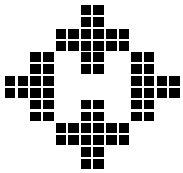
Acuity of Patients Hospitalized for Medical Conditions at Winnipeg Acute Care Hospitals

June 2001



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We thank the University of Manitoba, Faculty of Medicine, Health Research Ethics Board for their review of this project. The Manitoba Centre for Health Policy and Evaluation complies with all legislative acts and regulations governing the protection and use of sensitive information. We implement strict policies and procedures to protect the privacy and security of anonymized data used to produce this report and we keep the provincial Health Information Privacy Committee informed of all work undertaken for Manitoba Health.

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EXECUTIVE SUMMARY

The focus of this study was on assessing the acuity level of adult medical patients who received care on medical wards at Winnipeg acute care hospitals in 1998/99. The objectives of the study were to:

- Identify the proportion of medical admissions and days in hospital that met standard criteria indicating an acute care hospital was required;
- Determine the alternate level of care required by patients who did not require an acute care setting;
- Identify and examine factors which contributed to long-stays in hospital; and
- Assess the level of acuity in Winnipeg hospitals during the week of January 2-8, 1999, a high-pressure period when the numbers of patients with influenza-like illnesses increased dramatically.

The project was completed collaboratively between the Manitoba Centre for Health Policy and Evaluation (MCHPE) and the Winnipeg Regional Health Authority (WRHA) as part of MCHPE's contract with Manitoba Health. A WRHA Working Group was established early in the project. The Working Group participated in all stages of the study including design, evaluation of the utilization review tool, creation of the "Alternate Level of Care Criteria", interpretation of the findings, and review of this report.

Methods

Samples

The primary sample for this study consisted of adult medical patients who received care at and were discharged from one of the six Winnipeg acute care hospitals in 1998/99. Medical patients were defined according to hospital service codes, which are categories of medical practice specialties. A total of 150 records were randomly selected from, and reviewed at, each of the six acute care hospitals, for a total sample of 900 records. Within this sample, 75 records of patients with stays of longer than 30 days were randomly selected for in-depth review of the factors relating to the long-stays in hospital.

A second random sample was selected to assess patient acuity during a peak flu period. This sample included 75 patients who were admitted to hospital during the week of January 2-8, 1999, and an additional 75 patients who were in hospital during this week. The length of stay for this sample was restricted to 30 days.

Selection of a Utilization Review Instrument

The 1999 versions of the InterQual™ ISD Acute Care and Subacute Care Clinical Decision Support Criteria were used to assess the appropriateness of admission, continued stay in hospital, and discharge. The acute care criteria are designed to assess appropriateness of admission to and continued stay in an acute care setting. The subacute criteria are for patients who require a slower paced recovery and may be at risk for an acute exacerbation. While in some jurisdictions the subacute level of care may be provided in a facility that is structurally distinct from an acute care facility, this is not the case in Winnipeg; subacute care is appropriately delivered in Winnipeg acute care hospitals. These criteria underwent thorough review by the physician and medical nursing members of the WRHA Working Group, and three practising physicians not on the Working Group, to assess their applicability to the Winnipeg practice setting. The criteria were assessed to be relevant to the local practice setting.

The Working Group also developed a set of "Alternate Level of Care Criteria" specific to the Winnipeg health care environment (Appendix 2). The members of the Working Group who developed these criteria represented the following WRHA areas: medicine program, Personal Care Home program, and the home care program.

Review Process

Three abstractors were hired by the WRHA to review medical records at each of the six Winnipeg acute care hospitals. Abstractors reviewed the day of admission to hospital and all subsequent days of stay in hospital, until a patient was no longer assessed as requiring the services of an acute care setting. An alternate level of care was assigned to any remaining days in hospital after a patient was assessed as no longer requiring the services of an acute care setting.

Results

Admission

- Seventy-six per cent (76%) of medical patients admitted to Winnipeg acute care hospitals in 1998/99 were assessed as acute (Total acuity of 76% = 71% acute; 5% subacute).
- Nineteen per cent (19%) of medical patients were assessed as requiring the services provided in an observation unit on the day of admission.
- Five per cent (5%) of medical patients were assessed as requiring some alternate level of care on the day of admission. Specifically, the care needs of 2% of admitted patients could have been met in the outpatient setting; 1% of admitted patients required home care services; an additional 1% of admitted patients required the services of a long-term care facility; and the final 1% of admitted patients required palliative care services, provided in hospital or a hospice setting.
- Total acuity on the day of admission to hospital in 1998/99 ranged from 89% at the Health Sciences Centre to 55% at the Grace Hospital. In general, the level of acuity on admission was greater at Winnipeg teaching hospitals than at community hospitals.

Subsequent Days in Hospital

- Total acuity for days in hospital after the day of admission, what we have termed subsequent days in hospital, was 55% (34% acute; 21% subacute).
- Forty-two per cent (42%) of subsequent days in hospital in 1998/99 were assessed as requiring an alternate level of care and therefore did not require the services provided on acute care medical units. Twenty-nine per cent (29%) of days in hospital were assessed as requiring services provided in a long-term care facility [i.e., Personal Care Home (14%), chronic care (8%), rehabilitation (7%)], 5% of hospital days required home care services, 3% required outpatient services, 3% required palliative care services, and the remaining 2% were assessed as requiring other services.
- Total acuity for subsequent days in hospital in 1998/99 was greater in teaching than community hospitals. Sixty-two (62%) of subsequent days in the Health Science Centre and the St. Boniface General hospital were assessed as either acute or subacute, while

only 44% of days in the Concordia, Grace and Victoria General hospitals were assessed as acute or subacute.[1]

- Among those patients who were assessed as acute or subacute on the day of admission, total acuity on subsequent days in hospital decreased steadily over time. By day 10, 70% of patients remaining in hospital were assessed as acute or subacute, and by day 20 the percentage of acute or subacute patients had dropped to 60%.

Short-Stay Patients (1-30 Days)

- The total acuity for subsequent days in hospital spent by short-stay patients (those in hospital for 30 days and less) in 1998/99 was 73% (56% acute; 17% subacute).
- Twenty-three per cent (23%) of subsequent days in hospital by short-stay patients required an alternate level of care; 15% of days were assessed as requiring out-of-hospital services (9% home care; 6% outpatient services), 4% required a long-term care facility, 2% required a palliative care setting, and the remaining 2% were assigned to other categories.
- Total acuity for subsequent days in hospital by short-stay patients in 1998/99 was greater at the Winnipeg teaching hospitals (80%) than at the Concordia (67%) and Grace General Hospitals (42%). The level of acuity at Seven Oaks General Hospital (82%) was similar to the teaching hospitals.[2]
- Among those short-stay patients who were assessed as acute or subacute on the day of admission, total acuity on subsequent days in hospital decreased steadily over time. By

[1] Seven Oaks hospital is not reported in this section because the sample selected for this study was not representative of all 1998/99 medical separations at that facility. The sample had a significantly shorter average length of stay and proportionally fewer long-stay cases than the universe of medical cases from which it was selected. The total acuity for subsequent days in hospital at Seven Oaks was 74%, which was significantly greater than all other Winnipeg hospitals. The sampling bias may have contributed to this high level of acuity because long-stay patients in general contribute a significant proportion of non-acute days in hospital and the Seven Oaks sample under-represented long-stay cases.

[2] While sampling bias may have contributed to the high total acuity level at Seven Oaks when long-stay patients were included in the analysis, the effect of the sampling bias was removed when only short-stay patients were considered. Therefore we are confident that the high level of acuity for short-stay patients at Seven Oaks hospital is related to practice patterns at that institution and not to a sampling effect.

day 10, 70% of patients remaining in hospital were assessed as acute or subacute, and by day 14 the percentage of acute or subacute patients had dropped below 60%.

Acuity During a Peak Flu Period

- During the week of January 2-8, 1999 the average daily number of medical in-patients with influenza-like illnesses increased 155% compared to a non-flu pressure period.
- Total acuity for patients admitted to Winnipeg acute care hospitals during this week was 79% (76% acute; 3% subacute).
- Total acuity for patients in hospital during this week was 69% (38% acute; 31% subacute). Thirty-one per cent (31%) of patient-days during this week required a level of care other than an acute care medical ward; 17% of patient-days required some form of out-of-hospital services (9% home care; 8% outpatient services), 8% required a long-term care facility, 5% required a palliative care setting, and 1% required some other form of services.

Long-Stay Patients

- The medical records of a sample of long-stay patients (those in hospital for greater than 30 days) resident on acute care medical wards in 1998/99 were reviewed to assess the factors associated with long-stays in hospital after patients become non-acute.
- Fifty-two per cent (52%) of non-acute days were spent by patients awaiting placement; 24% of non-acute days were spent by patients undergoing rehabilitation; 9% of non-acute days were the result of in-hospital factors such as time spent waiting for diagnostic tests, treatments and procedures and delays in response to consultations; 7% of non-acute days were spent by patients who required palliative care; 5% of non-acute days were spent by patients awaiting home care services to be arranged; and the remaining 3% of days were spent awaiting beds at another hospital and family to confirm discharge plans.

Conclusions and Recommendations

- Almost 20% of medical patients were assessed as requiring the services of an observation unit on the day of admission, and 80% of these patients received their care in the

emergency room or observation unit on that day. **Given the reports of hospital overcrowding and pressures on emergency rooms, and the perception among health care providers that observation units are not functioning well, the group of patients who were assessed as requiring an observation unit on the day of admission warrant further study.**

- Almost 45% of days on medical wards of Winnipeg acute care hospitals in 1998/99 were spent by patients who did not require the services of an acute care setting. In general, total acuity for subsequent days was greater at the teaching than the community hospitals, but even at the teaching hospitals 37% of days in acute care medical wards were spent by patients who did not require that level of care.
- The largest proportion of days in hospital that did not require an acute care setting were assessed as requiring some form of long-term care facility. Long-stay patients (those in hospital for over 30 days) were responsible for the majority of these days. A large proportion of these non-acute days were spent awaiting placement for Personal Care Homes (PCH) and chronic care facilities. Since 1998/99, WRHA has undertaken significant efforts to decrease the length of time long-stay patients remain in hospital. While the average length of stay for medical long-stay patients decreased steadily between 1995/96 and 1999/00, long-stay medical patients still contribute more than a third of Winnipeg hospital days used by all medical patients. In 1998/99 we found that a large portion of these days were non-acute and could have been spent in a more appropriate setting. **Concurrent utilization review, beginning by day 20, could facilitate discharge planning through timely identification of patients who are ready for transfer or discharge.**
- Although the acuity level for short-stay patients (those in hospital for 30 days and less) was high (76%), almost one-quarter (23%) of days spent in hospital by short-stay patients in 1998/99 were non-acute and therefore did not require an acute care setting. The largest proportion of these non-acute days were assigned to outpatient and home care services. The majority of patients assigned to the outpatient category were in hospital awaiting diagnostic tests and procedures. Under the current system of diagnostic services, the length of time spent waiting for diagnostic testing is significantly shorter for in-patients than out-patients. Therefore, there is no incentive to discharge non-acute stable patients

and have them wait for tests as an outpatient. **The current system of managing diagnostic services should be changed so that there no longer remains a disincentive to discharge non-acute stable patients.**

- An equally large proportion of non-acute days for short-stay patients were spent waiting for home care services to be arranged. **Review of the referral process to home care and the factors contributing to delays in arranging services should be undertaken.**
- During the week of January 2-8, 1999, a period of intense pressure on Winnipeg hospitals, practice patterns appear to have remained essentially unchanged. **Concurrent utilization review of patients on admission (particularly at the community hospitals), and by the 10th day of hospitalization, during periods of high pressure, would be useful for identifying patients who could potentially be discharged to lower levels of care.**

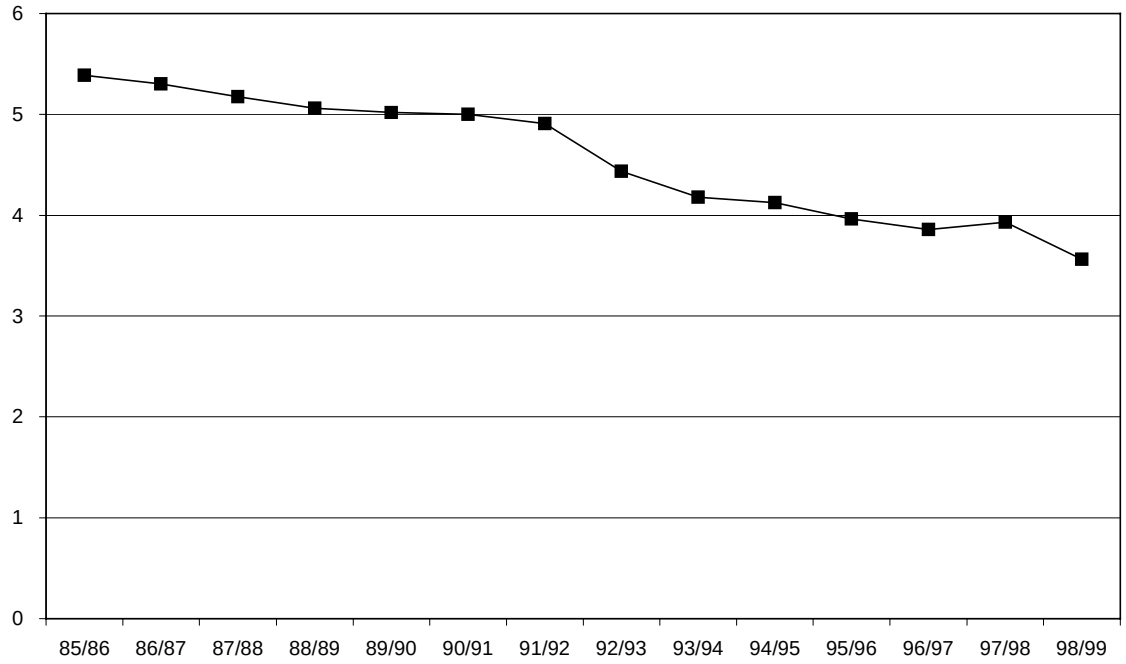
Significant variation in the level of acuity for adult medical patients on the day of admission and for subsequent days in hospital was found among Winnipeg acute care hospitals in 1998/99. The Grace hospital in particular operated at a much lower level of acuity for both long-stay and short-stay patients. Systematic utilization management coupled with increased efficiencies in discharge management, achieved perhaps through changes in the way diagnostic and home care services are provided, has the potential to significantly reduce non-acute days spent in Winnipeg acute care hospitals.

1.0 INTRODUCTION

The use of acute care hospital beds by patients who do not require that level of care is of concern because such use may not be cost-effective, and may contribute to shortages of acute care beds and hospital overcrowding. In addition, the placement of patients in settings which are not appropriate to their care needs has implications for the quality of care they receive.

In 1992, Manitoba Health, consistent with governments across Canada, began a downsizing of the acute hospital sector (Figure 1). Following the first set of bed closures, the Manitoba Centre for Health Policy and Evaluation (MCHPE) was asked to assess the use of acute care medical beds in Manitoba hospitals using the most current (1994) version of the InterQual™ ISD utilization review instrument (DeCoster et al., 1996). Records of adult medical patients who received care in a sample of Manitoba hospitals during the 1993/94 fiscal year were retrospectively reviewed to determine the proportion of admissions to and days spent in Manitoba hospitals that met standard criteria indicating that an acute care setting was required. Despite the closures which had occurred to that date, 50% of adult medical admissions and 33% of days in hospital after the day of admission were assessed as acute. Thus, a large proportion of days in Manitoba acute care hospitals in 1993/94 were spent by patients whose care needs could have been more appropriately met in some alternate setting. The largest proportion of days in hospital that were not acute but required some alternate level of care were for patients who required some form of long-term care such as Personal Care Home, rehabilitation or chronic care facility.

Figure 1: Hospital Beds per 1000 Winnipeg Residents, 1985/86 - 1998/99



In the interim, as seen in Figure 1, the bed supply in Winnipeg hospitals (as measured by beds per 1000 population) has dropped further, and the days of hospital care used by Winnipeg residents have also declined by 4.3% since 1993/94 (Figure 2). Because hospitals have adapted to bed closures by shortening lengths of stay and moving to outpatient surgery, the overall rate of hospital use has not decreased over this period (even when we have adjusted for the aging of the population) (Figure 3). Although not shown in these figures, the rate of medical separations (the focus of our analyses) has declined somewhat. Between 1993/94 and 1996/97 (the last year for which these analyses were done), medical separations decreased by 4.2%, from 36.9 to 35.3 per 1000 Winnipeg residents.

