of the days assigned an ALC, 9% were assessed as requiring services provided by home care, 6% required an outpatient setting, 4% required the services provided in a long-term care facility [i.e., nursing home (2%), and rehabilitation (2%)], and 2% of days were assigned to palliative care.

Discussion

Total acuity for patients on the day of admission across all six hospitals was 76%. This level of acuity on admission is quite high compared to earlier reviews in Canada for which acuity on admission ranged from 25-50%,^{1,6,7,8} but is similar to the estimates reported by an Ontario study group for medical admissions to Ontario hospitals in 1997.⁹ In this study, total acuity on admission was significantly greater at teaching hospitals than at the community hospitals. Further research demonstrated that differences in hospital admitting practices contributed to this finding. Community hospitals were more likely than teaching hospitals to write an admit order after the patient spent 24 hours in hospital; hence the community hospitals tended to have a higher proportion of patients assessed as requiring

observation-level services on the day of admission.¹³ Therefore, when patients assessed as requiring observation-level care are considered, 95% of medical admissions to Winnipeg acute care hospitals in 1998/99 were appropriate and no significant differences were found between teaching and community hospitals. Thus, Winnipeg acute care hospitals are effectively identifying those patients who require hospitalization on the day of presentation to hospital.

Total acuity was not as high for subsequent days in hospital. Only 55% of days spent on acute care medical wards were assessed as either acute or subacute, while 42% of days were non-acute. Although the level of acuity for subsequent days in hospital was significantly higher at teaching compared to community hospitals, almost 40% of days spent on acute care medical wards in the teaching hospitals were assessed as non-acute. The largest proportion of these non-acute days in Winnipeg acute care hospitals in 1998/99 were assessed as requiring some type of long-term care facility, and long-stay patients were responsible for the majority of these days. For short-stay patients, almost one-quarter of days spent on acute care medical wards were non-acute and the majority of these non-acute days were spent awaiting home care services to be arranged and diagnostic testing such as bronchoscopy, colonoscopy, angiogram and biopsies.

Conclusions

Given recent discussions and media reports in Canada about bed shortages, waiting lists, and emergency department diversions, the results of this study suggest that there is room for treating more acute patients within the existing system. So, how can we use existing resources more effectively? Ongoing evaluation of current practice is a step towards that goal. We found that by approximately the 12th day in hospital, 30% of patients no longer required the services of an acute care setting, and the proportion increased to 40% by the 20th day. Systematic utilization management in the form of standardized care plans and/or concurrent utilization review can facilitate discharge planning through timely identification of patients who are ready for transfer or discharge.

Improved coordination of services that intersect with the acute care system must also be realized. For example, we found that 40% of the non-acute days spent in hospital by short-stay patients were spent awaiting home care services to be arranged. A review of existing practices related to arranging home care services should be undertaken to determine if adjustments can be made to facilitate the discharge of non-acute patients who can be cared for in their homes.

We also found that 25% of non-acute days spent in hospital by short-stay patients were spent awaiting diagnostic testing. Under the current system of diagnostic services, the length of time spent waiting for diagnostic testing is significantly shorter for patients in hospital than for outpatients. Therefore, there is no incentive to discharge patients and have them wait for tests as an outpatient. The current practice of managing waiting lists for diagnostic testing should be reviewed so that there no longer remains a disincentive to discharge non-acute stable patients.

In Winnipeg we found that there is capacity within the existing acute care system to effectively manage the care of acute care medical patients. Increased efforts at systematic utilization management coupled with increased efficiencies in discharge management, has the potential to significantly reduce non-acute days spent in Winnipeg acute care hospitals.

Acknowledgements

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