Figure 2: Hospital Days per 1,000 Winnipeg Residents, 1985/86 - 1998/99 (age/sex adjusted)

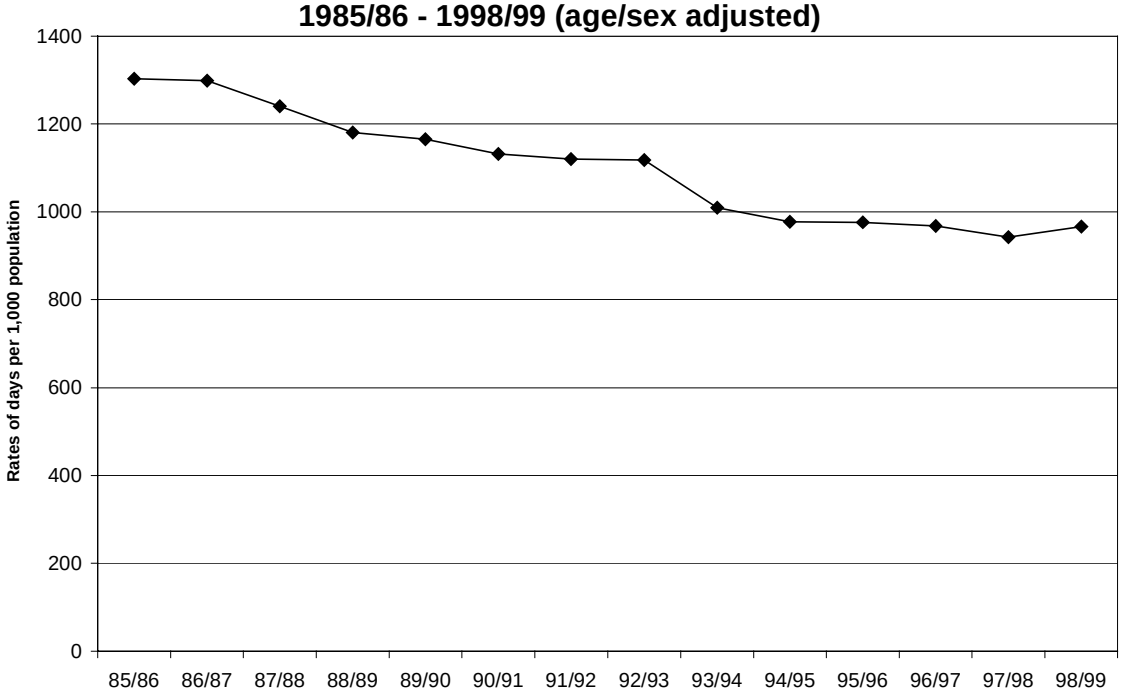
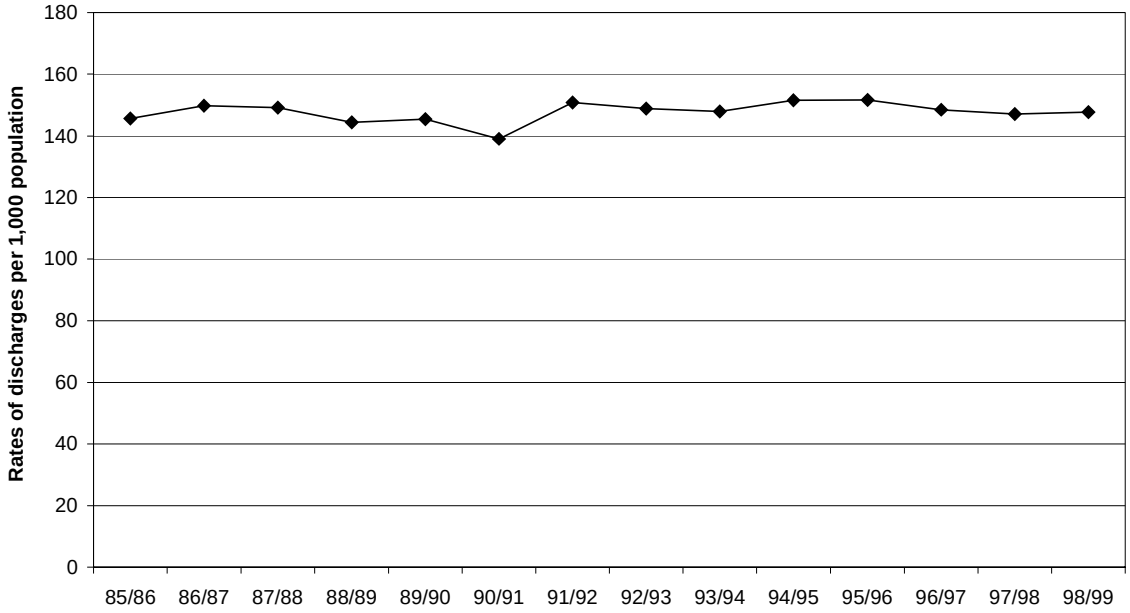


Figure 3: Hospital Discharges per 1,000 Winnipeg Residents (includes outpatient surgery), 1985/86 - 1998/99 (age/sex adjusted)



Given these changes, Manitoba Health and the Winnipeg Regional Health Authority (WRHA) asked MCHPE to reassess the use of adult acute care medical beds at Winnipeg acute care hospitals during the 1998/99 fiscal year, using the InterQual™ ISD utilization review instrument. As part of this project, we also examined acuity levels of medical patients during an influenza outbreak in January 1999. We also focused particular attention on the records of very long-stay patients, as part of an investigation of factors contributing to these long stays. This project was completed collaboratively between the Manitoba Centre for Health Policy and Evaluation and the Winnipeg Regional Health Authority.

Previous research at MCHPE has consistently documented that long-stay patients use a considerable proportion of acute care hospital resources (Black, Roos and Burchill, 1993; Brownell, Roos and Burchill, 1999; DeCoster and Kozyrskyj, 2000). For example, between 1991/92 and 1997/98, medical and surgical long-stay patients (defined as a hospitalization of greater than 30 days) constituted approximately 5% of the acute care medical-surgical patient population and used between 35% and 39% of all medical-surgical days in hospital. DeCoster and Kozyrskyj (2000) identified the factors associated with long-stay hospitalizations including patient characteristics (e.g., a diagnosis of stroke, treatments such as dialysis), discharge destination and hospital of stay. However, they were not able to distinguish between the acute and non-acute phases of the hospitalization. Because of the large impact long-stay patients have on the acute care hospital system, we were interested in examining the factors associated with long-stays in hospital after patients became non-acute. Using the InterQual™ ISD instrument, we were able to determine that portion of long-stay hospitalizations that were assessed as non-acute and examine the factors that contributed to the long-stay.

Another area of great interest to the WRHA is the seasonal pattern in hospital use. During the week of January 2-8, 1999 the Winnipeg acute care hospital system was under tremendous pressure as a result of an increase in the average daily number of medical in-patients with influenza-like illnesses. This high pressure period resulted in bed shortages and hospital overcrowding. We were interested in determining the proportion of acute

admissions to and days in hospital during this week, to assess whether, and how, practice patterns responded to periods of intense pressure.

1.1 Utilization Review – A Brief Review of the Literature

Utilization review is a process through which the appropriateness of hospital use is assessed. There are at least two aspects to utilization review: (1) assessment of the appropriateness of service provision (i.e., is a particular treatment or procedure medically necessary); and (2) assessment of the appropriateness of the setting in which care is provided (i.e., is the illness of sufficient severity to warrant an acute care setting) (Lavis and Anderson, 1993). The focus of this report is on assessment of the appropriateness of the setting in which care is provided.

Two of the main reasons for conducting utilization reviews are: (1) the identification of ways to provide care in a cost-effective manner, and (2) improving quality of care (Lavis and Anderson, 1993). The provision of health care services is expensive and acute care settings in particular are resource intensive and costly. It may be possible to provide care to those patients who do not require the services of an acute care setting more cost-effectively in an alternate setting. Equally important to cost-effectiveness is quality of care. The care needs of patients who require rehabilitation, palliative care or convalescence, for example, may not be well met in acute care settings because the skill sets of the practitioners and the physical environments of acute care settings are generally not suited to the care needs of these types of patients. Therefore the benefits of providing care in an appropriate setting may include cost savings and improvements in the quality of patient care.

The determination of whether an acute care setting is appropriate has been accomplished through the application of objective, diagnosis-independent criteria, such as the AEP (Appropriateness Evaluation Protocol) and the InterQual™ ISD instrument (Intensity-Severity-Discharge), to patient medical records. Both the AEP and ISD instruments are used to assess whether patients require an acute care setting on the day of admission and on subsequent days in hospital, although the criteria sets and methods of application differ

between the two instruments. Nevertheless, the goal of utilization review using both instruments is to identify the proportion of care that is inappropriately provided in acute care settings; in other words, care that could be provided in some alternate care setting. The ISD and AEP instruments have been used extensively in the United States, Canada, Europe and Israel to assess the appropriateness of hospitalizations in a variety of patient populations such as adult medicine and surgery (Merom et al., 1998; Smith et al., 1997; Butler et al., 1996; Houghton et al., 1996; Paldi et al., 1995;), older populations (Coast et al., 1996; Tsang and Severs, 1995), and United States Veterans hospital patients (Weaver et al., 1998; Smith et al., 1996).

In Canada, the InterQual™ ISD instrument has been used most frequently. Saskatchewan was one of the first provinces to conduct utilization reviews with the InterQual™ ISD instrument (HSURC, 1994). A sample of medical records from the 1991/92 fiscal year were selected from 51 urban and rural hospitals. The focus of the study was on adult medicine and non-surgical paediatrics. The 1992 ISD instrument was used for the chart reviews. The proportion of acute adult medical admissions ranged from 40-63% depending on hospital type and size (admission was defined as the first 72 hours of hospitalization). From 34-53% of days in hospital were assessed as acute. DeCoster et al. (1996) reviewed adult medicine and paediatric medical records for the 1993/94 fiscal year from a sample of 26 urban and rural Manitoba hospitals. The 1994 InterQual™ ISD instrument was used for the review of charts. Overall, 50% of adult admissions were assessed as acute and 33% of subsequent days in hospital met the acute criteria (admission was defined as the first 72 hours of the hospitalization). A study examining medical bed use in British Columbia was conducted using medical records from the 1994/95 fiscal year and the 1996 version of the InterQual™ ISD instrument (ACCRM, 1997). Forty-one urban and rural hospitals were included in the study and the focus was on general medicine. Overall, 25% of the sample population were assessed as acute on admission if they met the criteria during the first 48 hours of the hospitalization. The level of care for days in hospital after the day of admission was not reported in a manner comparable to the other Canadian studies. The British Columbia group reported the proportion of patients who were assessed as acute on admission and remained acute on the day following admission. Then, for those assessed acute on the second day, how

many were acute on day 3, etc., up until day 22. Another study using the 1997 version of the InterQual™ ISD criteria was conducted in Prince Edward Island (Wright and Cardiff, 1998). The sample consisted of adult medical patients who had been hospitalized at one of seven hospitals between January and December 1997. Overall, 27% of admissions were assessed as acute, with a range of 13% to 51% by hospital (admission was defined as the first 48 hours of hospitalization). The level of acuity for continued days in hospital was measured and reported in the same manner as the British Columbia study, except that review was continued for 12 days instead of 22.

In 1997 the Ontario Joint Policy and Planning Committee released the *Non-Acute Hospitalization Project (Adult)* report (JPPC, 1997). The project was conducted in two phases: a retrospective and an optional concurrent phase. The 1997 report was based on the retrospective phase. Ninety-eight rural and urban Ontario hospitals participated in the study. Samples of medical records of patients hospitalized between April to December 1995 were drawn and the 1996 version of the ISD criteria was applied. This study was the first in Canada to use the subacute criteria in addition to the acute criteria. The samples included the following five medical diagnoses and three surgical procedures: acute myocardial infarction (AMI), congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), cerebral vascular accident (CVA), pneumonia, elective hip or knee replacement, hysterectomy, and transurethral resection of the prostate (TURP). Overall, 82% of admissions for all diagnoses and procedures were assessed as acute (62% acute and 20% subacute) (admission was defined as the first 24 hours of hospitalization). The level of acuity on admission was highest for AMI and CVA and lowest for hip and knee replacement. Fifty-five per cent (55%) of days in hospital following the day of admission were assessed as acute (18% acute and 37% subacute) for all diagnoses and procedures. The level of acuity for subsequent days in hospital was highest for AMI and hip and knee replacement and lowest for CVA. The proportion of days in hospital that were assessed as subacute was generally greater for subsequent days than on the day of admission. Inclusion of the subacute criteria in this study was important because subacute care, as defined through the InterQual™ criteria, is appropriately delivered in Canadian acute care settings; therefore their exclusion may result in the under-estimation of acute admissions and days in Canadian hospitals.

While the purpose of most studies is to derive estimates of over-utilization, at least one study has attempted to derive an estimate of under-utilization, which was defined as "a health care encounter in which a patient receives a lower level of care than they require to achieve optimal benefit" (Trerise et al., 1999, p1). Medical records of a sample of patients who had been discharged from either the emergency department (for a select time period in 1997), or an inpatient acute care unit at an urban British Columbia hospital in 1996, were reviewed retrospectively using the InterQual™ ISD acute care criteria, to determine if discharge was appropriate. A concurrent phase was also conducted in June and July 1997 to determine if a sample of patients occupying non-critical beds met the criteria indicating that a critical care bed was required. The investigators found that 4% of the emergency department sample and 3% of the acute inpatient unit sample, did not meet the ISD discharge screens prior to discharge, indicating they may have been discharged prematurely. In addition, the concurrent review found that 1% of patients occupying acute care beds met the criteria indicating that a critical care placement was warranted. The authors concluded that under-utilization should be measured in concert with over-utilization to achieve the greatest improvements in quality of care.

The results of the Canadian studies that have been reviewed are not directly comparable because the objectives, sampling methodologies and data collection methods differed. Therefore, it is not possible to conclude that one setting manages acute care medical services better than another. In addition, different versions of the InterQual™ ISD criteria were used (the InterQual™ ISD criteria are updated annually to reflect ongoing changes in medical practice standards, technologies and out-of-hospital care options). Nevertheless, the methods for each study were relevant to the particular practice setting and all demonstrated that, within their practice environment, a considerable proportion of admissions to and days of stay in Canadian acute care hospitals did not require the services of an acute care setting.

1.2 Objectives

The objectives of the study were to:

1. Identify the proportion of medical admissions and subsequent days of care that met standard criteria indicating an acute care hospital was required;
2. Determine the alternate level of care required by patients who did not require an acute care setting;
3. Identify and examine factors which contributed to long stays in hospital; and
4. Assess the level of acuity in Winnipeg hospitals during the week of January 2-8, 1999, a high-pressure period when the numbers of patients with influenza-like illnesses increased dramatically.

1.3 Process

1.3.1 Establishment of a Working Group

A Working Group consisting of WRHA professional staff was established early in the project. The Working Group participated in all stages of the study including design, evaluation of the utilization review tool, creation of the "Alternate Level of Care Criteria", interpretation of findings, development of recommendations and review of the final written report. The Working Group met four times between November 12, 1999 and December 8, 2000. The composition of the Working Group is found in Appendix 1.

1.3.2 Selection of a Utilization Review Tool

InterQual's 1999 ISD Clinical Decision Support Criteria were used to assess the appropriateness of medical hospitalizations (InterQual ™, 1999). The InterQual ISD criteria are a set of statements that help determine the appropriateness of medical interventions. These criteria were chosen because they had been used in a previous MCHPE report (DeCoster et al., 1996) and in other Canadian provinces, have been externally validated (Strumwasser et al., 1990; Inglis et al., 1995), are based on best practices and medical research as reported in the literature, updated continually, and released annually.

The InterQual ISD criteria are used to assess the appropriateness of admission, continued care at a particular level and discharge. These three aspects of care are assessed through the construct **ISD®**: **Intensity** (of Service), **Severity** (of Illness), and **Discharge** (Screens). Severity of Illness (SI) refers to the objective clinical indicators of patient illness, Intensity of Service (IS) relates to treatments and medications relevant to the Severity of Illness indicator, and the Discharge Screens (DS) are objective clinical and operational parameters of patient stability, indicating discharge or transfer readiness. In order to be defined as an appropriate admission a patient must present to hospital with certain clinical indicators (i.e., Severity of Illness - SI) and receive specific treatments and/or medications to address the presenting illness (i.e., Intensity of Service - IS). On subsequent days of stay, the patient must receive specified treatments and/or medications (IS) in order to be assessed as appropriate for an acute care setting. When the patient no longer receives the types and levels of treatments required of an acute care setting, the Discharge Screen (DS) is applied to determine if he/she has achieved a level of physiological stability that warrants discharge or transfer to another level of care.

Two Level of Care criteria sets were used for this study: ISD-AC® Acute Care and ISD-SAC® Subacute Care. The acute care criteria are designed to assess appropriateness of admission to and continued care in an acute care setting. The subacute criteria are designed for patients who require a slower paced recovery and may be at risk for acute exacerbation. While in many U.S. cities the subacute level of care is structurally distinct from acute care, this is not the case in Winnipeg or other Canadian cities. Patients assessed as requiring care at the subacute level are appropriately receiving that care in Winnipeg acute care hospitals. In this report, the proportions of admissions and days assessed as acute and subacute have been combined to reflect total acuity. The two levels will also be presented separately, in graphs and tables, to distinguish these different types of care requirements in Winnipeg hospitals.

The ISD-AC® criteria contain the following levels of care corresponding to the specific types of services that are provided at each level based on the severity of the patient's illness: observation, critical care (including cardiac, medical and surgical/trauma), intermediate care

(cardiac/telemetry, medical-surgical) and acute. The acute criteria are divided into the following subsets based on the presenting illness: cardiovascular /peripheral vascular; CNS/ Musculoskeletal; Endocrine/Metabolic; Eye, Ear, Nose and Throat; Gastrointestinal/ Biliary/Pancreatic; Genitourinary/Gynaecology; Haematology/ Oncology; Infectious Disease; Mental Health; Respiratory/Chest; Skin/Connective Tissue; and Surgery/ Trauma. The ISD-SAC® criteria contain the following subsets: Cardiovascular; Medically Complex; Neuromuscular; Orthopaedic; Respiratory; and Skin/Wound.

The 1999 versions of the InterQual™ ISD Acute and Subacute criteria underwent thorough review by the Working Group to assess their applicability to the Winnipeg practice setting. In addition, three WRHA physicians not on the Working Group provided independent reviews (the practice specialties of these three physicians were family practice, internal medicine and geriatrics). Overall, the criteria were assessed to be relevant to the local practice setting with a few modifications. One of the major concerns expressed was the ability of the criteria to assess needs of the elderly. First, many elderly individuals presenting with infections are not febrile and therefore may not meet the Severity of Illness (SI) criteria under the Infectious Diseases section. The abstractors were instructed that an afebrile elderly individual (70 years and over) presenting with a high band count (>6%) would be appropriate for admission, thus removing the additional requirement of an elevated body temperature. Second, there was no category to adequately deal with the elderly presenting with confusion or any acute change in mental status. The abstractors were instructed to assess elderly individuals presenting with confusion under the CNS/ Musculoskeletal subset. However, in practice most elderly patients presenting with confusion did not receive enough hospital services on the day of admission to meet the Intensity of Service criteria under the CNS/Musculoskeletal subset. Most of the elderly who presented to Winnipeg hospitals with confusion underwent a fairly standard work-up up consisting primarily of diagnostic testing, to determine the cause of the confusion. Most of these patients did meet the criteria for admission to an observation unit, and were therefore classified as requiring the services of an observation unit on the day of admission. Third, in the Critical Care – Medicine section, it was recommended that the criteria for hypothermia be changed to <35°C from <32.8°C for the elderly. Another concern was the focus on physiologic measures as a requirement for

admission and a lack of consideration of compromised functional status. The majority of patients with compromised functional status met, at least, the subacute criteria and were therefore not assessed as non-acute. Finally, and not specifically related to the elderly, the Severity of Illness criteria for Infectious Diseases included the following as a sole indicator for admission to an acute care setting: "Sputum (+) for S. aureus/Group A Strep/Gram (-) enteric/Pseudomonas/ Legionella". The Working Group did not feel that this criterion alone would warrant admission, so it was therefore removed.

The Working Group also developed a set of "Alternate Level of Care Criteria" specific to the Winnipeg practice environment. The abstractors assigned an alternate level of care 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 provided in Appendix 2.

1.3.3 Hiring of Project Co-ordinator and Abstractors

One of the Principal Investigators (SB) served as project co-ordinator and received training on the use of the InterQual criteria in Marlborough, Massachusetts in February 2000. The WRHA hired three abstractors for the project (1 full-time and 2 part-time) who underwent training by the Project Co-ordinator in March 2000. Two of the abstractors were registered nurses who had experience in medical nursing and research, and one of the abstractors was a physician completing a community medicine residency.

2.0 METHODS

2.1 Sample

The sample for this study consisted of adult medical patients who received care at and were discharged from one of the six Winnipeg acute care hospitals in the 1998/99 fiscal year. The six Winnipeg acute care hospitals are the Health Sciences Centre, and the Concordia, Grace, Seven Oaks, St. Boniface and Victoria General Hospitals.

Medical patients were defined according to primary service codes, which are categories of medical practice specialties (e.g., internal medicine, cardiology). Primary service codes refer to the service under which the patient was treated for the greatest length of time. There was discussion at the Working Group level about whether the sample should be selected based on most responsible diagnosis or by primary service code. The consensus of the Group was that as we were interested in deriving baseline information about the acuity of medical patients and the way in which medical beds were being used, it was more appropriate to select on service codes. MCHPE was provided with a listing of medical services applicable to 1998/99 hospital separations from the health records department at the St. Boniface General Hospital. The following services were included: Family Medicine (01), Internal Medicine (10), Allergy (11), Cardiology (12), Dermatology (13), Endocrinology (14), Gastroenterology (15), Nephrology (16), Neurology (17), Respirology (18), Rheumatology (19), Oncology (59), and Haematology (66).

While one of the goals of the study was to derive estimates of acuity on admission and for subsequent days of stay at each of the six acute care hospitals, another goal was to compare acuity between teaching (Health Sciences Centre and St. Boniface General Hospital) and community facilities (Concordia, Grace, Seven Oaks and Victoria General Hospitals). In order to make these comparisons, a total of 150 records were required at each site, for a total sample of 900 records. With 150 records per site, we are able to detect an 8% difference in the level of acuity between the teaching and community hospitals with 95% confidence and 80% power. Thus, if the difference in the level of acuity on admission between the tertiary

and community hospitals is at least 8%, then we can have 95% confidence that the difference is real and not due to chance.[3]

Another point of discussion at the Working Group level concerned exclusion of medical patients who had undergone surgical procedures during their hospitalizations. Members of the Working Group expressed an interest in assessing the impact of surgical cases on medical bed use. Therefore, patients who had undergone some surgical procedures were retained in the sample. The types of procedures undergone by those in the sample include: ileostomy, prostatectomy, sphincterotomy of the bladder, amputations, coronary artery bypass, kidney transplantation, bone marrow transplants, insertion of stents, cardiac catheterizations, angioplasties, and hip replacement. A small proportion of days in hospital were therefore spent on acute care surgical wards.

2.1.1 Representativeness of Sample

The sample of records drawn at each hospital was tested to determine if it was representative of medical separations for the year from which it was selected (i.e., 1998/99). The sample at each hospital was first compared to 1998/99 medical separations at each respective facility and then to 1998/99 medical separations from all acute care hospitals on the following variables: mean length of stay, age, gender, most responsible diagnosis and proportion of short- and long-stay hospitalizations, where a short stay is defined as a hospitalization from 1-30 days and a long-stay as a hospitalization of over 30 days. The samples drawn at each of the hospitals were representative of the entire year of medical separations at each institution and for all medical separations from all six institutions, on all of the variables with one exception. The sample selected at Seven Oaks was not representative of the 1998/99 medical separations at that site on average length of stay and proportion of short- and long-stay cases. The Seven Oaks sample had a significantly shorter average length of stay (10 days) than did the medical cases at Seven Oaks for 1998/99 (17 days), and under-represented the proportion

[3] Power refers to the probability of detecting a genuine difference. In the context of this project, when we state that the difference in the level of acuity between teaching and community hospitals is statistically equivalent (i.e., there is no statistical difference), then we are 80% confident that we have not made a mistake by missing a real difference.

of long-stay cases (i.e., the proportion of long-stay cases in the Seven Oaks sample and for all medical separations at Seven Oaks was 6% and 11%, respectively). However, the average length of stay for short-stay cases at Seven Oaks, as well as the other five hospitals, was representative of the average length of stay for all short-stay medical separations for the 1998/99 fiscal year.

2.1.2 Long Stay Records

Within the total sample of 900 records, 75 records of patients with stays of longer than 30 days were randomly selected for more in-depth review of the factors relating to their long stays in hospital. These records were sampled across all six hospitals. The focus was on understanding the factors contributing to long stays, not on making comparisons across facilities.

2.1.3 Peak Flu Period Records

In order to assess patterns of care that occurred over a peak flu period in January 1999, a second sample was drawn that included 75 patients who were admitted during the peak flu period, and an additional 75 patients who were in hospital at the time the peak flu period occurred. For the group of 75 cases admitted during the peak flu period, the length of stay was restricted to 30 days and less. For the second group of 75, we randomly selected patients who had been in hospital at least eight days but not longer than 30 days during the peak flu period. These records were sampled across all six hospitals.

2.2 Data Collection

Data collection could not have occurred without the efficient and capable assistance of the staff of the health records departments at each of the six hospitals. Letters describing the project were sent to each health records department in early March, 2000 and arrangements were made for chart retrieval soon thereafter.

In preparation for the data abstraction process, the abstractors underwent a Personal Health Information Act (PHIA) training session at WRHA and signed Oaths of Confidentiality.

Abstractors recorded patients' medical record numbers, dates of admission and separation, dates of birth and the services patients received on each day of hospitalization (described below). Patient names and addresses were not recorded. Data abstraction was completed between April and September 2000 and was facilitated through the use of InterQual's™ Autobook® 2, the Windows version of the criteria. Data were entered directly into laptop computers supplied to each abstractor.

2.2.1 Admission Review

Admission was defined as the first 24 hours of the hospitalization. Abstractors first applied the acute criteria and if not met, they applied the subacute criteria to this time period. If neither the acute or subacute criteria were met, the abstractors applied the observation criteria. 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 (see below). However, if the patient failed to meet the acute, subacute, or observation, SI and IS criteria, an alternate level of care was assigned for the day.

2.2.2 Subsequent Days in Hospital

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 Intensity of Service (IS) criteria. If upon failing to meet the IS criteria, the patient did meet the Discharge Screen (DS), indicating readiness for discharge, an alternate level of care 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 IS criteria but also failed to meet the discharge screen (i.e., the patient was considered too unstable for discharge), the day was assessed as an appropriate acute/subacute day.

2.3 Inter-Rater Reliability

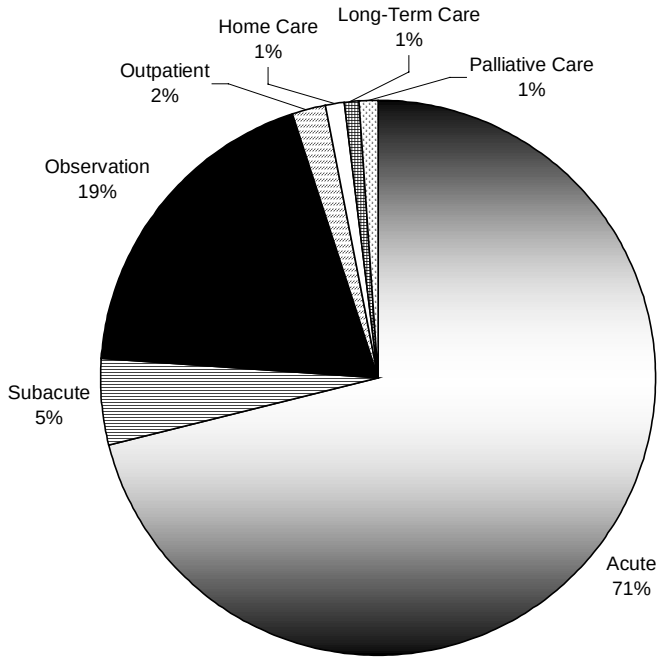
Quality control was assured through the provision of a thorough training session, including the opportunity to complete data abstraction on a sample of "practice" medical records, and ongoing communication between the abstractors and the project co-ordinator. Inter-rater reliability tests were also completed on each abstractor's records, from two to three times, depending on their length of employment. Reliability was evaluated on two measures: (1) crude agreement and (2) Cohen's kappa coefficient, which is a measure of agreement that corrects for chance (Fleiss, 1981). Reliability was assessed by comparing reviews completed by each abstractor against the project co-ordinator. 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 and the project co-ordinator spent additional time with abstractors. The levels of crude agreement between the project co-ordinator 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.

3.0 RESULTS

3.1 Admission

The level of care required on the day of admission for all six acute care hospitals is presented in Figure 4. Total acuity on admission was 76% (71% acute; 5% subacute). A further 19% of admissions were assessed as requiring services provided in an observation unit, while the remaining 5% were assessed as requiring an Alternate Level of Care (ALC). The care needs of 2% of the admissions assigned an alternate level of care could have been met in an outpatient setting.[4] The care needs of a further 1% of admissions could have been met by home care. Another 1% of admissions could have received care in a long term care facility (Personal Care Home, chronic care and rehabilitation), while the remaining 1% of admissions required palliative care, either in a hospital or hospice setting.

Figure 4: Level of Care on Admission - All Hospitals, Winnipeg, 1998/99



[4] The outpatient estimates also include cases assigned to the Medical Day Unit category. These two categories were combined because of the small number of cases assigned to the Medical Day Unit category.

The level of care on admission by hospital is listed in Table 1. The first two rows of Table 1 correspond to the percentage of admissions at each hospital that were assessed as acute and subacute respectively. The third row of the Table represents total acuity on admission and consists of those patients assessed as either acute or subacute. Because both acute and subacute levels of care are appropriately delivered within Winnipeg acute care hospitals, comparisons between hospitals were based on total acuity.

The total acuity on admission in 1998/99 at Winnipeg acute care hospitals ranged from 89% at the Health Sciences Centre to 55% at the Grace Hospital. In general, the level of acuity on admission was greater at Winnipeg teaching hospitals than at community hospitals. The exception is Seven Oaks General Hospital, which was assessed as having similar levels of acuity on admission to the teaching hospitals. It is evident from Table 1 that the acute level of care contributed the greatest proportion to total acuity on admission. Another interesting finding from Table 1 is the variability in the proportion of admissions that were assessed as requiring the services provided in an observation unit; from 10% at the Health Sciences Centre to 33% at the Grace General Hospital. The percentage of admissions requiring an observation unit was generally greater among community hospitals. The proportion of non-acute admissions assigned an alternate level of care is also provided in Table 1.

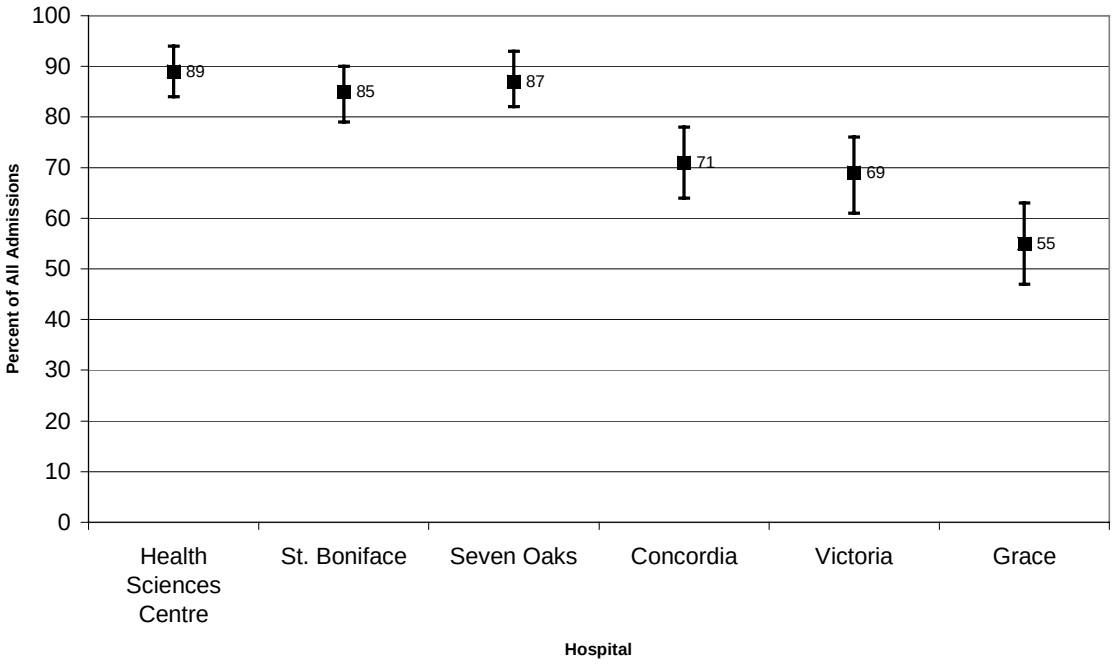
Table 1: Level of Care Required on Admission by Hospital (Per cent), Winnipeg, 1998/99

	Health Sciences Centre	St. Boniface	Seven Oaks	Concordia	Victoria	Grace
Acute	83%	77%	86%	68%	63%	48%
Subacute	6%	8%	1%	3%	6%	7%
Total Acuity	**89%**	**85%**	**87%**	**71%**	**69%**	**55%**
Observation	10%	11%	11%	21%	25%	33%
Alternate Level*	1%	4%	2%	8%	6%	12%

*The specific alternate level of care categories are not reported for individual hospitals because of the small number of individuals represented in some of the categories. MCHPE does not report data when fewer than 5 individuals are represented per category.

Total acuity on admission with confidence intervals is displayed in Figure 5. Because we based our analyses on a sample of records for the 1998/99 fiscal year, the total acuity is an estimate of the true level of acuity of all medical separations for that year. The lines above and below the individual hospital estimates indicate the range in which the true value may lie. We can state with 95% confidence that the true value lies within the two lines. If the lines associated with an individual hospital estimate overlap the lines from another hospital, then the estimates of total acuity for the two hospitals are statistically equivalent. However, if the lines do not overlap, then we can state that there are statistically significant differences in the level of acuity on admission between the hospitals.

Figure 5: Total Acuity on Admission by Hospital, Winnipeg, 1998/99



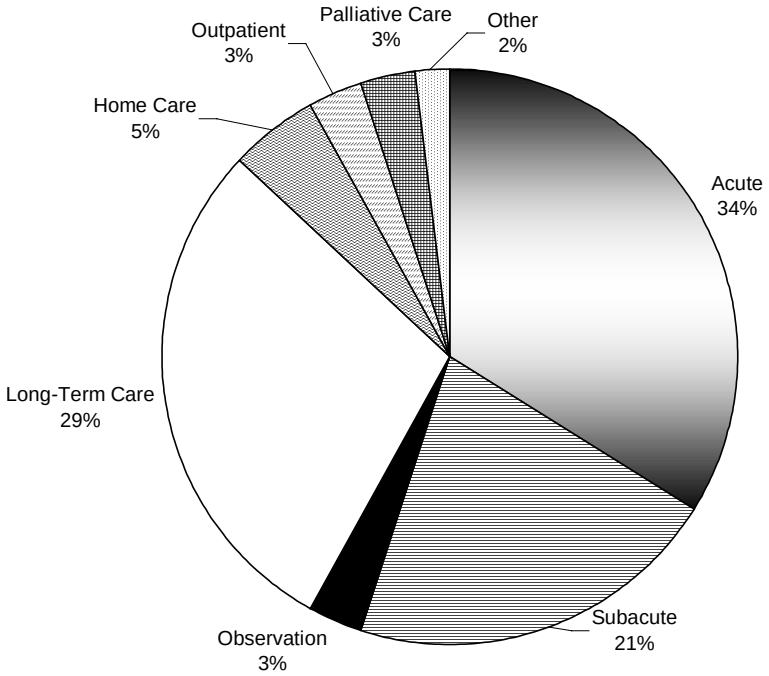
The total acuity on admission at the Health Sciences Centre and the St. Boniface General Hospital was significantly greater than the levels at all community hospitals except Seven Oaks. The Concordia and Victoria General Hospitals had similar levels of acuity on admission, while acuity on admission at the Grace General Hospital was significantly lower than all of the other hospitals except Victoria. It does not appear that the estimate of total acuity on admission at Seven Oaks would have been affected by sampling bias, resulting in an over-estimate of total acuity, because 82% of the long-stay cases included in this sample

were assessed as acute or subacute on the day of admission. With such a high acuity level on the day of admission for this sub-group, there would probably be no bias towards higher acuity created by Seven Oaks having fewer long-stay cases and greater numbers of short-stay cases.

3.2 Subsequent Days of Care

The level of care required for subsequent days of stay in hospital (i.e., all days after the day of admission) is presented in Figure 6. The total acuity for subsequent days was 55% (34% acute; 21% subacute). Three per cent (3%) of subsequent days required services provided in an observation unit and 42% of subsequent days were assessed as requiring an Alternate Level of Care (ALC) and therefore did not require the services provided on acute care medical units. Twenty-nine percent (29%) of subsequent days were assessed as requiring services provided in a long-term care facility [i.e., Personal Care 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.

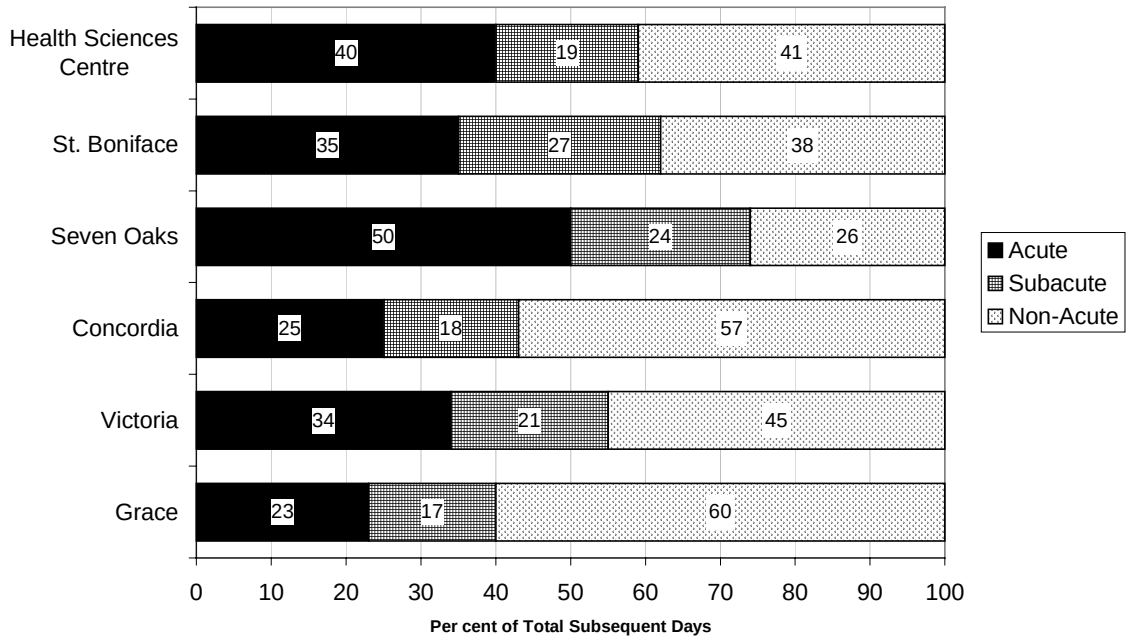
Figure 6: Level of Care for All Subsequent Days - All Hospitals, Winnipeg, 1998/99



Not surprisingly, the total acuity for subsequent days was substantially less than on the day of admission (i.e., 55% versus 76%).

The proportion of subsequent days (i.e., from day two to the end of each patient's stay) that was assessed as acute, subacute and non-acute is displayed by hospital in Figure 7. Whereas on admission, subacute days contributed a small proportion to total acuity, the subacute level of care contributes a larger proportion to total acuity for subsequent days in hospital. In other words the care provided on a considerable number of days in Winnipeg acute care hospitals is at the subacute level. What is also evident in Figure 7 is the large proportion of days in hospital, especially at the Concordia and Grace hospitals, that met neither the acute nor subacute criteria, and were assessed as non-acute.[5]

Figure 7: Proportion of All Subsequent Days Assessed as Acute, Subacute and Non-Acute by Hospital, Winnipeg, 1998/99



WHAT IS THE DIFFERENCE BETWEEN ACUTE AND SUBACUTE CARE LEVELS?

The following cases are examples of patients who were assessed as both acute and subacute during their hospitalization. (These examples are composites of many individual cases that have been developed for illustrative purposes).

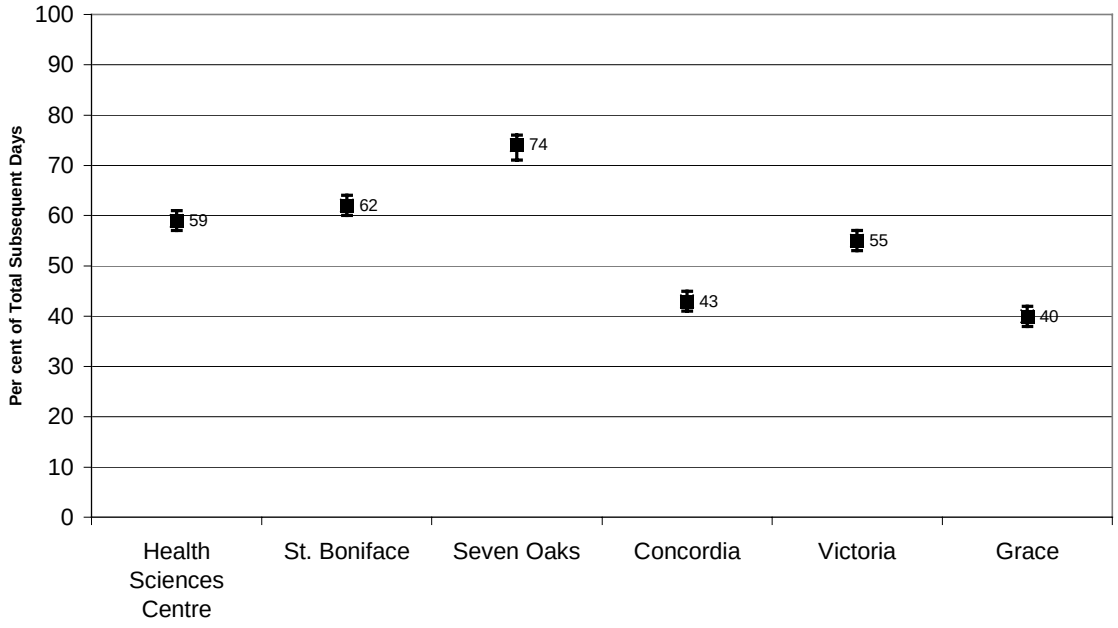
Example 1: A female aged 82 years presents to hospital with a three day history of increased shortness of breath, weakness, chills, diaphoresis, and productive cough. Her vital signs on admission were: blood pressure 145/82; heart rate 86; respiratory rate 28; O_2 sat 91%; temperature 37.5° C. Pneumonia is confirmed by chest x-ray. The individual is admitted to hospital and started on a course of IV antibiotics and 3L oxygen by nasal cannula. By the fourth hospital day this patient's chest x-ray revealed that the pneumonia was clearing, her oxygen saturation had improved to borderline normal and she was switched from IV to oral antibiotics. However, she was still weak and experienced shortness of breath with minimal exertion and was not stable enough for discharge home. The patient began a progressive activity program intended to increase physical strength. ***This patient would be assessed as acute for the length of her IV antibiotic therapy from day 1 through day 3. On day 4 the patient would be assessed as subacute because her care plan changed from active treatment of pneumonia to restoration of physical strength. The patient would remain assessed at the subacute level until her strength had improved sufficiently to allow for safe transfer to another level of care, if appropriate, or discharge home***.

Example 2: A 55 year old male was admitted to the intensive care unit as a result of an acute myocardial infarction confirmed by ECG. While in the ICU the patient receives treatment for the myocardial infarction and an angiogram. The angiogram reveals significant blockage of coronary arteries and the patient is scheduled for coronary artery bypass surgery. On the fifth hospital day the patient is transferred from ICU to the medical ward where he remains on continuous IV anticoagulant therapy and oral medications until his surgery on day nine of his hospitalization. After two days of post-surgical care in the ICU, the patient is transferred to the medical ward and is discharged home two days later. ***This patient would be assessed as acute during his first stay in the coronary care unit (days 1-4). The patient would continue to be assessed as acute for up to two days upon transfer to the medical ward (days 5-6). By day seven the patient was stable and therefore assessed as subacute as a result of receiving continuous anticoagulants (days 7-8). The patient would be re-assessed as acute during his post-operative stay in the intensive care unit and transfer back to the medical ward (days 9-12). Overall, this patient would have nine acute days and two subacute days.***

[5] The proportions of subsequent days assessed as requiring the services of an observation unit range from 2-4% across hospitals and have been included in the non-acute category (see Table 2 for exact figures).

The total acuity for subsequent days with confidence intervals is displayed for each hospital in Figure 8. The total acuity for all subsequent days at Winnipeg acute care hospitals ranged from 74% at the Seven Oaks General Hospital to 40% at the Grace. In general, the level of acuity for subsequent days was greater at Winnipeg teaching hospitals than at community hospitals. The exception to this finding was Seven Oaks General Hospital, which was assessed as having higher levels of acuity for subsequent days than the teaching hospitals. One factor which may have contributed to this finding is that the sample selected at Seven Oaks was not representative of the medical separations for the year from which it was selected (i.e., 1998/99) on length of stay and proportion of short and long-stay cases. The sample had a significantly shorter average length of stay and significantly fewer long-stay cases. This may have affected the results because long-stay patients in general contribute a significant proportion of non-acute days.

Figure 8: Total Acuity for All Subsequent Days by Hospital, Winnipeg, 1998/99



Statistical differences between teaching and community hospitals were found for total acuity on subsequent days. The overall level of acuity for subsequent days at the Health Sciences

Centre and St. Boniface Hospital was significantly greater than at the Concordia and Grace Hospitals. Total acuity for subsequent days at the Victoria General Hospital was not significantly different from total acuity at the Health Sciences Centre but was significantly lower than cases at St. Boniface General Hospital. Total acuity for subsequent days at the Seven Oaks General Hospital was significantly higher than all of the other hospitals, however, this may be the result of sampling bias.

The level of care for subsequent days by hospital, including alternate level of care designations, is displayed in Table 2. The first row of the Table represents the total acuity for subsequent days and consists of patients assessed as either acute or subacute (rows 2 and 3). The proportion of subsequent days assessed as requiring the services provided in an observation unit was uniform across all hospitals, ranging from 2-4% (row 4). The fifth row contains the proportion of subsequent days in hospital that were assessed as requiring an alternate level of care. Rows 6-8 correspond to the long-term care categories of Personal Care Home, rehabilitation and chronic care, respectively. The majority of subsequent days at each hospital were assigned to a long-term care facility, with the exception of Seven Oaks. Home care accounted for as much as 7-10% of subsequent days in hospital at the Health Sciences Centre, Concordia and Grace. Palliative care was assigned to 9% of subsequent days at St. Boniface, which is no doubt a result of the palliative care unit at this hospital.

Table 2: Level of Care Required for Subsequent Days by Hospital (Per cent), Winnipeg, 1998/99

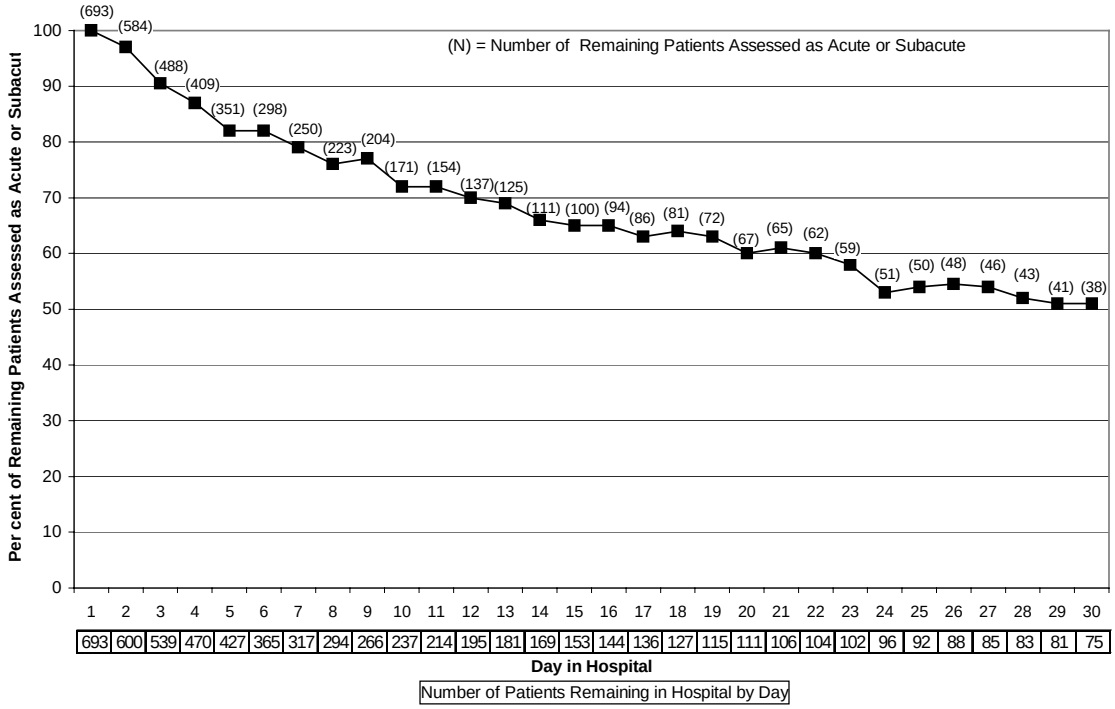
LEVEL OF CARE	CATEGORY	HEALTH SCIENCES CENTRE	ST. BONIFACE	SEVEN OAKS	CONCORDIA	VICTORIA	GRACE
TOTAL ACUTE	**TOTAL**	**59%**	**62%**	**74%**	**43%**	**55%**	**40%**
	Acute	40%	35%	50%	25%	34%	23%
	Subacute	19%	27%	24%	18%	21%	17%
OBSERVATION	**TOTAL**	**2%**	**4%**	**2%**	**2%**	**3%**	**3%**
ALTERNATE LEVEL OF CARE	**TOTAL**	**39%**	**34%**	**24%**	**55%**	**42%**	**57%**
	Personal Care Home	18%	14%	4%	23%	5%	16%
	Rehabilitation	7%	6%	4%	3%	7%	14%
	Chronic Care	0%	0%	3%	11%	21%	9%
	Home Care	7%	2%	3%	7%	3%	10%
	Outpatient	3.5%	3%	4%	1%	3%	3%
	Palliative Care	0.5%	9%	3%	2%	2%	3%
	Minimal Supervision Residence	1.5%	0%	1%	6%	0%	0%
	Other	1.5%	0%	2%	2%	1%	2%

HOW WERE THE ALTERNATE LEVEL OF CARE CATEGORIES ASSIGNED?
A total of 10 categories were available to the abstractors (Appendix 2). Abstractors determined the alternate level of care (ALC) based on notes in the medical record and the definitions provided in the ALC category descriptions. The ALC designation was assigned the day the patient no longer met either the acute, subacute or observation criteria and therefore represents an "ideal" situation (i.e., assigning an ALC category was completed under the assumption that the particular level of care was available as soon as the patient no longer met the criteria required to be assessed as acute or subacute). While we recognize that some of the ALC days may represent unavoidable delays in service arrangement, it would not have been appropriate to ask the abstractors to determine a reasonable length of time for services to be arranged and assign the ALC category once that day had passed. Notwithstanding the challenges of arranging services on discharge, the proportion of ALC days provide an accurate estimate of the non-acute days spent in Winnipeg acute care facilities. In addition, this method ensured that the assignment of ALC days was uniform across all Winnipeg acute care hospitals.

3.3 Total Acuity by Length of Stay

As the total acuity for subsequent days is substantially less than on the day of admission, we undertook analyses to determine how the level of acuity changes over time. Included in the analysis were those individuals who were assessed as either acute or subacute on the day of admission. We then determined the proportion who were still acute or subacute on day 2, day 3, etc., up until day 30 (Figure 9).

Figure 9: Total Acuity for Patients Assessed as Acute or Subacute on Day of Admission by Day of Hospitalization - All Lengths of Stay, Winnipeg, 1998/99



The number of patients included in the analysis is not uniform throughout the time frame, and is represented by the numbers in the box under the day in hospital (arrayed on the x-axis). For example, a total of 693 individuals were assessed as acute or subacute on the day of admission (i.e., day 1) and formed the group under study. As indicated in Figure 9, by day 30, 75 of those original 693 patients remained in hospital. The numbers in parentheses associated with each point on the graph line represent the number of patients who were assessed as either acute or subacute on any particular day. For example, on day 30, 38 (or 51%) of the 75 patients remaining in hospital were assessed as either acute or subacute.

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 reaches a plateau, and from that point onward about half of the remaining patients could have been cared for in an alternate setting.

3.4 Subsequent Days of Care: Days 1-30 - All Hospitals

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 consumed by medical patients (the study sample is representative of the proportion of short-stay cases and days across Winnipeg hospitals and representative of each individual hospital's case load except at Seven Oaks for which, as mentioned previously, the sample over-represented short-stay cases). Because short-stay cases constitute the majority of cases treated at Winnipeg acute-care hospitals, we undertook analysis on the level of acuity on subsequent days for short stay cases (≤30 days) to determine how they were being managed.

The level of care required for subsequent days associated with short-stay hospitalizations is presented in Figure 10a. The total acuity for subsequent days was 73% (56% acute; 17% subacute). Four per cent (4%) 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 (ALC). Of the days assigned an alternate level of care, 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., Personal Care Home (2%), and rehabilitation (2%)], and 2% of days were assigned to palliative care. When cases with lengths of stay of longer than 30 days are removed from the analysis a significant decrease in the proportion of days assessed as requiring an alternate level of care is observed (23% for short-stay patients versus 42% for all patients regardless of length of stay). In addition, the ALC categories themselves were different when only the short-stay cases were considered. The majority of ALC days for short-stay patients were assigned to out-of-hospital services provided by home care and outpatient services. However, when long-stay cases were included in the analysis, the majority of ALC days were assigned to in-hospital long-term care facilities (Figure 10b).

Figure 10a: Level of Care on Subsequent Days for Short-Stay Patients - All Hospitals, Winnipeg, 1998/99

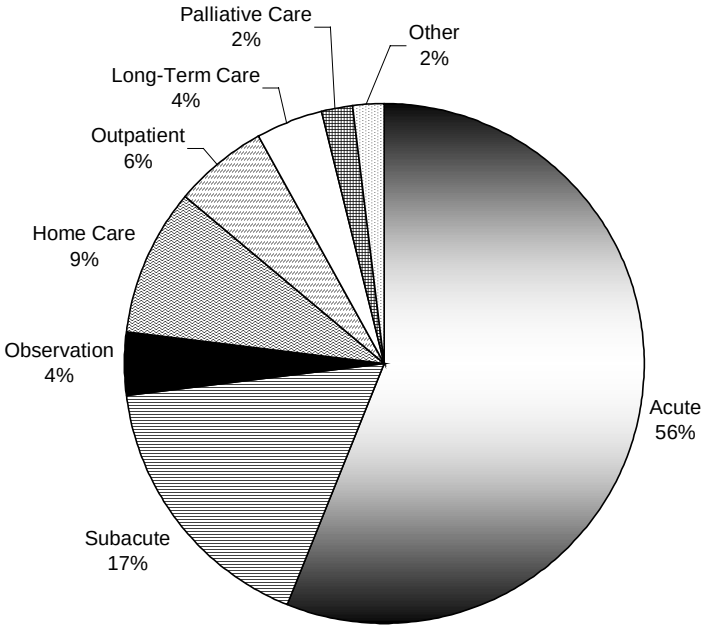
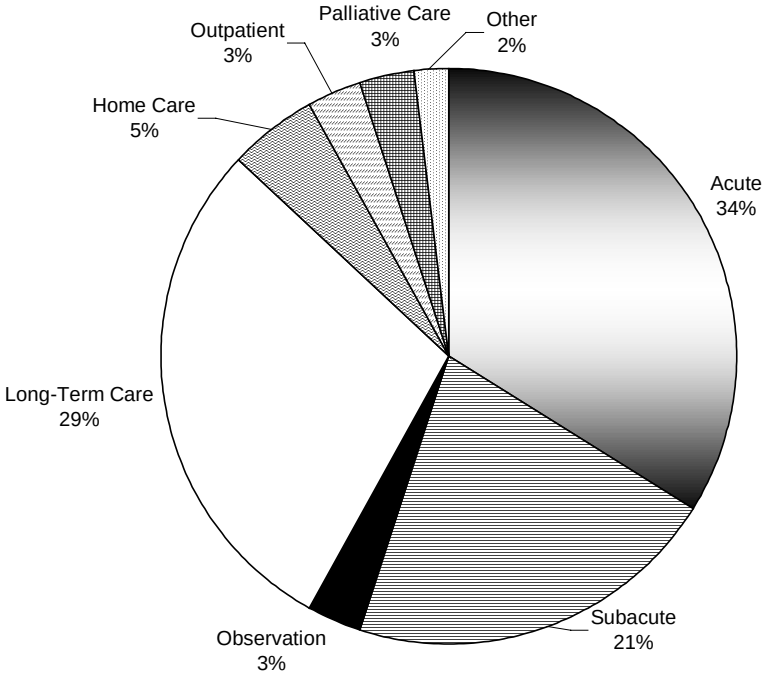
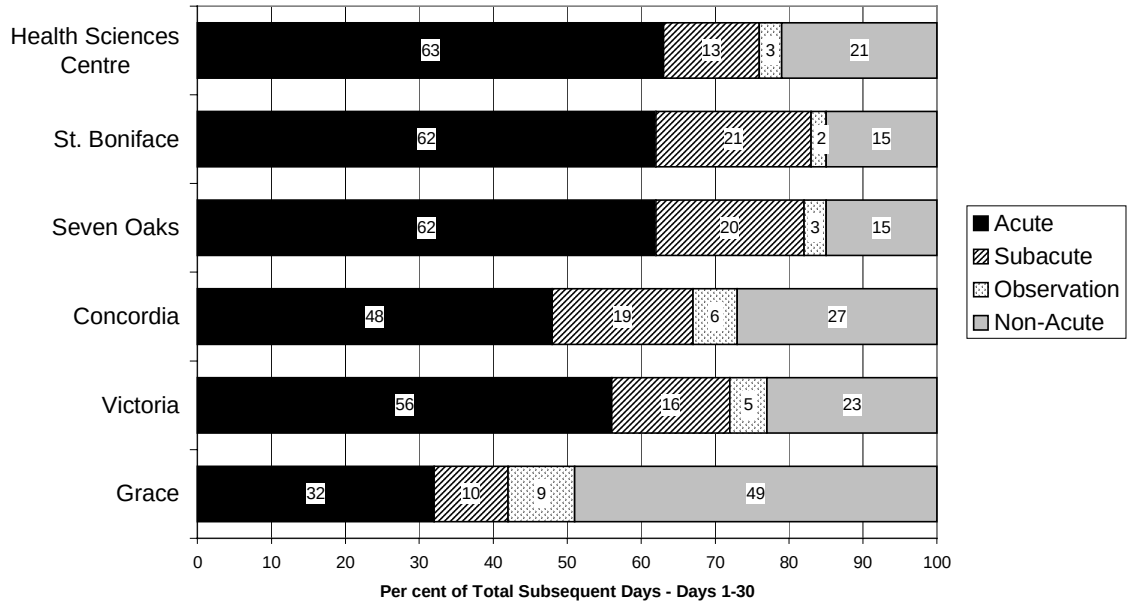


Figure 10b: Level of Care on Subsequent Days for All Patients - All Hospitals, Winnipeg, 1998/99



The proportion of subsequent days in hospital by short-stay patients assessed as acute, subacute, observation or non-acute is displayed by hospital in Figure 11.

Figure 11: Proportion of Subsequent Days for Short-Stay Patients Assessed as Acute, Subacute, Observation and Non-Acute by Hospital, Winnipeg, 1998/99



The difference in total acuity for subsequent days in hospital between short-stay patients and all patients, regardless of length of stay, by hospital is found in Table 3. Total acuity was greater for short-stay patients than for all patients at all hospitals except the Grace, for which total acuity for subsequent days remained essentially unchanged. The range of difference in total acuity between short-stay patients and all patients ranged from 8% at Seven Oaks to 24% at the Concordia Hospital (among the hospitals that observed a statistically significant difference in overall acuity).

Table 3: Difference in Total Acuity for Subsequent Days Between Short-Stay and All Patients by Hospital, Winnipeg, 1998/99

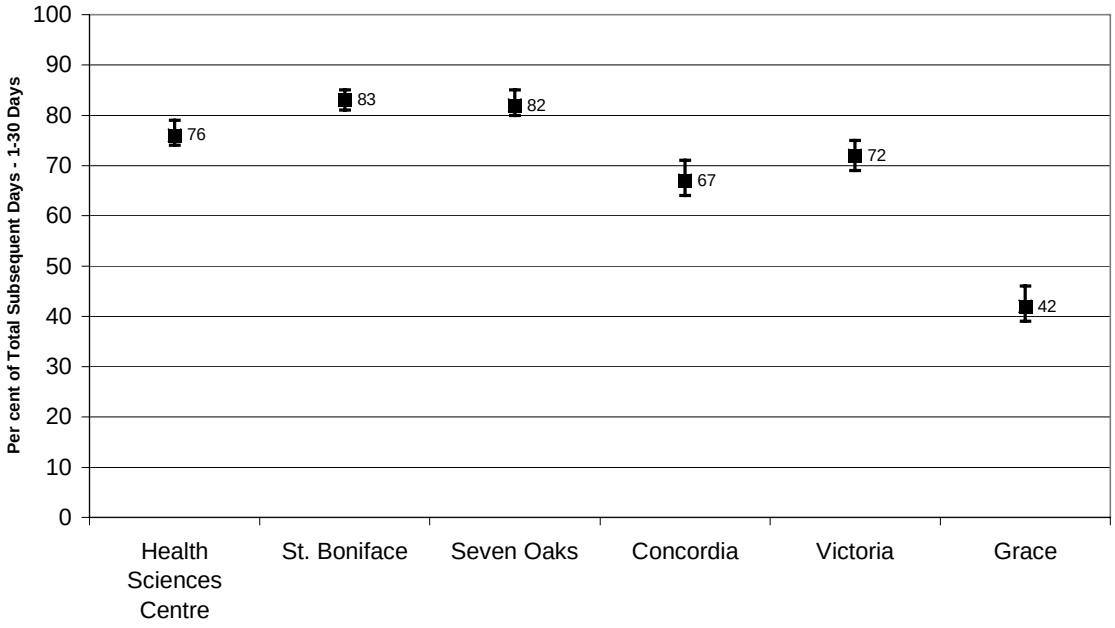
	Total Acuity		
Hospital	Short-Stay Patients	All Patients	Percentage Difference
Health Sciences Centre	76%	59%	17%*
St. Boniface	83%	62%	21%*
Seven Oaks	82%	74%	8%*
Concordia	67%	43%	24%*
Victoria	72%	55%	17%*
Grace	42%	40%	2%

*statistically different

Total acuity for subsequent days in hospital by short-stay patients, with confidence intervals, is displayed for each hospital in Figure 12. Total acuity for subsequent days at Winnipeg acute care hospitals ranged from 83% at St. Boniface General Hospital to 42% at the Grace. The total acuity level for subsequent days in hospital by short-stay patients was greater at the Winnipeg teaching hospitals than at the Concordia and Grace General Hospitals. The level of acuity at Seven Oaks General Hospital was similar to the teaching hospitals, while total acuity at the Grace General Hospital was significantly lower than all other hospitals.

Total acuity for subsequent days in hospital by short-stay patients at the Seven Oaks General Hospital was similar to the levels at the two teaching hospitals. While a sampling bias may have contributed to the high total acuity levels at Seven Oaks when long-stay patients were included in the analysis, the effect of the sampling bias was removed when only short-stay patients were considered. Therefore, the high level of acuity for short-stay patients suggests that Seven Oaks may be operating more similarly to the teaching hospitals than any of the other community hospitals.

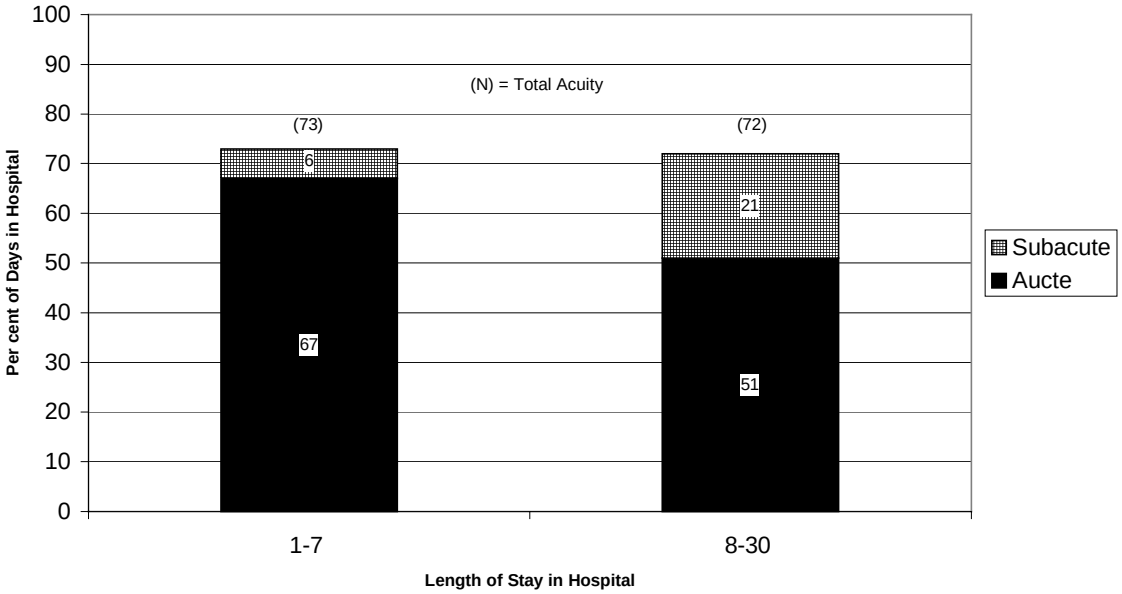
Figure 12: Total Acuity on Subsequent Days for Short-Stay Patients by Hospital, Winnipeg, 1998/99



3.5 Further Examination of Short-Stay Patients

Thus far we have considered short-stay patients as a group, however, it may be that the nature of the illnesses experienced by patients in hospital from 1-7 days is different from those in hospital for at least 8 days but not longer than 30 days (i.e., from 8-30 days). We therefore investigated how the care for these two groups of patients was managed at Winnipeg hospitals by comparing the proportion of days spent in hospital by each group that were assessed as either acute or subacute (Figure 13).

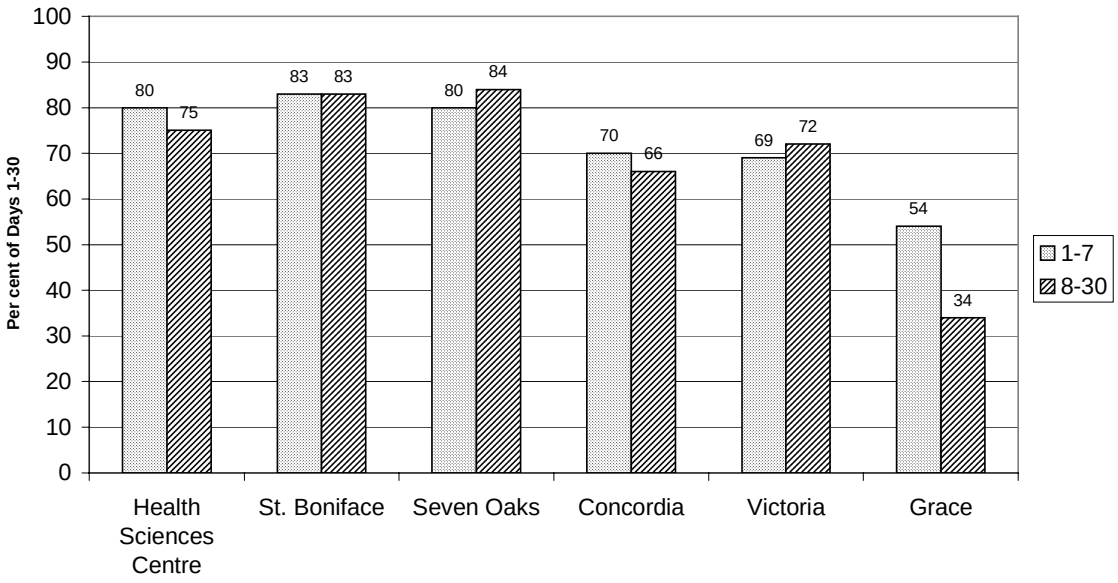
Figure 13: Proportion of Days in Hospital Assessed as Acute and Subacute for Patients with Lengths of Stay from 1-7 Days and 8-30 Days - All Hospitals (Per cent), Winnipeg, 1998/99



Total acuity for each patient group was virtually identical. Seventy-three per cent (73%) of days spent in hospital by patients with lengths of stay from 1-7 days were assessed as either acute or subacute, and 72% of days spent in hospital by patients with lengths of stay from 8-30 days were assessed as either acute or subacute. The proportion of days assessed as subacute is greater for the group with lengths of stay from 8-30 days compared to the group with length of stay from 1-7 days. This finding is consistent at each of the Winnipeg hospitals.

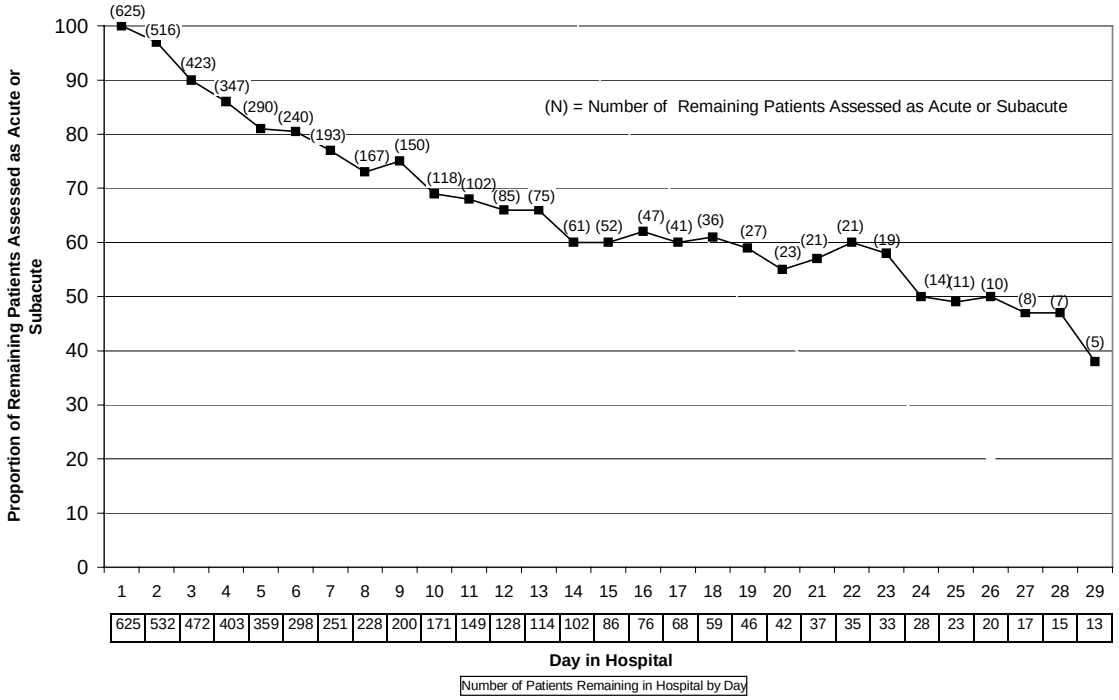
The total acuity for the two groups of patients is displayed by hospital in Figure 14. Total acuity at all Winnipeg acute care hospitals was similar for the two patient groups with the exception of the Grace hospital where the level of acuity decreased from 54% for patients with lengths of stay from 1-7 days to 34% for patients with lengths of stay from 8-30 days. Thus it appears that, with the exception of the Grace hospital, Winnipeg hospitals were managing both groups of short-stay patients with similar efficiency, although differences in total acuity are noted among hospitals.

Figure 14: Total Acuity for Patients with Lengths of Stay from 1-7 Days and 8-30 Days by Hospital (Per cent), Winnipeg, 1998/99



We repeated the earlier analysis examining changes in total acuity over time (see Figure 9), for short-stay patients. As in the previous analysis, only those patients who were assessed as either acute or subacute on the day of admission were included. We determined the proportion who were still acute or subacute on day 2, day 3, etc. up until day 29 (Figure 15). (Because of small numbers the data for day 30 were suppressed).

Figure 15: Total Acuity for Short-Stay Patients Assessed as Acute or Subacute on Day of Admission by Day in Hospital, Winnipeg, 1998/99



As with the previous analysis, the number of patients included in the analysis is not uniform throughout the time frame and is represented by the numbers in the box under the day in hospital (arrayed on the x-axis). For example, a total of 625 short-stay patients were assessed as acute or subacute on the day of admission (i.e., day 1) and formed the group under study. By day 29, 13 of the original 625 patients remained in hospital. The numbers in parentheses associated with each point on the graph line represent the number of patients assessed as either acute or subacute on any particular day (e.g., on day 29, 5 of the 13 patients remaining in hospital were assessed as either acute or subacute).

Total acuity for short-stay patients decreased steadily from day 1 through day 29. When comparing the results presented in Figures 10 and 11 with those in Figure 15, it may seem odd that the total acuity for patients with lengths of stay from 8-30 days (72%) was so similar to that of patients with lengths of stay from 1-7 days (73%) given the steady decrease in acuity over time presented in Figure 15. The reason for the apparent inconsistency is that the analyses presented in Figures 13 and 14 are based on the total numbers of *days* patients spent

in hospital while Figure 15 is based on the number of *patients* assessed as acute or subacute on any given day. By day 10, 454 (or 73%) of the original 625 patients had already been discharged, leaving 171 of the original study group in hospital. Therefore, when the total acuity drops below 70% for the first time on day 10, less than 30% of the original study group remains in hospital. In other words, as the length of time in hospital increases there are fewer and fewer patients contributing to the total number of days for each patient group. Because the majority of patients were discharged prior to the point when total acuity dropped below 70%, the majority of *days* spent in hospital were assessed at the acute and subacute levels. Nevertheless, Figures 9 and 15 graphically depict the decreasing proportion of patients in hospital assessed as acute over time. Interestingly, the percentage of remaining patients assessed as acute reaches 50% by day 24, similar to the analysis which included long-stay patients.

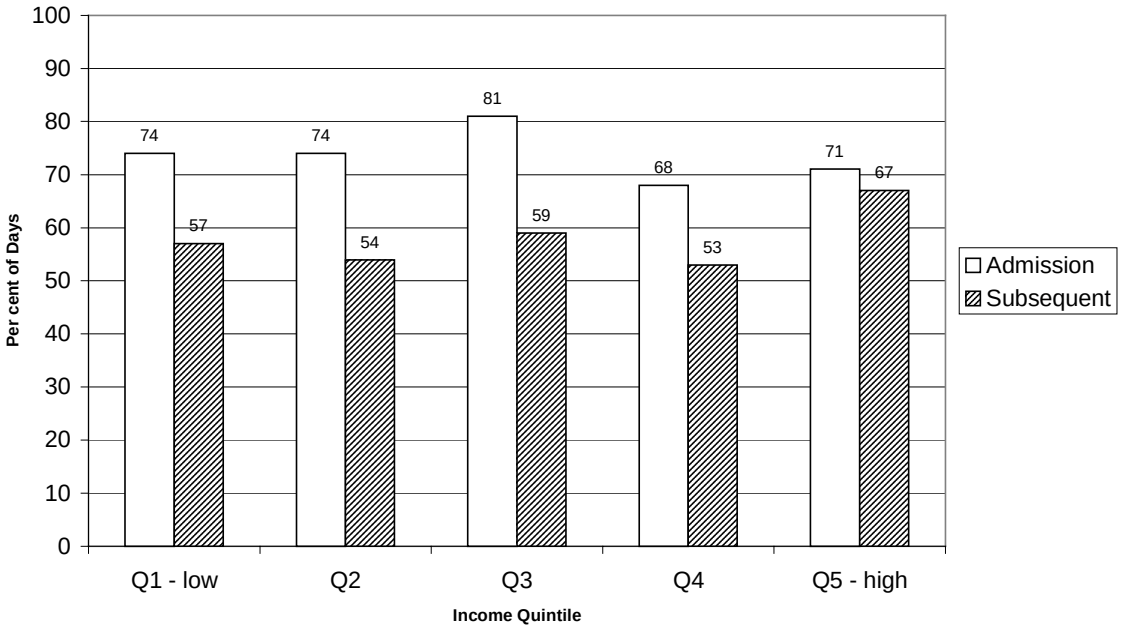
3.6 Total Acuity by Income Status[6]

Analyses undertaken by MCHPE have demonstrated that individuals of lower socioeconomic status have higher rates of admission to hospital and spend more days in hospital than those of higher socioeconomic status (Brownell, Roos and Burchill, 1999). Concern has been expressed about the possibility of greater proportions of "social admissions" among those of lower socioeconomic background compared to those of higher socioeconomic status. In the context of this study, a "social admission" would likely be assessed as non-acute and requiring an alternate level of care, because the patient would not be receiving the types of treatments and services required to be assessed as acute or subacute. We investigated total

[6] This analysis is based on Winnipeg residents only. The acuity estimates for rural quintiles are not included because the small number of non-Winnipeg residents included in the sample (12% of total cases and 7% total days), resulted in unstable estimates.

acuity on admission and for subsequent days in hospital by income quintile, a measure of socioeconomic status (Figure 16).[7]

Figure 16: Total Acuity by Income Quintile for Admissions and Subsequent Days - Winnipeg Residents, 1998/99



Total acuity on admission ranged from 68% to 81% across quintiles and was essentially the same for those in the lowest income quintile (74%) as for those in the highest income quintile (71%). Total acuity for subsequent days in hospital among those in the lowest and highest income quintiles was 57% and 67%, respectively, and among those in the first four income quintiles, it was very similar, ranging from 53% to 59%. The level of acuity for subsequent days in hospital was greatest among those in the highest income quintile; however, those in the lowest quintile were not different from those in the middle quintiles suggesting that the

[7] Income quintiles are based on postal codes which have been sorted by average household income value (lowest to highest income). This information is based on publicly available census data from 1996 that provided household income at the Enumeration Area level. Postal code population values were classified by average income from lowest to highest, so that approximately 20% of the population was present in each quintile.

proportion of non-acute days in hospital is not substantially greater among people of a particular socioeconomic standing.

As in previous analyses, we found individuals from lower socioeconomic background had greater numbers of admissions and days in hospital than those from the higher quintiles. The number of admissions decreased by quintile and ranged from 211 admissions in the lowest quintile to 107 admissions in the highest quintile. The days in hospital also decreased by quintile and ranged from 2906 among those in the lowest quintile to 1178 among those in the highest.

3.7 Overall Acuity During a Peak Flu Period[8]

Previous analyses at MCHPE have demonstrated seasonal patterns in the number of patients in hospital at Winnipeg acute care hospitals (Menec et al. 1999). In examining patterns of hospital use from 1987/88 through 1997/98, Menec et al. (1999) found that high-pressure periods leading to bed shortages consistently occurred during the winter months (any time between December and April). These high-pressure periods were driven by emergent/urgent medical patients and coincided with increases in influenza-associated illnesses. MCHPE recently examined in greater detail the impact of influenza-like illnesses[9] on the Winnipeg hospital system and found a substantial increase in the average daily number of patients in hospital with influenza-like illnesses from December 26, 1998 through January 29, 1999 (Menec et al. 2001). The pressure placed on the hospital system peaked during the week of

[8] The definition of medical patients used by Menec et al. (1999, 2001) is different from that employed in this research. In this research, medical patients were defined using hospital service codes which are categories of physician practice specialties. Menec defined medical patients using Diagnostic Related Groupings (DRGs), which are groupings of medical diagnoses that are based on the diagnosis that was considered to be most responsible for the patient's stay in hospital. The effect of this difference is that each method may include patients that the other method would not. For example, using service codes we were able to include some diagnoses that we wouldn't using DRGs (e.g., dementia). However, when DRGs are used one may include patients on a service other than a medical service (e.g., geriatrics).

[9] Influenza-like illnesses were defined through three respiratory diagnostic categories: (1) pneumonia and influenza (ICD-9-CM codes 480-487), (2) acute respiratory diseases (codes 460-466): and (3) chronic obstructive pulmonary disease and allied conditions (codes 490-496).

January 2-8, 1999 when the average daily number of medical in-patients with influenza-like illnesses peaked at 258, an increase of 155% from the daily average of 101 patients during the non-flu pressure period (Figure 17). This peak in influenza-like illnesses contributed to an overall increase in the number of emergent/urgent medical in-patients. During the week of January 2-8, 1999 the total number of emergent/urgent medical in-patients rose to 1170 patients in hospital per day from an average of 970 during the non-flu pressure period (a 21% increase) (see Figure 18). Thus, it is apparent that influenza-like illnesses placed considerable pressure on the hospital system during this particular week in January 1999. Headlines in the Winnipeg Free Press that week also pointed to the strain the system was under:

Winnipeg Free Press

January 5, 1999

"Weather floods emergency rooms, delays surgery"

January 8, 1999

"No room for dignity in ERs hallways"

Figure 17: Defining Hospital Flu Pressure Periods vs. Non-Flu Pressure Periods, Winnipeg, 1998-99

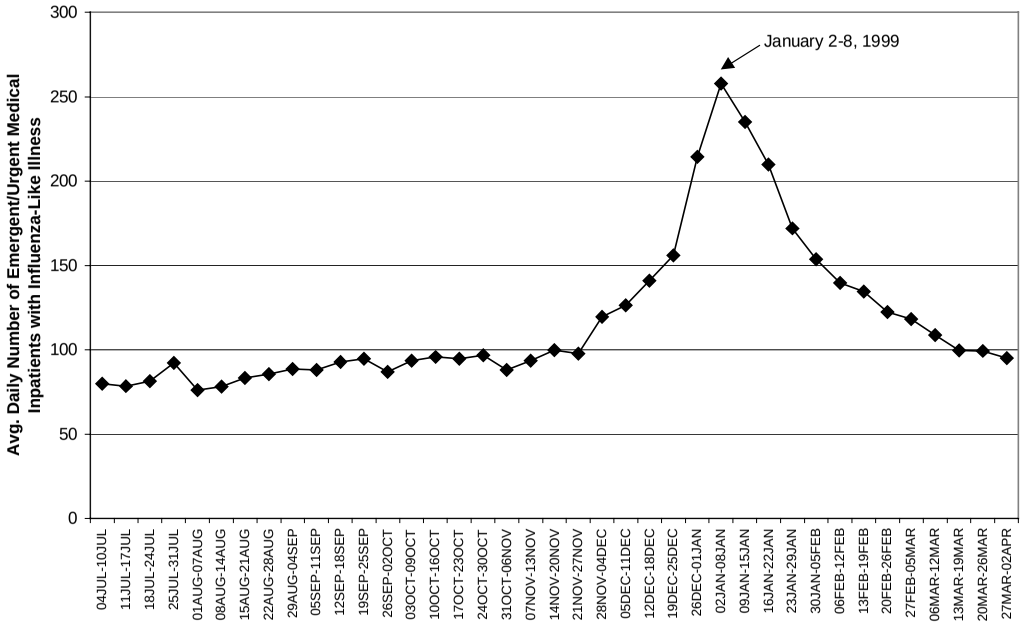
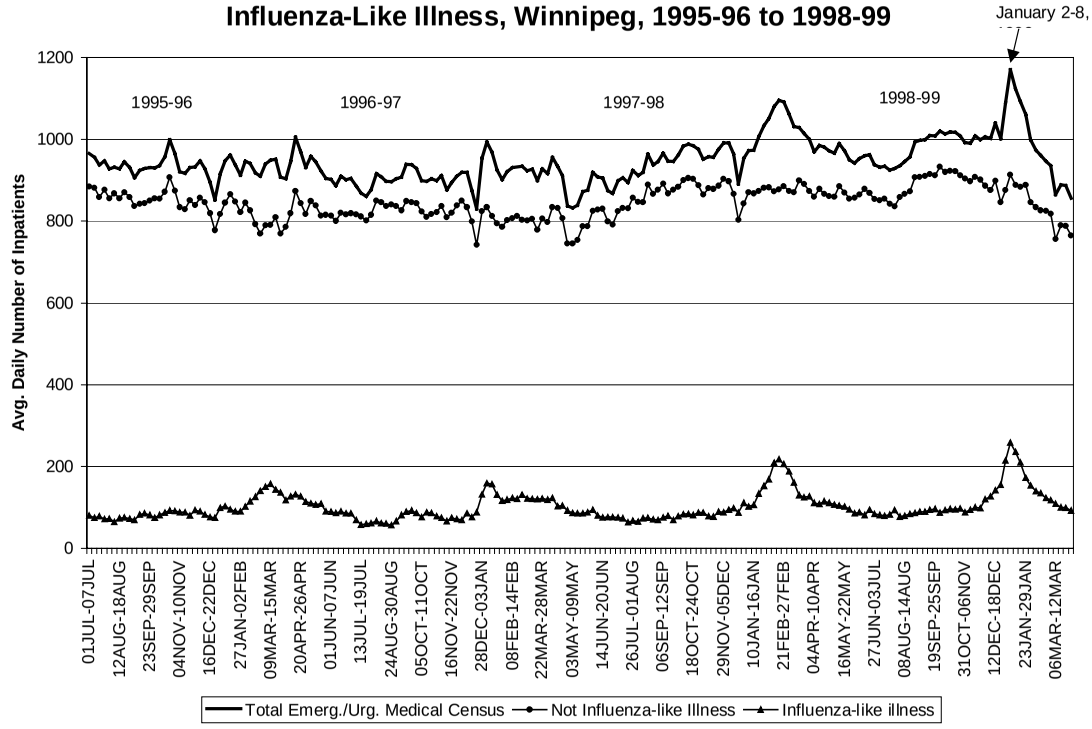
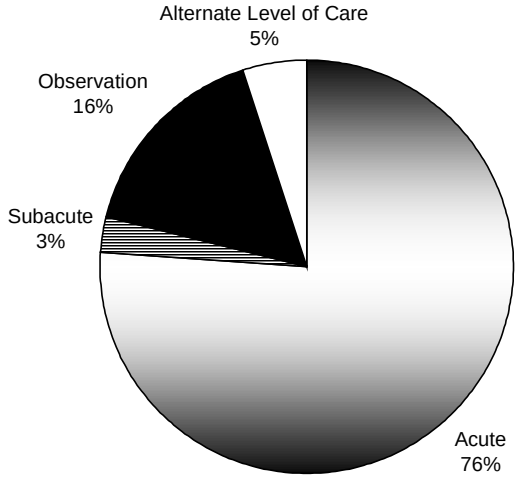


Figure 18: Average Daily Census for Patients with/without Influenza-Like Illness, Winnipeg, 1995-96 to 1998-99



Because our study year encompassed the peak flu period in January 1999, we selected an additional sample of hospital records to determine the total acuity of patients in Winnipeg hospitals during this week. The first group of 75 medical records consisted of patients admitted to hospital during the week of January 2-8 and whose length of stay did not exceed 30 days. The level of care on the day of admission was determined for these 75 patients. A second group of 75 medical records was selected and consisted of patients who were admitted to hospital prior to January 2, had a hospitalization of at least 8 days but not greater than 30 days, and remained in hospital for some portion of the week of January 2-8. Because the impact of the peak flu period was experienced system-wide, we chose these samples across all six hospitals and report system-wide estimates only.

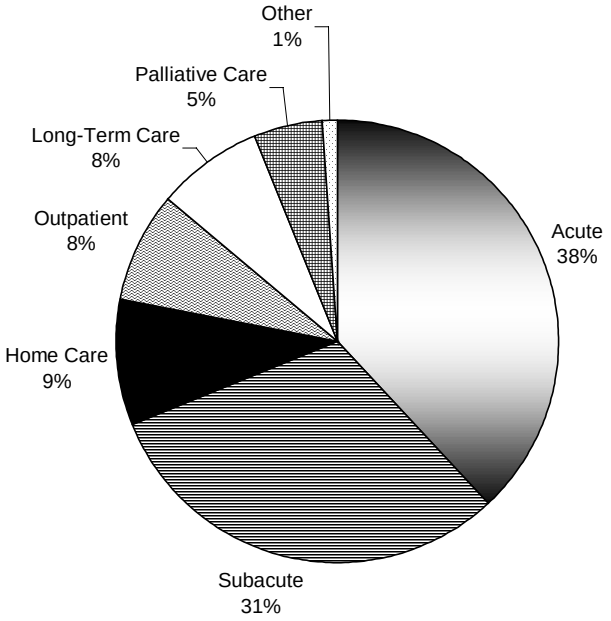
Figure 19: Level of Care on Admission For Week of January 2-8, 1999
Winnipeg



The level of care on the day of admission for those patients admitted during the week of January 2-8, 1999 is found in Figure 19. The total acuity during this period was 79% (76% acute and 3% subacute). Sixteen per cent (16%) of admissions required the services provided in an observation setting, and 5% of admissions during this time period were assessed as non-acute and requiring an alternate level of care.

The levels of care required during the week of January 2-8 for those who were admitted prior to January 8 are presented in Figure 20. Recall that we excluded from this review patients who were in hospital during this period but whose hospitalizations were longer than 30 days. Individuals with hospitalizations of greater than 30 days were excluded because we had found in previous work that the acuity level was considerably lower for long-stay than short-stay patients (DeCoster et al., 1996). The total acuity for the sample during this week was 69% (38% acute and 31% subacute). Thirty-one per cent (31%) of patient-days during this week were assessed as non-acute and requiring an alternate level of care; 17% of patient-days required some form of out-of-hospital services (9% home care and 8% outpatient services), 8% required a long-term care facility and 5% required a palliative care setting. Thus, during this time of hospital overcrowding 31% of patient-days on acute care medical wards were accumulated by patients who did not require the level of care found in acute care hospitals and could have been more appropriately cared for in some alternate setting. It is important to recall that the patients included in these samples (just as the larger main study sample) occupied acute care medical beds; patients resident in designated long-term care beds did not form part of the sample. Thus, during a week of intense pressure on the hospital system, almost one-third of medical beds were occupied by patients who could have been cared for in their homes, or some alternate settings. More efficient organization of non-acute services and discharge of non-acute patients would have freed up beds for acute patients housed elsewhere in the hospitals.

Figure 20: Level of Care for Week of January 2-8, 1999, Winnipeg



3.8 Long-Stay Patients

Long-stay patients, those who remain in hospital for more than 30 days, comprised only 10% of our study population but contributed 55% of the total number of hospital days (these proportions are representative of all medical separations from the six Winnipeg acute care hospitals for the 1998/99 fiscal year). As described above, the proportion of days assessed as non-acute and requiring an alternate level of care was significantly greater when long-stay cases were considered (42%), than when only short-stay cases were examined (24%). This suggests that a large portion of long-stay patients' hospitalizations may be non-acute and that these patients could perhaps be better cared for in an alternate setting. Previous research at MCHPE has revealed that certain patient characteristics such as main diagnosis (e.g., stroke) and treatments (e.g., rehabilitation, dialysis), discharge destination (PCH versus home) and the hospital of stay all contributed to longer lengths of stay in hospital (DeCoster and Kozyrskyj, 2000). However, this research was not able to distinguish between acute and non-acute portions of long-stay hospitalizations. Using the InterQual™ criteria we had the ability to distinguish between periods of each hospitalization that were assessed as either

acute or subacute and non-acute. Our objective was to review, in-depth, a small number of long-stay hospitalizations to identify and describe the factors associated with continued stay in hospital once patients were assessed as non-acute. Seventy-five long-stay hospitalizations from the entire sample of 900 medical records were identified for inclusion, and 58 of these records were available for review during the data abstraction period.

3.8.1 Methods

A pilot review of 30 long-stay hospitalizations at one of the Winnipeg teaching hospitals was completed by one of the authors (SB) in January 2000. The purpose of the pilot review was to determine the type and quality of information that was available in patient medical records regarding discharge planning, and to identify factors which contributed to long-stays. The pilot review was successful in identifying broad factors associated with long hospital stays. The quality of information available in patient records was variable, however, a substantial amount of documentation pertaining to discharge planning was available in the majority of records. Based on the pilot review a data abstraction instrument was developed which guided data collection for the main study. The abstraction instrument contained the following types of information:

Patient History – age, sex, reason for hospitalization, past medical history, type of residence prior to admission, discharge destination, and functional status prior to admission;
Course in Hospital – consultations (specialty consulted, date consulted, date seen), treatments received (e.g., blood transfusions, dialysis), in-hospital events (e.g., falls), and status reports;
Discharge Planning – abstractors recorded dates and details of all discussions regarding discharge including when discharge plans were first discussed and initiated, disciplines involved in the discharge plans, dates arrangements initiated, dates services in-place, date of panelling (assessment by a review panel to determine if care needs are at a level which require either a Personal Care Home or chronic care facility), role of family in discharge plans, and any barriers to discharge.

The abstraction instrument was developed into an Access Database format, which allowed abstractors to enter data directly into a laptop computer. Qualitative content analysis was

completed to develop categories of reasons for long hospital stay. In addition to the qualitative component, non-acute days were quantified into the corresponding broad qualitative categories.

3.8.2 Results

A total of 58 long-stay hospitalizations were reviewed. An equal number of male and female patients were included (29 of each). The ages of patients included in the review ranged from 21-98 years. The mean and median ages of patients included in the review were 77 and 80.5 years, respectively. The majority of patients (48/58 or 83%) were admitted to hospital from home. Twenty-one patients (36%) were functioning independently prior to their admission, meaning they were independent in the management of their activities of daily living and were not receiving any outside services such as home care. Twenty-seven patients (47%) were receiving the services of home care, and 6 (10%) were dependent on their spouses and/or other family members for care. Twenty-three patients (40%) were discharged home at the end of their hospitalization, 10 (17%) were discharged to a Personal Care Home (PCH), six were discharged to an Interim PCH bed, and six died in hospital.[10]

The total number of in-hospital days for this group of 58 patients was 4,711. The length of stay ranged from 31 to 500 days. The mean and median lengths of stay were 81 and 56 days, respectively. Forty per cent (1866/4711) of the total in-hospital days were assessed as either acute or sub-acute, and 60% (2845/4711) of in-hospital days were assessed as non-acute and requiring services provided in an alternate setting. The remainder of the discussion relates to the 60% of days assessed as requiring an alternate level of care.

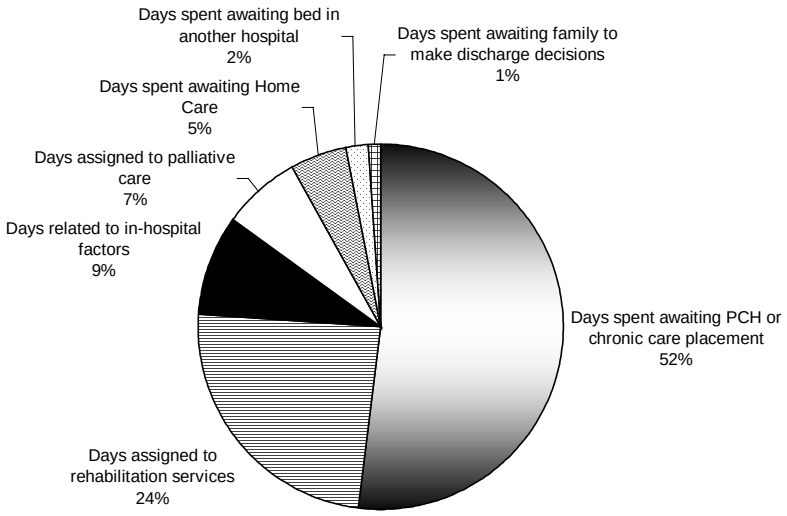
Content analysis was completed on the notes found in patient medical records pertaining to discharge planning. Four major categories of factors associated with non-acute extended stays in hospital were derived:

1. Patients receiving rehabilitation and assessment for appropriate discharge destination;

[10] The functional status and discharge destination of some patients included in the subgroup has been suppressed because of small numbers.

2. Medically stable patients for whom the discharge process had begun and who were:
    (a) awaiting panelling
    (b) awaiting placement, post-panel
    (c) awaiting arrangement of home care services and/or community placement,
    (d) awaiting family to make decisions regarding discharge, and
    (e) awaiting a bed in a non-panel situation (e.g., another hospital)
3. Medically stable patients remaining in hospital because of in-hospital factors;
4. Patients receiving palliative care.

Figure 21: Factors Associated with Non-Acute Days Spent in Hospital by Subset of Long-Stay Patients - All Hospitals, Winnipeg, 1998/99 (58 Patients and 2,845 Non-Acute Days)



The factors associated with non-acute days spent in hospital by this subset of long-stay patients is graphically depicted in Figure 21.

Patients Receiving Rehabilitation and Assessment For Appropriate Discharge Destination – Twenty-four per cent (676/2845) of the non-acute days were assigned to patients receiving rehabilitation services provided by physiotherapy to increase strength and endurance prior to discharge. These patients were also being assessed by services such as occupational therapy, geriatrics and home care to determine functional status for a safe discharge location.

Medically Stable Patients For Whom the Discharge Process had Begun - This group of patients was determined by medical staff to be medically stable and discharge arrangements were therefore started. Abstractors recorded notes by medical staff on each patient's status, and the majority of records contained notes by physicians indicating when a patient was medically stable.

- Awaiting Panelling and Placement Post-Panelling: In the majority of patient records, the dates when assessments for panel were completed and submitted were recorded. At least 14% of all non-acute days were spent after forms for panel were submitted and patients were awaiting the decision of the panelling process. A further 38% of non-acute in-hospital days were spent awaiting placement in either a Personal Care Home or chronic care unit once the patient had been accepted at panel. Because the panel date was not available on a small number of patient records, it may be more accurate to report that 52% of non-acute days were spent awaiting placement to PCH or chronic care unit.
- Awaiting Home Care Services and/or Community Placement: Five per cent (149/2845) of non-acute in-hospital days were spent awaiting home care services to be arranged or for some other form of community placement to become available (e.g., supportive housing).
- Awaiting Family to Make Decisions Regarding Discharge – One per cent of non-acute days (34/2845) were spent waiting on family to make decisions regarding the discharge plans for the patient. Days were assigned to this category only when notes in the patient record indicated that formalization of discharge plans was being held pending discharge decisions by family.
- Awaiting a Bed in a Non-Panel Situation – Two per cent of non-acute days were spent awaiting beds in another hospital.

Medically Stable Patients Remaining In Hospital Because of In-Hospital Factors – Nine per cent (255/2845) of non-acute days were determined to be the result of in-hospital factors such as delays in response to consultations, and time spent waiting for diagnostic tests, treatments and procedures. The determination that a response to a consult was delayed was based on notes in the patient's record. For example, days would only be assigned to this segment of the category when there was an accompanying note in the patient record indicating that a

particular care giver perceived the response by another professional member to be slow. Another aspect to this category concerns patients who did not receive the level of services required to be considered acute or subacute and remained in hospital awaiting some form of diagnostic test or a treatment or procedure. Examples of diagnostic tests include biopsy, bronchoscopy, and angiogram. Patients also remained in hospital awaiting coronary bypass surgery, and outpatient radiation therapy at another facility.

Patients Receiving Palliative Care – Seven per cent of non-acute days (198/2845) spent in acute care medical beds were assigned to patients who required in-hospital palliative care services.

For this random group of long-stay patients, 60% of days spent in hospital were non-acute. Fifty-two per cent of these non-acute days were spent waiting for panelling and placement. Recall that an alternate level of care was assigned when there were notes in the patient's record indicating that the panelling process had begun. Therefore in calculating the percentage of days spent waiting for panelling and placement, we included only those days in hospital which followed a note in the patient record indicating that the panel process had begun (e.g., physician forms had been completed and submitted), or that the patient had been accepted at panel. This value translates into a large number of days spent on medical wards by patients awaiting transfer to a Personal Care Homes or chronic care units. An additional 5% of non-acute days were spent awaiting home care services to be arranged. Another interesting finding, is that 9% of non-acute days spent in hospital were determined to be due to in-hospital factors, such as delays in response to consults and waits for diagnostic testing and treatment. While we cannot be certain that the proportion of days attributed to the various factors associated with long hospitalizations identified above are representative of the larger universe of long-stay patients from which our study group was drawn, we are confident that we have captured, through qualitative analysis, the main factors associated with long-stays throughout the Winnipeg hospital system for this sample.

4.0 DISCUSSION

The focus of this research was on medical patients receiving care on acute care medical wards in Winnipeg hospitals. We defined medical patients on the basis of primary service codes which are categories of medical practice specialties (e.g., internal medicine, family medicine, cardiology). We excluded from our sample services which were not specific to acute care medicine (e.g., geriatric medicine, rehabilitation). Therefore, the results presented in this report are specific to medical patients who received their care on acute care medical units and did not include patients who received their care in some form of long-term care facility located within acute care hospitals. However, some long-stay patients included in the sample began their hospitalizations on acute care medical wards and later transferred to a long-term care unit, such as geriatric rehabilitation, prior to discharge. Because we were interested in the acuity level of patients on acute care units, we determined total acuity for subsequent days in hospital when days spent on long-term care units were removed from analyses . Removing days spent on long-term care units did not significantly alter the estimate of total acuity for subsequent days in hospital, most likely because of the small proportion of in-hospital days that were spent on long-term care units. In addition, some medical patients spent time on surgical wards either as a result of having some type of surgical procedure or because of overcrowding on medical wards. However, this was limited to a small proportion of all hospital days. Therefore, we are confident that the results presented in this report refer to medical patients who received care on acute care medical units.

4.1 Acuity on Admission

The total acuity for patients on the day of admission across all six hospitals was 76% (71% acute and 5% subacute). This level of acuity on admission is quite high compared to earlier reviews in Canada for which acuity on admission ranged from 25-50%, but is similar to the estimates reported by the Ontario study group for medical admissions to Ontario hospitals in 1997 (JPPC, 1997). The total acuity on admission for the five medical diagnoses studied by the Ontario group ranged from 75% to almost 100% by peer group (hospitals of different types and sizes were grouped into one of seven groups).

The results of our present study cannot be directly compared to most of the previous Canadian reports that used the InterQual™ ISD instrument, because medical patients were defined and selected differently and we used the most current (and more strict) version of the InterQual™ ISD acute care criteria. In addition we used the subacute criteria which were only used previously by the Ontario group. However, there are some similarities between our study and the Ontario study that may allow for general comparisons. For example, the sample reviewed in our study included the diagnoses the Ontario group reviewed, both studies used the subacute criteria, and both studies measured acuity on admission and for continued stay in similar ways. In addition, the version of the utilization review instrument used in our study is similar to, but more stringent than the 1996 version, essentially eliminating the possibility of an over-estimation of acuity when compared to the Ontario study. Therefore, the estimate of total acuity on admission for medical patients admitted to Winnipeg acute care hospitals in 1998/99 is congruent with the most recent utilization review completed at another Canadian site when different methods are taken into account.

While the total acuity on admission to Winnipeg acute care hospitals in 1998/99 was 76%, considerable variation was found among hospitals. The proportion of patients assessed as acute or subacute on the day of admission at the Health Sciences Centre was 89%, while at the Grace hospital only 55% of patients on the day of admission were assessed as either acute or subacute. In general, total acuity on admission was significantly greater at teaching hospitals than at the community hospitals, with the exception of Seven Oaks General Hospital for which acuity on admission was similar to the teaching hospitals and significantly greater than the other three community hospitals.

An interesting finding was that almost 20% of patients on the day of admission were assessed as requiring the services of an observation unit. The purpose of an observation unit is to provide assessment, diagnosis, and treatment to non-emergent patients who present to hospital and the cause of their distress is not readily apparent. The length of a patient's stay in an observation unit is usually limited to approximately 24 hours, during which time diagnostic tests and assessments are completed and the cause of the patient's distress is determined. Within this 24 hour period a decision is usually made as to whether the patient

is stable enough for discharge home or if the patient requires admission to a care unit within the hospital.

Substantial variation in the proportion of admissions that required an observation unit was found among hospitals. Fewer admissions were assessed as requiring an observation unit at the teaching hospitals and Seven Oaks hospital (approximately 10%) than at the three other community hospitals. The proportion of admissions that required an observation unit ranged from 21-33% at the Concordia, Victoria and Grace hospitals. Eighty per cent (80%) of patients who were assessed as requiring the services of an observation unit on the day of admission received their care in either the emergency room or the observation unit on that day, while 20% were admitted to an acute care medical unit. These results are particularly interesting as the WRHA is currently examining the role of observation units in Winnipeg acute care hospitals. There is a perception that observation units, as currently configured, are not functioning well. However, it is clear that a substantial proportion of patients who presented to hospital in 1998/99 did not require admission to an acute care unit on that day, but required a setting in which assessment and determination of severity of illness could be provided. What is also clear, is that in 1998/99, this type of care was provided in Winnipeg hospital emergency units and observation units. Given the reports of hospital overcrowding and pressures on emergency rooms, and the perception that observation units are not functioning well, the group of patients who were assessed as requiring an observation unit on the day of admission warrant further study. A follow-up study to this report, *Options For Managing Patients who Require Observation in Winnipeg Acute Care Settings*, will focus in more detail on these patients, and may help inform the way observation units could be optimally structured.

4.2 Acuity for Subsequent Days in Hospital

In 1998/99, 55% of the days medical patients spent in hospital after the day of admission were assessed as either acute or subacute, and 42% of all subsequent days in hospital were spent by patients who did not require the services of an acute care setting. Wide variation was found among the six hospitals on total acuity for subsequent days in hospital (40%-

74%). Given the discussions and media reports in recent years about bed shortages, waiting lists, Emergency Room closures and "hallway medicine", these results suggest that there is room for treating more acute patients within the existing system. It is evident that in 1998/99, medical wards at Winnipeg acute care hospitals were not filled to capacity with acute medical patients. Therefore, shortages of acute care medical beds were no doubt also related to how non-acute patients were managed and how discharge was arranged.

4.2.1 Seven Oaks

Total acuity for subsequent days at Seven Oaks was similar to that of the teaching hospitals. Seven Oaks has been actively involved in utilization management since 1991. Some of the measures include physician bed managers, use of a utilization review instrument and CareMaps®. CareMaps are comprehensive standardized care plans that were developed to improve quality of care and decrease length of stay. Twenty-five CareMaps are currently in use at Seven Oaks (and were in use in 1998/99) in the following areas and departments: emergency, observation, intensive care, medicine, surgery, geriatrics and the geriatric day hospital. The use of these tools has improved care practices and patient outcomes. For example, use of the CareMaps has eliminated unnecessary testing, resulted in the use of agreed upon drug protocols and decreased length of stay for all patient types (Berry, Cranston, and Fox, 2000). While we cannot discount the effect the sampling bias had on the estimates of total acuity at Seven Oaks, it is likely that the utilization management efforts contributed to high levels of acuity at this hospital. The use of CareMaps in the Emergency department and observation unit may also have contributed to the high level of acuity on admission at this hospital. Standardized care plans may be the model for other hospitals to follow in order to decrease the proportions of non-acute admissions to and days spent in acute care settings. The WRHA is currently in the process of developing standardized care plans to be used across the Winnipeg hospital system.

4.2.2 Long-Stay Patients

The largest proportion of non-acute subsequent days in hospital (i.e., those days that were assigned an alternate level of care) were assessed as requiring some type of long-term care facility. Long-stay patients were responsible for the majority of these days. Examination of

a subset of long-stay cases revealed that the majority of non-acute days were spent awaiting panel or placement.

A number of changes have occurred in the Winnipeg health care system since 1998/99 that may have an effect on the length of time long-stay patients remain in acute care settings awaiting placement in Personal Care Homes and chronic care facilities. In April 1999, the Misericordia General Hospital changed function from an acute care institution to a mixed-use facility. Part of the change involved the gradual (from December 1998 through March 1999) inclusion at the facility of 194 interim Personal Care Home (PCH) beds. These interim beds are for patients who have been panelled and are awaiting placement at a Personal Care Home. Rather than waiting in acute care centres, patients are now transferred to Misericordia Health Centre where they receive care in an environment that is more appropriate to their needs. In addition, since the end of the study period on March 31, 1999, 295 Personal Care Home beds have been opened in Winnipeg.

WRHA has therefore undertaken significant efforts to decrease the length of time long-stay patients remain in hospital waiting for placement to long-term care institutions. Our review of data indicates that the rate of hospital days used by long-stay medical patients per 1000 Manitoba residents decreased by 1%-3% annually from 1995/96 through March 2000. This corresponds to a decreasing average length of stay for medical long-stay patients over the same time frame (i.e., 87.9 days in 1995/96; 75.6 days in 1998/99; 72.1 days in 1999/00). However, the rates of separation of long-stay medical patients per 1000 Manitoba residents increased in 1998/99 and 1999/00 compared to 1995/96. In other words, the numbers of long-stay patients in Winnipeg acute care hospitals increased but the length of time they remain in hospital decreased. Long-stay medical patients continue to use a substantial proportion of Winnipeg acute care hospital days; in 1998/99 and 1999/00, long-stay medical patients accounted for 41% and 44% of days spent in Winnipeg acute care hospitals by medical patients, compared to 39% in 1995/96.

It may be too early to assess with the available data whether the addition of interim and PCH beds has contributed to the decrease in the hospital days used and average length of stay in

hospital by long-stay medical patients. The proportion of hospital days used by long-stay medical patients remains high. In 1998/99 we found that a large portion of those days were non-acute and could have been spent in a more appropriate setting. By approximately the 20th day in hospital, we found that only 60% of patients in hospital who were assessed as acute on admission, remained acute. In other words, by day 20, fully 4 in 10 patients no longer required the services of an acute care setting. Concurrent utilization review, using an instrument such as InterQual™ ISD, could facilitate discharge planning through timely identification of patients who are ready for transfer or discharge.

4.2.3 Short-Stay Cases

While total acuity across Winnipeg hospitals in 1998/99 was substantially higher for short-stay patients (73%) than short-stay and long-stay patients combined (55%), almost one-quarter of days spent in hospital by short-stay patients were non-acute (23%). This translates into a large number of days spent in acute care settings by patients whose needs could have been better met in some alternate care setting. The largest proportion of these non-acute days were assigned to home care and outpatient services. Recall that the alternate level of care designations were assigned the first day the patient was assessed as non-acute. Using this method we were able to estimate the proportion of non-acute days spent in hospital by short-stay patients awaiting for services to be arranged. With respect to home care, almost 40% of the non-acute days spent in hospital by short-stay patients were spent awaiting home care services. While we acknowledge that organizing home care services is a complex process, a reduction in the number of non-acute days spent in acute care settings may potentially be achieved either through increases to home care staffing and/or changes in managing the services.

Twenty-five per cent (25%) of non-acute days spent in hospital by short-stay patients were assigned to the outpatient category. The majority of patients assigned to this category were in hospital awaiting diagnostic tests such as bronchoscopy, colonoscopy, angiogram, and biopsies. In our sample, non-acute patients spent from 1 to 12 days in hospital awaiting such tests. 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 out-patients.

Therefore, there is no incentive to discharge patients and have them wait for tests as an outpatient. In fact, the incentive is to keep patients in hospital, even when they are non-acute, because these patients will have their tests completed on a more timely basis. The current practice of managing waiting lists for diagnostic testing should be changed so that there no longer remains a disincentive to discharge non-acute stable patients.

We earlier identified that in 1998/99 50% of days spent in hospital by short-stay patients at the Grace were assessed as non-acute. Since the time of data abstraction, a new system of patient care delivery has been introduced at this institution, that being a group of physicians known as hospitalists. Hospitalists are physicians whose responsibility it is to provide medical care for patients admitted to the Grace hospital. They have largely replaced family practitioners in the provision of hospital care and this system was fully implemented and functioning by December 1999. As these physicians are only responsible for the care and management of patients within the hospital system, the hope is to increase efficiencies in admission, treatment and discharge. However, given the large proportion of non-acute days for both long- and short-stay patients at the Grace and Concordia hospitals, a system of concurrent utilization review of medical patients may assist these institutions in identifying, managing and thereby reducing the numbers of non-acute patients in these institutions.

4.3 Flu

Menec et al. (1999), based on an earlier MCHPE report, put forth a series of recommendations that may aid in the alleviation of high-pressure periods on Winnipeg hospitals.[11] Given the results of this study (i.e., 30% of patient days spent in hospital during a time of hospital overcrowding did not require an acute care setting), these recommendations are all the more meaningful. Menec et al. (1999) recommended that Winnipeg hospitals undertake a process of concurrent utilization review for medical patients

[11] Menec based these recommendations on previous MCHPE research using the InterQual™ assessment tool, which demonstrated that a significant proportion of medical patients in acute care hospitals did not require acute care services and could be treated in alternative settings (DeCoster et al., 1996).

on admission to and after a certain number of days in hospital. According to the data presented in this report, systematic reviews of medical patients presenting to hospital could prevent admission of patients who do not require the services of an acute care medical unit. Systematic reviews of patients in hospital during very high pressure periods (i.e., overcrowding with patients in hallways) could begin by the 10th hospital day, the point at which total acuity for patients drops below 75% (see Figure 15). Systematic utilization review coupled with efficient discharge planning has the potential to reduce the numbers of non-acute patients in hospital during a high-pressure period.

4.4 Long-Stay Patients

Analysis of the factors contributing to long-stays in hospital was enhanced through the use of the InterQual™ criteria because we were able to isolate and examine non-acute days. While it is important to understand the factors contributing to acute days in hospital, it is vital to identify factors which keep non-acute patients in acute care beds considering the pressures upon the acute bed system. We identified that, for a random group of long-stay patients, 60% of days spent in hospital were non-acute. Our study group included individuals of varying functional capacity prior to admission. In other words, our study group was not over-represented by patients with low functional abilities for whom placement might be more challenging.

Fifty-two per cent (52%) of the non-acute days spent in hospital by this study group were spent waiting for panelling and placement. Recall that an alternate level of care was assigned when there were notes in the patient's record indicating that the panelling process had begun. Therefore in calculating the percentage of days spent waiting for panelling and placement, we included only those days in hospital which followed a note in the patient record indicating that the panel process had begun (e.g., physician forms had been completed and submitted), or that the patient had been accepted at panel. An additional 5% of non-acute days were spent awaiting home care services to be arranged. Improvements to discharge procedures specific to Personal Care Homes and home care has the potential to significantly decrease the number of non-acute days spent in acute care settings. Another interesting finding is that

9% of non-acute days spent in hospital by long-stay patients were determined to be due to in-hospital factors, such as delays in response to consults and awaiting diagnostic testing and treatments. It is clear that more efficient discharge mechanisms and changes to the current waiting system for diagnostic testing would reduce the numbers of days spent in hospital by both short- and long-stay patients.

4.5 InterQual™ Assessment Tool

Criticism has been levelled against utilization review tools such as InterQual™ claiming that they are of limited utility in the face of real-life medical scenarios. In other words, standardized rule-based assessment tools are not able to incorporate the myriad of possible medical situations that clinicians frequently encounter. The implication of such criticisms is that care will be denied or considered inappropriate when criteria rules are not met, even if the patient is unstable and in need of medical care. While it is true that the InterQual™ criteria cannot account for every imaginable medical event, there is flexibility built into the use of the tool that does incorporate deviations from "standard" cases. InterQual™ is very clear that their criteria are to be used as *screening guidelines* in the assessment of appropriateness of care provision and not for *determination* of the level or type of care to be provided. InterQual™ criteria were developed for concurrent reviews of patient status, and decisions regarding care provision can pass through three levels of review. The first review level is completed by a non-physician. If there is a discrepancy between the outcome of the review and the patient's care plan, the case proceeds to the second level review, a medical review, which is completed by a physician who applies her/his clinical knowledge to the situation. If this physician disagrees with the care plan, a third review is undertaken usually with a medical director or specialist. At the levels of the two medical reviews, physicians can indicate why the patient is required to remain in hospital even though s/he does not meet the criteria indicating that an acute care setting is warranted. Possible reasons include: hospitalization is clinically necessary; hospitalization is not clinically necessary, however social factors or distance from home necessitate a longer stay; alternate services are not available; and other reasons.

Completing a retrospective review negated the possibility of performing second and third level medical reviews. However, abstractors had the advantage of reading a day or two ahead in a patient's medical record if the patient was clearly not stable but for some reason did not meet the criteria indicating an acute setting was warranted on that day. A fictitious example will illustrate the point.[12] An elderly man is admitted to hospital with an upper Gastrointestinal (GI) bleed, and a history of chronic obstructive pulmonary disease (COPD) and congestive heart failure (CHF). This individual is given blood products on days one and two of the hospitalization in addition to oxygen by nasal cannula and an intravenous solution running at 75 ml/hr. On the third hospital day the GI bleeding is controlled, his IV is placed on a saline lock, he is tolerating fluids well, his blood pressure and heart rate are stable, oxygen saturation is within normal limits and his hematocrit is greater than 25%. This patient meets all the discharge criteria from the acute care setting. However, the patient is weak and clearly not able to manage at home alone. This individual did not meet the criteria for subacute either because he was not receiving any services on this day. In such a case the abstractors used their clinical judgement in addition to notes in the medical record to decide on the level of care for the day. Upon reading the events further ahead in the chart, the abstractors determined that the patient had a recurrent GI bleed on days four and six. Although the patient was not receiving any services on day three of his hospitalization which would indicate he warranted an acute care placement, he was clearly at risk for acute exacerbation. In such a case, the abstractors would indicate that the patient did not meet the discharge criteria and that particular day would be classified as an acute day. Thus, the abstractors used their clinical judgement and applied a form of "medical review" in cases where the patient was not receiving services but also was not stable enough for discharge or transfer. In general, the abstractors were creative in the application of the criteria and used clinical judgement in cases that were not clear cut. The abstractors spent a great amount of time with some medical records searching for ways that patients could "make the criteria". Thus, we are confident that retrospective use of the InterQual™ criteria did not result in an underestimation of patient acuity.

[12] Privacy rules prevent the description of actual patient cases. However, examples provided in this document are accurate and based on the principal author's experience in application of the tool.

5.0 CONCLUSIONS

The total acuity of medical patients on admission to Winnipeg acute care hospitals in 1998/99 was high. However, substantial variation in admitting practices among the six institutions was evident indicating that there is room for improvement especially at two of the community hospitals. Utilization management efforts at the Grace and Concordia General Hospitals, especially over the three month high pressure period during the winter months, may help reduce the pressures on the acute care system and illustrate to the staff of these facilities how the numbers of non-acute admissions could be reduced.

Total acuity for days patients spent in acute care medical wards was not as high as total acuity on the day of admission; almost 45% of days on medical wards of Winnipeg acute care hospitals were spent by patients who did not require the services of an acute care setting. Substantial variation on acuity for subsequent days spent in hospital was found among the hospitals. In general, total acuity for subsequent days was greater at the teaching than the community hospitals, but even at the teaching hospitals 40% of days in acute care medical wards were spent by patients who did not require that level of care. Seven Oaks General hospital was the one community hospital which had acuity levels greater than the teaching hospitals. While a sampling bias may have contributed to the high levels of total acuity at Seven Oaks, the utilization management efforts at that facility may also have affected total acuity. The use of standardized care plans at the other Winnipeg acute care hospitals may help reduce the numbers of non-acute admissions to and days in hospital. Implementation of a concurrent utilization review process at the Concordia and Grace hospitals may also help these institutions decrease the large numbers of non-acute days that were found in 1998/99.

Patients who remain in hospital longer than 30 days, those we have identified as long-stay, contributed a substantial proportion of non-acute days. Since 1998/99, Manitoba Health and the WRHA have undertaken efforts to decrease the length of time long-stay patients remain in hospital waiting for placement to long-term care institutions. However, our review of data up through March 2000, suggests that long-stay medical patients still contribute more than a third of Winnipeg hospital days used by all medical patients. In 1998/99 we found that a substantial proportion of these days did not require an acute care medical setting. Concurrent

utilization review beginning by day 20 may identify patients who are ready for transfer or discharge and facilitate the discharge process.

Although the acuity level for short-stay patients was high, areas for improvement were identified. First, review of the management of diagnostic services should be a priority given the large proportion of non-acute days that were spent in hospital by patients awaiting tests. Second, a large proportion of non-acute days were also spent waiting for home care services to be arranged. As demand for home care services appears to be high, review of the referral process and the factors contributing to delays in arranging services should also be undertaken. We also determined that during a period of intense pressure on the hospital system, the week of January 2-8, 1999, practice patterns at Winnipeg hospitals appear to have remained essentially unchanged. A system of utilization review of admissions, particularly at the community hospitals, and of patients in all acute care hospitals who had been in hospital for more than 10 days during periods of high pressure would be useful for identifying patients who could potentially be discharged to lower levels of care. Utilization review coupled with improved discharge practices, achieved perhaps through changes in the way diagnostic testing and home care services are provided, has the potential to eliminate a substantial proportion of non-acute days spent in the acute care system.

The focus of this report was on practices in Winnipeg acute care hospitals over the 1998/99 fiscal year. However, there are many reasons to think the results remain relevant. For example, since changes have not been implemented on a system-wide basis in regard to all diagnostic testing procedures, it is likely that the proportion of days assessed as non-acute for short-stay cases has not changed. In addition, while the average number of days spent in hospital by long-stay medical patients has decreased since 1995/96, and the numbers of hospital days they used also decreased, the proportion of medical beds occupied by long-stay patients increased over the same time period. We found that in 1998/99 a substantial proportion of days spent in hospital by long-stay medical patients did not require an acute care setting. The proportion of non-acute patients in hospital will likely remain similar to 1998/99 levels until systematic efforts at utilization management are undertaken.

Utilization management efforts at Seven Oaks General Hospital (i.e., CareMaps) may have contributed to the high levels of acuity at that facility in 1998/99. Seven Oaks appears to operate at a much higher level of acuity than the other three community hospitals – Grace, Concordia, and Victoria. The Grace hospital in particular operates at a much lower level of acuity for both long-stay and short-stay patients. Systematic utilization management in the form of CareMaps and concurrent utilization review, coupled with increased efficiencies in discharge management, has the potential to significantly reduce non-acute days spent in these Winnipeg acute care hospitals.

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APPENDIX I: WINNIPEG REGIONAL HEALTH AUTHORITY (WRHA)

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APPENDIX II: ALTERNATE LEVEL OF CARE CATEGORIES

Category	Criteria/Definition
Residence	People who can go home
Outpatient Services	Non-acute patients who require tests and elective procedures that are provided by specialty physicians in an outpatient setting. Examples include: - Cardiology procedures - Neurological assessment - Endoscopic procedures - CT Scan - MRI
Medical Day Units	Ambulatory patients/clients who require medical services and nursing care but are clinically stable and do not require 24 hour care as an inpatient. Services provided include: - skin and wound care - infusion therapies - insertion and care of central lines - pre- and post-procedure care
Home Care	Persons who require support to remain in the community upon discharge from an acute care facility may be eligible for home care, based on the identified risk to the person's health and functional status. Where family and community cannot provide the supports, home care direct services will be identified as part of the plan. home care services include: - case management - nursing - occupational and physical therapy - personal care (activities of daily living) - household assistance - assessment and access to long-term care programs (adult day programs, supportive housing, companion care) home care programs include: - respiratory (for those who require oxygen and meet program criteria) - palliative care - ostomy - community IV
Palliative Care	• Hospital-based program for patients who are terminally ill and who cannot be cared for at home due to unavailable and/or unstable family or live-in support and may utilize: - skilled nursing care and other services such as IV analgesia or alimental support - social services and pastoral care - rooming-in facilities for family members • Hospice: Independent facility for terminally ill (e.g., Jocelyn House type set-up).

Category	Criteria/Definition
Rehabilitation	Patients who are not receiving an acute level of care but require 24-hour supervision and assessment by a team of rehab personnel or who are receiving a therapy program planned by rehab personnel which is delivered daily. The patient may then be expected to be discharged fully restored or transferred to a home-based program or to another level of accommodation (e.g., HSC Rehab, Riverview, Deer Lodge and other Extended Treatment Units.
Personal Care	Patients who require long term care in a 24 hour supervised setting, who can no longer be cared for at home and whose care needs could be met by admission to a long term care facility licensed as a Personal Care Home. Accessible through the PCH panelling process only.
Chronic Care	Patients who show little or no potential for rehabilitation, whose care needs cannot be met at home, and who require equipment, treatment or a level of professional supervision (e.g., nursing, medical, respiratory) not usually provided in a Personal Care Home. These individuals must be assessed as eligible by the chronic care panel.
Minimal Supervision Residence	• Patients who require non-skilled care and 24-hour accessibility to support and who cannot be cared for at home due to unavailable and/or unstable family or live-in support (e.g., Guest Home) • Patients who have special housing needs (e.g., disability, seniors housing)
Other	"Other" days should be assigned to: - patients who require respite care to relieve the caregiver - patients who require room-in centres for alcohol and drug dependencies - patients who require protection/crisis intervention (e.g., safe homes, half-way houses, suicide treatment centres)

DEFINITIONS OF TERMS USED IN THIS REPORT

Acute, Acuity: Patients were assessed as requiring the services of an acute care hospital if they received particular services as determined through InterQual's 1999 ISD Clinical Decision Support Criteria (see definition).

Admission Review: Admission was defined as the first 24 hours of the hospitalization. Each patient record was reviewed to determine if the patient received, within the first 24 hours of hospitalization, the services necessary to require an acute care hospital.

Alternate Level of Care (ALC): When a patient did not meet the InterQual criteria indicating that an acute care hospital was necessary for their care needs, the abstractors assigned a level of care that would have been more appropriate to the patient's needs, had it been available. There were 10 possible alternate levels of care as follows (see also Appendix II for full definitions):

1. **Residence**: People who could have been discharged home.
2. **Outpatient Services**: Non-acute patients who require tests and elective procedures that are provided by specialty physicians in an outpatient setting.
3. **Medical Day Units**: Ambulatory patients/clients who require medical services and nursing care but are clinically stable and do not require 24 hour care as an inpatient.
4. **Home Care**: Persons who require support to remain in the community upon discharge from an acute care facility may be eligible for home care, based on the identified risk to the person's health and functional status. Where family and community cannot provide the supports, home care direct services will be identified as part of the plan.
5. **Palliative Care**: Hospital-based and hospice setting providing care for the terminally ill.
6. **Rehabilitation**: Patients who are not receiving an acute level of care but require 24-hour supervision and assessment by a team of rehab personnel or who are receiving a therapy program planned by rehab personnel which is delivered daily.

7. **Personal Care Home (PCH)**: Patients who require long-term care in a 24-hour supervised setting, who can no longer be cared for at home and whose care needs could be met by admission to a long-term care facility licensed as a Personal Care Home. Accessible through the PCH panelling process only.
8. **Chronic Care**: Patients who show little or no potential for rehabilitation, whose care needs cannot be met at home, and who require equipment, treatment or a level of professional supervision (e.g., nursing, medical, respiratory) not usually provided in a PCH. These individuals must be assessed as eligible by the chronic care panel.
9. **Minimal Supervision Residence**: Patients who require non-skilled care and 24-hour accessibility to support and who cannot be cared for at home due to unavailable and/or unstable family or live-in support.
10. **Other**: Other days were assigned to patients who require respite care to relieve the caregiver; patients who require room-in centres for alcohol and drug dependencies; and patients who require protection/crisis intervention.

Confidence Interval: A range of values within which we can have 95% confidence that the true value for the population lies. Because we are working with a sample, we can never state with absolute certainty that the value for the sample is the same as the value for the population. Statistical tests measure a range between which we can be 95% confident that the value for the population lies.

InterQual ISD Clinical Decision Support Criteria: A set of clinical statements that help determine the appropriateness of medical hospitalizations. The criteria are used to assess the appropriateness of admission to, continued care at and discharge from hospital. These three aspects are assessed through the construct **ISD**: **Intensity** (of Service), **Severity** (of Illness) and **Discharge** (Screens). These criteria are based on best practices and medical research as reported in the literature; they have been externally validated, are updated continually and published annually to reflect changes in medical practice.

Length of Stay: The length of stay was calculated by subtracting the discharge date from the admission date. The date of discharge was not counted in the length of stay. Patients who

were discharged on the day of admission were assigned a length of stay of one day. When a patient was transferred to a designated extended treatment bed in the same facility, an artificial discharge date was created on the date of transfer.

Long-Term Care Facility: A combination of the following three ALC categories: Chronic Care, Personal Care Home, and Rehabilitation.

Observation: A level of care for patients who did not meet the acute or subacute criteria and for whom: (1) stabilization and discharge was expected in less than 24 hours; or (2) treatment was needed for greater than 6 hours; or (3) clinical diagnosis was unclear and could be determined in less than 24 hours.

Power: The probability of detecting a genuine difference. In the context of this project, when we state that the difference in the level of acuity between teaching and community hospitals is statistically equivalent (i.e., there is no statistical difference), then we are 80% confident that we have not made a mistake by missing a real difference.

Primary Service Codes: Medical patients were defined according to primary service codes, which are categories of medical practice specialties (e.g., internal medicine, cardiology). Primary service codes refer to the service under which the patient was treated for the greatest length of time. The following services were used to generate the sample for this project: Family Medicine (01), Internal Medicine (10), Allergy (11), Cardiology (12), Dermatology (13), Endocrinology (14), Gastroenterology (15), Nephrology (16), Neurology (17), Respirology (18), Rheumatology (19), Oncology (59), and Haematology (66).

Subacute: A level of care for patients who require a slower paced recovery following medical treatment or convalescence following an acute medical episode. This level of care is provided to patients who are at risk for an acute exacerbation and are not stable enough for transfer to an alternate care setting. Subacute care is appropriately provided in Winnipeg acute care hospitals.

Subsequent Day: Each day after the day of admission was termed a “subsequent day”. Subsequent days were assessed until the patient no longer met the acute, subacute or observation criteria.

Total Acute/Total Acuity: Combination of the proportions of days assessed as acute and subacute.

Utilization Management: Actions to increase the efficiency or the effectiveness with which hospital services are provided.

Utilization Review: Process through which the appropriateness of hospital use is assessed.

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